POSTERS' SESSION

POSTERS' SESSION PS01
CARDIOVASCULAR RISK FACTORS

PP.01.01 THE PREVALENCE OF CARDIOVASCULAR RISK FACTORS IN THE GENERAL KAZAK ADULT POPULATION AGED 30 YEARS IN XINJIANG FUKANG, CHINA

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Objective: The objective of this study was to examine the prevalence of cardiovascular risk factors in Kazak adult population of Xinjiang pasture area and to provide the statistical data for management and controlling cardiovascular disease in this ethnic population.

Design and method: A population-based, cross-sectional survey was completed in the pasture area (Fukang area) of Northern Xinjiang in 2008. The total 1060 (male 464 and female 596) permanent residents aged over 30 years were involved, of whom 86.5% were herdsmen or peasants. Several risk factors were considered, including smoking, alcohol drinking, obesity (BMI>=30kg/m2), hypertension, diabetes, dyslipidemia, hyperuricemia.

Results: The rates of smoking and alcohol drinking were 22.1% and 19.7% respectively, of which the male smoking and drinking rate were 50.2% and 44%. The prevalence of overweight, obesity, hypertension, diabetes, dyslipidemia and hyperuricemia were 43%, 19.0%, 50.5%, 4.6%, 27.7% and 1.1%, respectively. The proportion of subjects without risk factors was only 5.4%, and most of subjects were with two to three risk factors. Among 73 patients with cardiovascular or cerebrovascular disease were higher detected rate for smoking, drinking, obesity, hypertension and diabetes than the others, except dyslipidemia and hyperuricemia.

Conclusions: The present results indicate that the prevalence of hypertension, dyslipidemia, smoking, drinking and obesity, in Xinjiang Kazak population are higher and a large proportion of kazakans has more than one risk factor. The data suggest that effective preventive strategies for cardiovascular risk factors in Kazak minority population are necessary and urge.It is emphasized that to advocate a healthy lifestyle for Kazak people, especially controlling weight, limiting alcohol intaking and controlling high blood pressure.

PP.01.02 PREVALENCE OF BEHAVIORAL RISK FACTORS OF ARTERIAL HYPERTENSION IN ADULT POPULATION OF THE REPUBLIC OF ARMENIA

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Objective: Arterial hypertension (AH) are among most topical problems faced by healthcare system of Armenia, which is showing a yearly rejuvenation trend. To reveal the reason behind high prevalence of AH the prevalence of behavioral risk factors (tobacco use, alcohol use, physical activity and obesity) in adult population of the country was studied.

Design and method: The study was carried out within the framework of the Health System Performance Assessment conducted in 2012. Data of a representational survey and examinations (including the capital city of Yerevan and ten regions of Armenia) were analyzed. The survey was based on stratified cluster self-weighted sampling method. Standard survey tools were developed and 1600 respondents were involved (34% in Yerevan, 31,8% in urban settings and 34,2% in rural ones. The fact of being overweight was defined through body mass index (BMI). Criteria for being overweight was BMI 25-30 kg/m2 and obesity – BMI more than 30 kg/m2.

Results: Prevalence of tobacco use among population of Armenia is 26%, with males comprising 55,4%. The survey suggests that the rate of tobacco consumption increases with the age (the highest rates were recorded among the 20-29 and 30-39 age groups (56,4% and 76% correspondingly). Compared with those of 15-19 years of age (7,4%) the prevalence of smoking in above mentioned age groups is nearly 10 times higher. The prevalence of consumption of the equivalent of 20 g or more of pure alcohol on daily basis in male population is 11,2% and in female – 0,5%. The prevalence of physical inactivity comprises 50% and prevails among women (53,7% versus men who make up 47,7%). The prevalence of being overweight accounts for 57%, where female respondents share 62,8% and males 56,2%.

Conclusions: The data evidence about high prevalence of behavioral risk factors and unhealthy lifestyle of the population, which inevitably implies high morbidity and mortality from AH.

PP.01.03 DIFFERENCE BETWEEN PEOPLE WITH AND WITHOUT PRE-HYPERTENSION IN LAB RESULTS. DATA FROM THE MACAO HEALTH SURVEY (MHS) 2006

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Objective: Pre-hypertension (pre-HBP) was proposed by the seventh report of the Joint National Committee (JNC 7) published in 2003. It is commonly related to obesity and other metabolic problems. This report is trying to explore the blood sample differences between people with and without prehypertension based on the data from a random household health survey in Macao (MHS2006).

Design and method: A total of 3121 Macao residents aged 18 and above were recruited. After excluding 867 missing or who had hypertension, total 2254 subjects were used for the analysis. There are three ways for data collection: health assessment, blood sample measurement, and face to face questionnaire interview. Blood pressures were measured twice for each participant in 10 to 15 minutes interval. Pre-hypertension was defined by SBP between 120 to <140, or DBS between 85 to <90. All participants were required fasting for at least 8 hours before the blood sample was collected. The blood sample was kept in a temperature below 4 degree Celsius for less than 2 hours before it was tested. All the testing results were automatically recorded from the testing machine. Data analysis was conducted by IBM-SPSS version 20.

Results: The people with Pre-HBP were significantly higher in the mean values of age, BMI, Creatinine, Uric Acid, Blood Urea Nitrogen, Total Cholesterol, Alanine Aminotransferase, Glucose, Low Density Lipoprotein, Aspartate Aminotransferase, Lactate Dehydrogenase, Triglyceride, Ferritin, Red Blood Cells, Hemoglobin, Hematocrit and White blood cell but low mean value in High Density Lipoprotein compared with people without prehypertension. There were more males in this group. In a logistic regression model using pre-HBP status as dependent variable and age, sex and all lab results significantly related to pre-hypertension above as independent variables, we found age, BMI, Uric Acid, Glucose, Lactate Dehydrogenase, Triglyceride and Hematocrit were significantly related to pre-HBP.

Conclusions: In the Macau adults, pre-hypertension was found related to the blood index related to glucose and lipid metabolism. The results implied that prehypertensive status could also relate to pre-diabetic and pre-dislipidemia status.

PP.01.04 DEPRESSION MORBIDITY IN HYPERTENSIVE PATIENTS WITH CARDIO-VASCULAR RISK FACTORS

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Objective: Depression is an important factor that accompanies cardio-vascular morbidity and may influence patients' wellbeing, outcome and success of treatment. On the other hand, cardio-vascular risk factors and diseases may predispose to development of depression and its progression.

Design and method: 931 treated hypertensive patients were included during the first visit: 347 (37.27%) males and 584 (62.73%) females. After a mean follow-up of 12 months (6-20 months) 263 (28.25% of the initially recruited patients) went through a second (follow-up) evaluation: 178 females (30.48% of all recruited females) and 85 males (24.49% of all recruited males). Strict inclusion and exclusion criteria were followed.

The mean age was 65.90±10.00 years. We gathered complete medical history, physical examination, office-, home- blood pressure measurement and ambulatory blood pressure monitoring, basic laboratory screening, echocardiography. Depression was assessed with Geriatric Depression Scale. The 4-Instrumental Activities of Daily Living and SCORE were also used. The statistical analysis was done with SPSS 19.

Results: 39 (4.19%) of the patients had depression. 10(25.64%) of the patients with depression had controlled to target values home-measured blood pressure compared to 318(35.69%) patients without depression. 29 (74.36%) of the patients with depression were with suboptimal home-measured blood pressure values as opposed to 573 (64.31%) in the group without depression. 588 (71.44%) of the patients were with high and very high SCORE result (for high-risk countries).

Conclusions: Depression in hypertensive patients with concomitant cardiovascular risk factors is a risk factor for suboptimal home-measured blood pressure control. On the other hand – uncontrolled hypertension might influence depression development. It is important to detect and treat both depression and uncontrolled hypertension.

PP.01.05 SUBCLINICAL ORGAN DAMAGE AND SEX DIFFERENCES IN CARDIOVASCULAR RISK STRATIFICATION IN PATIENTS WITH OR WITHOUT HYPERTENSION

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Objective: Assessment of subclinical organ damage and sex differences in cardiovascular risk stratification in patients with or without hypertension.

Design and method: We divided 100 patients in two groups: A: HT+: patients with arterial hypertension (25 women and 25 men); B: HT-: patients without arterial hypertension (25 women and 25 men). The average age of them: A: 56 yrs and B: 53 yrs (*p<0,05).
Ankle-brachial index (ABI), pulse wave velocity (PWV) and carotid intima-media thickness (IMT) were evaluated. We assessed cardiovascular risk according to: SCORE and Framingham scales.
Statistical calculations were performed in the StatSoft Statistica 10. For comparison of variables with a normal distribution and equal variances, we used the t-test for unrelated samples.

Results: We revealed following results in both groups: HT+ and HT- respectively [*for p<= 0,05; **for p<0,001; NS- negligible statistically].
In the group with hypertension women were characterized by a lower IMT and PWV than men. The cardiovascular risk according to risk SCORE and Framingham scales, in men was significantly higher than in women in both groups.

Conclusions: 1. There was no difference in values of: ABI, PWV and IMT between the sexes in normotensive patients.
2. Women with hypertension were characterized by a lower IMT and PWV than men.
3. The cardiovascular risk according to: SCORE and Framingham scales was higher in men than in women regardless of the presence or absence of hypertension.

PP.01.06 VITAMIN D AND GLYCAEMIC CONTROL IN PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: Vitamin D deficiency can affect glucose homeostasis by increasing insulin resistance and by reducing its secretion. Our aim was to study the levels of serum vitamin D [25(OH)D] in patients with essential hypertension (EH) and its relationship to the presence and degree of control of type 2 DM and metabolic syndrome (MS).

Design and method: Observational, cross-sectional study in patients with EH. In all of them the determination of HbA1c (HPLC, IFCC calibration, Menarini) and serum 25(OH)D (ECLIA, Roche Diagnostics) was performed. MS was diagnosed according to ATP-III criteria, excluding patients with DM.

Abstract PP.01.05 – Table.

Parameter [unit]	HT+		Statistical significance
	A Women (SD) n=25	B Men (SD) n=25	
ABI	0,94 (0,16)	1,01 (0,14)	NS
IMT [mm]	0,73 (0,15)	0,81 (0,17)	*
PWV [m/s]	10,68 (2,29)	12,54 (3,01)	*
SCORE	3,16 (2,49)	7,00 (5,10)	**
Framingham	6,84 (5,44)	12,24 (6,59)	**
Parameter [unit]	**HT-**		**Statistical significance**
	A Women (SD) n=25	B Men (SD) n=25	
ABI	1,09 (0,14)	1,07 (0,11)	NS
IMT	0,64 (0,13)	0,62 (0,15)	NS
PWV	10,78 (2,10)	11,58 (2,29)	NS
SCORE	2,04 (1,54)	3,80 (2,33)	*
Framingham	4,12 (3,17)	6,40 (2,72)	*

Results: We included a total of 908 patients (51.4% women), mean age 62±12 years. 265 (29%) had a diagnosis of DM and 254 (39.5%) of 643 patients without DM complied with MS criteria. Mean levels of 25(OH)D were 30±12 ng/ ml and mean HbA1c was 5.9±0.8% (6.7±1% in patients with DM). Levels of 25(OH)D were lower in presence of MS than without it (28.9±11 ng/ml vs. 31.8±12 ng/ml, p=0.004). The levels of 25(OH)D were also lower in patients with DM than those without it (27.6±12 ng/ml vs. 30.7±11 ng/ml, p=0.025). In the total of the sample, the levels of 25(OH)D showed a negative correlation with HbA1c (r= -0.083, p=0.013), glucose (r= -0.096, p=0.004), HOMA index (r= -0.127, p=0.002), BMI (r= -0.105, p=0.002), waist circumference (r= -0.099, p=0.005) and eGFR-MDRD (r= -0.104, p=0.002). In multivariate analysis, adjusted for age, the only independent determinant of serum 25(OH)D was HbA1c (B= -2.23, 95% CI: -3.63 to -0.83, p=0.002), with the rest of the studied variables (sex, BMI, waist circumference, HOMA-index, eGFR-MDRD, SBP, DBP and the number of anti-hypertensive drugs treatment) being excluded in the final model.

Conclusions: In our sample, both patients with DM and with MS diagnosis had vitamin D levels decreased compared to controls without these conditions. Vitamin D levels were inversely related to HbA1c. It would be necessary to investigate if supplementation with vitamin D could improve the glycaemic profile of hypertensive patients with DM or MS.

PP.01.07 DIFFERENCES IN 24-HOURS AMBULATORY BLOOD PRESSURE READINGS BETWEEN HYPERTENSIVES WITH AND WITHOUT PRIMARY HYPERPARATHYROIDISM. A CASE CONTROL STUDY

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Objective: High parathyroid hormone (PTH), even within normal reference ranges, increase the risk of cardiovascular morbidity. Clinical studies linked PTH with arterial dysfunction, vascular stiffening and arterial hypertension. We hypothesized that hypertensive patients with primary hyperparathyroidism (pHPT) show increased levels of 24-hours ambulatory blood pressure monitoring (ABPM) readings when compared to hypertensive patients without PTH excess.

Design and method: We enrolled hypertensive pHPT patients who participated in the "Effect of eplerenone on parathyroid hormone levels in patients with primary hyperparathyroidism" (EPATH) study and matched them for age, sex and body mass index to hypertensive participants of the Styrian Hypertension Trial. In both studies collection of data was performed in the similar manner: patients underwent blood sampling in the morning after an overnight fast and ten minutes in the sitting position. Laboratory parameters were determined immediately at the same in-hospital laboratories. ABPM was started the same day using either the Spacelabs 90207 (Spacelabs Healthcare, Snoqualmie, USA) or Mobil-O-Graph (I.E.M. Healthcare, Stolberg, Germany) device Nighttime ABPM (1am to 6am) was recorded 2 times per hour. Daytime ABPM (6am to 10pm) was recorded 3 times per hour.

Results: ABPM readings and covariates considered in our analysis were available for 39 hypertensive pHPT patients (mean age 68 +/- 9 years, 69% females). Compared to matched hypertensive controls without pHPT, patients with pHPT had higher levels of mean 24-hours (126/77 mmHg vs. 125/73 mmHg), daytime (128/79 mmHg vs. 127/75 mmHg) and nighttime (121/70 mmHg vs. 114/64 mmHg) bp readings, whereas statistical significance was only reached for diastolic readings ($p<0.05$, respectively). In multivariate analyses of covariance adjusted for bp modulating confounders, 25-hydroxy-vitamin D3 and estimated glomerular filtration rate (CKD-EPI), pHPT patients showed significantly higher diastolic ABPM readings (mean 24-hours: p=0.011; daytime: p=0.022; nighttime: p=0.003).

Conclusions: Our study shows that excessive elevation of PTH in the setting of pHPT is associated with increased diastolic blood pressure levels. This finding suggests that the increased cardiovascular risk associated with elevated PTH might be partially explained by its impact on arterial blood pressure.

PP.01.08 CARDIOVASCULAR STATUS OF HYPERTENSIVE PATIENTS WITH ELEVATED FASTING GLUCOSE

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Objective: Examination of characteristic and the frequency of the main cardiovascular risk factors in hypertensive patients with IF G.

Design and method: The study population included 135 patients with arterial hypertension (93 men, average age 58.44 ± 10.38 years.). The data from the survey, examination and laboratory blood tests were analyzed and compared between patients of group hypertensive patients with IF G and control groups you've done hypertensive patients with normal fasting glucose heart (NF G - normal fasting glucose). Elevated fasting glucose was defined by fasting plasma glucose of 6.1 to 6.9 mmol / L in the absence of previously diagnosed diabetes.

Results: Compared with hypertensive patients with NF G, hypertensive patients with IF G were older and had significantly higher body mass index, waist circumference, blood glucose values together, triglycerides ($p < 0.001$ for all) and significantly lower levels of HDL cholesterol ($p <0.01$). Average values together systolic and diastolic blood pressure were higher but not with statistical significance in hypertensive patients with IF G. The largest number of hypertensive patients with NF G (67.74%) had low to easily elevated risk of developing type 2 diabetes over the next 10 years. In contrast, only 17.07% of hypertensive patients with IF G had a same degree of risk, and 63.64% of subjects this group had a high or very high risk of developing type 2 diabetes.

Conclusions: The results show that the hypertensive patient with IF G significantly more burdened by the presence of the major cardiovascular risk factors. These patients are particularly important target groups for intensive treatment of their increased cardiovascular risk.

PP.01.09 A SIX QUESTION SCREEN TO IDENTIFY PERSONS AT RISK FOR DEVELOPING CARDIOVASCULAR DISEASES

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Objective: European guidelines on primary prevention of cardiovascular diseases (CVD) recommend the use of SCORE risk charts, which include blood pressure and serum cholesterol as risk parameters. However, when applying SCORE to the general population, screening of many individuals is required to identify one subject at increased CVD risk. To facilitate cost-effective screening, we aimed to construct a web-based screening tool to identify subjects at increased CVD risk exclusively using non-invasive parameters.

Design and method: We used data of Dutch employees from 25 organisations participating in a health risk assessment between August 2007 and January 2013. Participants were not being treated for CVD. Backward multivariate logistic regression analysis was use to predict the 10-year risk of fatal CVD of >=5% based on the SCORE formula.

Results: Because there were only eight women with high CVD risk, we only used data of 6,189 male participants for the development and validation of the screening tool. Age, tobacco use, history of hypertension, alcohol consumption, BMI, and waist circumference were independent predictors of high CVD risk in men. Ten-fold cross-validation resulted in an area under the curve of 0.95 (SE 0.01, 95% confidence interval 0.94-0.96). A cut-off score >=45 yielded the best performance.

Conclusions: With a simple six-item questionnaire we were able to accurately identify subjects at high CVD risk in a population of working men. Our results provide an evidence-based stepwise approach for the use of SCORE as an instrument to identify subjects at increased CVD risk.

PP.01.10 DYSLIPIDEMIA AGGRAVATES QUALITY OF LIFE IN HYPERTENSIVE PATIENTS

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Objective: Essential hypertension (EH) has a negative impact on health-related quality of life (H-rQoL) while dyslipidemia very often accompanies the hypertensive sequelae. We assesed the hypothesis that the combination of EH and dyslipidemia may have an additive effect on H-rQoL.

Design and method: We studied 145 subjects with newly diagnosed stage I-II untreated EH (aged 56±7 years, 47=dyslipidemic, office blood pressure=156/92 mmHg). Venous sampling was performed for estimation of lipidemic profile. The validated Greek version of Short Form 36 (SF-36) General Health Survey questionnaire was administered. The 8 subscales of SF-36 were further grouped into two summary scales: the physical component summary scale (PCS) and the mental component summary scale (MCS). Non-parametric Mann-Whitney and Spearmann rho tests were performed.

Results: Dyslipidemic hypertensives demonstrated significantly lower scores in all SF-36 dimensions compared to non dyslipidemic (Table). There was a negative correlation between scores in general health and the total SF-36 score with serum triglycerides level (r= -0.284 p= 0.009, r = -0.287 p= 0.014, respectively).

Table: Comparison of SF-36

	Dyslipidemia (n=47)	No Dyslipidemia (n=98)	P-Value
Physical functioning	45.12	51.76	0.25
Bodily pain	45.08	50.82	0.29
General health	40.29	54.46	0.02
Vitality	47.36	49.36	0.67
Social functioning	46.28	50.04	0.48
Mental health	48.37	50.34	0.75
PCS	43.68	51.28	0.17
MCS	47.54	50.62	0.44
Total SF-36 Score	46.18	51.23	0.34

Conclusions: Dyslipidemia exerts an additive detrimental effect on quality of life in the setting of essential hypertension. Whether the above mentioned association contributes to the high cardiovascular risk observed in those patients remains to be determined in future studies.

PP.01.11 AUGMENTED SALT INTAKE MAY EXPLAIN THE EXCESSIVE CARDIOVASCULAR BURDEN OF HYPERTENSIVE IMMIGRANTS

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Objective: Much of the variance in hypertension-related sequelae across ethnic groups is highly related to differences in socioeconomic conditions, nutrition, attitudes and deficits in accurate health related data. East european countries exhibit higher morbidity and mortality from coronary disease than tha rest of Europe.We assessed the hypothesis that target organ damage in this vulnerable population may be different than the one of the native hypertensive patients.

Design and method: The study population consisted of 128 hypertensives: 67 immigrants from Eastern Europe to Greece and 61 native inhabitants, matched for age, gender and office BP. Demographic characteristics were recorded, while echocardiography was performed and arterial stiffness was estimated by measuring carotid-femoral pulse wave velocity in all subjects. In addition, glomerular filtration rate (GFR) was evaluated and fundoscopy was performed in all study subjects.

Results: Although immigrants exhibited lower body mass index (BMI) compared to natives, they had significantly increased arterial stiffness ($p=0.003$), increased left atrial volume index ($p<0.05$) and left ventricular mass index ($p<0.05$), worse left ventricular diastolic dysfunction ($p<0.05$), elevated levels of serum cholesterol ($p=0.046$) and sodium urinary excretion ($p<0.05$) and considerably lower GFR ($p<0.05$). Finally, univariate analysis showed a positive correlation between LVMI and LAVI ($r = 0.43$, $p<0.0001$), and a negative correlation between LAVI and GFR ($r = -0.45$, $p=0.001$) as well as between PWV and GFR ($r = -0.538$, $p<0.0001$) in both groups.

Conclusions: Hypertensive immigrants appear to have lower BMI compared to native Greeks, but they are characterized by unfavourable lipidemic profile, increased aortic stiffness, structural and functional atrio-ventricular maladaptations and marked acceleration of the renal damage. Evidence indicate that dietary peculiarities like augmented salt intake might partially explain the increased target organ damage burden in this group.

PP.01.12 METABOLIC SYNDROME AND DIABETES MELLITUS INDEPENDENTLY PREDICT ADVERSE EVENTS IN ESSENTIAL HYPERTENSIVE SUBJECTS

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Objective: Metabolic syndrome (MS) is associated with increased risk for atherosclerotic cardiovascular disease, whereas its prognostic role in hypertension remains controversial. The aim of the present study was to assess the prognostic role of MS and Diabetes Mellitus (DM) for the incidence of adverse events in a cohort of essential hypertensives.

Design and method: We followed up for a median period of 40 months (IQR 28-60 months) 2176 essential hypertensives free of cardiovascular disease (mean age 57.6 years, 1010 males, office blood pressure (BP) = 143.4/89.2 mmHg). All subjects had at least one annual visit and at baseline underwent complete echocardiographic study for estimation of left ventricular mass index (LVMI) and blood sampling for assessment of metabolic profile. MS was defined according to the updated NCEP III criteria. Endpoint of interest was the incidence of stroke, coronary artery disease (CAD) and their composite.

Results: MS was present at baseline in 819 hypertensives (37.6%) and DM in 305 (14%). The incidence of the composite end-point was 3.1% (20 patients with stroke, 50 with CAD, 2 with both) over the whole follow-up period. Patients with MS compared to those without MS or DM exhibited greater office systolic BP (by 2.8 mmHg, $p=0.002$), waist circumference (by 9.9 cm, $p<0.001$), body mass index (by 3.1 kg/m², $p<0.001$) and LVMI (by 2.7 g/m², $p=0.029$) while did not differ regarding age and gender. Patients with DM compared to those without DM or MS were older (by 4 years, $p<0.001$) and exhibited greater office pulse pressure (by 4.2 mmHg, $p<0.001$), waist circumference (by 8.5 cm, $p<0.001$), body mass index (by 2.8 kg/m², $p<0.001$) and LVMI (by 4.4 g/m², $p=0.006$). Incidence of the composite end-point was significantly higher in patients with DM (5.9% vs. 1.9%, log rank $p<0.001$) and MS (3.7% vs. 1.9%, log rank $p=0.024$) compared to those without DM or MS, as well as in patients with DM compared to those with MS (log rank $p=0.018$).

Conclusions: Metabolic syndrome and diabetes mellitus independently predict adverse events in essential hypertensive subjects.

PP.01.13 PREVALENCE OF ARTERIAL HYPERTENSION AND OTHER CARDIOVASCULAR RISK FACTORS IN A ROMA ETHNIC COMMUNITY. DATA FROM THE ROMA STUDY

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Objective: As a continuation of our previous studies on the Roma population we aimed to assess the prevalence of arterial hypertension (HTN) and major cardiovascular (CV) risk factors in the adult Roma population.

Design and method: Four hundred and six adult subjects (age range 18-83) from the urban Roma community regardless of their medical history were included in 2013. For each subject we recorded demographic and anthropometric data, level of education, presence of major CV risk factors, blood pressure measurements using adequate cuff size, ankle-brachial index (ABI), pulse wave velocity (PWV), presence of left ventricular hypertrophy (LVH) on echocardiographic studies, complete lipid profile, fasting glycemia, uric acid and serum creatinine. Visceral obesity was defined as waist circumference >88 cm in females, >102 cm in males. Glomerular filtration rate was estimated using CKD-EPI study equation. Diabetes was considered as fasting glycemia >126 mg/dl and peripheral artery disease as ABI <0.9 in either limb.

Results: For results see table.

Parameters	Females	Males	p (F vs M)	Total
Gender, % (No)	63.05% (256)	36.94% (150)	0.01	100% (406)
Average age (years) ±SD	43 ±15.48	44 ±15.08	ns	43 ±15
Level of education (no years in school) ±SD	7.97 ±3.44	9.04 ±3.09	ns	8.37 ±3.35
Smoking, %	51.17%	54.66%	ns	52.46%
Arterial hypertension, %	35.15%	34.66%	ns	34.97%
Physical inactivity, %	59.37%	50.66%	0.04	56.15%
Visceral obesity, %	49.6%	36.66%	0.01	44.82%
Dyslipidemia, %	75.39%	79.33%	ns	76.6%
Hyperuricemia, %	11.32%	18%	0.03	13.79%
Diabetes mellitus, %	12.89%	15.33%	ns	13.79%
Peripheral artery disease, %	28.12%	34%	ns	30.29%
Left ventricle hypertrophy, %	21.84%	17.33%	ns	19.95%
Pulse wave velocity < 10m/s, %	32.42%	31.33%	ns	32.01%
Chronic Kidney Disease, % eGFR<60ml/min/1.73m2	2.73%	1.33%	ns	2.21%

Conclusions: In this study group, predominantly composed of middle aged women, the prevalence of major CV risk factors was impressive. More than half were physically inactive, which translated into half of subjects being obese, with visceral obesity observed significantly more frequently in females. Arterial hypertension was present in 35% of subjects. More than half were smokers, over two thirds were dyslipidemic and 14% had diabetes mellitus. Males were significantly more affected by hyperuricemia and peripheral artery disease.

PP.01.14 HIGH-DENSITY LIPOPROTEIN CHOLESTEROL, CORONARY ARTERY DISEASE, AND MORTALITY IN HYPERTENSIVE PATIENTS

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Objective: High-density (HDL) cholesterol is a strong predictor cardiovascular mortality. The work aimed to investigate his relationship with damage of target organs, morbidity and mortality of hypertension patients.

Design and method: We studied 107 participants (66 females, 41 males). They had a mean ± standard deviation age of 63.6 ± 8.7 years, body mass index of 29.04 ± 3.66 kg/m², and HDL cholesterol of 1.17 ± 0.27 mmol/l. Each participant underwent asymptomatic organ damage: 12-lead electrocardiogram examination, Two-dimensional and Doppler echocardiography, colour Doppler sonography of the carotid arteries, glomerular filtration rate (eGFR) and were prospectively followed for total and cardiovascular mortality, and disease over a median 6 years. High-density lipoprotein cholesterol: men <1.0 mmol/L (40 mg/dL), women <1.2 mmol/L (46 mg/dL), had 55 (51.4%) participant (I group) and 52 partitipants with normal range HDL (II group).
Results: A total from 8 (7.5%) participants died from cardiovascular disease, 4

by the patient in each group. Large CV event from I group had 20 participant (36.3%) while with normal HDL cholesterol (II group) 8 (p<0.02). In first group 5 participant is affected from a malignant disease and in second 1 (ns). In first group 26 (47.2%) participants had plaques on both carotid while 11 (19.6%) in II group (p<0.005). Echocardiographic left ventricular hypertrophy had 36 (65.45%) in I group and 31 (59.6%) in II group. Glomerular filtration rate was pathological in 14(25,4%) patients I group has 16 (31%) patient II group (ns).

Conclusions: Low HDL cholesterol with hypertension patients is associated with higher grades of large cardiovascular events, asymptomatic carotid disease and neoplasm.

PP.01.15 CARDIOVASCULAR RISK ASSESSMENT IN HYPERTENSIVE PATIENTS DEPENDS ON BLOOD PRESSURE MEASUREMENT METHOD

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Objective: Cardiovascular risk assessment has a crucial role in the management of hypertensive patient according to the ESH/ESC guidelines. However there is no indication which of blood pressure measurement modalities is the most appropriate for the cardiovascular risk estimation. Therefore the aim of our analysis was to compare the estimated risk level of hypertensive patients depending on the blood pressure measurement method.

Design and method: Eight hundred fifty four patients from the outpatient Hypertensive Unit Medical University of Gdansk, were invited to participate in the in-depth risk profile assessment (mean age 54,5±13,5 years; 54,3% males(n=464)). Office blood pressure (OBP, Omron), ambulatory blood pressure measurement (Spacelab 90207), pulse wave velocity (SphygmoCor; AtCor Medical), left ventricular mass index (LVMI; Vivid 7 Pro™), intima media thickness (IMT, ArtLab Esaote), as well as family history, and laboratory results were taken into account during risk profile estimation.

Results: In the studied group we observed marked differences in risk category frequency depending on the chosen blood pressure modality for the risk profile estimation. The highest prevalence of the high/very high risk patient was observed with office blood pressure. Whereas night time blood pressure from ABPM put the most patients into the intermediate risk group (more than 72% of patients needed reclassification from very high/high risk group to the lower category).

	Model with mean 24-h SBP/DBP		
Model with office SBP/DBP	total % reclassfied	% reclassified down	% reclassified up
Risk category			
1	9,09	0,00	9,09
2	13,21	3,77	9,43
3	36,67	13,33	23,33
4	47,95	43,38	4,57
5	49,50	49,50	0,00

Table 1. Percentage of change of risk category among patients in model with office SBP/DBP compared to mean 24-hours SBP/DBP incorporated

Conclusions: Our findings indicate that office blood pressure may overestimate assessed cardiovascular risk in hypertensive patients.

PP.01.16 RELATIONSHIP BETWEEN TISSUE ADVANCED GLYCATION END-PRODUCTS WITH ARTERY ELASTICITY IN HYPERTENSIVE PATIENTS

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Objective: To evaluate the relationship between tissue advanced glycation end-products with artery elasticity in hypertensive patients with or without diabetes mellitus (DM) and coronary artery disease (CAD).

Design and method: A total of 157 patients were enrolled, HBP group included 62 hypertensive patients, HBP+DM group included 42 hypertensive patients with DM, HBP+DM+CAD group included 53 hypertensive patients with DM and CAD. NBP group included 32 healthy persons. Carotid-femoral pulse wave velocity (cf-PWV, Complior, France) and tissue AGE (Diagnoptics, The Netherlands) were measured in all enrolled persons.

Results: (1)The levels of skin autofluorescence (AF) in groups (with HBP, with HBP and DM, with HBP and DM and CAD) with hypertension were significantly higher than in NBP group (all P<0.01). Compared with hypertensive patients without complications, the levels of skin AF in groups with DM and CAD were significantly higher (all P<0.01). (2)The levels of cf-PWV in groups with DM and CAD were significantly higher than in NBP group. Compared with hypertensive patients without complications, the levels of cf-PWV in groups with DM and CAD were significantly higher (P<0.01). (3) The results of multivariate stepwise regression analysis indicated that the level of skin AF had strong effect on cf-PWV.

Conclusions: The level of tissue AGE in hypertensive patients was higher than healthy persons, which was more significant in hypertensive patients complicated with DM and CAD. The level of tissue AGE correlated with the abnormality of arterial elasticity, the higher level of tissue AGE might play important role in evaluating vascular risks.

PP.01.17 HEMORHEOLOGICAL ALTERATIONS DURING MENTAL ARITHMETIC STRESS AND THEIR CLINICAL IMPLICATIONS IN ESSENTIAL HYPERTENSIVES

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Objective: Sympathoaderenal activation can induce vasoconstriction and hemoconcentration, thereby increasing blood viscosity (BV). Because the sympathoaderenal responses to stress is enhanced in essential hypertensives (EHT), the influences of stress on BV might be exaggerated in EHT. In the present study, therefore, the influences of metal arithmetic stress on hemorheological parameters were investigated in EHT.

Design and method: BV as well as determinants for BV (i.e., systemic hemodynamics, hematocrit and plasma viscosity) was evaluated during rest and after a 10-min arithmetic stress (serial subtractions of 7 from 1000) in 196 untreated EHT without apparent organ damages. BV was measured by use of a falling ball microviscometer. Plasma catecholamine was also measured to estimate the responsiveness of sympathoadrenal system to stress.

Results: At rest, BV was correlated positively with diastolic blood pressure (DBP), hematocrit and plasma viscosity (r=0.223, 0.764 and 0.216). Following the arithmetic stress, BV increased (4.11±0.49 to 4.26±0.53 mPaS) concomitantly with the elevation in plasma adrenaline and noradrenaline (27±18 to 46±31 pg/mL, 213±74 to 270±91 pg/mL, respectively). DBP, hematocrit and plasma viscosity also increased after the stress (82±10 to 93±13 mmHg, 39.6±3.8 to 40.5±3.8%, 1.74±0.09 to 1.78±0.12 mPaS). The stress-induced change in BV was correlated with that in DBP and hematocrit (r= 0.308 and 0.271, respectively), in addition to that in plasma adrenaline and noradrenaline (r= 0.367 and 0.368, respectively).

Conclusions: The arithmetic stress increased BV along with the activation of sympathoadrenal system in EHT. In EHT, the stress-induced alteration in BV might be mediated possibly by that in vasoconstriction and hemoconcentration. Hemorheological alterations during mental stress could lead to the repetitive mechanical overload on cardiovascular system in EHT.

PP.01.18 ARSENIC AND SUBCLINICAL VASCULAR DAMAGE IN A SAMPLE OF ITALIAN YOUNG ADULTS: A CROSS-SECTIONAL ANALYSIS

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Objective: Several studies relate exposure to high levels of arsenic (As) to an increase in cardiovascular diseases. Italy has As pollution in parts of its territory. The SepiAs project is an epidemiological, observational, multi-center study aimed at evaluating exposure to As and early signs of impairment of cells, tissues, and organs. The present study reports data about common carotid intima-media thickness (IMT), a marker of subclinical vessel damage.

Design and method: Volunteers aged 20-46 were recruited in four zones affected by As pollution: Viterbo, Mount Amiata, Taranto, and Gela. Each subject collected an urine sample, which was tested for total As, inorganic As (iAs), monomethylarsinic (MMA) and dimethylarsinic acid (DMA). Primary methylation index (PMI) was defined as MMA/iAs; secondary methylation index (SMI) as DMA/MMA. Ultrasound scans of the common carotid were acquired; clips were analysed off-line using an automatic edge-detection software.

Results: 214 patients had both urinalysis and a suitable carotid scan. None had IMT >0.90 mm. Ten had IMT over the 97.5th percentile for their age class: they did not differ from the rest in As or methylation indexes. There was no correlation between IMT and total As (ρ=0.02, p=0.83), iAs (ρ=0.02, p=0.83), iAs+MMA+DMA (ρ=0.01, p=0.85), PMI (ρ=-0.04, p=0.57), or SMI (ρ=0.05, p=0.46), neither in the overall population nor analysing each center. No correlation with IMT was found below or above the median of iAs+MMA+DMA (7.94 μg/L), and no correlation was significant neither when diameter and/or age were introduced in the model. The increase of IMT with age was higher than in the healthy reference population, both in males (6.25 vs. 5.20 μm/year) and in females (5.05 vs. 4.97 μm/year).

Conclusions: In a sample of young adults potentially exposed to As, no correlation was found between urinary As and common carotid IMT. In this range of age and thickness, changes in IMT could have been negligible compared to those due to confounders, or under the resolution limit of our method.
The analysis point, however, at a more rapid increase with time, i.e. a sign of vascular aging.

PP.01.19 ASSESSMENT OF DIASTOLIC WALL STRAIN IN COMORBID PATIENTS WITH ARTERIAL HYPERTENSION AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Objective: The traditional non-invasive parameters of left ventricular (LV) diastolic function have limitation during the pseudonormal and restrictive LV filling patterns. Now we evaluated an increasing of comorbid patients with arterial hypertension and chronic obstructive pulmonary disease (COPD). The recent studies in patients with heart failure provided data concerning novel echocardiographic index of LV function – so called diastolic wall strain (DWS) index, which could represent a less load-dependent measure of LV diastolic wall stiffness. But there is no data about DWS index in patient with arterial hypertension and COPD. The aim was to assess DWS index in patients with arterial hypertension and COPD.

Design and method: Observed 49 patients with Arterial Hypertension (AH) (39 male, mean age 55.3 +/- 4.1 years) and 56 hypertensive patients with COPD (43 male, mean age 57.1 +/- 4.3 years; FEV1 = 61,7+/-4.9%). Twenty healthy age-matched non-smokers served as a control group. Echocardiography were performed for all patients with assessment LV filling pattern and DWS as difference between posterior wall thickness (PWT) at end-systole and end-diastole divided by the PWT at end-systole.

Results: Diastolic wall strain was lower in controls (0.19 ± 0.08) than in patients with arterial hypertension and COPD (0.29 ± 0.09, P < 0.001). There were no difference found between patients with AH and hypertensive patients with COPD (0.28 ± 0.08 vs 0.31 ± 0.09, P > 0.05). DWS correlated with mitral E/A ratio in hypertensive patient (p=0.03), because of close relation between DWS and LV stiffness. The patients in both groups had higher LV mass index and relative wall thickness compare with controls.

Conclusions: The patients with arterial hypertension and hypertensive patients with COPD had increasing of DWS, which could reflect growth of LV diastolic wall stiffness. The increasing of DWS could be predictive for future cardiovascular events.

PP.01.20 TYPE D PERSONALITY AMONG SUBJECTS WITH HYPERTENSION

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Objective: Type D personality has been associated in the past with increased cardiovascular mortality among subjects with established coronary heart disease. Hypertension is a risk factor for coronary heart disease and chronic kidney disease. In this study, we assessed potential associations between type D personality and hypertension and we examined the hypothesis that patients with hypertension and deteriorating renal function would have a higher prevalence of type D personality.

Design and method: Patients with hypertension attending an outpatient clinic in the University Hospital of Ioannina were included in the study. A previously historical control group without hypertension from the same hospital was used. Type D personality was assessed with the DS-14 scale. Multivariate regression techniques were used to investigate the association between personality and hypertension adjusting for a number of medical and psychiatric confounders.

Results: The hypertension group consisted of 176 patients (61% male, mean age 55 years old, range 21-86) while the control group consisted of 134 patients (48% male, mean age 49, range 22-82). The prevalence of type D personality was significantly higher in the hypertensive group as compared to the control group (41% versus 14%, respectively, p<0.001). In multivariate logistic regression analysis the presence of Type D personality was significantly associated with hypertension independently of other clinical factors, sociodemographic factors and depressive symptoms (odds ratio 4.96, 95% Confidence Interval: 2.68-9.17). In the hypertensive only subset, patients with a lower eGFR were not more likely to meet criteria for type D personality compared to those with a higher eGFR (odds ratio 1.17, 95% CI 0.56-2.44).

Conclusions: Personality traits should be taken into account for the diagnostic aspects and treatment strategies in hypertension.

PP.01.21 CHANGES OF THE GLOBAL CARDIOVASCULAR RISK PROFILES IN ESSENTIAL HYPERTENSION SUBJECTS ACCORDING TO THE ANTIHYPERTENSIVE MEDICATION STATUS FOR THE 10 YEAR PERIOD

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Objective: The consideration of the global cardiovascular risk (GCR) profile in the management of individual hypertensive patients is underscored and recommended in the clinical guidelines. The GCR profile means the disease burden in the future so that its assessment may be helpful to understand the role of essential hypertension (EH) in the public health strategy.

Design and method: Using time series weighted data of Korean National Health and Nutrition Survey (KNHANES) from 1998 to 2010, the GCR profiles defined in the ESH/ESC hypertension guideline 2007 were categorized for EH patients. EH was defined by the blood pressure (BP) >= 140/90 mmHg or the subject taking antihypertensive medication (AHM). Lower risk group was compared to groups with moderate or more risk. Higher or very high risk group were compared to the groups with moderate or less risk.

Results: Among total 52,909,871 (7,558,553/per year) EH subjects, 42,584,407 (80.5%), 7,915,448 (15.0%), and 2,410,016 (4.6%) were grade I, II and III hypertension, respectively. The subjects with no risk factor (RF), 1~2 RF, RF >= 3 or metabolic syndrome/diabetes, and established cardiovascular or renal diseases were 2,280,232 (4.3%), 14,637,555 (27.7%), 32,060,311 (60.6%), and 3,931,773 (7.4%), respectively. The low, moderate, high and very high GCR profiles were 1,828,177 (3.5%), 1,4386,106 (27.2%), 30,637,538 (57.9%), and 6,058,050 (11.5%), respectively. The proportion of the lower risk group was decreased in the more recent years (OR=0.966, p=0.018 per year) in all subjects. The higher risk group was decreased only in treatment group in the more recent year (OR=0.972, p=0.0151 per year).

Conclusions: In the Korean NHANES, the proportion of the lower global cardiovascular risk group was only the minority. As the treatment rate was increasing, overall proportion of lower risk group was decreased. But at the same time the proportion of the higher risk group was also decreased in the treated hypertension subjects.

PP.01.22 IMPACT OF AZATHIOPRINE ON VASCULAR DISEASE: INCREASE OF VASCULAR MINERALIZATION IN RATS

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Objective: Cardiovascular complications like arteriosclerosis are the major death risk nowadays. Mineralization of the vascular wall increases arterial stiffening and therefore blood pressure.There are different evidences that immunosuppressive therapy may affect this unfavorable vascular event. Aim of this study is to characterize the cardiovascular outcome of azathioprine, an immunosuppressive drug used after solid organ transplantation or autoimmune disease, in an animal model.

Design and method: Azathioprine [10 mg/kg bodyweight] was applied enteral through drinking water for 8 weeks in Wistar Rats. Prior to and after treatment blood samples were taken and organs were preserved for histological staining. Blood parameters were measured using a blood dry chemistry analyzer. Parathyroid Hormone (PTH) was quantified via ELISA. The calcification-status of the vessel wall was detected by the extracellular calcium content, quantified using o-cresolphtaleine-complexon-method. Medial calcification was stained via alizarin red and examined by light microscopy.

Results: There was no significant difference in body weight throughout the observation period on azathioprine-treatment, and there were no indications for any difference in general condition in treated or untreated rats.
Upon azathioprine-treatment, plasma calcium content was significantly elevated in comparison to initial measurement. In addition, the azathioprine-treated group showed increased plasma inorganic phosphate and alkaline phosphatase. Measurement of PTH displays an enhanced level in azathioprine-treated animals. All these blood parameters are indicators for cardiovascular calcification. For further investigation of vascular mineralization the extracellular calcium concentration in the aorta was quantified and showed an increase upon azathioprine-treatment. Vessel histology visualized this quantitative increase of the calcium content in the media of the artery via alizarin red staining.

Conclusions: Recapitulatory, we could show that even short-term azathioprine treatment has a negative effect on vasculature by increasing vessel calcification in rats. Therefore, the mostly long-term medication of azathioprine in humans seems to require comprehensive investigations regarding vascular end-points.

PP.01.23 GLYCATED HGBA1C BIOMARKER OR PREDICTOR OF ATHEROTHROMBOSIS INFLUENCED BY HDL LEVEL IN HYPERTONICS

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Objective: Non adequately regulated glycemic level in patients with known hypertension, expressed in% Hgb A1C, cause disbalance in lipid metabolism. Very important antiatherogenic role in this process has the reversal transport of lipid particles from the artery walls itself towards liver, though regulated by HDL cholesterol. It stimulates the genesis of NO and vasodilatation, thus having anthitombogenic effect. In almost 2/3 of coronary patients the level of HDL is decreased. As a result cardiovascular complications can be seen, especially in those having diabetes and hypertension.

Design and method: Assessment if there is any link between high levels of glycosylated HgbA1C on the HDL level in cardiovascular, hypertonic patients with diabetes mellitus.
We have been studded interaction between linkage of HgbA1C and HDL cholesterol, and also their influence to cardiovascular events in the group of 20 patients with proven coronary disease (on coronarography 2 or more diameter stenosis over 50%) and having both hypertension and diabetes mellitus.

Results: There is exponential correlation between unregulated glycaemia and values of HDL. The mean values of HgbA1C (7-8,5%), while for HDL (0,9-1,5), pointing out that is the high risk population with non-adequately regulated glycaemia. But, although having in mind this is very small sample, all cardiovascular events were not significantly increased (HR 0,86-2,31; p-0,083).

Conclusions: HgbA1C is not only biomarker of non-regulated glycaemia for a longer period but could be a possible predictor of lipid profile in cardiovascular patients having hypertension and diabetes mellitus.

PP.01.24 PREVALENCE OF CARDIOVASCULAR RISK FACTORS IN BRAZILIAN NURSING PROFESSIONALS: INTEGRATIVE LITERATURE REVIEW

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Objective: To describe the prevalence of risk factors and cardiovascular risk stratification in Brazilian nursing professionals and assess the quality of the description of identified observational studies.

Design and method: Integrative Brazilian literature review. Articles, papers and theses and related references identified by Scielo and Google/Google Scholar were included, in November 2013. A hundred twenty-nine references were identified, of which only 19 have assessed cardiovascular risk factors in nursing professionals, were published in Portuguese and/or English and/or Spanish and were selected. The description of the studies was assessed by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).

Results: The prevalence of arterial hypertension ranged from 4.0% to 37.5%, while those of sedentary lifestyle and physical inactivity ranged from 33.0% to 93.4% and from 23.0% to 95.7%, respectively. The prevalence of overweight ranged from 12.5% to 58.8% and obesity from 9.1% to 65.9%. The prevalence of hypercholesterolemia varied from 24.6% to 42.3%, with only two studies (12.5%-45.4%) reported high HDL-c. The levels of triglycerides had a magnitude between 1.3% and 24.8%. Classical risk factors such as smoking (3.0%-35.4%), alcohol (5.3%-87.0%) and diabetes (3.1%-24.6%) were also reported. Stress varied between 19.1% and 74.8% of all respondents. The presence of family history of cardiovascular disease ranged from 16.5% to 86.3% and individuals with waist circumference increased from 28.0% to 75.0%. The waist-hip ratio increased from 32.8% to 61.7% and 26.0% to 68.5% of respondents had an inadequate diet. Of the 18 studies analyzed, 94.4% did not report the measures taken to avoid potential sources of bias, 88.8% did not report the statistical methods used to control for confounders and examining interactions; did not report information on potential confounders, and did not discuss generalization of results. The majority (83.3%) not clearly defined outcomes, exposures, predictors, potential confounders and effect modifiers, as well as estimates unadjusted and adjusted by the confounding variables and their accuracies.

Conclusions: No studies performed stratification of cardiovascular risk and control of confounders/modifiers of effect and presentation of confidence intervals of prevalence were the main limits related to the description of the studies.

PP.01.25 EXCESS WEIGHT IN EMPLOYEES OF FOOD AND NUTRITION UNITS AT A UNIVERSITY IN SÃO PAULO STATE

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Objective: To describe the prevalence and identify the factors associated with excess weight in restaurant employees at a public university in the city of São Paulo.

Design and method: A socioeconomic and nutritional census was conducted with 174 individuals to obtain data on body mass, height, and socioeconomic status, using a structured questionnaire. The body mass index was determined, and the cut-off points recommended by the World Health Organization were used. Student's t test, Fisher's exact test, and the x2 test were used to verify the differences between the means and prevalences. Poisson regression analyses with robust variance were performed, and the outcomes were excess weight or no excess weight.

Results: Most of the employees (57.5%) were women; 59.8% were non-white, 45.4% lived with a partner, 26.4% were smokers, and 50.6% were sedentary. There was a predominance of individuals with excess weight (60.9%), and most of them (64.0%) were women, non-white (66.3%), lived alone (58.8%), and were non-smokers (63.3%); furthermore, 62.8% of the subjects engaged in physical activities. There was a significant difference (p=0.03) regarding body mass index and gender, demonstrating more excess weight among the women. Excess weight was dependent on the age group and was more likely to occur in individuals over 50 years of age (adjusted prevalence ratio: 1.72; 95% confidence interval:1.02-2.98).

Conclusions: There was a high prevalence of excess weight in these professionals, indicating the necessity for interventions to control this important risk factor for chronic non-communicable diseases.

PP.01.26 ASSOCIATION OF CARDIOVASCULAR RISK FACTORS IN PATIENTS WITH ARTERIAL HYPERTENSION WITH OCCURANCE OF RETINAL VEIN OCCLUSION

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Objective: To evaluate the association of cardiovascular risk factors (low-density lipoprotein cholesterol (LDL-C), oxidized LDL (ox LDL), IgG antibodies to oxidized LDL (Ig ox LDL) levels) in patients with arterial hypertension (AH) and retinal vein occlusion (RVO).

Design and method: One hundred and ten men and women aged 45–79 years (mean 63,5±7,8 years) were enrolled in this study. They were divided into 3 groups, who were matched by age and gender to each other. First one included 80 patients with AH and RVO, second – 11 persons suffering from AH with history of ischemic stroke (without RVO) and the third one (controls) – 20 healthy participants, who remained free of clinical manifestation of aterosclerosis or AH. Blood pressure (BP) was measured after participants had been seated for 5 minutes. Groups I and II had previous diagnosis of hypertension with current use of antihypertensive medication and were matched by levels of office systolic and diastolic blood pressure. None of them were treated with lipid-lowering agents. All of baseline participants were reattended to provide fasting serum samples, which were analyzed for glucose, protein, creatinine, triglyceride, total cholesterol, LDL and high-density lipoprotein cholesterol, ox LDL, IgG antibodies to oxidized LDL levels and for hematology profiles (platelet levels, hemoglobin level, hematocrit, fibrinogen level and white and red blood cell counts). Participants underwent comprehensive ocular examination, fluorescein angiography (FA) and optical coherence tomography (OCT).

Results: Concentrations of LDL-C were higher in 1 and 2 groups than controls (3,86±0,25 and 3,34±0,28 vs. 2,66±0,19 mmol/L, $P < 0.05$), as well as levels of ox LDL were higher in 1 and 2 groups (3,36±1,14 and 5,68±2,37 vs.1,17±2,31 μg/ml controls, $p<0,05$). Elevated IgG ox LDL concentrations were found in patients with AH and RVO 467,89±140,61MU/ml, AH and history of stroke 555,14±124,4 MU/ml comparing with healthy participants 292,86±70,95 MU/ml ($p<0,05$).

Conclusions: The study showed that retinal vein occlusion occurs predominantly in patients with arterial hypertension, having the same kind of lipid metabolism disorders, as with the history of stroke, such as elevated level of LDL-C, and also was accompanied with activation of lipid peroxidation.

PP.01.27 LEPTIN/ADIPONEKTIN RATIO AS MARKER TO IDENTIFY PATIENTS OF HIGH RISK CARDIOVASCULAR DISEASE

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Objective: Reducing of adiponectin may appear predictor of cardiovascular disease. A higher correlation with lipid parameters and indicators of endothelial function was established with the ratio of leptin / adiponectin (L / A).

Design and method: The study involved 91 patients with hypertension (H) depending on the degree of obesity were groups: 1 gr.- 22 pts with overweight; 2 gr.- 26 pts with obesity (Ob) I; 3 gr.-21 pts. with Ob.II; 4 gr.- 12 pts with Ob III; 5 gr.- control with normal body mass index (BMI).
Were determined: waist circumference, body mass index, fast levels of glucose, HbA1c, insulin, lipids, leptin, adiponectin.

Results: In patients with H and Ob was no the inverse relationship between increasing BMI and decreased levels adiponectin. The most informative indicator of endocrine activity of adipose tissue, which was associated with the number of components of metabolic syndrome (MS) was the L / A ratio. Progression of the BMI and abdominal obesity in patients was accompanied by increase in L / A ratio. Minimum of L / A ratio was defined in 5 gr. and the smallest among all comparable groups, while the maximum of this index was shown in 4 gr. Increase L / A ratio was associated with the manifestations of the atherogenic type of dyslipidemia, carbohydrate disoders (impaired glucose tolerance, increase of insulin resistance (IR)) and insufficient nocturnal decline.
It was found the relationship between the reduction of adiponectin and IR progresses. In pts without IR adiponectin level was significantly ($p<0,01$) higher (2,35 ± 0,11) ng / ml and L / A ratio less (15,02 ± 2,03) than in pts with IR (0,76 ± 0,08) ng / ml and (21,74 ± 1,21) respectively.

Conclusions: Increase of the L / A ratio is associated with the BMI progresses and the increase of components of metabolic syndrome. The presence of IR is accompanied by decreasing levels adiponektin and increase of L / A ratio, which characterized the latter value as an important marker of formation and detection contingent patients of high risk cardiovascular disease.

PP.01.28 EFFECTS OF SHORT-TERM FRUCTOSE CONSUMPTION ON OXIDATIVE DAMAGE AND NO PRODUCTION IN EXPERIMENTAL HYPERTENSION

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Objective: Increased consumption of fructose may be involved in expanded metabolic disorders. The aim of this study was to determine blood pressure, nitric oxide synthase activity, oxidant status and to quantify the effect of fructose on serum total cholesterol (CHOL), low and high density lipoprotein cholesterol (LDL-CHOL and HDL-CHOL), very low-density lipoproteins (VLDL) and triglycerides (TG) in spontaneously hypertensive rats after 3 week-consumption of 10% fructose in drinking wather.

Design and method: In this study, 24 male 6-week-old rats were used. 6 normotensive Wistar Kyoto rats (WKY) and 6 spontaneously hypertensive rats (SHR) were taken as controls, whereas the remaining rats (WKY and SHR) were given free access to 10% fructose for 3 weeks. Blood pressure was measured by tail-cuff plethysmography. Total nitric oxide synthase (NOS) activity was determined by measuring the formation of L-[3H] citrulline from L-[3H] arginine in the heart, kidney and brain. Concentration of conjugated dienes (CD) was measured in the same tissues. CHOL, LDL-CHOL, HDL-CHOL, VLDL and TG levels in the plasma were analyzed spectrophotometrically.

Results: Plasma total CHOL, CHOL/HDL, VLDL and TG were significantly increased in SHR. Fructose intake elevated these parameters even more significantly. Similary, increase in CD concentration was further potentiated by fructose treatment. Despite decrease of tissue NOS activity in both WKY and SHR, blood pressure was not affected after 3 weeks fructose consumption.

Conclusions: In conclusion, short-term fructose treatment led to increase in bad lipids fallowed by increased oxidative damage and decreased NOS activity in the tissues. These changes were not reflected by blood pressure increased yet, however indicated already increased risk for cardiovascular disease.
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PP.01.29 RELATIONSHIP BETWEEN LUNG FUNCTION AND CARDIAC FUNCTION IN PATIENTS WITH CARDIOVASCULAR DISEASE

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Objective: The non-interventional uncontrolled prospective observational study was conducted to estimate the lung function in patients (pts) with cardiovascular diseases - arterial hypertension (AH), coronary artery disease (CAD), arrhythmia (A) or heart failure (HF).

Design and method: Data was received from 146 in- and outpatients, 58,2% men, aged 60,3±7,9, blood pressure (BP) 132,7±10,3/81,1±6,9 mm Hg and heart rate (HR) 69,4±7,7. 52 patients fell into AH group (gr), 33 pts - into CAD gr, 32 pts – into A gr and 29 pts – into HF gr. Peripheral blood pressure was recorded in the supine position according to ESH guidelines. Cardiac function was assessed by measuring LV geometry by echocardiography. Glomerular filtration rate (GFR) was calculated by MDRD formula. Spirometry was performed to assess the degree of airways obstruction by measuring forced expiratory volume in 1 second (FEV1) and forced vital capacity ratio (FVC) initially and after up to 30 min salbutamol 400 mcg. Statistical analysis was performed using nonparametric methods. Results are presented as Mean±std.

Results: FEV1 was 109,2±20,3% and FVC 114,5±21,8%. 4 (2,7%) patients had bronchoobstruction which had not been revealed before. A gr pts had significantly higher FEV1 and FVC compared to other pts (FEV1 117,7±25,0% and 106,8±18,2% respectively; $p<0,01$; FVC 124,9±29,1% and 111,5±18,3% respectively; $p=0,002$). AH and CAD grs pts had significantly lower FEV1 and FVC compared to A gr ($p<0,05$). AH gr. had lower lung function than A gr – FEV1 107,9±18,2% and 117,7±25,0% respectively; $p=0,04$ and FVC 114,2±18,4% and 124,9±29,1% respectively; $p=0,04$. FEV1 and FVC were significantly associated with smoking ($r=0,39$; $p<0,001$), left ventricular hypertrophy ($r=-0,33$;

p=0,001), GFR (r=-0,24; p=0,01). Larger change FEV1 after bronchodilator was significantly correlated with percentage of nocturnal fall of BP (r=0,33; p=0,02).

Conclusions: Left ventricular hypertrophy, decrease GFR and abnormal 24h BP profile are associated with impaired lung function in this study, suggesting a mechanism whereby impaired lung function may increase CV risk. Such associations may be a reflection of possible common mechanism of cardiovascular comorbidity.

PP.01.30 OVERWEIGHT AND OBESITY RELATIONSHIP TO ARTERIAL BLOOD PRESSURE IN PREPUBERTAL SCHOOL CHILDREN

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Objective: Overweight/obesity (OW/OB) are known risk factors in development of arterial hypertension in adulthood. Women are less prone to hypertension in generative age possibly due to protective effects of female sex hormones. This study aimed to assess markers of overweight/obesity and evaluate their relations to blood pressure (BP) values in prepubertal school children.

Design and method: Present study included 3rd grade elementary school prepubertal children (total 111-53 girls, 58 boys; 8.7±0.4 years). Height, weight, body mass index (BMI), waist circumference (WCirc), upper arm and thigh skin fold (ASF, TSF) and systolic (SBP) and diastolic blood pressure (DBP) and fasting blood glucose concentrations (fBGC) were measured. Data are expressed as mean±SD; p<0.05 was considered significant.

Results: 13,51% subjects were overweight (BMI>85th percentile; 3 girls and 12 boys) and 15.32% subjects (were obese (BMI>95th percentile; 7 girls and 10 boys). Boys had significantly higher SBP (107±10 mmHg) than girls (103±10 mmHg). Overweight/obese boys had significantly thicker ASF (20.6±7.8cm) compared to normal-weight boys (10.4±5.2cm) and TSF (OW/OB 33.4±13cm; normal-weight 26.1±15.4cm), higher SBP (overweight/obese 114±9mmHg; normal-weight 103±10mmHg), higher DBP (overweight/obese 67.4±4mmHg; normal-weight 63±4mmHg) and higher fBGC (overweight/obese 5.4±0.5mmol/L; normal-weight 5.1±0.4mmol/L). 5 boys and 4 girls were hypertensive (SBP>95th percentile). In boys, there were significant positive correlations of BMI and WCirc with SBP, DBP, ASF and TSF.
Overweight/obese girls had significantly thicker ASF (24.0±4.7cm compared to normal-weight 13.1±4.9cm) and TSF (OW/OB 51.5±21.3cm; normal-weight 30.6±11.9cm) and greater WCirc (OW/OB 75.1±7.9cm; normal-weight girls 60.7±5.1cm). Interestingly, SBP (OW/OB 107±7; normal-weight 101±9mmHg), DBP (OW/OB 66±6mmHg; normal-weight 63±4mmHg) or fBGC were not significantly different between OW/OB and normal-weight girls. In girls, BMI and WCirc significantly positively correlated with ASF and TSF,but no correlations to BP were observed. WCirc positively correlated to fBGC in both, boys and girls.

Conclusions: Significant association of overweight/obesity to arterial BP levels in prepubertal boys suggests OW/OB as an early marker of tendency to develop hypertension later in adulthood. In girls, lack of associations among OW/OB markers and arterial BP levels suggests that OW/OB might not be as important risk factors in development of hypertension in females as in males.

PP.01.31 CARDIOVASCULAR RISK AND EMIGRATION IN A SPANISH HOSPITAL

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Objective: Cardiovascular disease is the leading cause of death in developed countries and also in developing countries.
From a nephrological standpoint, most of non-EU foreign patients are diagnosed in their home countries and come directly onto dialysis.
This causes a constant flow of young patients, removed in their country and come to our looking their last opportunity to be treated.
The aim of this study was to analyze the factors of cardiovascular risk in patients on hemodialysis emigrants of a Spanish hospital.

Design and method: We performed a retrospective study of the population of non-EU patients who have passed through our Hemodialysis center at Torrecárdenas Hospital from January 2012 to September 2013.
We analyzed anthropometric variables, cardiovascular risk factors (hypertension and related complications, Diabetes Mellitus, Dyslipidemia, Obesity Smoking)

Results: We analyzed 37 patients with mean age of 37.6 years + - 4.2 years. Of these patients, 68% were male and 32% female.
Regarding the place of origin, 54% comes from Morocco, 26% Romania, 13% United Kingdom, 7% Lithuania.
The average time in Spain was 38 months.
66% of patients had an important language barrier thus favoring the therapeutic failure in 56% of patients.
More than 54% of patients needed social service aids from the hospital for housing and other assistance due to their socioeconomic status and family situation.
From a nephrological standpoint 65% had chronic kidney disease of unknown etiology, 25% secondary to nephrosclerosis, 20% secondary to chronic glomerulonephritis without histologic control.
82% of patients had hypertension with at least one antihypertensive medication and of these, 36% had hypertension refractory to more than 3 antihypertensive.
57% had hypertensive retinopathy and 46% hypertensive heart disease.
27% of patients were diabetics with good metabolic control.
Only 18% of patients were overweight, 6% obese and 7% were smokers.

Conclusions: To insist on proper control of cardiovascular risk factors in these patients in order to avoid complications arising from them.

PP.01.32 RATE OF OXIDATIVE DNA DAMAGE IN PATIENTS WITH HYPERTENSION WORKING UNDER CONDITIONS OF ULTRAHIGH RANGE RADIATION EXPOSURE

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Objective: Influence of electromagnetic radiation of ultrahigh frequency (UHF EMR) may increase the formation of radical oxygen species and may lead to a functioning breach in the internal organs, including the cardiovascular system.
The study purposes were determining the level of oxidative DNA damage and assess the patients with hypertension working in conditions of UHF EMR.

Design and method: The study included 48 men (mean age 37,6±6,4 years) with hypertension, who worked from 4 to 22 years (mean age 15,0±6,4 years) under the influence of UHF EMR (group 1). The dose of UHF EMR was within the range of 4320-31065 kW (17151,7±7102,4 kW average). The control group consisted of male patients of respective age with hypertension, who were not exposed to prolonged UHF EMR (group 2, n=35). Body mass index in patients of group 1 was 28,7 ± 4,7 kg/m², patients of group 2 - 29,8±3,9 kg/m².
5-7 days after admission, all patients underwent daily blood pressure monitoring using the ABMP-04 Meditech monitors (Hungary) and were daily measured for urine marker of oxidative DNA damage 8-hydroxy-2'-deoxyguanosine (8-oxodGu) by spectrophotometry using the SF-46 unit.

Results: In 40 patients (83%) of group 1 revealed stage 2 hypertension, whereas in patients of group 2 – only 5 of surveyed (13%).
Daily average systolic blood pressure in 1 group of patients was 144,5±13,5 mmHg vs. 126,3±11,8 mmHg in patients of the control group (P<0,05), diastolic blood pressure 84,3±5,4 mmHg vs. 79,4±10,5 mmHg (P<0,05) respectively.
The average rate of 8-oxodGu excretion in group 1 patients significantly exceeded the value of those in group 2 (15,8±4,2 nmol/kg/day vs. 12,4±2,4 nmol/kg/day, P<0,05).
A significant (P<0,005) direct correlation discovered between the blood pressure level and excretion rate of oxidative DNA damage marker (r=0,52), the relationship between the daily excretion rate of 8-oxodGu and work experience (r=0,66; P<0,001).

Conclusions: In patients who protractedly worked in conditions of microwave electromagnetic radiation, the rate of DNA damage increased, which, possibly due to the genome operation instability in endothelial cells, determined the high daily average level and low blood pressure control.

PP.01.33 EFFECT OF ENVIRONMENTAL EXPOSURE TO CIGARETTE SMOKE ON BLOOD PRESSURE IN PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: The study aimed at evaluation of effects exerted by environmental exposure to cigarette smoke in blood pressure in patients with essential hypertension.

Design and method: The study was conducted on 42 patients with essential hypertension treated with hypotensive agents, non-smokers environmentally exposed to cigarette smoke (group 1) and on 42 patients with essential hypertension, treated with hypotensive agents, non-smokers and not exposed to cigarette smoke (group 2), selected using the case to case approach taking into account anthropometric variables, principal risk factors of cardiovascular diseases, characteristics of arterial hypertension and of the applied treatment. Environmental exposure to tobacco smoke was evaluated using a questionnaire. Values of arterial blood pressure were evaluated basing on 24-hour ambulatory blood pressure monitoring (ABPM). The evaluated ABPM variables included mean blood pressure (MBP), mean systolic blood pressure (MSBP), mean diastolic blood pressure (MDBP), variability of systolic blood pressure (VSBP), variability of diastolic blood pressure (VDBP) and pulse pressure (PP).

Results: In group 1 mean values of MSBP, MDBP, MBP and PP were significantly higher than those in group 2 (MSBP (mmHg): 139.52 ± 18.43 vs. 127.39 ± 16.38; MDBP (mmHg): 86.12 ± 9.28 vs. 79.11 ± 8.47; MBP (mmHg): 99.58 ± 10.27 vs. 90.05 ± 8.59; PP (mmHg): 57.29 ± 7.35 vs. 49.03 ± 7,42; $p<0.05$). Statistically significant positive linear relationships were demonstrated between between the mean time of daily exposure (expressed in hours) to tobacco smoke and MBP as well as PP (correlation coefficient r: 0.51, 0.48). The multiple regression analysis permitted to demonstrate that a more advanced age, higher LDL cholesterol concentration, diabetes and environmental exposure to cigarette smoke represented independent factors of elevated PP in the group of patients with a diagnosed and pharmacologically treated essential hypertension.

Conclusions: In patients with essential hypertension environmental exposure to cigarette smoke may result in elevated values of blood pressure in 24-hour ABPM.

PP.01.34 RELATIONSHIP BETWEEN BLOOD SELENIUM CONCENTRATION AND LEVELS OF OXIDATIVE STRESS AND ANTIOXIDATIVE POTENTIAL IN CHILDREN

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Objective: High level of oxidative stress represents a recognised factor involved in pathogenesis of arterial hypertension. Patients with arterial hypertension are known to manifest lowered levels of blood selenium. This study aimed at determining the relationship between blood selenium concentration and levels of oxidative stress and antioxidative potential in a selected population of children.

Design and method: The study was conducted on 265 children inhabiting Silesian voivodship (Poland). The mean age of participants amounted to 7.94 ±0.87 years. Accepting cut-off levels of median value as well as 1st and 3rd quartile of blood selenium concentration (Se-B), the participants were divided into the group of children with Se-B <1st quartile (group I, Se-B <70 µg/L), the group with Se-B between the 1st quartile and median value (group II, Se-B within the range of 70-76.9 µg/L), the group with Se-B between median value and the 3rd quartile (group III, Se-B within the range of 77-83.9 µg/L) and the group with Se-B >=3rd quartile (group IV, Se-B >=84 µg/L). Level of oxidative stress was defined by estimation of malonyldialdehyde (MDA) concentration in urine using TBARS test. Moreover, the antioxidative level (ANTIOXI) and the marker of oxidative injury level: 8-OHdg, were estimated in urine.

Results: In the studied group of children Se-B, MDA, ANTIOXI and 8-OHdg amounted to, respectively, 77.79 ±12.51 µg/L, 6.65 ±6.68 µg/g creatinine, 3.88 ±5.21 µg/g creatinine and 4.69 ±5.21 ng/mg creatinine. In group IV the level of anti-oxidative potential was significantly higher than those in groups I, II and III (ANTIOXI (µg/g creatinine) – I: 3.29 ±3.03; II: 3.26 ±1.97; III: 3.61 ±3.03; IV: 5.82 ±10.08; p I, II, III vs. IV <0.05). No significant intergroup differences were disclosed in MDA or 8-OHdg. A statistically significant positive linear relationship was demonstrated between blood selenium concentration and the antioxidative level in urine (correlation coefficient r: 0.19).

Conclusions: In the studied group of children high blood selenium concentration seems to warrant a respectively high antioxidative potential in urine. High blood selenium concentration do not seem to significantly affect levels of oxidative stress.

PP.01.35 STUDY OF THE RELATIONSHIP BETWEEN HYPERTENSION, ANXIETY AND DEPRESSION FROM A.B.P.M. DATA ANALYSES

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Objective: To determine whether the patients suffering from hypertension and treated with antidepressants or anxiolytic drugs present different values of systolic (SBP) and diastolic blood pressure (DBP) than the ones not treated with any of these drugs, basing the study on the analysis of data obtained from 24 hours of Ambulatory Blood Pressure Monitoring (ABPM).

	With antidepressants (155)	Without Antidepressants (1040)	total
Untreated hypertensive	**19 (12.3%)**	**230 (22.1%)**	**249**
Controlled hypertension	**49 (31.6%)**	**436 (41.9%)**	**485**
Uncontrolled hypertension	**87 (56.1%)**	**374 (36%)**	**461**
total	**155**	**1040**	**1195**

p < 0.005

	With anxiolytic (n:290)	Without anxiolytic (n:905)	total
Untreated hypertensive	**41(14.1%)**	**208 (23%)**	**249**
Controlled hypertension	**116 (40%)**	**369 (40.8%)**	**485**
Uncontrolled hypertension	**133 (45.9%)**	**328 (36.2%)**	**461**
total	**290**	**905**	**1195**

p 0.001

Design and method: This is an observation-based, retrospective and descriptive study including 1195 ABPM records from the last 4 years (2009-2012). Patients younger than 18 years old or with less than 80% of ABPM lectures were excluded as well as the ones treated with Non-Steroidal Anti-inflammatory drugs (NSAID), antiretroviral, anticancer or immunosuppressive drugs. The patients were grouped in three groups(BP obtained during the 24 hr): Not treated hypertensive patients not treated: without hypertension treatment and SBP > 130mmHg and/or DBP> 80mmHg. Well controlled hypertensive patients: with hypertension treatment and SBP/DBP <= 130/80mmHg. Poorly controlled hypertensive patients: with hypertension treatment and SBP> 130mmHg and/or DBP> 80mmHg.

Results: Patients taking antidepressants treatment (n:155) were in average 64.1 years old, mostly women (69%). Among them, 12% were not treated, 31% well controlled and 56% poorly controlled hypertensive patients. Patients not taking antidepressants (n:1040): 59.4 years old and 56%men; 22% not treated, 41%well controlled and 36% poorly controlled.
Patients taking anxiolytic drugs (n:290): 64.9 years old and 61%women; 14%not treated, 40%well controlled and 45% poorly controlled.
Patients taking anxiolytic drugs (n:905): 58.3 years old and mostly men (41%). Among them, 23%not treated, 40% controlled; 36% poorly controlled.

Conclusions: The hypertensive patients treated with antidepressants or anxiolytic drugs are in average older than the ones without antidepressants or anxiolytic drugs. Both groups present also a higher percentage of women. The number of patients with anxiety and not receiving hypertension treatment was lower than the one without anxiety and also not receiving hypertension treatment (14% vs 23% respectively). The group treated with antidepressant and the group treated with anxiolytic drugs present both a higher percentage of poorly controlled hypertensive patients. The anxiety and the depression are psychosocial factors involved on the poor control of hypertensive patients, affecting then their blood pressure parameters.

PP.01.36 IRON SUPPLY IS POSITIVELY CORRELATED WITH AMBULATORY BLOOD PRESSURE VALUES IN GENERAL POPULATION

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Objective: There is a growing evidence that disturbance of trace elements such as copper, zinc and iron contributes to the development of cardiovascular disease. Available data are scarce and based on different methodology, selected patient groups, observation time and varying analytical techniques. We aimed to analyze whether the body supply with iron, copper and zinc, assessed based on their 24-hour urinary excretion, correlates with blood pressure (BP) values on ambulatory BP monitoring within the sample of general population.

Design and method: The study group included 114 individuals, recruited from the general population (mean age 47,3±14,6 years, 59M/55F). Detailed information about each participant's clinical data were collected by standardized questionnaires. Ambulatory BP monitors (SpaceLabs 90207) were programmed to obtain measurements each 15 min. during the day (6.00-22.00) and each 30 min. nighttime. Urinary iron, copper and zinc excretion was assessed in 24-hour collection by ICP-MS (Inductively Coupled Plasma Mass Spectrometry). Database management and statistical analysis were performed with SAS software (SAS Institute, Cary, NC), version 9.3.

Results: The study group included 70 hypertensive patients (61,4%). The average values of 24-hour urinary excretion were: iron 421,1±269,1 [µg/L], copper 12,6±19,3 [µg/L], zinc 390,0±329,8 [µg/L]. With adjustments applied for age, sex, body mass index, use of antihypertensive drugs, smoking and alcohol intake, we observed a positive correlation between 24-hour urinary iron and 24-hour BP values: systolic (beta±SE: 0,0094±0,0034 mmHg; p=0,007), diastolic (0,0067±0,0027; p=0,016). Urinary iron also correlated positively with daytime (0,0091±0,0035; p=0,01) and nighttime (0,0094±0,0041; p=0,02) systolic BP; and with daytime (0,0064±0,0028; p=0,025) and nighttime (0,0067±0,0032; p=0,042) diastolic BP. None of the multivariate analyses was significant for the relation between urinary copper or zinc and BP values.

Conclusions: 24-hour urinary iron excretion was positively correlated with 24-hour blood pressure values in the sample of general population. Iron supply might contribute to the pathogenesis of hypertension, pending confirmation on the larger study group.

PP.01.37 PROTECTIVE ACTIVITY OF HUMAN PLASMA AGAINST OXIDIZED PHOSPHOLIPIDS IS DECREASED IN HYPERTENSION

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Objective: Oxidized phospholipids (OxPL) play a central role in pathogenesis of atherosclerosis and its complications. Recent studies demonstrate the existence of multiple endogenous mechanisms neutralizing adverse effects of OxPL in blood. These include naturally occurring IgM antibodies, serum complement components and OxPL-specific phospholipases, inter alia. We hypothesized that protective capacity of plasma against OxPL may be a factor contributing to progression of cardiovascular disease. Our AIM was to evaluate anti-OxPL activity in plasma of patients with atherosclerosis.

Design and method: We have established a simple integrative ELISA method to measure multiple protective plasma responses against OxPL using commercially available and custom-made monoclonal antibodies against oxidation epitopes on OxPL. Plasma databank included 160 samples obtained from patients with different clinically classified stages of atherosclerosis. Patients were fully characterized with respect to risk factors, family history of the disease, the presence of endothelial dysfunction, degree of coronary artery stenosis and classical laboratory measurements.

Results: Preincubation of OxLDL standard with patients' plasma significantly reduces the ability of anti-OxPL antibodies to recognize OxLDL. This masking phenomenon reflects activity of multiple anti-oxidation mechanisms in plasma which either destroy OxPL molecules or make them inaccessible to detection antibodies due to sequestration by serum proteins. The degree of masking (the difference between OxLDL standard recognition before and after incubation with patients' plasma) was significantly reduced in smokers and patients with family history of coronary artery disease for the antibody recognizing phosphatidylcholine group on OxPL, in patients with acute coronary syndrome and diabetes for the antibody recognizing phosphatidylethanolamine group on OxPL, and in hypertension for both antibodies.

Conclusions: Protective capacity of plasma against OxPL is reduced in hypertension and several other pathological states. Insufficient protection against adverse effects of OxPL might contribute to pathogenesis of hypertension.

PP.01.38 GLOBAL CARDIOVASCULAR RISK IN ADULTS INFECTED WITH HUMAN IMMUNODEFICIENCY VIRUS (HIV)

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Objective: We describe the cardiovascular (CVS) risk factors in an urban population of HIV patients and assess their global CVS risk through different methods.

Design and method: Preliminary results of observational, cross-sectional cohort study, which included 250 randomized patients from local HIV- AIDS program in the province of Córdoba, Argentina. Routine clinical examination was performed with oscillometric blood pressure measurement in office. Lipid profile, creatinine and high- sensitive C-reactive protein (hsCRP) was measured. CD4 + T lymphocytes cells (TLCD4+) levels were measured by cytometer. 24-h creatinine clearance (CrCl) was measured. For diagnosis of hypertension and relative CVS risk, values of ESH guidelines 2013 were used. A sub- analysis reclassifying patients from moderate - high risk to high risk was performed, if hsCRP levels were above 3 mg / L. Absolute CVS risk score was calculated according to D:A:D score, a specific HIV model, considering high risk score of 10% or greater.

Results: 31 patient, 18 (58%) male, mean age 46.1 (27-63) years. The mean level of TLCD4+ was 470.7 ± 238 cells/mm ^{3}. 25 (80.6%) patients were treated with HAART, including 4 (16%) were receiving protease inhibitors. The average office BP was 136.8 ± 17.9 / 84.8 ± 11.7 mmHg (systolic / diastolic), BMI 26 ± 5.3 and waist circumference 90.5 ± 14 (cm). Total Cholesterol levels were 181.6 ± 43.7; LDL 106,5±35,1; HDL 44,6±13,3; TG 136,4±81 (all mg/dl). There were no patients with CrCl < 60ml/min or diabetics. hsCRP levels were 4.4 ± 4.1 mg /L. Table 1 shows CVS risk factor prevalence. There were no high-risk patient with D.A.D score, while 5 (16%) met the ESH guidelines criteria for high-risk, this increased to 8 (25%) when hsCPR was considered.

Conclusions: There is a high prevalence of traditional cardiovascular risk factors in HIV patients. A significant proportion of this population is at high CVS risk according to the relative risk from ESH guidelines while the D: A: D underestimate high-risk patients. Future prospective studies should determine the usefulness of non-traditional methods to reclassify the CVS risk in this population.

Table 1. Prevalence of CVS risk factor in HIV patients

	n	Prevalence %
Hypertension	14	45,1
Overweight	6	19,4
Obesity	10	32,3
Dyslipidemia	18	58,1
Hypertriglyceridemia	10	32,3
Smoking	13	41,9
Ilicits drugs use	5	16,1
hsCRP > 3mg/L	13	41,9
≥3 risk factors	14	45,2

PP.01.39 THE POLYMORPHISM C677T OF METHYLENETETRAHYDROFOLATE REDUCTASE, MAY INFLUENCE FUTURE CARDIOVASCULAR RISK IN PREVIOUSLY PREECLAMPTIC WOMEN

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Objective: To study the association of MTHFR C677T polymorphism with development of future hypertension in previously preeclamptic women compared with pregnant normotensive women.

Design and method: The sample consists of 170 women that were studied 2 to 16 years after pregnancy being 90 with pregnancy hypertension (HBP), and 80 normotensive (NT) also during pregnancy. Demographic, anthropometric and cardiovascular risk biomarkers such as leucocytes, lipid profile, myeloperoxidase (MPO) and nitrites were studied. The methylenetetrahydrofolate reductase (MTHFR) genotypes were evaluated by PCR-RFLP using DNA extracted from peripheral blood. Statistical analysis (Anova, t Student, X2 tests) was performed using SPSS vs 20.0.

Results: We observed that 47,7% of previously preeclamptic women, developed hypertension 2 to 16 years after pregnancy versus 10,3% of women without preeclampsia ($p<0,001$). Only the previously HBP women and not the NT ones, with genotypes CC+CT, present higher systolic and diastolic blood pressure means ($p<0,001$) and also higher IMC, waist and waist/hip ratio ($p= 0,03$, $p=0,02$ and $p=0,03$ respectively). Also the inflammatory markers (leucocytes, ApoB, MPO and nitrites) were significantly higher in previously preeclamptic women in CC+CT genotypes ($p=0,04$, $p=0,035$, $p=0,004$ and $p<0,001$ respectively) compared with normotensive ones. The TT genotype of MTHFR presented a lower frequency in preeclamptic women compared with the other genotypes ($p=0,001$) and also in the women that developed later hypertension ($p<0.001$).

Conclusions: The methylenetetrahydrofolate reductase may modulate blood pressure and cardiovascular risk not only during, but also years after pregnancy. Since TT individuals may present DNA hypomethylation due to a decreased activity of the homocysteine remethylaton pathway, TT genotype with increased expression of antioxidant enzymes, may be a protective factor for development of future hypertension in previously preeclamptic women.

PP.01.40 THE RISK GENOTYPES OF ENDOTHELIAL NITRIC OXIDE SYNTHASE AND HAPTOGLOBIN AND ITS INTERACTION MAY CONTRIBUTE FOR HYPERTENSION AND HEART FAILURE

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Objective: To study the association of endothelial nitric oxide synthase (eNOS) and Haptoglobin (Hp) polymorphisms and its interactions, with hypertension and co-morbidities as obesity and heart failure.

Design and method: A sample of 287 subjects aged (mean ± SD) 56.15 ± 16.30 years were studied. In this sample 80.8% were female and 52.7% were normotensive (NT) vs 47.3% hypertensive (HBP). They were divided into normal weight (NW), overweight (OW) and obese (OB) subgroup. According to the ejection fraction (EF), subjects were divided into 2 subgroups: EF >34 (42.9%) and <=34 (57.1%). Mean ± SD of EF in both groups were respectively: 43.49 ± 10.57 and 29.24 ± 4.84. The eNOS polymorphism was determined by PCR. The phenotype of Hp was determined by PAGE. The statistics methods were Chi-square, t-student and ANOVA.

Results: Considering the obesity degree, there were significant differences in distribution between the subgroups of NT (NW 82.3%, OW 72.5% and OB 61.7%) and HBP (NW 17.7%, OW 27.5% and OB 38.3%) ($p = 0.04$, $X2 = 6.45$, $df = 2$). The distribution of eNOS genotypes was significantly different between NT and HBP patients. Considering NT vs HBP was observed for genotypes: AA 4.8% vs 21.2%, BA 31.5% vs 56.9% and BB 63.7 vs 21 9%, respectively ($p <0.001$). The BB genotype was less frequent in HBP patients, compared with the other eNOS genotypes ($p <0.001$). The distribution of eNOS genotypes varied significantly between subjects with EF >34 vs <=34 respectively for AA 33.3 vs 14.3%; BA 38.1 vs 75% and BB 28.6 vs 10.7% ($p = 0.034$). The distribution of eNOS genotypes did not vary significantly according to BMI subgroups ($p = 0.299$) neither to gender ($p = 0.496$). The interactive association of risk genotypes (Hp 2-2 and eNOS AA+BA) were more frequent in hypertensive subjects (88.8%) than in normotensive ones ($p= 0.047$).

Conclusions: The eNOS genotypes of A/B polymorphism were associated with hypertension and heart failure, regardless degree of obesity and gender. Hp 2-2 which is related with greater NO inactivation, could contribute to hypertension risk.

PP.01.41 EFFECTS OF CHRONIC SMOKING ON ARTERIAL STIFFNESS IN HEALTHY PEOPLE

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Objective: Smoking is a modifiable cardiovascular disease (CVD) risk factor and is closely related with arterial stiffness (AS), which is an independent CVD risk factor. However, the chronic effects of smoking have been controversial, and data are relatively lacking regarding its effects on AS in ex-smokers (ES), who face remnant risk compared to never-smokers (NS).

Design and method: We recruited 678 relatively healthy men from 1722 subjects who underwent a health examination from September 2009 to November 2010 in Korea. To assess AS, the corrected augmentation index (AIx@HR75) and pulse pressure amplification (PPamp) were measured and compared according to smoking status.

Results: The baseline characteristics were similar among groups except age and triglyceride level. AS was significantly increased in current smokers (CS) compared to that in both the ES and NS. Overall, AIx@HR75 and PPamp did not differ between the NS and ES. Smoking duration was associated with AS in the ES, and subanalysis showed that long-term ES (LTES, >=20 years of smoking) had significantly increased AS compared to both short-term ES (STES, <20 years) and NS. The LTES had AS comparable to the CS despite lower CVD risk scores.

Conclusions: Long-term smoking can cause irreversible AS even after smoking cessation. Premature AS can be used as a supplementary measure for better risk stratification in this specific population, and further study is needed to determine its clinical implication.

PP.01.42 CARDIOVASCULAR RISK IN METABOLIC SYNDROME: CONTRIBUTION OF ULTRASONOGRAPHY

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Objective: The aim of this work is to evaluate cardiovascular risk factors related to the MetS with special regards to the contribution of ultrasonography to the definition of prognosis in these patients.

Design and method: 404 patients (F 203, mean age 56,9; M 201, mean age 53,6) admitted for the evaluation of MetS (NCEP ATP III, 2001) have been enclosed. The diagnosis of MetS was confirmed in 309 patients. All patients underwent a clinical and biochemical evaluation, and to abdominal (steatosis, regional distribution of fat) and cardiac ultrasonography and evaluation of intima media thickness. Data are M+SD. Comparison between means and frequency and multivariate logistic analysis were ruled out.

Results: Patients with and without MetS, among others factors, differed for waist circumference [110.62(11.71)vs102.78(13.14)], HDL chol [40.61(9.69) vs52.35(11.10)], glycemia [119.88(41.68)vs95.22 (21.15)], US visceral fat (mm) [84.60 (85.07)vs64.71 (28.81)], HOMA test [7.55 (6.42)vs3.43 (2.99)], microalbuminuria [74.62 (277.64)vs24.94 (51.14)], systolic pressure [136.53 (15.65)vs130.18 (15.99)], tryglicerides [185.62 (163.61)vs101.92 (39.37)]. Patients with (n=368) and without (n=36) steatosis, among others, differed for US preperitoneal fat [14.46 (13.24)vs12.01 (6.19)], US subcutaneous fat [17.17 (12.83)vs13.60 (4.73)], US visceral fat [82.85 (78.86)vs50.51 (26.24)], HOMA test [6.93 (6.13)vs1.86 (1.42)], tryglicerides [171.51 (153.21) vs109.03 (67.05)]. Patients with (n=107) or without (n=297) microalbuminuria, among others, differed for HDL chol [40.60 (10.00)vs44.34 (11.44)], glycemia [129.43(44.16)vs108.64(35.91)], US steatosis grade [1.38 (0.72) vs1.11 (0.70)], US visceral fat [81.07 (25.63)vs79.57 (87.48)], HOMA test [8.81 (7.25)vs5.80 (5.37)]. Multivariate logistic analysis (O.R., 95% OR CI) showed for: MetS, a correlation with systolic pressure (1.04, 1.01-1.06), glycemia (1.04, 1.02-1.07), tryglicerides (1.01, 1.01-1.02), HDL chol (0.92, 0.88-0.95); steatosis, a correlation with HDL chol (0.96, 0.92-1.00), LDL chol (1.03, 1.01-1.05), US visceral fat (1.03, 1.01-1.06), insulin levels (1.14, 1.04-1.24); microalbuminuria, a correlation with RCV PROCAM (1.02, 1.00-1.03) and the diagnosis of MetS (1); cardiovascular risk, a correlation with HDL chol (0.91, 0.88-0.94), LDL chol (1.02, 1.01-1.03), age (1.15, 1.10-1.19), subcutaneous fat (0.91, 0.86-0.96), diabetes (4.80, 2.52-9.14).

Conclusions: Our data show that US regional fat distribution study has a predictive value for steatosis, microalbuminuria and cardiovascular risk higher than the waist circumference in patients with MetS.

PP.01.43 SMOKING AND PHYSICAL ACTIVITY IN RUSSIAN POPULATION: RELATION TO CARDIOVASCULAR RISK FACTORS

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Objective: Smoking and low physical activity are listed among main risk factors of cardio-vascular diseases (CVD). The aim of our study is to estimate the association between smoking, physical inactivity and classical cardiovascular risk factors in Russian population.

Design and method: As a part of all-Russian epidemiology survey ESSE-RF random sampling of 1600 Saint-Petersburg inhabitants stratified by age and sex was involved. All subjects signed informed consent and filled in questionnaire regarding physical activity, smoking, education. Anthropometry (weight, height with body-mass index (BMI) calculation, waist circumference), blood pressure (BP) measurement (two times on right hand in sitting position with calculation of average level) and fasting blood-tests (lipids, uric acid, glucose, creatinine (Abbott Architect 8000 (USA), Roche-diagnostics), adiponectin, leptin (Cobas Integra 400 plus (Switzerland), Roche-diagnostics) were performed.

Results: All subjects were divided in 4 age-related groups (25-35 years, 36-45, 46-55 and 56-65). 48,5% had University education. Optimal physical activity (walking >300 min/week) had 27,8%; 21,3% of them marked physical inactivity during working day. 50,6% of subjects were non-smokers, 24,7% ex-smokers and 24,7% - current smokers. The youngest age group had the most “unhealthy” lifestyle – smoking 31% and sedentary lifestyle 55%, compared to oldest age group (18,4% and 42% respectively). Subjects with optimal level of physic activity in total group had significantly higher adiponectin level (10,8±8,9 ng/ml and 9,3±8,2 ng/ml, p=0,001).

Subjects with obesity according to waist circumference (>102 sm for men and >88 sm for women) smoke more frequent compared to lean subjects (27% vs 22%, p=0,02). Smokers comparing with non-smokers had significantly lower levels of high density lipoproteins (HDL) (0,84±0,47 mmol/l and 0,94±0,42 mmol/l, p<0,0001), leptin level (13,0±13,9 ng/ml and 17,0±18,9 ng/ml, p<0,001) and higher triglycerides (1,00±1,04 mmol/l and 0,88±1,00 mmol/l, p=0,01), and uric acid (313±96 mmol/l and 298±91 mmol/l, p=0,01).

Conclusions: In general, low level of physical activity and high prevalence of smoking were detected in the SPb inhabitants, especially in the young. Smoking was associated with lipid abnormalities, especially low HDL, while sedentary lifestyle was accompanied by low adiponectin level.

POSTERS' SESSION

POSTERS' SESSION PS02
BLOOD PRESSURE MEASUREMENT

PP.02.01 EARLY MORNING ISOLATED SYSTOLIC HYPERTENSION IN THE ELDERLY

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Objective: Most people >= 65 years commonly have isolated systolic hypertension (ISH), it has also proved to be an important factor in hypertensive complications. Morning hypertension and home 24-hour blood pressure (BP) measurement has been recommended in patients with target organ damage.Our aim was to assess whether an increased early morning BP surge, in treated elderly hypertensive's is related to more prominent target organ damage.

Design and method: 310 treated hypertensive patients were divided into 2 major groups systolic/diastolic blood pressure hypertension (n=266) and ISH (n=44 76 ±10 yrs). The ISH group (n=44) was further subdivided into 2 minor groups 35 nondippers and 9 dippers. EMBPS (early morning blood pressure surge), the main predictor of hypertensive target organ damage, was defined as peak BP or the average BP during morning period (4-6am early morning hours, 124.08 ± 21.91 mmHg) minus average BP during the sleep period (average of lowest 3 sleep values, 145.45 ± 22.14 mmHg), (mean 22.74 ±11.92 mmHg, P<0, 01). A cut off for the top decile of sleeptrough surge (37-50mmHg, n=4: the, morning surge group) versus all others (n=31: the nonsurge group).

Results: Females had an early morning surge rise in nondippers (ND) more than males. Hyperlipidemia arises equally in Dippers (D) and ND, 45% of ND had DM; 30 % suffered previous renal insufficiency and about 29 % of patients suffered from an endocrine disorder. Metabolic syndrome (MS) was only found to be associated with a ND pattern (3%). Left ventricular hypertrophy was in a 100% of patients, heart failure in 60% ND and 56% D, potential renal insuff in 34% ND and 22% D, retinopathy in 31% ND and 11% D, aortic aneurysm was only in ND. D suffered fewer cases of stroke and myocardial infarction than ND. Higher cases of stroke where reported in the EMS group than the NS group.

Conclusions: Early Morning Surge (EMBPS) is a predictor of hypertensive target organ damage.
A dipper or nondipper patient with ISH might not make a difference depending on one's own degree of target organ damage.

PP.02.02 INTRA-FAMILIAL AGGREGATION AND INHERITANCE OF WHITE-COAT EFFECTS IN A COMMUNITY OF AFRICAN ANCESTRY: IMPLICATIONS FOR GENETIC ASSOCIATION STUDIES

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Objective: An inability to show consistent relationships between gene variants and blood pressure (BP) may be confounded by the use of office BP measurements which, in-part, reflect white-coat effects. Whether white-coat effects are genetically predetermined is unknown.

Design and method: We therefore aimed to determine the intra-familial aggregation and inheritance of white-coat BP effects in 592 participants of 198 families (67 spouse pairs, 361 parent-child pairs and 169 sibling-sibling pairs) with 12 families including three generations from an urban developing community of black Africans. Nurse-derived office (mean of 5 measurements according to guidelines) and 24-hour ambulatory BP were measured. White-coat effects were defined from office minus day BP values. Heritability estimates were determined from SAGE software.

Results: 17.6% of participants showed an isolated increase in office BP. With adjustments for confounders, office (h2=0.35±0.09, p<0.0001) showed comparable heritability estimates as 24-hour (h2=0.33±0.09, p<0.0001) systolic BP (SBP). Similarly, with adjustments for confounders, office (h2=0.37±0.09, p<0.0001) showed comparable heritability estimates as 24-hour (h2=0.35±0.09, p<0.0001) diastolic BP (DBP). However, independent of confounders, white-coat effects (office-day BP) showed significant intra-familial aggregation and heritability (SBP; h2=0.51±0.10, p<0.0001, DBP; h2=0.37±0.09, p<0.0001), effects which persisted with further adjustments for office, day or day-night BP (p<0.0005 for SBP and DBP).

Conclusions: Although office and ambulatory BP may show similar heritability estimates, genetic associations with office BP may be confounded by the heritability of white-coat effects. The genetic factors that determine office BP may therefore not closely reflect the gene variants that influence BP-related cardiovascular risk.

PP.02.03 CROATIAN REGISTRY ON AMBULATORY BLOOD PRESSURE MONITORING (HRKMAT). PRELIMINARY REPORT ON BASIC CHARACTERISTICS OF STUDY POPULATION

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Objective: To analyse characteristics of the subjects included in the Croatian national registry on ambulatory blood pressure monitoring (ABPM).

Design and method: Out of 1637 subjects included so far in the national registry, data on 1399 participants (men 55%; median age 59) were analysed. ABPM was performed to each subject. Anthropometric measurements (height, weight, waist circumference) were determined and BMI was calculated. Medical history and data on ongoing medications were assessed. Office blood pressure (BP) was measured 3 times in a sitting position using sphygmomanometer, while heart rate (HR) was determined by palpation method; average values of the last two measurements of both variables were taken into consideration. ABPM was measured during normal working day.

Results: Median and interquartile ranges of height, weight, BMI, waist circumference of the whole were respectively: 170 (163-177), 83 (74-94), 28.7 (25.9-31.9), 99 (89-107). Office and ABPM BP and HR values are shown in table 1. Subjects reported using antihypertensive drugs as follows: one drug 13.4%, two 25.6%, three 26.1%, fo1ur 21%, and > 4 drugs 13.7%. Also 33.6% of participants were taking other medications apart from antihypertensives: 1 drug 12 %, 2 drugs 11% and 3 drugs 10.6% of subjects. BP control was achieved in 31.5% of patients. White coat hypertension (WCH) was diagnosed in 22.2% of hypertensives (42.1% men, median age 56.5 (19-88); masked hypertension (MH) was diagnosed in 23.7% of hypertensives (83.9% men, median age 23 (20-86). Subjects with WCH were older than those with MH (p < 0.001).

Table 1. Median and interquartile ranges of the observed variables

	Systolic BP	Diastolic BP	Heart Rate
Office	143 (130-160)	90 (80-100)	72 (64-78)
24 ABPM	127 (119.5-135)	74 (68-82)	71 (64,5-77)
Day-time ABPM	130.5 (123-140)	77 (71-85)	75 (67-82)
Night-time ABPM	119 (111-127)	67 (60-74)	63 (57,8-69)

Conclusions: BP control is poor in our cohort despite almost 90% were treated with drug combination. One third of hypertensive are regularly taking other medication what decreases overall adherence and effectiveness. Hypertensives have increased BMI and WC. In our registry WCH and MH represent a quite high percentage of patients with hypertension. Our analyses confirmed useful value of ABPM in regular clinical work. This first report from our registry confirmed its usefulness and results alert for action.

PP.02.04 AVERAGE 24H AMBULATORY BLOOD PRESSURE CONTROL AND NOCTURAL BLOOD PRESSURE FALL

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Objective: Ambulatory Blood Pressure Monitoring (ABPM) provides a better assessment of the response to treatment than does clinic Blood Pressure (BP). According to the ESH/ESC guidelines, goals of treatment for 24h ABPM are 125-130 mmHg systolic and < 80mmHg diastolic average BP. The distribution of patients between dippers and non dippers is conditioned by the limits of the blood pressure changes from day to night time. The aim of this study is to correlate the nocturnal BP fall and average BP control.

Design and method: We retrospectively review data of 167 hypertensive patients (124 women =74,3%, 43 men = 25,7%), mean age: 66 yrs, who underwent 24 h ABPM from March 2012 until June 2013. ABPM was recorded with Nissei DS-250 device, using auscultation and oscillographic methods simultaneously and BP was measured at 30 min. intervals for 24 hours. All patients had essential hypertension and all of them received drug therapy. The hypertensive ones with a nocturnal reduction in average daytime systolic and diastolic blood pressure of less than 10% are classed as non–dippers. Pearson's and Spearman correlation measurement and 2x2 tables were made.

Results:

Isolated SYSTOLIC BP and DIPPERS

		DIPPERS		Total
		YES	NO	
yst BP	**<130**	**43 ***	69	112(67%) **
	>=130	10*	45	55(33%)
Total		53	114	167

*r = .204, df=165, p<0.01 **p<0.05

Isolated DIASTOLIC BP and DIPPERS

		DIPPERS		Total
		YES	NO	
diast BP	<80	**39**	67	106(63,5%)**
	>=80	**14**	47	61(36,5%)
Total		53	114	167

SYSTOLIC – DIASTOLIC BP and DIPPERS

DIPPERS			BP DIASTOLIC <80	BP DIASTOLIC >=80	Total
YES	BP SYSTOLIC	**<130**	**32*****	11	43
		>=130	7***	3	10
	Total		39	14	53
NO	BP SYSTOLIC	**<130**	**42*****	27	69
		>=130	25***	20	45
	Total		67	47	114

***(n/s, p=0.065)

Conclusions: 1. Significantly more patients that underwent 24h ABPM had average isolated Systolic BP <130mmHg or Diastolic BP< 80mmHg. 2. Less than half of the patients, in total, had average 24h BP < 130/80 mmHg. 3. The hypertensive ones with average systolic BP<130 mmHg had significantly positive correlation to be dippers. 4. The hypertensive ones with average diastolic BP<80 mmHg had positive but no significantly correlation to be dippers.

PP.02.05 PREVALENCE OF DIPPERS - NON DIPPERS HYPERTENSIVE PATIENTS WITH AND WITHOUT TYPE II DIABETES MELLITUS, IN A REGIONAL HOSPITAL IN NORTHERN GREECE

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Objective: The distribution of patients between dippers and non dippers is conditioned by the limits of blood pressure (BP) changes from day to night time. The lack of nocturnal decline in blood pressure is frequent in patients with type II diabetes mellitus (DM). However, the actual prevalence of a non – dipping pattern in DM is highly variable among different studies.

Design and method: We retrospectively review data of 486 hypertensive patients (366 women =75,3%, 120 men = 24,7%), mean age: 66 yrs, who underwent 24 h ambulatory blood pressure monitoring (ABPM) from January 2010 until June 2013. Diabetes Mellitus had 81 (16,66%) patients and 405(83,33%) had no DM. ABPM was recorded with Nissei DS-250 device, using auscultation and oscillographic methods simultaneously and BP was measured at 30 min. intervals for 24 hours. All patients had essential hypertension and all of them received drug therapy. The hypertensive ones with a nocturnal reduction in average daytime systolic and diastolic blood pressure of less than 10% are classed as non–dippers. We analyzed the prevalence of dippers/non- dippers in relation of diabetes mellitus, irrespectively of hypertension or diabetes control. Pearson's and Spearman correlation measurement and 2x2 tables were made.

Results:

DIPPER –TYPE II DIABETICS

		TYPE II DIABETES MELLITUS		Total
		YES	**NO**	
DIPPER	**YES** Count	15	141	156
	YES % within DIPPER	**9,6%***	**90,4%**	100,0%
	NO Count	66	264	330
	NO % within DIPPER	**20%***	**80%**	100,0%
Total	Count	**81**	**405**	**486**
	% within DIPPER	16,7%	83,3%	100,0%

*r= -.130, df=484, p<0.01

Conclusions: Results from this study, on hypertensive patients with and without diabetes mellitus evaluated by 24h continues ABPM, indicated that diabetic patients had significantly negative correlation to be dippers. It means that, in our population, we strongly respect diabetic hypertensive patients to be non-dippers.

PP.02.06 PREVALENCE OF DIPPERS – NON DIPPERS HYPERTENSIVE PATIENTS, ACCORDING TO SEX AND SMOKING, IN A REGIONAL HOSPITAL IN NORTHERN GREECE

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Objective: The distribution of patients between dippers and non dippers is conditioned by the limits of blood pressure (BP) changes from day to night time. The clinical significance of the dippers/non-dippers classification is the different levels of cardiovascular risk and complications. It is considered that the majority of people have a dipping nocturnal pattern, and nocturnal decreasing of BP is independent of sex, but has positive correlation with smoking.

Design and method: We retrospectively review data of 501 hypertensive patients (372 women =74,3%, 129 men = 25,7%), mean age: 66 yrs, who underwent 24 h ambulatory blood pressure monitoring (ABPM) from January 2010 until June 2013. ABPM was recorded with Nissei DS-250 device, using auscultation and oscillographic methods simultaneously and BP was measured at 30 min. intervals for 24 hours. All patients had essential hypertension and all of them received drug therapy. The hypertensive ones with nocturnal reduction in average daytime systolic and diastolic blood pressure of less than 10% are classed as non–dippers. We analyzed the prevalence of dippers/non- dippers in relation to sex and smoking. Pearson's and Spearman correlation measurement and 2x2 tables were made.

Results: Dippers were 31,74% (159 /501) and non-dippers 68,26% (342/501) in total. Of women dippers were 35,48% (132 /372), vs 20,93% of men (27/129) r =0.239, df = 409, p<0,01. Smokers were 7,2% (36/501), no smokers 89,8% (450/501) and patients with no data for smoking 3% (15/501). For smokers, dippers were 25% (9/36) vs 75% (27/36) that were non dippers. For no smokers, dippers were 32,66% (147/450) vs 67,33% (303/450) that were non dippers (p= ns).

Conclusions: 1. There is a high percentage of non dippers in our population 2. Women had significantly positive correlation to be dippers. 3. Smokers had no significantly negative correlation to be dippers (maybe because of the small number of smokers in our sample).

PP.02.07 RELATIONSHIP OF CENTRAL, OFFICE AND 24-HOUR BLOOD PRESSURE VALUES WITH TARGET ORGAN DAMAGE IN PATIENTS WITH MILD TO MODERATE ARTERIAL HYPERTENSION

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Objective: Most studies have shown that levels of central (cSBP), office (ofSBP/ofDBP), average ambulatory (avSBP/avDBP) blood pressure are different and they provide different effects on target organ damage and prognosis. The purpose of this analysis was to evaluate the role of cSBP, ofSBP/ofDBP, avSBP/avDBP in target organ damage of heart and peripheral vessels.

Design and method: We included 44 patients with mild to moderate arterial hypertension (mean SBP 150,98±3,21 mmHg, mean DBP 91,44±2,49 mmHg; BMI 28,98±1,36; age 45±3,8), 22 men and 20 women. The following diagnostic procedures were performed: office BP measurement, measurement of central BP, carotid-femoral (cfPWV) and carotid-radial (crPWV) pulse wave velocity measurement, ambulatory blood pressure monitoring, doppler echocardiography, ankle-brachial index (ABI) measurement. To assess the relationship between these values we used Spearman correlation analysis.

Results: We found that there was a significant correlation between ofSBP/ofDBP and end systolic and diastolic volumes (r=0.59, P=0.0002/r=0.47, P=0.005 and r=0.55, P=0.001/r=0.44, P=0.01), ofSBP and E/E' (r=-0.46, P=0.007), cfPWV (r=-0.43, P=0.004). Also office SBP significantly correlated with mitral and aortic direct gradients (r=0.38, P=0.03, r=0.36, P=0.027). avSBP significantly correlated only with left ventricular mass index (r=0.43, P=0.017), avDBP correlated with ejection fraction (r=0.47, P=0.007). However cSBP significantly correlated with end systolic and end diastolic volumes (r=0.35, P=0.043 and r=0.34, P=0.05), ejection fraction (r=0.36, P=0.036), left and right atrium volumes (r=0.41, P=0.017 and r=0.44, P=0.011), E/E' (r=0.37, P=0.034), crPWV (r=0.5, P=0.001), cfPWV (r=0.6, P=0.00002) and ABI asymmetry (r=0.4, P=0.04).

Conclusions: As we can see the most frequently target organ damage markers correlated with cSBP and the most strong and significant this correlation was with peripheral vessel damage markers. Furthermore cSBP significantly correlated with volume of right and left atriums, which can be used for prediction atrium remodeling and possibly risk of arrhythmias.

PP.02.08 REPRODUCIBILITY OF THE NEW COMPLIOR® ANALYSE ESTIMATING CENTRAL ARTERIAL PRESSURES

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Objective: The aim of this study was to assess the inter- and intra-observer reproducibility, as well as the temporal variability of the new Complior®Analyse assessing central arterial pressures through carotid pulse wave analysis (PWA).

Design and method: Eighty-seven participants (60% men) with a mean age of 34.26±16.58 years, were enrolled in a cross-sectional study. All patients were submitted to sequential measures of carotid PWA by 2 experienced operators. In a group of 27 subjects, PWA was also determined 1 month after the first moment evaluation to address the temporal stability of the PWA estimations with the device.

Results: The analysis of concordance revealed a very good agreement for paired PWA values, regarding both the intra- and inter-observer variability and also the temporal variability. The intra-observer's intra-class correlation coefficients (ICC) were 0.97 (IC:0.96-0.98, p<0.0001), 0.98 (IC:0.97-0.99, p<0.0001) and 0.86 (IC:0.77-0.90, p<0.0001), respectively for central systolic (cSBP), pulse pressure (cPP) and augmentation index (AiX). For inter-observer analysis, the ICCs were 0.98 (IC:0.97-0.99, p<0.0001), 0.98 (IC:0.97-0.99, p<0.0001) and 0.85 (IC:0.77-0.89, p<0.0001). For temporal reprofucibility, ICCs of 0.98 (IC:0.96-0.99, p<0.0001), 0.96 (IC:0.92-0.98, p<0.0001) and 0.92 (IC:0.83-0.96, p<0.0001) were withdrawn for cSBP, cPP and AiX, respectively. Further evidences in favor of a good overall performance of the device were withdrawn from the Bland-Altman analysis, with small mean differences for intra-, inter- and temporal reproducibility, for the three major parameters. The observed correlations were independent of gender, age, arterial pressure, heart rate and body mass index.

Conclusion: The data demonstrated an excellent reproducibility of the Complior® Analyse for the assessment of central hemodynamic parameters, when used in ideal conditions and by experienced observers. The technical profile depicted demonstrates that this device meets the quality requirements for its inclusion in integrated clinical follow-up programs, particularly regarding central arterial pressure estimations.

PP.02.09 REPRODUCIBILITY OF AORTIC PULSE WAVE VELOCITY AS ASSESSED WITH THE NEW COMPLIOR® ANALYSE

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Objective: The aim of this study was to assess the inter- and intra-observer reproducibility, as well as the temporal variability of the new Complior®Analyse assessing aortic pulse wave velocity (PWV).

Design and method: Eighty-seven participants (60% men) with a mean age of 34.26±16.58 years, were enrolled in a cross-sectional study. All patients were submitted to sequential measures of aortic PWV by 2 experienced operators. In a group of 27 subjects, PWV was also determined 1 month after the first moment evaluation to address the temporal stability of the PWV estimations with the device.

Results: The analysis of concordance revealed a very good agreement for paired PWV values, regarding both the intra- and inter-observer variability and also the temporal variability. The intra-class correlation coefficients were above 0.98 for the 3 conditions (P <0.0001), indicating an excellent strength of agreement. Further evidences in favor of a good overall performance of the device were withdrawn from the Bland-Altman analysis, with small mean differences for intra-, inter- and temporal reproducibility (respectively, 0.02.±0.38m/s, 0.10.±0.45m/s and 0.07.±0.51m/s), and with differences mainly located between two standard-deviations of the mean difference. The observed correlations were independent of gender, age, arterial pressure, heart rate and body mass index.

Conclusion: The data demonstrated an excellent reproducibility of the Complior® Analyse for the assessment of aortic PWV, when used in ideal conditions and by experienced observers. The technical profile depicted demonstrates that this device meets the quality requirements for its inclusion in integrated clinical follow-up programs.

PP.02.10 DEFINING ARTERIAL HYPERTENSION USING OFFICE BLOOD PRESSURE MEASUREMENTS

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Objective: Our study aims to evaluate the proper way to use office blood pressure measurements for a more accurate diagnosis of arterial hypertension.

Design and method: One thousand nine hundred seventy five adult Romanian subjects were included between October 2011 – March 2012 in SEPHAR II representative cross-sectional survey (69% response rate, 52.6% females) aimed to determine hypertension's prevalence, treatment and control.
During the two study visits (5-7 days apart) each enrolled subject performed three blood pressure measurement using an validated automatic oscillometric BP measuring device according to current ESH-ESC guidelines.
Blood pressure values were defined by 3 methods: mean of the first and the second measurement, mean of the second and the third measurement and the mean of all three measurements respectively.
Arterial hypertension was defined by blood pressure values >= 140/90mmHg at both study visits in those without a previously diagnosed hypertension.

Results: Using BP values defined by the mean of the fist and the second measurement resulted in a statistically significant higher proportion of HT (646 cases, 32,7%) compared with the ones obtained using the average of the second and the third measurement (578 cases, 29,3%) or the average of all three measurements (605 cases, 32,7%).
At both study visits, the first blood pressure measurement was significantly higher than the second and the third, while the difference between the second and the third was less significant, both for systolic and for diastolic values. The same differences were noted for heart rate measurements (Table 1).
As a consequence, the amount of variability introduced by the first measurement significantly higher then the variability of the second and the third measurement (Table 2).

Table 1. Systolic and diastolic blood pressure values

	1st	2nd	3rd	p*
V1 SBP	137.76±24.66	133.89±23.51	132.76±23.05	<0,0001
V1 DBP	83.61±13.22	82.95±12.75	82.17±12.73	<0.0001
V2 SBP	135.36±23.62	132.18±22.26	130.98±21.64	<0,0001
V2 DBP	82.41±12.31	81.76±11.99	81.08±11.78	<0.0001
V1 HR	75.83±12.02	75.29±11.75	74.95±11.44	0.034
V2 HR	75.05±11.5	74.01±10.94	73.01±10.90	<0.0001

Data are presented as mean±sd (range), SBP: systolic blood pressure, DBP: diastolic blood pressure, V1: fist study visit; V2: second study visit, HR: heart rate, 1st: first measurement, 2nd: second measurement; 3rd: third measurement, * p value calculated using independent samples t test.

Table 2. Standard deviation of systolic and diastolic blood pressure values

	1st+2nd	1st+2nd+3rd	2nd+3rd	p*
SBP_sd_V1	5.36±4.98	5,79±4.33	4.23±4.32	<0,0001
SBP_sd_V2	4.89±4.74	5,26±4.11	3.72±3.88	<0,0001
DBP_sd_V1	3.24±3.38	3.64±3.09	3.72±3.88	<0,0001
DBP_sd_V2	3.08±3.25	3.49±2.81	2.75±2.82	<0,0001

Data are presented as mean±sd (range), SBP: systolic blood pressure, DBP: diastolic blood pressure, sd: standard deviation, V1: fist study visit; V2: second study visit, 1st: first measurement, 2nd: second measurement; 3rd: third measurement, * p value calculated using independent samples t test.

Conclusions: The first office blood pressure measurement has higher values probably due to the anxiety induced by the blood pressure measurement procedure and the medical enviroment.
Using this first measurement can lead to an overestimation of the arterial hypertension diagnosis.
Our results suggest that this source of byas can be minimalized by using the average of the second and the third blood pressure measurements, discarting the first measurement values.

PP.02.11 MEASUREMENT OF BLOOD PRESSURE IN THE VALENCIAN COMMUNITY PHARMACIES

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Objective: Know-how is being performed blood pressure measurement in Valencian Community pharmacies.

Design and method: Survey sent to owners of the pharmacies in the Valencian Community.

Results: 172 pharmacists responded at December 31 2013 (36.6% Valencia, 40.7% Castellón and 22.7% Alicante), 64% women and 36% men, with a mean of 19.63 ± 10.11 years of experience. Professionals in the province of Castellón were those with fewer years of experience, average 16.37, up from Alicante professionals who have an average experience of 25.62 years.
The types of devices used to measure blood pressure was: 34 mercury (19.77%) 33 aneroid (19.19%), 158 automatic arm (91.86%) and 22 automatic wrist (12.79%). 43% of the pharmacies have several types of devices, the most frequent combination with a number of 24 (13.95%) was automatic arm and mercury.
For taking blood pressure in the pharmacies, 94.8% is performed with the patient sitting, 1.7% with the patient lying down and 1.2% with the patient standing. A 2.3% reported making no use of a systematic way.
At the number of measures the pharmacist considers appropriate, 40.7% consider that only one, 31.4% always takes two measurements, 20.3% believe that measures should always have 3 and 1.2% provided more than 3. The 6.4% reported making a second measure if the first is altered.
The 68% of pharmacies have obese size blood pressure cuff. But only the 4.7% measures the arm circumference before choosing the right size cuff, compared to the 5.2% that usually makes this measure and the 41.3% which measures only sometimes. The 48.8% never measure the arm.

Conclusions: The high number of completed surveys clearly indicates the high level of involvement of pharmacists in the management of hypertensive patients. Most centers have an appropriated tensometer, although the cuffs for obese are clearly underutilized in spite of considering a high incidence of obesity in the target population of the study.

PP.02.12 RELATIVELY LOWER CENTRAL AORTIC PRESSURE IN SUBJECTS WITH IMPAIRED INSULIN SENSITIVITY AND RESISTANCE: THE TOON HEALTH STUDY

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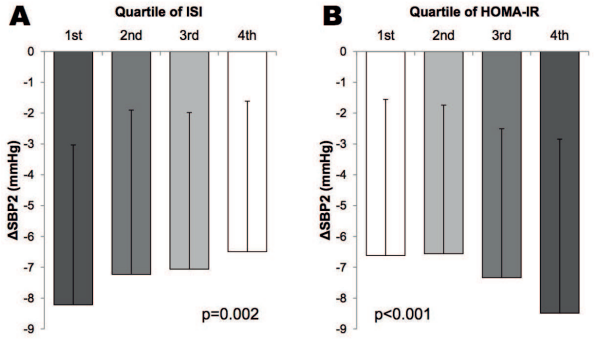
Objective: Central aortic blood pressure (BP) has been postulated to correlate more closely with cardiovascular disease risk than brachial cuff BP. However, the effect of insulin sensitivity and resistance on central BP is not fully understood. Here, we evaluated the associations between insulin sensitivity/resistance and central BP using the oral glucose tolerance test.

Design and method: A total of 1,034 Japanese participants were enrolled in this study. The absolute pressure of the late systolic peak (SBP2) of the brachial BP obtained by the radial waveform was considered to be the central systolic BP. Oral glucose tolerance test was performed by administering 75 g of glucose, and blood samples were obtained at 0, 60, 120 min after glucose loading.

Results: Mean SBP2 was found to be lower than mean brachial systolic BP (SBP) (119±20, 126±19 mmHg, p<0.001), and differences between SBP and SBP2 (δSBP2), i.e. pulse pressure (PP) amplification between central and brachial artery, were significantly larger in subjects with reduced insulin sensitivity (ISI: 8.2±5.2, 7.2±5.3, 7.1±5.1, and 6.5±4.9 mmHg, in the 1st, 2nd, 3rd and 4th quartiles, respectively; p=0.002) and increased insulin resistance (HOMA-IR: 6.6±5.1, 6.6±4.8, 7.3±4.8, 8.5±5.6 mmHg, p<0.001). Insulin sensitivity and resistance was also significantly associated with body mass index, fasting plasma glucose level, and baseline BP. However, multiple linear regression analysis identified reduced insulin sensitivity (β=-0.067, p=0.033) and increased insulin resistance (β=0.081, p=0.009) as significant determinants of the PP amplification after adjustment for the covariates.



Conclusions: Reduced insulin sensitivity and increased insulin resistance are generally cardiovascular risk factors. However, our results showed that impaired insulin sensitivity and resistance were associated with relatively lower central BP. We suggest measuring the SBP2 in individuals with impaired insulin action in order to accurately assess their risk of developing cardiovascular disease.

PP.02.13 ASSOCIATION OF CENTRAL VERSUS PERIPHERAL OFFICE BLOOD PRESSURE WITH LEFT VENTRICULAR MASS INDEX IN YOUNG INDIVIDUALS: A PILOT STUDY

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Objective: In the adults, central systolic blood pressure has been shown to be more closely related than brachial systolic BP with echocardiographic indices of left ventricular hypertrophy. However, this relationship has not been investigated in young individuals in whom peripheral systolic blood pressure may be elevated whereas central blood pressure is low.

Design and method: Untreated young individuals referred for blood pressure evaluation were subjected to: (i) simultaneous determination of office central and peripheral blood pressure using a non-invasive brachial cuff-based oscillometric device (Arteriograph, triplicate measurements), and (ii) echocardiographic left-ventricular mass index estimation.

Results: Twenty-five young individuals (20 males, mean age 15.3±3.7 years, range 9-25, body mass index 23.9±3.1 kg/m2, 9 with elevated peripheral office systolic BP) were included in the analysis. There was a trend towards a stronger association of left ventricular mass index with central systolic blood pressure than with brachial systolic blood pressure (r=0.23 versus r=0.08; z-statistic=0.5). In addition, there was a trend for an inverse association between left ventricular mass index and the absolute difference between brachial and aortic systolic blood pressure (r=-0.27).

Conclusions: This pilot study in young individuals suggests that central office systolic blood pressure tends to be superior to peripheral office blood pressure in terms of its association with left ventricular mass index. In addition, there seems to be an inverse association between left ventricular mass index and the brachial-central systolic blood pressure difference.

PP.02.14 COST ANALYSIS OF HOME BLOOD PRESSURE MONITORING VERSUS COMBINED CLINIC AND AMBULATORY MEASUREMENTS IN HYPERTENSION MANAGEMENT

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Objective: The monitoring of blood pressure (BP) at home (HBPM) is regarded as a reliable alternative to ambulatory BP monitoring (ABPM) and superior to office BP measurement. This study compared the resources consumed and subsequent costs for hypertension management using HBPM alone versus combined ABPM and office measurements.

Design and method: 116 untreated subjects with elevated BP were randomized to use either HBPM alone or ABPM and office measurements for antihypertensive treatment initiation and titration and followed for 12 months. The cost analysis involved measurement and costing of health resources consumed (outpatient visits, BP monitoring; antihypertensive treatment), which were calculated according to official NHS 2013 pricing.

Results: The total cost of the 1st year of hypertension management, regardless of the BP measurement method was 264.2 € per patient (BP measurements/outpatient visits: 43.9%, pharmaceuticals: 56.1%). The respective total cost in HBPM vs. ABPM group subjects was 230.9 vs. 298.6 €/patient (p<0.001). The cost of drug treatment did not differ between the two groups (143.9 vs. 152.9 €/patient respectively, p=NS), whereas the cost of BP monitoring was higher in the ABPM group (87.0 vs. 145.8 €/patient respectively, p<0.001). Assuming (a) continuation of stable treatment as in the end of first year, (b) single ABPM per year) (c) 2 visits/year in HBPM group and 3 in ABPM, the cost for subsequent years (>1) was estimated at 196.3 €/patient for the HBPM strategy vs. 211.1 for the ABPM (p=NS), or 1016.1 €/patient vs. 1143.2 respectively for a 5-year projection (p=NS).

Conclusions: ABPM and office BP measurement strategy for hypertension management had a 22.7% higher first year cost compared to HBPM alone, and a trend towards higher cost in 5-year projection. Estimating costs and resources used to manage hypertension is essential to the timely and proper planning of specialized services.

PP.02.15 SEASONAL VARIATION OF BLOOD PRESSURE: ASSOCIATION WITH CHANGES IN METEOROLOGICAL PARAMETERS AND PREDICTING FACTORS

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Objective: Blood pressure (BP) is affected by the seasonal temperature variation. This study investigated the relationship between the seasonal variation in clinic (CBP), home (HBP) and ambulatory blood pressure (ABP) with the corresponding changes in meteorological parameters and independent predictors of the BP changes.

Design and method: Hypertensive subjects on stable treatment were assessed in winter and summer with CBP (seated and erect), HBP (3 workdays) and ABP monitoring (24-hours). Meteorological indices derived from temperature, humidity and atmospheric pressure reflecting subjects' discomfort were evaluated. Symptomatic orthostatic hypotension was assessed using a questionnaire (score 0-34).

Results: Sixty-three subjects were analysed (mean age 65.1±8.7 [SD], 39 men, BMI 28.1±5.2 kg/m²). CBP, HBP and daytime ABP were lower in summer versus winter (mean differences 7.1±11.3/2.0±6.3, 5±6.2/2.8±4.2, 6.9±10.3/3.6±5.5 mmHg respectively, systolic/diastolic, p<0.01 for all), with no difference in nighttime ABP (-1.2±9.7/-0.5±6.2 mmHg, p=NS). Orthostatic hypotension symptoms tended to be more often in summer (mean score difference 0.7±2.5, p=0.06). The summer decline in CBP (seated and erect) was larger in women (p<0.05) and in subjects receiving diuretics (p<0.05), and there was a trend for those aged over 70 years (p=NS). The summer increase in temperature was correlated with the corresponding decrease in daytime ABP (r=0.37/0.31 systolic/diastolic, p<0.05). Likewise, seasonal differences in all the meteorological indices were correlated with seasonal differences in all ABP measurements (24h, daytime, nighttime; r range 0.29-0.44, all p<0.05). In multivariate regression analyses, the summer BP decline (%) was predicted by winter BP levels (for ABP, CBP), differences in meteorological indices (ABP, CBP), female gender (ABP, HBP), number of antihypertensive drugs (ABP) and diuretic use (CBP).

Conclusions: These data suggest that CBP, HBP and daytime ABP are significantly lower in summer compared to winter, whereas nighttime ABP remains unchanged. The seasonal BP changes were largely predicted by changes in meteorological parameters, as well as anthropometric and antihypertensive treatment characteristics.

PP.02.16 ASSOCIATION OF CENTRAL VERSUS PERIPHERAL SYSTOLIC BLOOD PRESSURE WITH PULSE WAVE VELOCITY IN CHILDREN AND ADOLESCENTS

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Objective: Studies in the adults have shown that central blood pressure (BP) appears to be superior to peripheral brachial BP in terms of association with target-organ damage. However, this issue has not been investigated in young individuals in whom peripheral BP elevation may be accompanied by low central BP. This study compared central versus peripheral BP in children and adolescents in terms of their association with arterial stiffness assessed by pulse wave velocity.

Design and method: Children and adolescents referred for suspected hypertension were subjected to simultaneous determination of peripheral and central systolic office BP, as well as pulse wave velocity using a non-invasive oscillometric device (Arteriograph; triplicate assessments).

Results: Fifty-five subjects (mean age 13.4±2.6 years, range 6-18, 44 males, body mass index 24.8±4.7 kg/m2, 12 with peripheral BP >95th centile were included in this analysis. Central systolic BP was closely correlated with peripheral systolic BP (r=0.82, p<0.01). The peripheral to central systolic BP ratio was higher in males compared to females (1.15±0.07 versus 1.13±0.04 respectively, p<0.05). There was a trend towards a stronger correlation with pulse wave velocity for central systolic BP (r=0.37, p<0.01) compared to peripheral systolic BP (r=0.31, p=0.02) that did not reach statistical significance (z statistic=0.4). In multivariate stepwise regression analysis with pulse wave velocity as dependent variable and age, gender, body mass index, heart rate, central and peripheral systolic BP as independent variables, only central BP along with age, body mass index and heart rate were identified as predictors of pulse wave velocity (R2=0.55).

Conclusions: In children and adolescents, central BP appears to be a stronger predictor of arterial stiffness than peripheral BP.

PP.02.17 A NEW METHOD FOR REFERENCE BLOOD PRESSURE MEASUREMENT: DIGITAL SPHYGMOCORDER II PILOT STUDY

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Objective: The mercury sphygmomanometer (MS) is being banned from clinical practice and its use is restricted as reference method for testing new blood pressure (BP) measurement technologies and devices. The Digital Sphygmocorder II (DSII) is a novel mercury-free device developed to replace the MS as a reference method for non-invasive BP measurement. It records and graphically displays Korotkov sounds and cuff pressure during BP measurement. An observer can replay these data and assess the BP values. A pilot study was conducted to validate the BP measurement accuracy of the DSII compared to a standard MS.

Design and method: A DSII prototype was connected (Y-tube) to 2 MS. Two observers independently and simultaneously assessed the auscultatory BP using the MS, while DSII was recording the BP data. In a second occasion each of the observers assessed BP by replaying the DSII data independently and blinded to the MS measurements.

Results: After several evaluations that resulted in repeated software modifications the final pilot study was based on 100 simultaneous BP measurements performed in 10 subjects (10 measurements/subject). Three diastolic BP readings were excluded due to non-evaluable recorded Korotkov V sound. Average entry BP (MS) was 118.0±14.2/74.5±10.7 mmHg (mean±SD systolic/diastolic; range 96-152/48-98 mmHg). The between observers difference using MS was 0.3±1.3/0.3±1.8 mmHg with absolute differences 0.7±1.1/1.3±1.3 mmHg, whereas using the DSII -0.1±0.9/0.3±1.4 mmHg and 0.3±0.9/0.8±1.2 mmHg respectively. The difference of observers' average BP obtained using the MS versus the DSII was -0.5±2.2/-0.3±2.0 mmHg with absolute difference 1.3±1.9/1.5±1.3 mmHg.

Conclusions: This pilot study suggests that the novel mercury-free device DSII developed to replace the MS as a standard for non-invasive BP measurement appears to have at least as good accuracy as the MS with superior inter-observer agreement, probably because it allows replay of each individual BP measurement. A formal validation study using a modified version of the European Society of Hypertension International Protocol has been designed.

PP.02.18 WHITE COAT HYPERTENSION SHOULD DOCTORS MEASURE BLOOD PRESSURE AT ALL?

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Objective: Objective of study was to determine a difference in the measurement of blood pressure by physicians versus nurses.

Design and method: A total number of 120 patients were included in prospective clinical trial. 75 were females and 45 males. Average age was 51.7 y: women 45.9 and 55.3 y males. Measuring blood pressure was first done by physician (Group 1), and 15 minutes later by study nurse (Group 2). Same subjects were classified into 2 subgroups, group 1 (1a and 1b): normotensive subjects and subgroups (2a and 2b): with arterial hypertension. Normotensives were 76 (subgroup 1a: BP measured by a doctor and 1b BP measured by nurses), and arterial hypertension was detected in 44 patients (subgroup 2a and 2b). Blood pressure was done with the same digital device with brahial cuff. Subjects with blood pressure over 140/90mmHg were considered hypertensive.

Results: Average value of systolic blood pressure in group 1 was 129.4 mmHg and diastolic 78.5 mmHg. Average value of systolic blood pressure in group 2 was 120.8 mmHg and diastolic 70.7 mmHg. The average number of heartbeats was 73.4 in group 1 and in group 2 an average of 74.3 which was not statistically significant. In subgroup 1a mean systolic blood pressure was 119.1 mHg, and diastolic 73.6 mmHg, while in subgroup 1b, the mean systolic blood pressure was 114.6 and 68.1 mmHg diastolic. In subgroup 2a, the mean systolic blood pressure was 148.3 mmHg and diastolic 87.5 mmHg, while in subgroup 2b, the mean systolic blood pressure was 132 mmHg and diastolic 79.1 mmHg.

Conclusions: The difference in 120 subjects between doctors and nurses was 8.6mmHg systolic, and 7.8 mmHg. diastolic. In the subgroup of 76 normotensives the difference in systolic blood pressure between the doctors and nurses was 4.5 mmHg and 5.5 mmHg diastolic. In the subgroup of 44 hypertensive patients, the difference between doctors and nurses was 16.3 mmHg,systolic and 8.4 mmHg. diastolic.The results indicate that white coat hypertension is more pronounced by doctors than to nurses. This is not significantly present in normotensives, but more pronounced in hypertensive patients.

PP.02.19 SEASONAL AMBULATORY BLOOD PRESSURE CHANGES IN TWO REGIONS OF THE RUSSIAN FEDERATION: PRELIMINARY RESULTS

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Objective: The number of trials which study seasonal variations of blood pressure (BP) in hypertensive patients is growing. The investigation of this problem in the Russia deserves special interest due to great variability of climate conditions in different regions. The aim of the study was to estimate the BP dynamics (winter vs. summer) in two sites of the Russian Federation – Ivanovo (relative north) and Saratov (relative south).

Design and method: The trial is on-going. We include patients from general population who visit ambulatory clinics for various reasons. The main inclusion criterion is office blood pressure 130/85-139/89 mmHg or stable antihypertensive therapy. All participants provide written informed consent. The ambulatory BP monitoring (ABPM, BPLab, Russia) is performed twice in each patient: in winter (December, January, or February) and in summer (June, July, or August). The interval between ABPMs should be 6 months±7 days. The selection criterion for ABPM records is the quality adequate for the sophisticated analysis: duration >24 hours, absence of data gaps >1 hour, >55 readings per 24 hours.

Results: The data of all patients enrolled into the study until February 2013 were used in the preliminary analysis: Group I – patients from Ivanovo enrolled in summer 2012 (n=79, mean age 59±9 years (M±m), 39 men; Group II – from Ivanovo enrolled in winter 2012-2013 (n=227, mean age 52±8 years, 66 men); Group III – from Saratov enrolled in winter 2012-2013 (n=224, mean age 57±11 years, 118 men). We found no significant differences in mean office BP in summer vs. winter (Group I). However, 24-hour systolic BP in the same group in winter (137.1±14.5 mmHg) was higher than in summer (131.0±12.1 mmHg, $p<0.05$). Winter office systolic and 24-hour BP in Ivanovo (Group II) was higher than in Saratov (Group III): 134.6±13.4 vs. 125.6±16.3 and 135.6±12.3 vs. 129.1±12.0 mmHg ($p<0.05$), respectively.

Conclusions: Despite some limitations of preliminary analysis, our results show the seasonal (Group I) and between-regional differences (Group II vs. Group III). Overall, these data obtained in Russia confirm the opinion on negative association between outdoor temperature and office or ambulatory BP.

PP.02.20 LONGITUDINAL EVALUATION OF CLINICAL CARE QUALITY OF PATIENTS WITH HYPERTENSION AND DYSLIPIDEMIA IN A PRIMARY CARE PRACTICE

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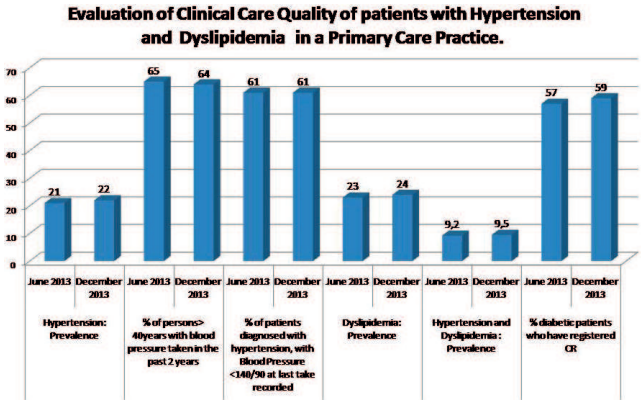
Objective: To conduct a longitudinal study on the quality of clinical care provided to patients with Hypertension and Dyslipidemia assigned to a medical practice (during the period June 2013-December 2013).



Design and method: Longitudinal evaluation: Palmer's Quality Cycle an urban health care center.
Patients (total according to inclusion criteria, 2013, June-December) with Hypertension (n=3289-3445), with Dyslipidemia (n=3602-3758), with Hypertension and Dyslipidemia (n=1440-1488).
Internal evaluation, dimensions: scientific-technical quality, adequacy, accessibility, continuity of care; data related to the care process and intermediate results; explicit, evidence-based procedural criteria.
Analysis of coverage. Analysis on the evolution of treatment compliance. The Z statistical test for comparing proportions, alfa 0.05.

Results: Compliance criteria (June 2013-December 2013) Hypertension: Prevalence:21-22; Percentage of persons> 40years with blood pressure taken in the past 2 years: 65-64; Percentage of patients diagnosed with hypertension, with Blood Pressure <140/90 at last take recorded: 61-61; Dyslipidemia: Prevalence: 23-24. Hypertension and Dyslipidemia: Prevalence::9,2-9,5. Percentage of patients with Hypertension and Dyslipidemia, having registered Cardiovascular Risk (CR):57-59.

Conclusions: Improvement plan should be established:
1-Degree of control Hypertension and Dyslipidemia
2-Arterial Hypertension and Dyslipidemia care
3-CV measurement.

PP.02.21 SEVEN DAYS AMBULATORY BLOOD PRESSURE MONITORING: CIRCADIAN AND HALF-WEEKLY VARIABILITY

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Objective: To assess the circadian and half-weekly variability of 7-day/24-hour ambulatory blood pressure (BP) and heart rate (HR) monitoring.

Design and method: Hundred and thirty men and fifty-seven females without antihypertensive therapy (age between 20 and 80 years) were recruited for 7-day ambulatory BP monitoring (TM-2421 A and D, Japan). The obtained data were fitted with sinusoid curve (wave length 24 hours) by the least square method and mean value (M) and amplitude (A) were determined for every subject. Double amplitude roughly corresponds to the night-day BP difference.

Results: BP overswinging (excessive dipping, circadian hyper-amplitude-tension), a vascular disease risk factor was detected in 8.5% SBP and 7.0% SBP and DBP. BP overswinging was associated with evening exercise in one subject. Decreased heart rate variability occurred in 2.2%. In the data from the whole group, women had a lower SBP-M ($p=0.026$) and a higher HR-M ($p=0.005$) than men. SBP increased linearly with age ($r=0.341$, $p<0.001$). The M of DBP and HR and the circadian amplitudes of SBP and DBP followed a quadratic model, reaching maximum values around 40-60 years of age.

The 7-day and 3.5-day amplitudes of BP and HR were correlated (p<0.001), as were the 3.5-day and circadian amplitudes of SBP (p=0.004) and HR (p=0.013). The 7-day and circadian amplitudes of SBP (p=0.067) and DBP (p=0.046) were weakly associated.

Conclusions: The circadian amplitudes of SBP and DBP showed also weekly rhythms. Gender differences and changes with age are found.

PP.02.22 SEVEN DAYS AMBULATORY BLOOD PRESSURE MONITORING: DETERMINATION OF HIGH BLOOD PRESSURE RISK FOR STROKE

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Objective: The determination of risk of mortality and morbidity based on the linear relationship between logarithm of risk and systolic (SBP) and diastolic blood pressure (DBP) doesn't take into account the circadian variation of blood pressure (BP) followed by ambulatory BP monitoring. We suppose that determination of risk for every measured value of BP followed by calculation of mean risk value is better than calculation of daily mean BP value used later for risk calculation. The analysis of the relationship between amplitude (A) of circadian BP variation and risk was the aim of the present paper.

Design and method: Ninety-two subjects without antihypertensive therapy (age between 20 and 80 years) were recruited for 7-day ambulatory BP monitoring (TM-2421 A and D, Japan). The obtained data were fitted with sinusoid curve (wave length 24 hours) by the least square method and mean value, so called mesor (M) and amplitude (A) were determined for every subject. Double amplitude roughly corresponds to the night-day BP difference.

Results: The data for SBP were M between 100 and 155mmHg. We have found M of DBP to be between 60 and 98 mmHg in our subjects. The range of A was 2 to 19 mmHg. A between 2 and 23 mmHg. The mathematical analysis revealed A value to be more important in DBP than in SBP. Equal A of DBP is more important in high DBP than in low DBP. The quantitative examples of DBP are as follows. Assuming risk of stroke at M 91 mmHg and A 2 mmHg 1.0, then risk at M 60 mmHg and A 2 mmHg is 0.12, risk at M 60 mmHg and A 20 mmHg is 0.17, risk at M 100 mmHg and A 2 mmHg is 1.87 and risk at M 100 mmHg and A 20 mmHg is 2.87.

Conclusions: It is concluded that the increase of amplitude of circadian variation of DBP increases the risk of stroke, especially at high DBP mean values.

PP.02.23 AGE-RELATED DIFFERENCES IN 24-PATTERNS OF CENTRAL BLOOD PRESSURE AND AUGMENTATION INDEX

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Objective: 24-h ambulatory monitoring (AM) of central blood pressure (BP) and augmentation index (AIx) is a new method that extends understanding of the characteristics of BP and arterial properties. Age differences of arterial stiffness characteristics are well known. The aim of the study was to explore characteristics of central pulse wave and AIx on AM of brachial and central BP depending on the age.

Design and method: Successful AM of brachial and central BP (>85% valid readings) was done with oscillometric BPLab VASOTENS system (OOO Petr Telegin, Nizhniy Novgorod, Russia) in 84 untreated hypertensive subjects (mean age 55,8±9,6 years, male 36,9 %). The device allows to derive aortic BP and AIx from brachial pulse wave. Gender differences of central BP and AIx were evaluated in patients <55 years (14 men, 23 women), 55-60 years (7 men, 16 women), 61-70 years (10 men, 14 women). Differences were considered significant if p<0,05.

Results: Day- and night-time systolic BP (SBP) was similar in age subgroups: <55 years brachial SBP day/night 140±15/130±18, 55-60 years 139±17/136±22, 61-70 years 137±19/132±23 mmHg. Increase in day- and night-time brachial pulse pressure (PP) was observed from younger to older patients due to the reduction of diastolic BP (DBP): <55 years brachial PP day/night 53±12/52±12, 55-60 years 57±11/57±13, 61-70 years 57±12/58±16 mmHg, <55 years DBP day/night 87±11/78±11, 55-60 years 84±9/79±12, 61-70 years 81±9/73±12 mmHg. Aortic PP trends were similar: <55 years aortic PP day/night 42±9/43±10, 55-60 years 45±10/48±12, 61-70 years 47±12/50±14 mmHg, <55 years DBP day/night 88±11/79±12, 55-60 years 85±10/80±12, 61-70 years 82±9/74±12 mmHg (p<0,05 of day-time DBP compared to group <55 years). AIx also increased with age, and this increase was observed both during day- and night-time: <55 years AIx day/night 24±18/31±17, 55-60 years 28±16/38±16, 61-70 years 33±15/42±12%.

Conclusions: 24-h AM of central BP revealed age-related increase in aortic PP and AIx both for day- and night-time.

PP.02.24 AMBULATORY MONITORING OF CENTRAL BLOOD PRESSURE AND AUGMENTATION INDEX REVEALS GENDER DIFFERENCES REPRODUCIBLE ACROSS AGE SUBGROUPS

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Objective: 24-h ambulatory monitoring (AM) of central blood pressure (BP) and augmentation index (AIx) is a new method that extends understanding of the characteristics of BP and arterial properties. The aim of the study was to explore gender differences on AM of central BP and AIx in different age groups.

Design and method: Successful AM of brachial and central BP (>85% valid readings) was done with oscillometric BPLab VASOTENS system (OOO Petr Telegin, Nizhniy Novgorod, Russia) in 84 untreated hypertensive subjects (mean age 55,8±9,6 years, male 36,9 %). The device allows to derive aortic BP and AIx from brachial pulse wave. Gender differences of central BP and AIx were evaluated in patients <55 (14 men, 23 women), 55-60 (7 men, 16 women), 61-70 years (10 men, 14 women). Differences were considered significant if p<0,05.

Results: Several findings consistent among all age groups were revealed. First, men had slightly higher levels of brachial and aortic systolic BP (SBP) than women: respectively, <55 years brachial SBP day/night 144±14/134±20 vs 137±16/128±16, 55-60 years 147±18/146±21 vs 139±16/132±22, 61-70 years 141±23/135±32 vs 137±14/129±17 mmHg. Second, nocturnal decline of brachial and aortic SBP was to a greater extent in women than in men: respectively, <55 years aortic SBP day/night 128±15/121±15 vs 132±14/132±14, 55-60 years 130±15/124±21 vs 134±17/137±19, 61-70 years 128±14/122±16 vs 131±22/127±29 mmHg. Third, despite comparable heart rate (HR) women had a higher AIx in all time periods, however, the night increase AIx was significantly more evident in men: respectively, AIx day/night <55 years -11±24/0,1±24* vs -31±26/-21±30, 55-60 years 0,6±18**/13±23 vs -30±16 / -9±21, 61-70 years 2±19/15±19* vs -20±16/-5±18% (*p<0,05, ** p<0,001 compared to male).

Conclusions: Gender differences in characteristics of AIx and its diurnal variation were identified and they were consistent across all age group. This finding should be considered when analyzing the results of AM of central BP results and require investigation of its prognostic value.

PP.02.25 FREQUENCY OF BLOOD PRESSURE MEASUREMENT AT HOME CORRELATES WITH THE NUMBER OF ANTIHYPERTENSIVE DRUGS USED

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Objective: Home blood pressure monitoring (HBPM) is recommended for hypertensive patients as a tool to improve both blood pressure (BP) control and compliance with treatment.

Design and method: We therefore evaluated the use of HBPM in hypertensive subjects examined during a cross-sectional general population survey (Czech post-MONICA). Models predicting the availability and use of HBPM were constructed using univariate and multivariate logistic regression.

Results: Out of 449 treated hypertensive patients (mean age 63.2 years, 52.1% women), 250 (55.7%) subjects reported they had a device for HBPM available at home. Factors associated with HBPM availability were older age, university education, marital status, longer duration of hypertension and nonsmoking. Out of the 250 subjects with HBPM available, 40% of patients used HBPM regularly (at least once a week) and this ratio increased with the number of antihypertensive drugs taken (monotherapy 30%, dual combination 43%, combination of >3 drugs 48%; Ptrend=0.028). BP control was similar in those using HBPM regularly compared with those who used HBPM irregularly or did not use it at all (54.5 vs 49.7%; P=0.52).

Conclusions: In conclusion, HBPM is available to more than a half of treated hypertensive patients from a general population. However, only minority of patients performs home blood pressure measurement regularly.

PP.02.26 DIPPING PATTERN REPRODUCIBILITY IN THE LONG TERM

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Objective: Nocturnal dipping reproducibility by ambulatory blood pressure monitoring of 24 hours (ABPM) is controversial.
However, the lack of nocturnal decrease in blood pressure or non dipper pattern has been associated to increased cardiovascular risk.
The objectivo was to evaluate long term reproducibility of nocturnal dipping in patients without antihypertensive medical treatment.

Design and method: Retrospective study conducted on a database of 9000 ABPM, between 2008 and 2013, at the Buenos Aires British Hospital cardiology department. The reproducibility of the dipping pattern was evaluated with three indicators: the coefficient of repeatability, the Kappa indicator when the dipper pattern was expressed as a dichotomous variable and the intraclass correlation coefficient when the dipper pattern was identified as a continuous variable. Comparison of mean blood pressures was examined using Student's t-test, with a P value of less than 0.05 regarded as significant.

Results: 94 patients without antihypertensive treatment with two ABPM (Spacelabs), averaging between them: 12 (+/-5) months were found.
Daytime blood pressure was 2.5/1.4 mmHg higher in the second ABPM and nocturnal blood pressure was also 3.5/2.5 mmHg higher.
Daytime systolic and diastolic blood pressure coefficient of repeatability was 8.23% and 7.78% respectively, while night time systolic and diastolic blood pressure coefficient of repeatability was 11.9 and 8.89% respectively.
Taking dipper pattern as a dichotomous variable, Kappa coefficient was 0.27, indicating poor reproducibility. However, when the variation of dipping pattern is taken as a continuous variable, the reproducibility of this phenomenon increases ith an intraclass correlation coefficient of 0.65.

Blood Pressure (BP) in the ABPM

	MAPA basal	MAPA 12 meses	P *
24 hs sistolic BP mmHg	124 ± 10,9	127,4 ± 10,34	0,01
24 hs diastolic BP mmHg	75,1 ± 8,31	77,5 ± 8,37	0,04
Daytime sistolic BP mmHg	128,6 ± 10,5	131,1 ± 10,1	0,03
Daytime diastolic BP mmHg	78,1 ± 8,5	79,5 ± 8,4	0,1
Nocturnal sistolic BP mmHg	114 ± 13	117,5 ± 14,1	0,03
Nocturnal diastolic BP mmHg	66,6 ± 8,9	69,1 ± 9,9	0,03

*T test

Conclusions: Dipper pattern reproducibility was different depending on the statistic method being used, which is consistent with other publications. The reproducibility of this pattern was low with most indicators used, showing an increase only in assessing the dipper pattern as a continuous variable (percentage decrease in blood pressure).

PP.02.27 COMPARISON OF AORTIC STIFFNESS AND CENTRAL BLOOD PRESSURE BETWEEN PATIENTS WITH VARIOUS HYPERTENSIVE CONDITIONS: FROM BP BEHAVIOR STUDY

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Objective: We undertook this study to compare central blood pressure and aortic stiffness as determined by pulse wave analysis in patients with various hypertensive conditions.

Design and method: The study is based on the subjects from Blood Pressure Behavior Study, a prospective registry of Korean Hypertension Network, which consist of the 12 cardiovascular centers in Korea. All subjects were naïve hypertensive patients and the radial augmentation index was measured in all patients. White coat hypertension, hypertension, masked hypertension participants were identified after ambulatory blood pressure and office blood pressure monitoring. Using radial artery applanation tonometry, aortic pulse wave analysis was performed. Augmentation pressure and central aortic blood pressure were measured. Augmentation index (AI) and AI75 were calculated. We measured also epidemiologic, echocardiographic, hemodynamic and laboratory parameters for each hypertensive patients.

Results: We enrolled 515 naïve prehypertensive and hypertensive patients (mean age: 49 +- 11.7 y; 46% female). Patients with prehypertension, hypertension stage1, 2 were 128(24%), 182(34%), 197(37%) respectively. Patients with normal blood pressure, white coat hypertension, true hypertension, masked hypertension were 40(8%), 65(12%), 314(60%), masked hypertension(18%) respectively. In the epidemiologic parameter, body mass index and weight were significantly higher in patients with true hypertension and masked hypertension. In the echocardiographical parameter, there is no significant difference in each group. In the hemodynamic parameter, office blood pressure average, ABP average, maximal morning systolic blood pressure of WCH patients were significantly lower than which of true and masked hypertension. Central blood pressure was significant higher in masked and true hypertension, but results of augmentation index showed no signficant difference between the patients with WCH and MT. But the patients with masked hypertension have relatively low level of augmentation index. Pulse pressure in patients with WCH was higher than with true hypertension. But there was no stastical difference.

Conclusions: These results suggest that as compared to WCH, aortic stiffness in patients with true hypertension and masked hypertension was significantly higher. But about augmentation index, patients with masked hypertension have relatively low level. Further study is needed.

PP.02.28 THE EFFECTS OF DEPRESSION IN BLOOD PRESSURE DURING EXERCISE TESTING

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Objective: To determine the effects of depression (D) in blood pressure (BP) during exercise testing.

Design and method: This study was carried out in a random sample of schools from Maracaibo, Venezuela. The participants were 416 adolescents, males (n= 219) and females (n= 197), age-mean = 14, 71 years and standard deviation =1, 7. Each adolescent was performed exercise testing and completed the Zung self-rating depression scale to assess depression symptoms, and they were classified according to the results of the scale in 3 categories: Normal (N), Minimum Depression (MiD), Moderate Depression (MoD) and Severe Depression (SeD). The One-way ANOVA was used to study the effects of D in BP during exercise testing.

Results: Of the study sample 317 (65,8%) adolescents had MiD, 36 (7,5%) had MoD, 6(1.2%) had SeD and 123 (25,5%) with not D. ANOVA´ s results showed a significant effect for D factor in (SBP stage1 min2: F = 3,772 p= 0.011); (DBP stage1 min2: F = 2,737 p= 0.043); (SBP stage2 min2: F = 3,538 p= 0.015); (DBP stage2 min2: F = 3,369 p= 0.018); (MaxSBP F = 4,679 p= 0.003); (SBP min1 recuperation: F = 4.066 p= 0.007); (SBP min3 recuperation: F = 3.123 p= 0.026) and (SBP min5 recuperation: F = 3.054 p= 0.028).

Conclusions: The results provide evidence for an effect of D in BP during exercise testing, which would mean that D may influence BP in this group that is more vulnerable to D due to hard changes typical of their life stage. It is possible that there is a relationship between symptoms of D, negative thoughts before exercise and some indications of abnormal autonomic nervous function that affect BP during exercise.

PP.02.29 VALENCIAN PHARMACISTS ROLE IN THE CONTROL OF BLOOD PRESSURE

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Objective: Know how is being performed blood pressure measurement in Valencian Community pharmacies.

Design and method: Survey sent to owners of the pharmacies in the Valencian Community.

Results: The professionals surveyed consider normal figures of blood pressure <140/90 mmHg in 86.7% of the answers. The majority (66.3%) consider the limit for having a bad control of blood pressure, figures of 140-159/90-99 mmHg, while the 11.6% think that these figures are in 160-179/100-109 mmHg and the 8.1% chose 130-139/85-89 mmHg as limit. Only 10.5% indicated no response/don´t know.
At the question what do you do as a professional when you detect a high blood pressure, being able to answer all of the proposed options, the results were: repeat the measure (87.8%), send to non-urgent Primary Care (58.7%), suggest changes in life and/or diet (64%), check compliance (44.2%), send to Emergency Primary Care (47.7%), refer to Emergency hospital (27.9%).
Professionals, emphasize some of the advantages that the offices of pharmacies provide the hypertensive patient: proximity (91.3%), decreased white coat effect (52.3%),

lower cost to the patient (37.2%), greater time flexibility (83.1 %), intensify health education (62.8%) and the possibility of detecting asymptomatic hypertension (11%). Only 0.6% of pharmacists believe that pharmacies play no role in controlling blood pressure and barely a 13.4% consider their limited role. By contrast, 46.5% believe that it is important and even essential to 38.4%. Only 1.2% did not answer this question.

Conclusions: Pharmacists and pharmacies, are an important part of both consultation by users, such as the point of derivation to other care levels of health services. This importance is clearly perceived by the pharmacist professional himself. It's time to increase our collaboration.

PP.02.30 24-HOUR AMBULATORY BLOOD PRESSURE MEASUREMENT IN EXTREME CONDITIONS. ANTARCTICA 2011

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Objective: 24-hour ambulatory blood pressure measurement (ABPM) in extreme conditions (Antarctica) and normal living conditions (Czech Republic). Comparison using standard blood pressure (BP) and heart rate (HR) parameters. Evaluation of device reliability.

Design and method: ABPM in scientific mission participants (Antarctica, January to February 2011) and control measurement in normal living conditions (Czech Republic, June to November 2011). 13 subjects, 11 males and 2 females, mean age 40 years. ABPM according to ESH criteria, device SpaceLabs 20100, statistic software IBM SPSS Statistic 21. The pilot study.

Results: In extreme (92 %) and standard (93 %) conditions the reliability of device and success rate of measurements were high.
24h BP and HR parameters in extreme, 24h BP and HR parameters in standard conditions, statistical evaluation:
Systolic BP 131,7 ± 9,7 mmHg, 121,8 ± 6,0 mmHg, P below 0,01, diastolic BP 81,3 ± 6,1 mmHg, 78,9 ± 4,0 mmHg, P = 0,10, HR 24h 75,7 ± 7,9 B/min, 74,8 ± 11,8 beats/min, P = 0,10, pulse BP 24h 50,4 ± 6,2 mmHg, 43,0 ± 6,1 mmHg, P below 0,01, variability of systolic BP 24h 14,3 ± 2,2 mmHg, 12,6 ± 2,1 mmHg, P below 0,01, morning surge of systolic BP 36,6 9,1 mmHg, 28,0 ± 9,4 mmHg, P below 0,01.

Conclusions: The reliability of SpaceLabs 20100 device and success rate of measurements were high in both conditions.
In extreme conditions increased levels of systolic BP, pulse BP, variability of systolic BP measured by standard deviation and morning surge of BP were statistically significant.

PP.02.31 PULSE WAVE VELOCITY BUT NO AUGMENTATION INDEX IS RELATED TO BP CATEGORY IN UNTREATED SUBJECTS

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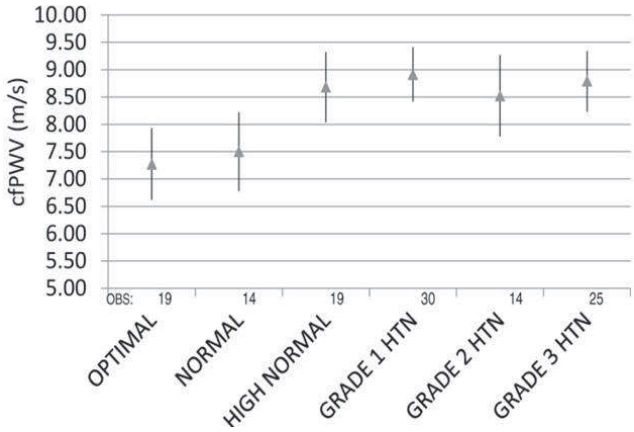
Objective: Arterial stiffness parameters are closely related with BP, especially with central aortic BP. Our objective was to determine how two commonly used measurements of arterial stiffness (PWV and Aix) vary according to the ESH hypertension groups in untreated subjects.

Design and method: cfPWV and AIx were assessed in a series of untreated patients attending to the HTN unit with the Complior and SphygmoCor devices. The directed carotid-femoral distance was used to calculate the cfPWV and the results were corrected by multiplying per 0.8. Patients were classified in 6 groups according to the office BP levels (optimal, normal, high normal, and hypertension grade 1, 2 and 3). One-way ANOVA models were used to compare cfPWV and Aix among groups. The adjusted means for each category and confidence intervals were obtained from linear regression estimates after adjusting for important covariates.

Results: 412 patients (mean age 50.4 ± 14.8 years; 296 (60.9%) women; mean BMI 27.2 ± 4.9) were evaluated: 88 (18.1) had optimal (O); 63 (12.9%) normal (N); 62 (12.7%) high normal (HN); 92 (18.9%) grade 1 HTN (HTN1); 30 (6.2%) grade 2 HTN (HTN2) and 152 (31.2) grade 3 HTN (HTN3) according to office BP. There were significant differences for the cfPWV among categories of BP, being significantly higher in hypertensives as compare to normotensive subjects (7.3, 7.5, 8.7, 8.9, 8.5, and 8.8 for O, N, HN, HTN1, HTN2, and HTN3, respectively, p-value <0.001).



In the case of AIx, there were not significant differences among BP categories (24.4, 25.5, 24.2, 27.7, 28.5, and 24.1 for O, N, HN, HTN1, HTN2, and HTN3, respectively, p-value 0.107).

Conclusions: cfPWV but no AIx is closely related with ESH BP categories in untreated patients.

PP.02.32 PULSE WAVE VELOCITY: DIFFERENCES BETWEEN TWO DIFFERENT METHODS OF MEASUREMENT

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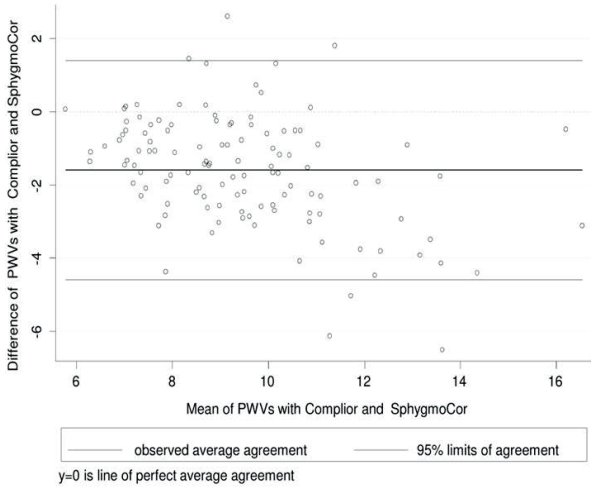
Objective: The measurement of arterial stiffness (AS) is recommended in patients with HTN as an indicator of subclinical organ damage. Carotid-femoral PWV (cfPWV) is used for the assessment of arterial stiffness. The objective of this study was to evaluate the concordance between the cfPWV measurements obtained by two different devices, Complior and SphygmoCor.

Design and method: AS of 118 patients referred to the hypertension unit was assessed with Complior and SphygmoCor. The methods of subtracted distances and the direct distance were used in the SphygmoCor and Complior devices, respectively, for distance calculation. Both measurements were corrected prior to the analysis in accordance with the current recommendations.

Results: cfPWV was measured in 118 patients: 40 (33.9%) women; 72 (61.0%) were hypertensive under treatment. Among patients without treatment: 24 (52.2) were hypertensives, and 22 normotensives according to the office BP values. The average age was 55.1 ± 12.3 years, BMI 28.9 ± 4.4 kg/m2, SBP 137.7 ± 18.3 mm Hg, DBP 81.6 ±10.3 mmHg, aortic SBP 127.0 ±17.1 mmHg, aortic DBP 82.8 ± 10.6 mm Hg. The corrected cfPWV measurement using Complior was 8.6 ± 1.8 m/s while the one obtained using SphygmoCor was 10.3 ± 2.4 m/s. The average difference between the two methods was, - 1.59 ± 1.5 m/s with a 95 % limits of agreement for the concordance of Bland-Altman of: - 4.6 - 1.4.



The Pearson correlation coefficient between the two measures was 0.782, p-value < 0.001, being the value of the concordance-correlation coefficient of Lin, Rho, of 0.59 ± 0.04, p-value < 0.001. The Bland-Altman analysis indicates that the SphygmoCor measurements were systematically higher than that of Complior and that these discrepancies were especially manifest for large cfPWV values.

Conclusions: Our study shows that the correlation between the cfPWV measurements by two different devices is poor even after correcting those values by the currently recommended carotid-femoral distance. The SphygmoCor cfPWV values were systematically higher than those obtained with Complior.

PP.02.33 FEATURES OF 24H BLOOD PRESSURE PROFILE AND STATUS OF HUMORAL REGULATION SYSTEMS IN CARDIAC SURGEONS AND OPERATIVE NURSES

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Objective: To evaluate the influence of mental stress within working time on 24h blood pressure (BP) profile and condition of humoral regulation systems in cardiac surgeons and operative nurses.

Design and method: The study included 16 people (7 males), aged 40,4±11,1 years. The antihypertensive therapies were not taken by any people. Clinical BP (BPcl.) was measured before work, at the same time took blood for tests and put on ambulatory blood pressure monitor (ABPM). After the operation blood was taken for laboratory tests for a second time.

Results: BPcl. was 127,6±13,0/83,1±10,6 mm Hg, heart rate (HR) 86,4±15,4 bpm. There were no statistically significant differences in BPcl. and HR between groups (gr) of surgeons and nurses. 24hBP was 121,0±10,0/77,6±5,4 mm Hg, HR 77,9±10,2 bpm. All people had significantly higher BP during working hours than in their free time (δBP -4,6±7,1/-4,7±7,5 mmHg; p=0,04/0,02). At night BP level and nocturnal BP fall were normal. We compared gr of surgeons and nurses. The surgeons were older than nurses (48,6±10,7 and 34,1±6,4, respectively; p=0,005) and they had a higher systolic BPcl. (134,9±9,3 and 120,4±13,0 mmHg, respectively; p=0,03). According to the ABPM surgeons had 24hBP which was also significantly higher (126,5±8,1/80,6±5,3 mmHg compared to nurses 115,4±8,9/74,7±3, 8 mmHg; p=0,03) due to a higher increase of BP in the working time (surgeons' δBP between a non-working and working time was 8,7±4,8/-6,1±9,2 mmHg compared to nurses' -0,9±6,9/-3,4±6,0 mmHg; p=0,03/NS). BP of all people did not differ significantly during daytime out of office hours and nighttime. There is a correlation between the rise of systolic BP and profession (r=0,62; p=0,01). The baseline level of NO3 was within the normal range (40,0±14,6 mmol/l). After work NO3 significantly decreased (δNO3 -7,2±6,3; p=0,002).

Conclusions: Even individuals who do not have arterial hypertension show an increase of BP during work stress, winch is accompanied by endothelial dysfunction. Reactivity of systolic BP and its increase depend on the intensity of work stress. Given the fact that the increase in systolic BP reactivity is associated with long-term risk of incident hypertension, heart surgeons may be at greater risk of arterial hypertension.

PP.02.34 BLOOD PRESSURE DIFFERENCES BETWEEN HOSPITAL AND OUT HOSPITAL HEMODIALYSIS PATIENTS IN DIALYSIS CENTRES IN DALMATIA COUNTY IN SOUTHERN CROATIA

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Objective: There is a high prevalence of hypertension in end stage renal disease with estimates from 25 to 80%. The aim of the study was to show the differences in blood pressure during HD session between subjects in hospital HD and subjects in out hospital HD centres.

Design and method: In the study 402 patients (aged 68.3±13.8 years) on maintained HD (4.73±5.17 years) were included (232 males, 170 females) in Dalmatian centres in Dalmatia county in Southern Croatia, 331 in hospital and 71 subjects in out hospital HD units. For every single observed HD systolic (SBP) and diastolic blood pressure (DBP) before and after the HD (mmHg), blood pressure two hours after beginning of the HD, and mean arterial pressure (MAP) (mmHg) was obtained.

Results: There were 170 (42.3%) unregulated hypertensive subjects (SP >140 mmHg and/or DP >90 mmHg at the beginning of HD). There were no differences in unregulated hypertension incidence between subjects in hospital (N=135, 40.79%) and subjects in out hospital HD centres (N=35, 49.30%) (x2= 1.735; p= 0.233). The significant differences between these two groups was found in SBP and DBP before HD, two hours after beginning HD, and after HD and consecutively in MAP values (Table 1 on the following page).

Conclusions: Unregulated arterials hypertension is highly prevalent in the Dalmatian HD population, with no difference in hospital vs. out hospital HD units, but HD patients in out hospital HD units have higher SBP and DBP values. Possible explanations for this differences is possibly better nephrologists' care in hospital HD units, or higher proportion of cardiovascular diseases in hospital HD patients with a higher incidence of heart failure and associated hypotension.

Abstract PP.02.34 – Table.

Table 1 The differences between subjects in hospital (N=331) and subjects in out hospital (N=71) HD centres (Student's t-test for independent subjects, one tailed).

	Hospital	Out hospital	
	X±SD	X±SD	p
SBP before HD (mmHg)	131.61± 22.45	137.44± 31.39	0.034*
DBP before HD (mmHg)	71.78± 11.96	77.01± 14.18	0.001*
MAP before HD (mmHg)	91.73± 14.02	97.15± 17.82	0.003*
SBP two hours after beginning of HD (mmHg)	121.07± 25.37	127.54± 24.36	0.025*
DBP two hours after beginning of HD (mmHg)	68.14± 13.21	71.63± 13.14	0.022*
MAP two hours after beginning HD (mmHg)	85.78± 16.08	90.27± 15.16	0.016*
SBP blood pressure before HD (mmHg)	124.07± 23.16	126.96± 22.77	0.170
DBP two hours after beginning HD (mmHg)	69.63± 11.61	71.10± 12.79	0.171
MAP after HD (mmHg)	87.77± 14.34	89.72± 14.72	0.152

Legend: *p*, significance; * $p < 0.05$, *SD*, standard deviation

PP.02.35 THE FREQUENCY OF ADVERSE PROGNOSTIC FEATURES DETECTED WITH AMBULATORY BLOOD PRESSURE MONITORING IN THE PRACTICE OF A ROMANIAN PREVENTIVE AMBULATORY SYSTEM

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Objective: Twenty four hour ambulatory blood pressure monitoring (24-H ABPM) plays an important role in the management of hypertensive patients.
To determine the frequency of seven known adverse prognostic features in an ambulatory assisted hypertensive patient population.

Design and method: The study included all the 957 hypertensive patients with a performed 24-H ABPM, examined between 2008-2011 in a preventive ambulatory cardiology system. The sex distribution of the studied patients was 44.7% male average age 58.8 years, and 55.2% female average age 62.9 years. The studied adverse prognostic features were: daytime systolic blood pressure (BP) >135 mmHg, daytime diastolic BP >85 mmHg, night time systolic BP >120 mmHg, night time diastolic BP >75 mmHg, nocturnal dipping <10%, Morning hypertension >140/90 mm Hg, pulse pressure >50 mm Hg.
Patient data was introduced in an integrated patient data management system as an electronic health record.

Results: The frequency of the studied adverse prognostic features were as follows: High daytime systolic BP 49.5%, High daytime diastolic BP 34,6% High night time systolic BP 56.4%, High nighttime diastolic BP 31.3%, Absent nocturnal dipping 59.9%, Morning hypertension 33.6%, High pulse pressure 59.8%. A large proportion of subjects (91%) had one or more adverse features reported on the 24-H ABPM.
Patients with coronary heart disease had a significantly lower frequency of high daytime diastolic BP (27.1% versus 37.5% p=0.001) and high nighttime diastolic BP (27.4% versus 33.6% p=0.021) than patients without coronary heart disease with no significant difference in the other adverse prognostic features.
Patients with stroke had a significantly higher frequency of high pulse pressure versus patients without stroke (67.1% versus 58.5%, p=0.048) with no significant difference in the other adverse prognostic features.

Conclusions: The frequency of adverse prognostic features was high in our cohort. Such information can alert the physician to modify treatment accordingly, either by changing the type, dose, or timing of antihypertensive agents, or by intensifying treatment for high BP and coexisting cardiovascular risk factors.

PP.02.36 AN ADDED VALUE TO 'HOME BLOOD PRESSURE MONITORING (HBPM)': THE HEMODYNAMIC STABILITY CONTROL (HSD)

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Objective: HBPM with validated automatic monitors is important in hyperten sion management. There are scientific evidence in favor of this. The accurate

technique for HBPM involves resting, not talk, place arm at the level of heart, sit with back against the backrest, remain motionless during the measurement. Very often the measurements are affected by factors such as psychological and physical stressors.
Aim of study was evaluate impact of a new oscillometric pressure monitor equipped with a system that detect physical and psychological conditions of not rest that could alter the results of measurement and steer clinicians to treatment options incorrect.

Design and method: Enrolled 80 hypertensive subjects. All have been provided an apparatus (HELP CHECK) for HBPM with HSD, suitable to understand whether the measurement was accurate (right state of mental and physical rest needed for a correct measurement by analyzing the period of pulse waves along the brachial artery). All were asked to complete a questionnaire for annotation of physical causes temporary or psyche that could compromise the correct measurement after the appearance of the logo on the display of HSD.

Results: Of the 80 patients, 8 were withdrawn from the study for lack of compliance. All the other 72 were carried out according to the plan diagnostic about HBPM. Each patient made 42 measurements per week for a total of 84 in two non-consecutive weeks. Signal of hemodynamic instability appeared 705 times (11.65%: 35% due to postural and 39% to psychic cause. In 26% of cases it was not possible to give a certain cause. In three patients for the persistence of the signal of hemodynamic instability - it was provided to perform ECG that showed ventricular extrasystolic beats in two patients,atrial fibrillation in the third patient not previously diagnosed. All patients have recognized important role in helping to put in place appropriate procedures for accurate HBPM.

Conclusions: The help check system increases the accuracy of HBPM making the patient more aware of the correct procedures. The patient -by encouraging a better clinician's action- becomes the star of their pressure control.

PP.02.37 STUDY OF THE BLOOD PRESSURE IN HYPERTENSIVE PATIENTS TREATED WITH ANXIOLYTIC OR ANTIDEPRESSANT DRUGS

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Objective: To determine whether the patients suffering from hypertension and treated with antidepressants or anxiolytic drugs present different values of systolic (SBP) and diastolic blood pressure (DBP) than the ones not treated with any of these drugs, basing the study on the analysis of data obtained from 24 hours of Ambulatory Blood Pressure Monitoring (ABPM).

Design and method: This is an observation-based, retrospective and descriptive study including 1195 ABPM records from the last 4 years (2009-2012). Patients younger than 18 years old or with less than 80% of ABPM lectures were excluded as well as the ones treated with Non-Steroidal Anti-inflammatory drugs (NSAID), antiretroviral, anticancer or immunosuppressive drugs. Blood pressure was measured during three different periods: the daytime, the nighttime and the whole 24 hours.This Measure were adjusted for sex and age (p*) (ANOVA).

	With antidepressants (n 155)	Without antidepressants (n 1040)	p	p*
SBP 24hr (SD)	133.9 (15.9)	130.4 (12.9)	0.02	0.026
DBP 24hr (SD)	75.4 (10.4)	75.4 (10.5)	0.98	0.041
MBP 24hr (SD)	97.17 (10.12)	95.3 (9.4)	0.02	0.012
SBP daytime (SD)	136.1 (15.4)	133.6 (13.2)	0.03	0.155
DPB daytime(SD)	77.8 (10.9)	78.4 (11.3)	0.54	0.140
MBP daytime (SD)	99.6 (10.1)	98.3 (10.1)	0.14	0.387
SBP nighttime (SD)	129.27 (19.2)	122.9 (15.4)	<0.005	<0.005
DBP nighttime (SD)	70.32 (10.8)	68.4 (10.2)	0.03	0.001
MBP nighttime (SD)	91.9 (12.1)	88.1 (10.6)	<0.005	<0.005
	With anxiolytic (n 290)	Without anxiolytic (n 905)	p	p*
SBP 24hr (SD)	132.4 (14.9)	130.3 (12.8)	0.02	0.12
DBP 24hr (SD)	74.1(9.8)	75.9 (10.6)	0.008	0.30
MBP 24hr (SD)	95.6 (9.8)	95.5 (9.4)	0.83	0.14
SBP daytime (SD)	135 (14.8)	133.5 (13.1)	0.11	0.19
DBP daytime (SD)	76.6 (10.6)	78.9 (11.4)	0.002	0.44
MBP daytime(SD)	98.4 (10.1)	98.6 (10.1)	0.76	0.17
SBP nighttime (SD)	126.4 (18.2)	122.8 (15.2)	0.001	0.09
DBP nighttime (SD)	68.2 (9.9)	68.8 (10.4)	0.34	0.15
MBP nighttime (SD)	89.5 (11.6)	88.3 (10.6)	0.11	0.13

Results: The results are expressed: Systolic (SBP)/ Diastolic blood pressure (DBP)/ Medium blood pressure (MBP).
a) Patients with antidepressants: 24-h:133/ 75/ 97mmHg; Daytime: 136/77/99mmHg; Nighttime: 129/70/91mmHg vs Patients without antidepressant: 24h: 130/78/98 mmHg; Daytime: 133/78/98 mmHg: Nighttime: 122/68/88 mmHg
b) Patients with anxiolytic drugs: 24h: 132/74/95mmHg; Daytime: 135/76/98mmHg; Nighttime: 126/68/89mmHg vs Patients without anxiolytic: 24hr: 130/75/95mmHg ; Daytime: 133/78/98mmHg: Nighttime: 122/68/88mmHg.

Conclusions: Hypertensive patients treated with antidepressants present higher values of BP than the others groups for all three periods (daytime, nighttime and 24h). The ones treated with anxiolytic drugs also present higher values of BP, but their differences are not significant.

PP.02.38 REPRODUCIBILITY OF BLOOD PRESSURE DIPPING IN UNTREATED SUBJECTS WITHIN A 6-24 MONTHS INTERVAL

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Objective: It is controversial the relation of the non dipping profile i.e a less than 10% decline in night/day BP with 24-h ambulatory BP (ABP) with cardiovascular risk and the studies on reproducibility of blood pressure (BP) dipping have produced inconsistent results. Our aim was to measure the reproducibility of ABP for subtypes of dipping paterns.

Design and method: We evaluate the reproducibility of ABP 24 profile and of dipping subtypes in 485 untreated adult subjects (ageing 49±9 years, 61% female) performed at baseline (V0) and with 6-24 months (V1)apart (average 11±6 months).Day and night time were defined as 7:00–22:40 and 23:00–6:30.

Results: The mean 24h BP in both measurements was 133/80 ±15/10 (V0) vs 131/79 ±14/10 (V1) p<0.02. The mean ± SD day-night Systolic BP (SBP) and Diastolic BP (DBP) dip was 13.7/11.9 ±10.9/7.8 (V0) vs 12.7/11.4 ± 10.4/7.7 (V1) mm Hg, p<0.02; nighttime/daytime ratio N/D ratio (%) SBP/DBP = 9.9/14.1 ±7.7/13.6 (V0) 9.4/13.5 ± 8.4/8.5 p<0.02. Comparing both ABP evaluations the intercorrelation coefficients and concordance coefficients of nighttime % fall was 0.483 and 0.456 for SBP and 0.495 and 0.476 for DBP (p<0.001). From the first evaluation 17/45 (38%) of reverted dippers (N/D ratio <0%), 102/188 (54%) of non-dippers (N/D ratio 0-9.9%); 119/214 (56%) of dippers (N/D ratio 10-19.9%) and 11/41 extreme dippers (N/D ratio >20%) maintained the same dipping category based on N/D ratio. These rates of maintenance of dipping categories were independent of age, gender, BMI and baseline level of 24h BP values.

Conclusions: Despite mean 24-h values were relatively stable over repeated ABP monitoring for at least 24 months, we confirmed that a significant variability in BP dipping exists for all the dipping categories.

PP.02.39 ASSESSMENT OF SALT SENSITIVITY IN A VENEZUELAN POPULATION THROUGH AN INDEX BASED ON AMBULATORY BLOOD PRESSURE AND HEART RATE RECORDINGS. DATA FROM ARTEMIS INTERNATIONAL REGISTRY

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Objective: Although the assessment of salt sensitivity has been shown to have prognostic value in hypertensive patients, its use in daily practice and in population studies has been limited by the complexity of its conventional assessment. A simpler salt sensitivity index (SSI) has been recently proposed and tested, based only on parameters derived from 24h ambulatory blood pressure monitoring (ABPM).

Design and method: We analyzed ABPM data (only validated devices) of Venezuelan subjects (n= 197, all untreated) referred for clinical screening to hypertension centers of three cities (Caracas, Maracaibo and San Cristóbal) and included in the international ARTEMIS registry. Salt sensitivity was assessed through the formula proposed by Castiglioni P. et al (SSIABPM *), together with anthropometric characteristics and BP parameters.

Results: SSIABPM in the whole population showed a high mean value (64,9 ±13,3, range: 31,3-103,8) as compared to reference Italian population where it was described, being significantly higher in women (65,6±13,3) than in men (61,4±12,7)(p<0,05). SSIABPM showed a non-significant trend to be higher in subjects with elevated (>=130/80 mmHg, n=93) than in those with normal (<130/80 mmHg, n=104) 24h ABP (64,6±14,2 vs 63,3±12,3, respectively, NS), and there was a weak correlation between 24h systolic BP and SSIABPM in the entire population (r=0,18 p<0,05). There were no correlations between SSIABPM and, age, weight, body mass index an abdominal circumference, neither in the total group nor in the two BP subgroups separately analyzed. Interestingly, SSIABPM was significantly (P<0.05) lower in subjects from Caracas (56,9±11,9) than in those from the other two cities. (Maracaibo:67,2±12,4. San Cristóbal:66,58±13,1).

Conclusions: We found very high levels of SSIABPM in the Venezuelan population analyzed, even in subjects non affected by arterial hypertension, which is relevant in relation to local diet habits and high cardiovascular risk. Further studies are now needed to evaluate whether this easy to apply index may be considered a clinically useful tool to more systematically explore the role of salt sensitivity in cardiovascular risk assessment.

*SSIABPM=(HR24H×MAPN/D×PPN/D).HR24H: mean 24 hours heart rate, MAPN/D:mean arterial pressure night/day ratio. PPN/D:pulse pressure night/day ratio. Castiglioni. Int J Cardiol.2013

PP.02.40 CORRELATION BETWEEN BLOOD PRESSURE LEVELS DURING NIGHT AND INSULIN RESISTANCE IN HYPERTENSIVE PATIENTS

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Objective: Aim of our study was to evaluate the association between insulin resistance and blood pressure levels, as well as the variability, during daytime and nighttime in newly diagnosed essential hypertensive patients.

Design and method: We studied 254 consecutive newly diagnosed, never treated, essential hypertensive patients (Mean Age: 51,7 years, mean systolic/diastolic blood pressure: 156,2/98,8mmHg). All participants underwent 24hr Ambulatory Blood Pressure Monitoring (ABPM). Moreover, in all participants levels of fasting glucose, fasting insulin and HOMA-IR index were measured in venous blood sample or calculated, accordingly. Pearson's correlation coefficient were calculated to assess associations between blood pressure measurements and insulin resistance.

Results: Results are shown in Table 1.

Table 1. Correlations between Blood pressure levels during night and HOMA-IR

	r	P value
NSBP	0,170	0,007
NDBP	0,193	0,002
NSBPv	0,159	0,013
NSBP(23-06)	0,282	<0,001
NDBP(23-06)	0,216	0,002

NSBP=Systolic blood pressure during night, NDBP=Diastolic blood pressure during night, NSBPv=Variability of systolic blood pressure during night, NDBPv=variability of diastolic blood pressure during night, NSBP(23-06)=variability of systolic blood pressure during night (23:00-06:00), NDBP(23-06)=variability of diastolic blood pressure during night (23:00-06:00), HOMA=Homeostatic model assessment.

Conclusions: Blood pressure levels during nighttime, as well as variability of blood pressure, are correlating significant with insulin resistance in newly diagnosed essential hypertensive patients, underlining the significance of blood pressure monitoring during nighttime.

PP.02.41 THE WHITE-COAT EFFECT IS AN INDEPENDENT PREDICTOR OF SILENT MYOCARDIAL ISCHEMIA IN RESISTANT HYPERTENSIVE PATIENTS

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Objective: The white-coat hypertension (WCH), commonly found in pseudoresistant hypertension does not pose higher cardiovascular risk than hypertensive status. However when the decrease of the out-of-office blood pressure does not reach normal levels – white-coat effect (WCE) – the repercussion is still obscure. The WCE is characterized by higher sympathetic activity and stress, which can be associated to myocardial ischemia. We aimed to investigate the repercussions of the WCE in myocardial perfusion in patients with resistant hypertension (RHTN).

Design and method: We enrolled 129 truly RHTN subjects to perform rest and pharmacological stress myocardial perfusion scintigraphy, 24h-ABPM and biochemical tests. All patients were asymptomatic for heart ischemic disease. We divided patients in groups with white coat effect (WCE, n=63) and without (non-WCE, n=66), based on the differences between ABPM and office measurements.

Results: Groups were equal regarding age, gender and BMI. There was a high prevalence of WCE (49%). WCE group had more myocardial ischemia (49.2% vs. 7.6%, p<0.001), more microalbuminuria (60.3% vs. 36.4%, p=0.01), and higher heart rate (HR) (72 [64-80] vs. 64 [60-69], p<0.001),

compared with non-WCE. On an adjusted logistic regression HR was considered a predictor of WCE (OR=1.10, CI95% 1.04-1.15; p<0.001), but MA was not (OR=1.8, CI95% 0.8-3.9; p=0.15). On a second model of adjusted logistic regression, WCE was an independent predictor of myocardial ischemia (OR=14.7, CI95% 4.8-44.8; p<0.001).

Conclusions: In RHTN there is a high prevalence of WCE, and this effect is a predictor of silent myocardial ischemia. In this group of hypertension a special attention should be given to the WCE phenomenon.

PP.02.42 THE COMPARISON OF AUTOMATED AND MERCURY SPHYGMOMANOMETERS IN AN EPIDEMIOLOGICAL SURVEY OF HYPERTENSION CONTROL

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Objective: Control of hypertension in cardiovascular patients remains according to EUROASPIRE study results suboptimal (53% in average). We would like to evaluate, in which extend was this result influenced by method of measurement, i.e. using automated oscillomethric device.

Design and method: 1044 patients with stable vascular disease (mean age 65.0 years, 72.3% of males), pooled samples of Czech EuroAspire III/ IV and stroke suveys). All study subjects underwent two sets of blood pressure (BP) measurements, per protocol by automated sphygmomanometer (OMROM M6) and then using mercury sphygmomanometer ("gold standard" in clinical practice).

Results: BP values of both methods significantly correlates (Spermans r =0.78 and 0.64, for systolic and diastolic BP, resp.), however these coefficients are in context rather low. Median intra-individual difference between automated and mercury sphygmomanometer was 8/5 mmHg, causing that overall prevalence of uncontrolled blood pressure raised from 41.1 (by mercury) to 60% (by automated). These differences were significantly pronounced in males, coronary, hypertensive and diabetic patients, and in those treated with betablockers.

Conclusions: The use of automated device (used per protocol in EUROASPIRE studies) markedly overestimated the prevalence of un-adequately controlled hypertension. However taking also this bias in account, the overall control of hypertension in cardiovascular patients remains far from being optimal.

PP.02.43 PRELIMINARY RESULTS OF NON INVASIVE AMBULATORY 24 HOURS PERIPHERAL, CENTRAL BLOOD PRESSURE AND ARTERIAL STIFFNESS IN MEDICAL STUDENTS FROM FIRST TO FOURTH YEAR COHORT 2013

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Objective: The measurement of blood pressure (BP) has been based on taking the pressure through the method developed by Riva Rocci-Korotkoff, however there are enough evidence that it is very poor to estimate the real individual cardiovascular risk.as the measurement of noninvasive ambulatory central (BP) and arterial stiffness have brought new evidence in this field, and this are a novel tool. but normal values in a young population are still unclear.
The aim of study was determinated the non invasive ambulatory 24 hours, peripheral, central blood pressure and arterial stiffness values in a young population, medical students, from the first to fourth year.

Design and method: An observational cohort study, on 412 medical students, from first to fourth year, at the Universidad de los Andes.
Clinical record personal, family hystory and habits, anthropometric measurments were taken, the measurement of ambulatory nonivasive braquial, central 24hors (BP) and arterial stiffmes (pulse wave velocity PWV, augmentattion index AIx, augmentattion pressure, reflecction coefficent) were performed with a Mobilograph NG-PWA by IEM device.

Results: Of the 412 students, 66 were obtained, 37 women and 29 men, average age was 20.48 years, body mass index: 22.62 kgs/m2, Waist circunference: 77cm. Non-significant cardiovascular risk factors, or any diseases.

	DAY TIME VALUES	Men's Results				Women's Results			
		Mean	Standard Deviation	Variance	Confidence intervals(95,0 %)	Mean	Standard Deviation	Variance	Confidence intervals(95,0 %)
Brahial Hemodynamic	*Brachial Systolic Blood Pressure (BSBP)*	124,82	16,26	264,30	0,76	113,32	11,86	140,55	0,48
	Brachial Diastolic Blood Pressure	74,01	11,50	132,31	0,54	70,93	10,50	110,31	0,42
	Brachial Pulse Pressure	50,81	15,62	243,88	0,73	42,39	10,19	103,82	0,41
	MAP	97,28	11,50	132,19	0,54	90,35	9,92	98,43	0,40
Central Hemodynamic	*Central Systolic Blood Pressure (CSBP)*	110,01	12,39	153,46	0,64	102,94	10,43	108,74	0,45
	Central Diastolic Blood Pressure	75,80	11,12	123,72	0,57	72,56	10,38	107,71	0,45
	Central Pulse Pressure	34,21	10,74	115,45	0,55	30,39	7,75	60,00	0,33
	Cardiac output	4,26	0,70	0,49	0,04	3,99	0,54	0,29	0,02
	Heart rate	75,53	14,77	218,08	0,69	80,56	14,54	211,38	0,59
Arterial stiffness	*Augmentation pressure*	5,41	4,43	19,60	0,23	7,55	4,77	22,79	0,21
	BSP - CSP	13,48	7,31	53,44	0,38	9,92	4,60	21,13	0,20
	AIx@75	14,27	12,25	150,14	0,64	25,66	12,08	146,01	0,52
	AIx	14,67	9,38	87,95	0,48	23,04	10,43	108,89	0,45
	Reflection coefficent	56,29	11,26	126,90	0,58	61,97	8,98	80,57	0,39
	Peripheral vascular resistence	1,25	0,19	0,04	0,01	1,27	0,17	0,03	0,01
	Pulse Wave Velocity, (PWV)	5,20	0,31	0,10	0,02	5,04	0,13	0,02	0,01
	NIGHT TIME VALUES	**Mean**	**Standard Deviation**	**Variance**	**Confidence intervals(95,0 %)**	**Mean**	**Standard Deviation**	**Variance**	**Confidence intervals(95,0 %)**
Brahial Hemodynamic	*Brachial Systolic Blood Pressure (BSBP)*	113,65	15,66	245,30	1,29	105,38	11,22	125,85	0,80
	Brachial Diastolic BloodPressure	62,14	10,52	110,64	0,86	62,00	9,65	93,15	0,69
	Brachial Pulse Pressure	51,51	12,60	158,65	1,03	43,38	8,20	67,16	0,58
	MAP	85,73	11,53	132,98	0,95	81,88	9,55	91,19	0,68
Central Hemodynamic	*Central Systolic Blood Pressure (CSBP)*	105,35	14,49	209,83	1,26	98,99	11,14	124,08	0,82
	Central Diastolic Blood Pressure	63,85	10,76	115,87	0,93	62,98	9,58	91,77	0,70
	Central Pulse Pressure	41,50	11,17	124,81	0,97	36,01	8,26	68,29	0,61
	Cardiac output	3,65	1,02	1,05	0,09	3,86	0,77	0,59	0,06
	Heart rate	57,91	10,93	119,50	0,90	66,70	12,13	147,12	0,87
Arterial stiffness	*Augmentation pressure*	8,87	8,15	66,44	0,71	8,57	6,52	42,45	0,48
	BSP - CSP	8,38	6,14	37,70	0,54	6,38	3,99	15,90	0,30
	AIx@75	9,77	16,55	273,90	1,44	16,65	14,46	209,04	1,06
	AIx	20,47	17,30	299,17	1,50	22,30	13,91	193,49	1,02
	Reflection coefficent	65,45	9,64	92,98	0,84	66,89	8,44	71,25	0,62
	Peripheral vascular resistence	1,24	0,27	0,07	0,02	1,19	0,24	0,06	0,02
	Pulse Wave Velocity, (PWV)	5,14	0,28	0,08	0,02	5,02	0,09	0,01	0,01

Conclusions: The values of peripheral, central (BP) and arterial stiffness (PWV and AIx) in 24 hours were higher in men than in women,both day and night, with a stadistically significant with a confidence interval of 95% for P>0,05. Except for nocturnal cardiac output and heart rate and the augmentation pressure wich were higher in women.
In both sexs at night the augmentation decrease and the PWV remain unchanged. This findings suggest that younger male gender has a higher CV risk.

PP.02.44 ARE HYPERTENSIVE PATIENTS READY FOR TELEMEDICINE?

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Objective: Advancements in technology offer the possibility for patients with chronic diseases to be managed at home while being monitored by health-care professionals. Telemedicine programs for arterial hypertension have been suggested to improve the chronic care of the patients. But to date, few data exist in the "real world" concerning the availability of required devices and patient's acceptability of telemedicine. The objective of this study was to gather through a self-administered questionnaire, the prerequisites of the existing technical equipment in hypertensive patients and physicians, as well as their perceptions and expectations concerning telemedicine.

Design and method: 15 hypertension specialist physicians recruited the first 10 consecutive outpatients. A self questionnaire was fulfilled by 179 patients concerning their technical equipments.

Results: Doctors were aged 31,6 ± 6 years, 50% men, working mostly n teachin hospitals included 179 patients aged 60,4 ± 15,4 years (57.5% men, SBP / DBP averaged 145 ± 23/81 ± 13 mmHg, 31.8% with diabetes), 67.6 % had home blood pressure devices (34.1 % arm-cuff). Among 57 patients with diabetes, 33 regularly used a blood glucose meter. The level of equipment of doctors and patients is summarized in the following table (1):

	Physicians (n=15)	Patients (n=179)
Mobile phone	14 (93 %)	147 (82.1 %)
Smartphone	10 (66 %)	53 (29.6 %)
- with Bluetooth system	9 (60 %)	55 (30.7 %)
- with Internet acces	9 (60 %)	53 (29,6 %)
- with medical applications	8 (53.3 %)	8 (4.5 %)
Digital tablet	6 (40 %)	21 (11.7 %)
Laptop	13 (86.6 %)	26 (14.5 %)
Home computer	12 (80 %)	38 (21.2 %)
Internet access at home	13 (86.6 %)	126 (70.4 %)
Box with WiFi	13 (86.6 %)	107 (59.8 %)
Acceptance to share medical data with mobile devices via Internet	12 (80 %)	144 (80,4 %)

For patients, expected potential benefits of telemedicine were: improved control of blood pressure (37.4%) and being reassured (32.4%). Moreover, 80.4% of patients agreed to share their blood pressure data with a non-medical staff, such as a nurse.

Conclusions: Smartphones with internet access are not frequently used by hypertensive patients and represent the main potential barrier to the deployment of a telemedicine program in the real world. On the other hand, a majority of patients visiting specialized hypertension centres had a good perception of telemedicine as a supporting action for hypertension care.

POSTERS' SESSION

POSTERS' SESSION PS03
OBESITY

PP.03.01 COMBINING WAIST CIRCUMFERENCE WITH BODY MASS INDEX IS CRUCIAL IN CARDIOVASCULAR RISK ASSESSMENT IN PATIENTS WITH CORONARY HEART DISEASE

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Objective: It has been reported in CHD patients that mortality is inversely associated with body mass index (BMI), and directly associated with waist circumference (WC). The purpose of this study was to examine the association of the general obesity parameter (BMI) and the adipose tissue discriminator (WC) with cardiovascular risk in patients with coronary heart disease (CHD) established by coronary angiography.

Design and method: We included 1345 subjects with CHD. A multivariate COX proportional regression model adjusted for potential confounders was used to assess the relative risk of total and CV mortality according to the parameters of general obesity (BMI) and adipose tissue distribution (WC).The mean age of subjects was 63.2±9.2 years, and 57% were men.The present study is a part of PROGNOSIS study.

Results: There were 164 (12%) all-cause deaths including 90 (7%) CV deaths during the follow-up period. CV events occurred with the following frequencies: 201 (15%) for ACS, 60 (5%) for stroke and 588 (44%) for coronary artery interventions. Analysis of WC showed that instead of CHD responding well to treatment, (over 70% of patients in each quartile of WC were treated with a combined therapy containing acetylosalicylic acid, a lipid-lowering drug and a β blocker) multi-vessel CAS occurred more frequently in subjects from the 4th quartile than in other patients. There was direct relationship between WC and both total mortality (HR 1.03 (CI 1.01-1.10), p <0.01) and CV mortality (HR 1.03 (CI 1.01-1.07), p <0.03), but an inverse relationship between BMI and both total mortality (HR 0.91 (CI 0.86-0.98), p <0.03) and CV mortality (HR 0.97 (CI 0.87-0.99), p <0.05). After combining WC with BMI, the group of subjects with BMI <25 kg/m2 and WC >=104 cm had the highest rates of both total and CV mortality of all CHD patients.

Conclusions: Assessment based on a combination of WC and BMI is superior to assessment based on a separate estimation of these parameters in both total and CV mortality risk evaluation.

PP.03.02 GANSU LONGXI RADIX ASTRAGALI EFFECT THE EXPRESSIONS OF ANGIOTENSIN 1-7 RECEPTOR IN MYOCARDIUM OF MEYABOLIC SYNDROME RATS

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Objective: To clarify the anti-oxidative role of Gansu Longxi Radix Astragali and its effects on the Ang 1-7 specific receptor, Mas receptor in metabolic syndrome (MS) rats.

Design and method: Male Wistar rats were randomly divided into three groups: nomal control group(NC), MS group,MS+Astragali group (MS+HQ,6 mg/kg/day in gavage.) . The 2K1C method with high fat diet and fructose water were constructed to set up the MS model. After two weeks treatment, we used echocardiology and invisive hemodynamic to measure left ventricular fuction . Plasma and myocardial Ang II, MDA and SOD levels were measured with radioimmunoassay . And the MasR, AT1R, ACE and ACE2 were detected by western blot analysis.

Results: Compared with NC group, the left ventricular systolic and diastolic pressure, body weight,,fasting glucose, fasting insulin, triglycerides and serum fatty acid of MS group were significantly increased (P<0.05). The plasma Ang II of MS group (66.77 14.08 pg/ml) were higher than MS+HQ group(46.99 11.45 pg/ml,P=0.001). We found that Astragali ameliorated the myocardial oxidative stress in MS rats(SOD: MS 106.34 16.07 vs MS+HQ, 141.06 23.20 U/mg, P=0.006; MS 106.34 16.07 vs NC 174.02 20.52 U/mg, P=0.000, MDA: 30.37 7.43 vs 22.43 5.25 μmol/mg,P=0.008;30.37 7.43 vs 17.56 2.49 μmol/mg,P=0.001). Astragali coordinated the expressions balance between ACE and ACE2(ACE: 2.07 0.21 vs 1.45 0.39,1.19 0.12,P<0.05; ACE2: 1.02 0.34 vs 1.41 0.27,1.58 0.20,P<0.05). Additionally, the novel finding of this study was that Mas R was significantly upregulated in MS+HQ group(0.54 0.11 vs 0.96 0.28,1.08 0.16,P<0.05).

Conclusions: Astragali can increase the ACE2 and Mas receptor expressions through anti-oxidative effects. This has implications for RAS function and identifying new therapeutic in Metabolic Syndrome.

PP.03.03 GLUCOSE TIME SERIES COMPLEXITY IN A POPULATION WITH ESSENTIAL HYPERTENSION

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Objective: Non-linear methods, such a data complexity statistics, have been applied to the analysis of biological signals. Essential hypertension (EH) is a condition with at increased risk of developing type 2 diabetes mellitus (DM). Complexity analysis (Detrended Fluctuation Analysis -DFA-) of glucose time series may be a useful tool to study the initial phases of glucoregulatory dysfunction in this setting.

Design and method: Observational, crossectional study, performed in patients with EH. Patients were classified as displaying the metabolic syndrome (MS) on the basis of the ATP-III criteria. Patients with DM were excluded. Glucose time series were measured by iPro glucometer (Medtronic) during 72 hours. Glucose variability on the glucose time series was measured by MAGE (Mean Amplitude of Glycaemic Excursion) and glucose complexity was measured by DFA metric.

Results: We include 91 patients, with a mean age of 59±10 years, women 51,6 %. Mean BMI was 30±5, mean BP 134±13/77±8 mm Hg, mean basal glucose 98±12 mg/dl and mean HbA1c 5.8±0.2%. 41 patients (45%) complied with MS criteria. We founded a significant correlation between the number of MS-defining criteria and DFA (r= 0.233, p= 0.026) and with MAGE (r= 0.396, p< 0.0001). DFA differed significantly between patients complying or not with MS (1.44 vs. 1.39, p= 0.018). There were differences between DFA tertiles in MAGE (f= 5.3, p= 0.006), diastolic blood pressure (f= 4.1, p= 0.018) and HOMA index (f= 4.2, p= 0.018). In multivariate analysis the only independent determinants of the DFA values were MAGE (beta coefficient = 0.002, CI 95%: 0.001 - 0.004, p= 0.001) and abdominal circumference (beta coefficient = 0.002, CI 95%: 0.000015 - 0.004, p= 0.048) (model R^2 0.45), with the rest of the analysed variables (fasting glucose, HbA1c, number of MS criteria, age, BMI, systolic and diastolic blood pressure, triglycerides, HDL-cholesterol and basal insulinemia) being excluded in the final model.

Conclusions: In our population DFA was associated with MS and number of MS criteria. Complexity analysis seems capable of detecting differences in variables arguably related with the risk to evolution to DM in our hypertensive patients.

PP.03.04 GENDER DIFFERENCES IN CENTRAL OBESITY AND METABOLIC PROFILE CONCERNING PERIPHERAL ARTERIAL WAVE REFLECTIONS

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Objective: Central obesity is an established cardiometabolic risk factor. However, gender specific abdominal fat repartition is less well studied. We assessed the hypothesis that gender-specific differences of subcutaneous and preperitoneal fat compartments as expressed by abdominal fat index (AFI), are related to altered metabolic profile and arterial properties of hypertensive men and women.

Design and method: We studied 369 consecutive never treated essential hypertensive men (n=183, age= 52±10 years) and women (n=186, 57±12 years), non diabetic, with normal waist circumference (92±9 and 73±13 cm, respectively). In all participants anthropometrics variables were recorded and venous blood samples were taken to determine their metabolic profile. Arterial stiffness was evaluated, on the basis of c-f PWV by means of a computerized method (Complior SP). Heart rate-corrected augmentation index (AIx75) was estimated as a measure of wave reflections. Ultrasonography was used for the assessment of abdominal fat distribution. Subcutaneous (S) and preperitoneal (P) fat layers were measured at their maximum and minimum thickness sites on the upper median abdomen. AFI was calculated as Pmax to Smin ratio.

Results: Women had better metabolic profile than men, according to fasting plasma glucose, total cholesterol, low-density lipoprotein, triglyceride and high-density lipoprotein levels (97±9 vs. 97±5 mg/dl p=0,869, 201±43 vs. 213±38 mg/dl p=0.036, 133±40 vs. 139±43 mg/dl p=0.043, 116±52 vs. 140±79 mg/dl p=0.010, 59±14 vs. 42±10 p<0.001, respectively) and lower AFI (0.87±0.52 vs. 1.24±0.72 p<0.001), though more subcutaneous (18±7 vs. 15±6 p<0.0001) than preperitoneal fat accumulation (14±6 vs. 16±6 p=0.078). On the contrary, women had increased AIx75 than men (30.3±6 vs. 23±10 p<0.001), while they did not differ regarding c-f PWV (8.52±1.6 vs. 8.6±1.9 m/sec p=0.611).

Conclusions: Hypertensive women exibit lower abdominal fat index and higher subcutaneous fat accumulation than men. This is associated with better metabolic profile and augmented peripheral wawe reflections.

PP.03.05 DISCORDANCE BETWEEN ARTERIAL STIFFNESS AND PERIPHERAL WAVE REFLECTIONS IN HYPERTENSIVES WITH VISCERAL ADIPOSITY

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Objective: Excess fat accumulation is considered to be a determinant of arterial stiffness, as expressed by increased carotid - femoral pulse wave velocity (c-f PWV) and Augmentation index (Aix). However, in the context of visceral obesity, the relationship between Aix and c-f PWV is less well established. We assessed the hypothesis that there might be an association between abdominal fat distribution and arterial stiffness, by estimating abdominal fat index (AFI).

Design and method: We studied 185 newly diagnosed, never treated, non diabetic, essential hypertensive subjects (aged =57±10 years, male=96, office blood pressure=156/92 mm Hg, waist circumference=89±13 cm). In all participants anthropometric data were recorded and venous blood sampling was performed to determine their metabolic profile. Aortic stiffness was evaluated on the basis of c-f PWV by means of a computerized method (Complior SP). Heart rate-corrected augmentation index (Aix75) was estimated as a measure of wave reflections. Ultrasonography was used for the assessment of abdominal fat distribution. Subcutaneous (S) and preperitoneal (P) fat layers were measured at their maximum and minimum thickness sites on the upper median abdomen. AFI was calculated as Pmax to Smin ratio.

Results: Excess visceral adiposity as expressed by increased AFI was negatively correlated with Aix75 (r = - 0.28, p=0.04) and positively with c-f PWV, glomerular filtration rate, triglycerides and homocysteine levels (r =+0.18 p=0.44, r=+0.32 p=0.02, r=+0.16 p=0.04, r=+0.28 p=0.79, respectively). On multiple regression analysis, 57% of the variance in Aix75 was carried out with the following significant predictors: age, smoking, glucose, mean systolic blood pressure and waist circumference.

Conclusions: Hypertensives with excess visceral adiposity are characterized by increased arterial stiffness but decreased peripheral wave reflections.

PP.03.06 THE NUMBER OF METABOLIC SYNDROME RISK FACTORS CORRELATES WITH AORTIC STIFFNESS

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Objective: Metabolic syndrome (MS) is a cluster of >=3 risk factors (RF). The presence of subclinical organ damage increases the risk of cardiovascular disease in patients with MS. Arterial stiffness and wave reflections are independent predictors of cardiovascular disease. The aim of our study was to compare pulse wave velocity (PWV) and parameters of wave reflections in subjects with different number of MS risk factors (definition of MS according to Czech guidelines: arterial hypertension or antihypertensive drug treatment, waist circumference, serum triglycerides or lipid-lowering drug treatment, HDL cholesterol, type 2 diabetes mellitus or impaired glucose tolerance).

Design and method: We examined 936 respondents from the Czech general population (post-MONICA study). We measured aortic PWV, augmentation index (AIx) and central augmentation pressure (cAP) using SphygmoCor device. We divided subjects into 5 groups according to number of RF (0,1,2,3, >=4). We used multivariate linear regression analysis to assess association between the number of RF and PWV, AIx and cAP after adjustment for age, gender, heart rate and MAP.

Results: 334 respondents (35.7 %) had MS. Subjects with MS were older (60.4±9.8 years vs. 51.0±13.6 years, p<0.0001) and had higher PWV than subjects without MS (9.0±0.1 m/s vs. 7.3±0.1 m/s, p<0.0001). After adjustment for covariates, the PWV (pfor trend <0.0001), and cAP (p=0.025) were higher with increasing number of RF, while AIx was lower (p=0.020).

Conclusions: With growing number of metabolic syndrome risk factors, the aortic PWV and central augmentation pressure increase, while opposite is true for central augmentation index.

PP.03.07 WAIST CIRCUMFERENCE VERSUS OTHER OBESITY PARAMETERS AS DETERMINANTS OF CORONARY ARTERY DISEASE IN ESSENTIAL HYPERTENSION

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Objective: There is still controversy over which obesity parameter has the strongest cardiovascular predictive value. The aim of this study was to assess the predictive role of body mass index (BMI), waist circumference and waist to hip ratio for the incidence of coronary artery disease (CAD) in a cohort of essential hypertensive patients.

Design and method: We followed up 2361 essential hypertensives (mean age 57.8 years, 1131 males, office blood pressure (BP)=143/89 mmHg) free of cardiovascular disease for a mean period of 6 years. All subjects had at least one annual visit and at baseline underwent complete echocardiographic study for determination of left ventricular mass index (LVMI) and blood sampling for assessment of metabolic profile. Moreover, weight and height were measured by standard techniques and waist circumference was estimated at the midpoint between the low rib margin and the iliac crest. LV hypertrophy (LVH) was defined as LVMI >or=125 g/m² in males and LVMI >or=110 g/m² in females, while CAD was defined as the history of myocardial infarction or significant coronary artery stenosis revealed by angiography or coronary revascularization procedure.

Results: The incidence of CAD over the follow-up period was 2.37%. Hypertensives who developed CAD (n=56) compared to those without CAD at follow-up (n=2305) had at baseline greater waist circumference (100.7±11.3 vs 96.5±11.9 cm, p=0.007), LVMI (117±26.8 vs 103.3±27 g/m², p<0.0001) and prevalence of LVH (43% vs 26%, p=0.014). No difference was observed between hypertensives with CAD and those without CAD with respect to baseline office BP, BMI and waist to hip ratio values (p=NS for all). In successive multivariate Cox regression models waist circumference (HR 1.027, p=0.014) and LVMI (HR 1.012, p=0.003) were independent predictors of CAD.

Conclusions: In essential hypertensive patients baseline waist circumference predicts future development of CAD, whereas BMI and waist to hip ratio have no independent prognostic value. These findings suggest that among obesity indices waist circumference constitutes an easy clinical tool to assess risk in hypertension.

PP.03.08 METABOLIC SYNDROME IS ACCOMPANIED BY INCREASED MUSCLE SYMPATHETIC NERVE ACTIVITY AND ARTERIAL STIFFNESS IN RESISTANT HYPERTENSIVE PATIENTS

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Objective: Resistant hypertension is related to sympathetic overdrive and arterial stiffening, while there are scarce data whether metabolic syndrome further potentiates sympathetic activity and vascular abnormalities in this setting. The aim of this

study was to assess the effect of the metabolic syndrome on muscle sympathetic nerve activity (MSNA) and arterial stiffness in resistant hypertensive patients.

Design and method: We studied 24 patients with resistant hypertension [age: 58±10 years, 15 males, office blood pressure (BP): 178/94±15/12 mmHg, 24-hour BP: 149/84±15/11 mmHg, under 4.2±0.5 drugs] that underwent transthoracic echocardiographic study and blood sampling for assessment of the metabolic profile. Metabolic syndrome was defined according to the Adult Treatment Panel III criteria and arterial stiffness was evaluated on the basis of carotid to femoral pulse wave velocity (PWV). In all participants sympathetic drive was assessed by MSNA estimations based on established methodology (microneurography).

Results: Resistant hypertensive patients with metabolic syndrome (n=11) compared to those without (n=13) exhibited higher waist circumference (108.1±5.4 vs 94.6±9.2 cm, p=0.001), fasting glucose (131.8±2.9 vs 94.6±2.1 mg/dl, p<0.05), office systolic BP (186±17 vs 171±15 mmHg, p<0.001) and left ventricular mass index (134.2±18.1 vs 124.6±17.2 g/m², p=0.001). Moreover, metabolic syndrome patients compared to those without were characterized by greater levels of carotid to femoral PWV (11.7±0.8 vs 9.3±1.1 m/sec, p<0.001) and sympathetic nerve traffic as reflected by MSNA levels (84.2±2.8 vs 75.1±2.2 bursts per 100 heart beats, p<0.001). In all participants MSNA was related to waist circumference (r=0.38, p=0.002) and office systolic BP levels (r=0.35, p<0.05) but there was no association with PWV values (p=NS).

Conclusions: In resistant hypertensive patients, metabolic syndrome is associated with high MSNA and PWV levels. These findings support that metabolic syndrome further deteriorates sympathetic activity and arterial stiffening characterizing resistant hypertension.

PP.03.09 IMPACT OF WEIGHT GAIN AFTER MATURITY ON CARDIOVASCULAR RISK FACTORS

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Objective: Obesity is a major risk factor for hypertension and cardiovascular diseases. It is not clear whether persistent obesity from childhood and adult onset obesity have a different impact on cardiovascular risk. This study is to investigate the impact of weight gain after maturity on cardiovascular risk factors.

Design and method: A total of 9,518 subjects (women 39%), aged 21–92y, who underwent health check-up.
Exclusion criteria: women, chronic illness(+), BMI<25kg/m², lack of previous body weight data, body weight decreased as compared with that at age 18-20y. Difference between current body weight and that at age 18-20y were confirmed by self-reported questionnaire and/or interview. Subjects with overweight (BMI>=25kg/m²) were classified into two groups (H group (n=167); weight gain over 8.7kg, L group (n=167); weight gain under 8.7kg). 8.7kg is inter quartile range (IQR) of weight gain.
We performed propensity score matching for age, body weight and body mass index. The homeostasis assessment insulin resistance (HOMA-IR) were calculated (fasting blood glucose × fasting immunoreactive insulin/405). Parameters (waist circumference, blood pressure, heart rate, LDL cholesterol, HDL cholesterol, triglyceride, fasting blood glucose, HbA1c, and HOMA-IR) were analysed by two-tailed unpaired t tests.

Results: Systolic blood pressure (H; 128.9mmHg vs L; 125.3mmHg, p=0.023), diastolic blood pressure (H; 79.9mmHg vs L; 76.7mmHg, p=0.015), waist circumference (H; 92.0cm vs L; 90.5cm, p=0.023) and HOMA-IR (H; 2.18 vs L; 1.72, p=0.0003) were significantly higher in H group compared to L group.

Conclusions: Although the extent of overweight is similar, adult onset overweight has more impact on insulin resistance and high blood pressure. In this group, weight loss may subserve more beneficial influences on prevention of hypertension and diabetes.

PP.03.10 RELATIONSHIP BETWEEN METABOLIC SYNDROME AND KIDNEY VOLUME

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Objective: Hypertension is the most important component of metabolic syndrome. Patients with metabolic syndrome have histopathological change of the kidney. However, there are few data about kidney volume of these populations. The aim of this study is to clarify relationship between metabolic syndrome and kidney volume.

Design and method: Cross-sectional study was performed on a sample of 203 men aged 29-69 years who underwent health check-up for primary disease prevention. We measured and analyzed components of metabolic syndrome (modified NCEP/ATP3 criteria) and ultrasonography. The parenchymal volume(PV) and the central echo complex(CEC) volume of the kidneys were estimated with ultrasonographic measured variables.
Receiver operating characteristic (ROC) curve analyses to detect metabolic syndrome were also performed for each of the ultrasonographic measured variables.

Results: Each component of the metabolic syndrome was all significantly associated with PV and CEC(P<0.001). A highly significant relationship was observed between the number of components of the metabolic syndrome and the parenchymal volume of the kidneys(P<0.0001). A comparison of ROCs showed that PV(0.72) had a greater area under the ROC than CEC(0.69).

Conclusions: The results of this study suggest that greater attention should be paid to not only cardiometabolic risk factors but also kidney volume in order to prevent cardiovascular disease.

PP.03.11 THE IMPACT OF THE METABOLIC SYNDROME ON LEFT VENTRICULAR MECHANICS. A TWO- AND THREE-DIMENSIONAL SPECKLE TRACKING STUDY

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Objective: Our aim was to evaluate left ventricular (LV) mechanics assessed by two- (2DE) and three-dimensional echocardiography (3DE) speckle tracking analyses in subjects with the metabolic syndrome (MS).

Design and method: This cross-sectional study involved 114 untreated subjects with the MS and 78 controls similar by sex and age. The MS was defined by the presence 3 or more ATP- AHA-NHLB criteria. All subjects underwent adequate laboratory analyses and complete 2DE and 3DE examination.

Results: 2DE global longitudinal strain was reduced in the MS subjects (-18.2 ± 3 vs. -20.8 ± 3.5 %, p<0.01). Similar findings were obtained for 2DE LV circumferential strain (-19.7 ± 3.6 vs. -22.4 ± 3.9 %, p<0.01), and 2DE LV radial strain (43.5 ± 8.2 vs. 48.3 ± 9.1 %, p<0.01). 3DE global longitudinal myocardial function was significantly decreased in the MS group in comparison with controls (-17.5 ± 3.1 vs. -19.8 ± 3.4 %, p<0.01). Parallel results were obtained for 3DE global circumferential strain (-18.8 ± 3.5 vs. 20.5 ± 3.6 %, p<0.01), as well for 3DE global radial strain (41.8 ± 8 vs. 46.2 ± 9.5 %, p<0.01), and 3DE LV global area strain (-26.7 ± 4.6 vs. -30.8 ± 4.4 %, p<0.01). 3DE LV ejection fraction was also lower in MS subjects (58 ± 3 vs. 62 ± 4 %, p<0.01). LV torsion was similar between MS participants and controls (1.54 ± 0.54 vs. 1.62 ± 0.64 °/cm, p=0.23); whereas LV untwisting rate was significantly decreased in the MS group (-94 ± 36 vs. -117 ± 31 °/s, p<0.01). Multivariate analysis of MS criteria showed that mean blood pressure, waist circumference and fasting glucose level were independently associated with 3DE global longitudinal, circumferential, radial and area myocardial function.

Conclusions: LV deformation obtained by 3DE is significantly impaired in the MS individuals. Among all five MS components, blood pressure, waist circumference and fasting glucose level are the most associated with the impairment of LV deformation.

PP.03.12 SYSTEM INFLAMMATION AND PSYCHOEMOTIONAL DISORDERS IN PATIENTS WITH HYPERTENSION AND METABOLIC SYNDROME

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Objective: To study pathophysiological mechanisms of psychoemotional disorders in patients with hypertension and metabolic syndrome (MS).

Design and method: Object of study - 74 patients in the age 30-62 years (in the average 45,2±1,2 years), 49 (67%) - men, 25 (33%) – women. The assessment of a psychoemotional status was done using the Hospital Anxiety and Depression Scale (HADS) and a Zung Questionnaire. We used C-reactive protein (CRP), Intrerleykin-6 (IL-6), Tumor Nekrose Factor Alpha (THφ-α) for system inflammation assessment.

Results: The depression was revealed in 40 (56%) pts according to Zung Questionnaire and in 5 (7%) pts according to HADS Questionnaire (p<0,05). The prevalence of anxiety was 28% (4 of 74 pts). The combination of anxiety and a depression was diagnosed in 3 (4%) pts.
Using Pearson method we established that anxiety wasn't connected with level of above-mentioned indicators of a system inflammation (p>0,05). On the other side HADS-detected depression had strong correlation with the CRP level (r=0,3502, p=0,0184), Zung-scale diagnosed depression correlated with the TNF-α level (r=0,3629, p=0,0448).

Conclusions: The system inflammation caused the frequency and severity of depression but didn't influence on anxiety in patients with hypertension and MS.

PP.03.13 SALT-SENSITIVE HYPERTENSION AND CARDIOMETABOLIC SYNDROME: STUDY IN GEORGIAN PATIENTS

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Objective: Salt-sensitivity has been linked to obesity and insulin resistance. The study was aimed to assess whether an association between sodium-sensitive hypertension and cardiometabolic diseases exists.

Design and method: Salt-sensitivity was assessed in 162 hypertensive (stage I by Joint National Committee 7th classification) ethnically Georgian patients aged 38- 62 years, of them 93 females and 69 males). Salt sensitivity was detected by the difference of mean arterial pressure (equal and more than 3 mm Hg) on high (200 mmol/day) vs. low (40 mmol/day) salt diet. Cardiometabolic syndrome criteria were abdominal obesity, high triglyceride concentration, low level of high density lipoproteins, high glucose blood level.

Results: Our studies revealed high daily salt-consumption in Georgian patients with salt-sensitive hypertension (basal urinary sodium excretion was 314±17.2 mmol). Eighty two (45.7%) of 162 patients appeared to be salt sensitive while the rest of hypertensives were salt resistant. Of salt-sensitive patients 61 (74.4%) were females. Our results revealed significantly higher incidence of cardiometabolic syndrome in salt-sensitive hypertensives (predominantly in women) compared to salt-resistant hypertensive subjects (34,2±2,75 % vs. 18.7±0,86%, p<0,001).

Conclusions: Our findings showed that high sodium consumption in salt-sensitive hypertensive patients of Georgian nationality is closely linked with higher incidence of cardiometablic syndrome, in particular, with obesity. There is an urgent need to developing preventive measures aimed to prevent growing incidence of salt-sensitive hypertension and cardiometabolic disease in Georgian population.

PP.03.14 PREVALENCE OF METABOLIC SYNDROME AND ITS ASSOCIATION AMONG PATIENTS WITH HYPERTENSION IN A PRIMARY CARE CLINIC

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Objective: Metabolic syndrome (MS) is a clustering of metabolic factors that is associated with higher risk in total and cardiovascular disease mortality.Reported cardiovascular pathologies which was associated with MS are increased in pulse pressure, arterial stiffness, diastolic dysfunction and left ventricular hypertrophy (LVH).However,little is known about the association between MS and Framingham risk score (FRS) in Malaysia population. Thus, this study aimed to determine the prevalence and predictors of MS among patient with hypertension in a primary clinic.

Design and method: This is a sub-analysis of a cross sectional study on prevalence and determinants of LVH in patients with hypertension registered at the department of Primary Care Medicine Clinic in the University of Malaya Medical Centre. MS is based on NCEP-ATPIII 2004 criteria and IDF 2005 criteria. Obesity is defined as a BMI of more than 27.5 kg/m2. Individual CVD risk was computed using the General Framingham CVD risk score based on age, total and high-density lipoprotein cholesterol, systolic BP, treatment for hypertension, smoking, and diabetes status. Ratio peak early (E) to late (A) diastolic filling velocities were used to assess the left ventricular diastolic dysfunction (LVDD). The LVDD was defined as reversed E/A ratio of <1. LVH was diagnosed when the left ventricular posterior wall thickness together with interventricular septal thickness is >=11 mm. The estimated glomerular filtration rate (eGFR) was used to determine renal function.

Results: 359 patients were entered into the analysis. The prevalence of MS is 48.5% based on NCEP-ATPIII 2004 criteria and 41.8% based on IDF 2005 criteria. The mean age of the participants was 59 years. 69.7% were females. Using multiple logistic regressions, there is a positive relationship found between MS and diastolic dysfunction (p=0.08), FRS (p<0.01) and eGFR (p<0.01). Age has a negative relationship with MS (p=0.03).

Conclusions: Prevalence of MS was high among hypertensive population in primary care setting. Patients with MS had underlying diastolic dysfunction, higher FRS and higher eGFR level. Every effort should be made to detect MS earlier for an intensive lifestyle modification.

PP.03.15 THE IMPACT OF BARIATRIC SURGERY ON LIPID AND CARBOHYDRATE METABOLISM, BLOOD PRESSURE AND LEFT VENTRICULAR HYPERTROPHY IN PATIENTS WITH MORBID OBESITY AND HYPERTENSION

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Objective: To study the dynamics of carbohydrate and lipid metabolism, blood pressure and left ventricular mass in patients with morbid obesity and arterial hypertension before and after 6 months of drug treatment and bariatric surgery.

Design and method: Were examined 164 patients with arterial hypertension and morbid obesity. We have two clinical groups:
1-st group (n=81, BMI 43,2±0,6 kg/m2, 41,1±1,6 years) with non-pharmacological (low-carbohydrate, low-fat diet) and drug treatment
2-nd group (n=83, BMI 52,1±1,2 kg/m2, 42,2 ±1,1 years) with bariatric surgery (Sleeve Gastrectomy, Roux-en-Y Gastric Bypass).
We analysed anthropometric data, carbohydrate and lipid profile, daily blood pressure (BP), echocardiography: determination of left ventricular hypertrophy. Define cardiovascular risk using European and U.S. scales: Score, BMI score, Full score, Procam, Framingham, DRS.

Results: At baseline, all participants had hypertension, 41 % had glucose intolerance, 28 % had diabetes, and 84 % had dyslipidemia. After bariatric surgery, average excess weight loss was 23 %, 68 % of participants had resolution or improvement of hypertension, 75 % had resolution or improvement of diabetes, and 60 % had resolution or improvement of dyslipidemia. In a subset of patients who underwent echocardiography, there were statistically significant improvements after surgery in left ventricular mass and improved diastolic function in terms of E/A ratio and isovolumic relaxation time.These changes were independent from changes in blood pressure and were not accompanied by changes in left atrial or left ventricular dimensions.

Conclusions: Bariatric surgery is more effective in weight loss in patients with morbid obesity, bariatric surgery reduces blood pressure, improves lipid and carbohydrate metabolism. Bariatric surgery is beneficial in lowering risk factors for CV disease, as well as in regression of left ventricular hypertrophy and in improving diastolic function.

PP.03.16 SIMILAR PROPORTIONS OF FRAMINGHAM RISK CATEGORISATION IN OBESE SUBJECTS DEFINED BY WAIST CIRCUMFERENCE AND BODY MASS INDEX

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Objective: To study the prevalence of obesity among Malaysian population, defined using BMI and WC cut offs; and the association between BMI and WC with (FRS).

Design and method: A total of 1404 subjects were recruited from community health screenings and categorised as centrally obese (WC greater and equal to 80cm and greater and equal to 90cm for females and males respectively); and further classified according to BMI subgroups: overweight (BMI: 23-27.4), obesity type 1 (BMI: 27.5 - 34.9), obesity type 2 (BMI: 35.0 - 39.9), and obesity type 3 (BMI greater and equal to 40). They were classified as low, moderate or high risk based on the calculated FRS. The proportion of FRS categories in each BMI and WC groups were evaluated.

Results: The prevalence of central obesity at 58.0% (39.2% males, 60.8% females) was higher than that using BMI cut-off at 31.9% (39.6 % males, 60.4% females). Using BMI, 41.7%, 24.8%, 5.2% and 1.9% were in the overweight, obese 1, obese 2 and obese 3 groups respectively. Central obesity group using WC cut-off and obesity defined by BMI cut-off exhibit similar proportions of subjects with the high, moderate and low risk categories according to FRS. FRS showed that the prevalence of low, moderate and high risk categories was similar in proportion between central obesity and BMI defined obesity (45.7% vs 44.3%, 30.8% vs 30.4% and 23.6% vs 25.3% respectively).

Conclusions: Despite obesity prevalence differences between WC and BMI defined subjects, the proportion of risk categorisation was similar between both groups. This suggests that irrespective of the criteria used in defining obesity, risk assessment is not affected.

PP.03.17 ENHANCED INFLAMMATION AND ENDOTHELIAL ACTIVATION IN DRUG NAIVE CENTRALLY OBESE SUBJECTS WITH OR WITHOUT METABOLIC SYNDROME

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Objective: To study the relationship between biomarkers of inflammation and endothelial activation in drug naive centrally obese subjects with or without MS compared to normal controls.

Design and method: A total of 449 subjects (156 males and 293 females, age (mean ± SD) : 48.3 ± 8.4 years) were divided into 3 groups; MS, central obesity without metabolic syndrome (NonMS) and normal lean control (NC). Based on the International Diabetes Federation (IDF) 2006, MS was defined as central obesity (waist circumference greater and equal to 90cm and greater and equal to 80cm for males and females, respectively) plus at least 2 out of 4 MS components. Exclusion criteria were those on lipid lowering, anti-diabetic, anti-hypertensive or anti-inflammatory drugs, or antioxidants, chronic inflammatory disorders or severe diseases that shorten lifespan. Fasting serum samples were collected to measure high sensitivity C-Reactive Protein (hs-CRP) concentrations using enzymatic reference method on an automated analyzer (Cobas Integra 400, Roche Systems, Germany) while plasma E-selectin and soluble Intercellular Adhesion Molecule-1(sICAM-1) by enzyme-linked immunosorbent assay (e-Bioscience, Austria).

Results: There was higher concentration of hs-CRP in MS and Non-MS compared to NC (3.7mg/L ± 2.8 vs. 1.0mg/L ± 1.2, p<0.0001; 3.1mg/L ± 2.6 vs. 1.0mg/L ± 1.2, p<0.0001 respectively). Similarly, the concentrations of E-selectin in MS and NonMS were higher than NC (mean±SD : 69.0ng/L ± 46.3 vs. 32.4ng/L ± 22.4, p<0.0001; 60.0ng/L ± 42.2 vs. 32.4ng/L ± 22.4 respectively, p<0.0001). In addition, the plasma sICAM-1 was significantly higher in MS and NonMS when compared to NC (533.4ng/mL ± 225.4 vs. 445.9ng/mL ± 344.7, p<0.05; 589.6ng/mL ± 225.4 vs. 445.9ng/mL ± 344.7, p<0.0001).

Conclusions: Central obesity with or without MS exhibits enhanced inflammation and endothelial activation, suggesting that central obesity is pivotal in the pathogenesis of atherogenesis. This may contribute in part to the increased cardiovascular risk in subjects with MS.

PP.03.18 PREHYPERTENSION, HYPERTENSION AND CARDIOMETABOLIC CHANGES ASSOCIATED WITH ANTIPSYCHOTIC USE IN SCHIZOPHRENIA

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Objective: Antipsychotic-induced blood pressure and metabolic changes in the treatment of mental illness is one of the biggest challenges being observed in recent times. Previous research studies have been limited by several confounders. This study evaluated the cross-sectional and prospective effects of olanzapine, risperidone and haloperidol on development of prehypertension, hypertension and metabolic changes in drug-naive patients with first-episode schizophrenia and compared them with a healthy matched control group.

Design and method: In the first part of the study, a cross-sectional sample of 130 patients on steady doses of antipsychotics was evaluated for the presence of prehypertension, hypertension and metabolic changes. In the second part, newly diagnosed patients with first-episode schizophrenia, randomized in a double blind trial to be treated with antipsychotic medication—olanzapine, risperidone, or haloperidol—and matched healthy controls were followed for 6 weeks. Body mass index (BMI), blood sugar, blood pressure changes and lipid profile changes were monitored and repeated after 6 weeks.

Results: The cross-sectional data revealed a prevalence of obesity in 35.4%, hypertension in 1.5% and metabolic syndrome in 16.2%. In the prospective part, ninety-nine patients with first-episode schizophrenia and 51 healthy controls were examined. Significant changes, between baseline and endpoint, in BMI, serum triglycerides, serum HDL, serum glucose and blood pressure was noted in the patient group (p<0.001) as compared to control group. Olanzapine (P <0.001) was associated with greater incidence in new onset diabetes, prehypertension and hypertensive changes as well as cardiometabolic changes when compared with risperidone and haloperidol.

Conclusions: The results confirm clinically significant and substantial changes induced by antipsychotic treatment in drug-naive patients with first-episode schizophrenia and underscore the need to carry out early monitoring of patients on atypical antipsychotics.

PP.03.19 CORRELATION BETWEEN MORPHOLOGICAL PARAMETERS OF THORACIC AORTA, ARTERIAL STIFFNESS AND CARDIOVASCULAR DAMAGE IN VISCERAL OBESITY

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Objective: Little is known about the presence of thoracic aorta dilation and its relation with cardiovascular (CV) remodeling in patients with visceral obesity. Aim of the study is to evaluate in abdominal overweight/obese patients, morphological parameters of thoracic aorta and their correlation with left ventricular (LV) mass, carotid intima-media thickness (cIMT) and aortic stiffness.

Design and method: We evaluated 107 consecutive not smokers patients, without known cardiovascular diseases or diabetes, never treated with antihypertensive drugs or statins: 72 subjects had body mass index (BMI) > 25 Kg/m2 and waist circumference (WC) >102 cm for males and >88 cm for women, 35 patients had BMI < 25 Kg/m2, WC < 102 cm for males and < 88 cm for women. All patients underwent: echocardiography, 24h ambulatory blood pressure (BP) monitoring, carotid ultrasonography, arterial tonometry (central blood pressure, CBP) and pulse wave velocity (PWV) measurement.

Results: Age, gender and 24h BP values were not different between groups. LV mass index (37.5±7.0 vs 31.2±7.3 g/h2.7, P<0.001) and cIMT values (0.73±0.13 vs 0.64±0.11 cm, P=0.001) were higher in overweight/obese patients. Overweight/obese patients had also greater systolic central BP (123±14 vs 116±10 mmHg, P=0.005). Thoracic aorta diameters were higher in overweight/obese patients (aortic root 32.4±4 vs 30.7±4 mm, P=0.04; ascending aorta 29.5±3.6 vs 27.7±3.4 mm, P=0.02). Parameters of thoracic aorta (root, ascending) had a positive correlation with LV mass (r=0.179 P=0.04, r=0.230, P=0.02) and systolic central BP (r=0.306 P=0.002, r=0.330 P=0.001) while they had not correlation with 24h BP values, PWV and cIMT.

Conclusions: In visceral overweight/obese patients diameters of thoracic aorta are higher than in patients without abdominal obesity and directly correlate with LV remodeling and systolic central blood pressure but not with 24BP values.

PP.03.20 INFLUENCE OF OBESITY ON CONTROL QUALITY OF ARTERIAL HYPERTENSION

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Objective: Data about arterial hypertension (HTN) control quality are different and far from satisfactory in different countries. Our special interest was paid to the manifestation of factors, which have strong influence on the success of HTN control quality, namely influence of body mass index (BMI) on the HTN treatment success and its control rate.

Design and method: 327 patients (mean age±SD, 65.7±10.4 years) with HTN were included in the study. Calculation of BMI was performed in all the patients. According to the BMI, all the patients were divided into 3 groups: normal weight (n=61), overweight (n=136) and obese (n=140). For assessment of HTN control quality, were used blood pressure levels obtained during the three last visits to the doctor for regular checkups. Patients with diabetes mellitus, smokers, pregnant as well as renal/liver insufficiency were excluded from the study.

Results: Mean age of patients was not different between the study groups. BMI of groups were as follows: 21.6±2.2 kg/m2 in patients with normal weight, 27.1±1.6 kg/m2 in overweight and 35.2±4.9 kg/m2 in obese individuals. There did not appear difference of gender distribution between the groups (54%, 53% and 53.4% females in normal, overweight and obese groups, respectively; P=NS). Practically all the study participants were on the antihypertensive treatment; therefore, mostly was prescribed combination therapy. Control of AH was reached in 73.7% in normal and 73.6% in obese individuals (P=NS), therefore control quality was significantly lower in overweight patients – 64%.

Conclusions: Results of our study point out that control rate of AH on ambulatory level among patients visiting doctors on regular basis is quite high in comparison with data taken from the population level. Study data ruled out an influence of obesity on AH control quality. Therefore, we can suggest that special attention should be paid to the overweight patients, who are linked to the poorer control rate in comparison with normal weight and obese patients.

PP.03.21 INFLUENCE OF OBESITY IN THE RELATIONSHIP OF PWV AND AIX CENTRAL SYSTOLIC BLOOD PRESSURE

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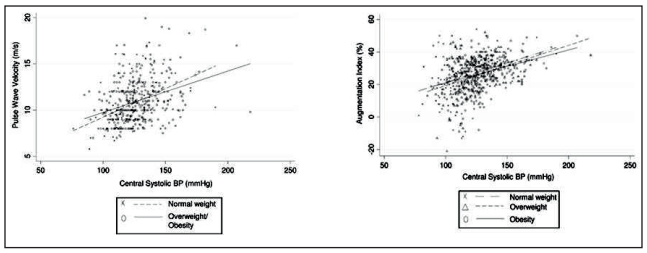
Objective: Recently, it has been suggested that obesity could blunt the association of arterial stiffness parameters with blood pressure, at least in youth. Therefore, the objective of this study was to assess the impact of BMI in the relationship between the carotid-femoral pulse wave velocity (cfPWV), augmentation index and aortic systolic BP.

Design and method: cfPWV (443 patients (mean age 57.2 ± 11.4 years; 222 women; mean BMI 28.5 ± 4.3; 253 57.1% hypertensives under treatment). and the heart rate corrected augmentation index, Aix, (mean age 52.3 ± 14.1 years; 269 women; mean BMI 28.6 ± 4.9; 346 hypertensives under treatment), and the central aortic systolic blood pressure were assessed with the Complior and the SphygmoCor devices in a series of patients attending to the HTN unit. Patients were classified in 3 groups according to BMI (<25 normal weight; between 25 and 30 overweight; more than 30 obesity). Linear regression model were used to investigate the factors related with the augmentation index.

Results: Age, aortic systolic BP and heart rate were all significantly associated with an increase in cfPWV whereas overweight, obesity and female sex were associated with a decrease in cfPWV. There were significant differences for cfPWV values among groups of BMI, being these values lower in overweight and obese as compare with normal weight after adjusting by significant covariates (9.3, 8.8 and 8.7 m/s for normal, overweight and obese, respectively, p-value 0.04) (Figure a). Concerning AIx, female sex, age and aortic systolic BP were all significantly associated with an increase in AIx whereas BMI categories and hypertension treatment were not significant. There was a trend to lower AIx with the increase of BMI after adjusting by significant covariates. (Figure b).



Conclusions: Our study might support the potential influence of obesity in the normal relationship between parameters of AS and aortic SBP.

PP.03.22 IDIOPATHIC ODEMA: A MANIFESTATION OF INSULIN RESISTANCE AND METABOLIC SYNDROME IN MIDDLE AGED FEMALE

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Objective: Idiopathic edema is a clinical syndrome characterized by fluid retention seen in premenopausal women in the absence of cardiac, hepatic, thyroid or renal disease. The exact pathogenesis is unknown and believed to be due to abnormality of pre capillary sphincter, altered capillary permeability and capillary leak which results in activation of renin -angiotensin aldosterone system so also ADH. Insulin is well known to cause salt and water retention through various mechanisms.The aim of the present study is see whether insulin excess state associated with metabolic syndrome and other inflammatory factors contribute for idiopathic odema in middle aged women.

Design and method: 52 consecutive patients with idiopathic odema (Group A) attending the outpatient clinic and 50 aged matched controls (Group B) were studied for components of metabolic syndrome during the period from June 2008 to September 2013. Variables of the study were: height, weight, BMI, waist circumference, body fat percentage (using OMRON HBF 306 fat monitor) FBS; HDL;Triglycerides, Uric acid and SGPT. The results were compared.

Results: Group A: n =52 Group B: n=50. Mean and SD of variables in group A and B were as follows : BMI (27± 4 vs 21±6); Waist circumference (85±8 vs 80±5); Systolic BP (130±12 vs 110±8); Diastolic BP (80±8 vs 72±6); FBS (103±12 vs 89±6);Triglycerides (185±11 vs 115 ± 18); HDL Cholesterol(42±5 vs 47±4); Body fat percentage (31±4 vs 24± 6); Uric acid (6.9±3 vs 4.4±2); SGPT(53±4 vs 32±6). In patients with idiopathic odema the metabolic parameters were found to be significantly higher compared to control population.

Conclusions: Insulin resistance or other inflammatory state in metabolic syndrome may be the factors contributing for altered permeability and fluid retention in patients with idiopathic odema. Treatment aimed at insulin resistance may be a therapeutic option for this common condition in middle aged females.

PP.03.23 IMPAIRED URINARY L-DOPA/DOPAMINE RATIO AS AN EARLY PREDICTOR OF RENAL DAMAGE IN FRUCTOSE OVERLOADED HYPERTENSIVE RATS

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Objective: Fructose overload produces in the rat metabolic changes, insulin resistance, hypertension and kidney damage. We hypothesize that these changes are associated with alterations in the renal dopaminergic system contributing to sodium retention and hypertension, preceding urinary microalbuminuria, then changes in the renal production of dopamine (DA) were evaluated through the urinary L-DOPA/DA ratio and its relationship with the evolution of natriuresis, systolic blood pressure (SBP) and microalbuminuria in male Sprague Dawley rats.

Design and method: The groups studied were: a) Control (C, tap water to drink) and b) Fructose overloaded: (F, 10% w/v of fructose to drink), treated during 4 (C4,F4), 8 (C8,F8) and 12 (C12,F12) weeks, respectively (n=8 rats per group and per period). L-DOPA and DA were determined by HPLC; diuresis, sodium and creatinine were measured in 24 hr. urine samples; and creatinine, triglycerides, glucose and insulin in plasma. SBP was determined by tail-cuff.

Results: Fructose overload increased SBP (mmHg, C4: 121±8 vs F4: 145±1*; C8: 130±4 vs F8: 161±10#; C12: 133±5 vs F12: 163±4#), triglyceridemia (mg/dl, C8: 44±8 vs. F8: 116±10#; C12: 57±20 vs. F12: 143±18#), insulinemia (ng/ml, C8: 1.18±0.13 vs. F8: 3.05±0.75*; C12: 1.03±0.18 vs. F12: 1.9±0.31*), L-DOPA/DA ratio (C4: 0.49±0.05 vs F4: 1.9±0.09#; C8: 0.53±0.06 vs F8: 2.35±0.1#; C12: 0.54±0.07 vs F12: 2.57±0.2#), urine output (ml/24 hrs, C4: 11.79±1.42 vs F4: 24.54±2.05#; C8: 9.98±1.01 vs F8: 23.52±1.9#; C12: 11.55±1.6 vs F12: 28.37±2.07#), glycemia (mg/dl, C8: 144±12 vs. F8: 175±11*; C12: 135±6 vs. F12: 157±15) and decreased urinary sodium excretion (mEq/24 hr, C4: 1.01±0.05 vs F4: 0.83±0.04*; C8: 1.02±0.08 vs F8: 0.72±0.05#; C12: 1.04±0.08 vs F12: 0.64±0.04#) *p<0.05, #p<0.01. Fructose-induced microalbuminuria was observed only at week 12 (mg/g creatinine, C12: 13.11±1.4 vs F12: 57.6±2.5#). Fructose overload leads to an increase in the urinary L-DOPA/DA ratio from 4th week, along with SBP elevation and natriuresis decrease, preceding microalbuminuria, which was detected at the 12th week.

Conclusions: The urinary L-DOPA/DA ratio could be an even earlier predictor than microalbuminuria to detect renal dysfunction in fructose hypertension suggesting that an impaired renal DA metabolism could be involved in sodium retention and blood pressure elevation.

PP.03.24 OBESITY IN URBANIZED MONGOLIANS AND ITS RELATIONSHIPS WITH CARDIOVASCULAR RISK ESTIMATED BY DIFFERENT RISK ASSESSMENT TOOLS

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Objective: We examined the prevalence of obesity in Mongolian railway workers and revealed the best obesity-related indicators for increased cardiovascular (CV) risk estimated by SCORE and 2013 ACC/AHA risk equations.

Design and method: 1277 people aged 18-63, 737 men and 540 women, were investigated. Body mass index (BMI), waist circumference (WC), waist-to-hip and waist-to-height (WHt-R) ratios, body and visceral fat percentage, evaluated by bioelectrical impedance analysis, were determined. The 10-year risk for fatal CV events by SCORE algorithm and 10-year risk for first hard atherosclerotic CV disease (ASCVD) event using 2013 ACC/AHA risk calculator were assessed in persons of age 40 and over. The diagnostic accuracy of each obesity marker for increased CV risk was evaluated through area under the receiver operating characteristics curve (AUC). Than we revealed the optimal cutoff values for the best obesity-related predictors.

Results: The prevalence of overweight (BMI 25-29 kg/m²) and obesity (BMI>=30 kg/m²) were 36.0% and 29.4% in men and 38.1% and 30.4% in women. Mean SCORE risk was 2.9% for males and 0.8% for females. 70.3% of men and 49.7% of women were at moderate CV risk by SCORE (1-4%) whereas 27.3% and 1.2%, respectively, were at high risk (>=5%). Mean ASCVD risk was 4.8% in men and 1.6% in women. 18.9% of men and 1.6% of women had elevated ASCVD risk (>=7.5%). In males WHt-R showed the largest AUC (0.630±0.038) relative to risk SCORE>=5% and WC showed the largest AUC (0.653±0.038) relative to ASCVD risk >=7.5%. In females the body fat percentage was found to be the best obesity marker for predicting risk SCORE>=1% (AUC 0.660±0.03). The optimal cutoff WHt-R, WC and body fat values for predicting CV risk were 0.59, 94 cm and 37%, respectively.

Conclusions: Overweight and obesity were common among urban employed population of Mongolia. We received statistical evidence supports the superiority of abdominal obesity markers in men for detecting high CV risk by SCORE (waist-to-height ratio >=0.59) and 2013 ACC/AHA algorithms (waist circumference >=94 cm) whereas in women the body fat >=37% may be better indicator for elevated CV risk than anthropometrical data.

PP.03.25 RILMENIDINE TREATMENT IN POSTMENOPAUSAL HYPERTENSIVE WOMEN WITH METABOLIC SYNDROME

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Objective: In postmenopausal women hypertension remains an important problem and a serious therapeutic challenge because more than half women of this age suffer from arterial hypertension. The metabolic syndrome is an important cluster of coronary heart disease risk factors with common insulin resistance and sympathetic activation. Both hypertension and metabolic syndrome had an increased prevalence in menopause. The purpose of our study was to evaluate the efficacy of rilmenidine on blood pressure, left ventricular hypertrophy regression and diastolic dysfunction in postmenopausal hypertensive women.

Design and method: We performed a prospective study, lasting 3 months, in which 32 never- treated postmenopausal hypertensive grade 1 and 2 women with metabolic syndrome, age between 46 and 72 years old, received once a day rilmenidine 1 mg. The echocardiography and Doppler echocardiography were performed to all of them at baseline and after 3 months of therapy. The echographic parameters assessed were: left ventricular mass index (LVMI), end diastolic diameter (EDD), interventricular septum (IVS), posterior wall thickness(PWT), early diastolic mitral inflow velocity/atrial induced velocity ratio (E/A), isovolumetric relaxation time (IVRT), and deceleration time (DT).

Results: Blood pressure was significantly reduced by treatment, both systolic (157.7±3.2 vs 129.5±1.5 mmHg, p<0.01) and diastolic (101±2.4 vs 83.2±1.2 mmHg, p<0.001). LVH regression was observed in 27 women receiving rilmenidine (83.7%), with a LVMI decrease from 139.5±15 to 114.1±13.6 g/m² (p<0.001). Left ventricle diastolic function was improved in 28 women (86.8%). E/A ratio increased from 0.99±0.03 to 1.18±0.03 (p<0.05). IVRT decreased from 138.2±3 to 130±2.5 ms (p<0.05), and DT from 186.1±3.7 to 170.3±3.4 ms (p<0.05).

Conclusions: Rilmenidine show high antihypertensive and cardio protective efficacy in postmenopausal women with metabolic syndrome, reducing left ventricular hypertrophy and remodeling, and improving diastolic relaxation.

PP.03.26 CACHECTIN AND APOPROTEIN B IN HYPERTENSIVE PATIENTS WITH ABDOMINAL OBESITY, PRE-DIABETES AND TYPE 2 DIABETES MELLITUS

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Objective: To investigate the relationship between indicators carbohydrate and lipids metabolism, apoprotein B (apo B) and cachectin (TNF-α) level in hypertensive patients (HTP) with obesity, pre-diabetes and type 2 diabetes mellitus (T2DM).

Design and method: 222 HTP with obesity, pre-diabetes and T2DM on average age 57.35±11.68 matched in age and sex and 21 healthy persons were examined. All participants underwent clinical examination, assessment of carbohydrate and lipids metabolism. Plasma concentrations of apo B, TNF-α were determined. The IDF criteria (2005) were used to diagnose abdominal obesity (AO). Carbohydrate metabolism was evaluated according to IDF (2012), ADA (2010). The patients were divided into 5 groups depending on presence of AO and glucose metabolic profile.

Results: Means plasma apo B [g/l] and TNF-α [pg/l] were increased in T2DM HTP (n=27) [2.09±1.05 and 26.80±30.98] compared to pre-diabetes HTP (n=40) [1.69±0.79 and 20.61±19.60], obese HTP (n=104) [1.32±0.37 and 14.21±16.73], HTP (n=51) [1.20±0.37 and 12.66±11.54] and control [1.16±0.27 and 13.06±5.35]. AO was diagnosed in 88% of T2DM HTP and 65% of pre-diabetes HTP. Insulin resistance (IR) was identified in 92% of T2DM HTP, 85% of pre-diabetes HTP, 49% of obese HTP and 37% of HTP. In T2DM HTP apo B was correlated with insulin [R=0.62, p<0.009], fasting glucose [R=0.52, p<0.03], HOMA-IR [R=0.66, p<0.004], and TNF-α was correlated with HbA1c [R=0.52, p<0.006] and apo B [R=0.73, p<0.001]. In pre-diabetes HTP apo B was correlated with insulin [R=0.51, p<0.002], HbA1c [R=0.42, p<0.01], HOMA-IR [R=0.49, p<0.003]. In obese HTP apo B was correlated with HOMA-IR [R=0.27, p<0.003], total cholesterol [R=0.26, p<0.004], low-density lipoprotein cholesterol [R=0.28, p<0.002], and TNF-α was correlated with degree of hypertension [R=0.40, p<0.004], HbA1c [R=0.36, p<0.008], apo B [R=0.28, p<0.03]. In HTP apo B was correlated with insulin [R=0.51, p<0.002], HOMA-IR [R=0.57, p<0.0005], and TNF-α was correlated with very low-density lipoprotein cholesterol [R=0.39,p<0.008], triglycerides [R=0.41,p<0.005].

Conclusions: Our data showed that increased cachectin promotes the formation of T2DM in HTP, along with haemodynamic parameters, AO, and IR. Cardiometabolic risk is increased in HTP depends on presence AO, pre-diabetes and T2DM, as evidenced by the relationship between the basic and additional cardiometabolic markers.

PP.03.27 DIFFERENTIAL ASSOCIATION OF GLUCOSE METABOLIC INDICES WITH ARTERIAL STIFFNESS AND MICROALBUMINURIA IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME

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Objective: Arterial stiffness and microalbuminuria are markers of target organ damage and carry significant cardiovascular risk. Disorders of glucose metabolism such as metabolic syndrome and diabetes mellitus II have been associated with both arterial stiffness and microalbuminuria but whether it is glucose per se or other indices of glucose metabolism that have the most powerful effect on target organ damage is unknown. The aim of the present study is to investigate the independent relationship of blood glucose, glycated haemoglobin and insulin resistance with arterial stiffness and microalbuminuria in hypertensive patients with metabolic syndrome.

Design and method: We studied 524 never treated hypertensive patients with metabolic syndrome defined by Adult Treatment Panel III criteria. Arterial stiffness was assessed by measuring carotid-femoral pulse wave velocity (PWV) using the Complior device. Microalbumin excretion was measured after 24h urine collection and albumin to creatinine ratio (ACR) was estimated. All patients underwent full laboratory assays, including insulin measurement and estimation of HOMA (index of insulin resistance), glycated haemoglobin (HbA1c) and high sensitivity C-reactive protein (hsCRP).

Results: In the whole population the mean values of PWV and ACR were 8.8 m/s and 36.8 mg/g, respectively. In univariate analysis, both PWV and ACR were significantly associated with all indices of glucose metabolism (p<0.001 for the association of PWV and ACR with glucose, HbA1c and HOMA). When all glycaemic indices were entered in the same model of multivariate analysis, after adjustment for age, gender, body mass index, smoking, mean arterial pressure and hsCRP, PWV was independently related to HOMA (beta=0.09, p=0.03) whereas ACR was independently related to HbA1c (beta=0.58, p=0.001) and glucose levels (beta=0.34, p=0.03).

Conclusions: In hypertensive patients with metabolic syndrome, among indices of glucose metabolism, insulin resistance is the most powerful determinant of arterial stiffness whereas glycated haemoglobin has the strongest association with microalbuminuria. The present findings suggest possible pathophysiological mechanisms underlying the relationship between abnormal glucose metabolism and target organ damage and emphasize the need for measurement of insulin levels and glycated hemoglobin in all patients with hypertension and metabolic syndrome in order to improve their risk stratification.

PP.03.28 MARKERS OF INFLAMMATION AND LIPID PROFILE IN THE PATHOGENESIS OF VASCULAR WALL REMODELING IN HYPERTENSIVE PATIENTS WITH ABDOMINAL OBESITY

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Objective: To study correlations between structural parameters of vessel wall, inflammatory and lipid biochemical parameters in patients with arterial hypertensios (AH) and abdominal obesity (AO).

Design and method: 115 patients were included in the study and randomized into 2 groups. The Gr.1 included 72 subjects at the mean age 47.39±1.60 with AH degree I-III and AO. 43 subjects at the mean age 47.29±0.95 without metabolic disorders were involved in the control group (2). The parameters of sphygmography by VASERA VS-1000 «FUCUDA» and 24-hour blood pressure monitoring using MEDITEX device; biochemical parameters (total cholesterol, low-density lipoprotein cholesterol (LDL-chol), high-density lipoprotein cholesterol (HDL-chol), triglycerides (Tg), and inflammatory markers - homocysteine and hs-CRP were estimated.

Results: In Gr.1 there were registered: significant increase in sphygmography indexis (pulse wave velocity PWV – normal importance PWV-L< 12 m/s, cardio-ankle vascular index CAVI) and decrease ancle-brachial index ABI; significant increase in mean 24-hour and mean daytime systolic BP (SBP), in day time SBP variability (p<0.001). In biochemical parametrs significant increase in total cholesterol, LDL-chol. (p=0.034), triglycerides level (p=0.002), and in inflammatory markers - homocysteine and hs-CRP level (p=0.001); decrease HDL-chol. (p=0.001) compared to the patients in group 2.

Besides in Gr.1 there were registered correlation between lipid and inflammatory markers with parameters of sphygmography (positive associations PWV, CAVI with LDL-chol., homocysteine and negative connections ABI with triglycerides and hs-CRP).

In patients with AH and AO i t was shown that with an increase in total cholesterol level> 5.0 mmol / l, an decrease HDL-chol. <1.2 mmol / l, the risk of high rate PWV-L> 12 m /s and CAVI > 9 increased by 15 and 19 times accordingly; with an increase in triglycerides by 1.0 mmol/l, the risk of reduction ABI increased by 39.9 percent (more pronounced in women).

Conclusions: The inflammatory markers and atherogenic lipids parametrs have pathogenetic mechanisms of influence on vascular remodeling process in patient AH and AO.

PP.03.29 A HIGH-FAT PLUS FRUCTOSE DIET PRODUCES CARDIOVASCULAR AND METABOLIC ALTERATIONS IN THE RAT

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Objective: A high-fat plus fructose diet produces in the rat cardiovascular and metabolic alterations that resemble human metabolic syndrome. Prostanoids (PR), cyclooxygenase-derived arachidonic acid metabolites, have vasoactive properties and mediate inflammation.

Design and method: The aim of this study was to analyze the effect of that diet on blood pressure (BP), metabolic parameters and mesenteric vascular bed PR production in male Sprague-Dawley rats. Four groups were studied during 9 weeks (n=6 each): Control (C), standard diet (SD) and tap water to drink; Fructose (F), SD and 10% w/v F solution to drink; high fat (HF), 50% (w/w) bovine fat added to SD and tap water; and HFF, both treatments. PR were determined by HPLC

Results: HFF showed elevated BP (mmHg), 152±5 vs. C, 123±3 p<0.01; liver weight/body weight ratio (mg/g) 38.0±1,2 vs. C, 32,8±1,9, p<0,05; glycemia (mg/dl), 155 ± 6 vs. C, 129 ± 9, p<0.05; triglyceridemia (mg/dl), 191± 16 vs. C, 56 ± 8, p<0,001; and insulinemia (ng/ml) F, 3.2 ± 0,3 vs. C, 1,6 ±0,2, p<0,01. Body weight was not significantly altered. In addition, prostaglandins (PG) E2, F2alpha, 6-ketoF1alpha and thromboxane (TX) B2 (metabolites of prostacyclin and TXA2 respectively) were measured. In HFF, production (ng PR/mg tissue) of PGE2, 149±17 vs. C, 101±4, PGF2alpha, 163±17 vs. C, 89±4 and TXB2, 137±18 vs. C, 69±6, were elevated (p<0.01). Similar results were obtained for HF and F groups referred to PA, triglyceridemia and insulin, but not for glycemia, which was not modified. In the case of PR production, F caused a decrease in the vasodilators prostacyclin and PGE2, meanwhile HF showed similar effects to HFF.

Conclusions: The increased BP in HFF could be partly attributed to the imbalance in vascular PR production towards vasoconstrictors. On the other hand, this dietary modification implies an inflammatory process, which could explain the elevation of PGE2, a well-known mediator of such mechanisms. In the case of the F-overload model, the hypertension could be related to the decreased vasodilator PR. The simultaneous administration of HF and F in the rat produces deleterious effects more marked than those of each treatment separately.

PP.03.30 ALDOSTERONE IN METABOLIC SYNDROME

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Objective: It is well established that aldosterone has deteriorating effect on target organs thereby increasing total cardiovascular risk. As the role of aldosterone in metabolic syndrome (MS) is still not elucidated, our aim was to determine relationship between serum aldosterone values and MS in our cohort.

Design and method: In this analyses we included 283 subjects (median age 50 (34-64), men 68%) enrolled in the Croatian rural study (151 MS, 132 non-MS). Exclusion criteria were usage of renin-angiotensin blockers, diuretics and beta blockers, pregnancy, chronic terminal diseases, dementia, immobility and missing data. Blood pressure was measured using Omron M6 device following the ESH/ESC guidelines. Blood samples were obtained after a 12-hrs overnight fast and untimed morning urine sample was used for albuminuria-creatinine ratio (ACR). Glomerular filtration rate (eGFR) was estimated using MDRD formula. CKD was defined according to the KDIGO 2012 guidelines. Natriuria was estimated from spot urine sample after Tanaka s formula. The NCEP-ATPIII definition was used for making MS diagnosis.

Results: Patients with MS were older (60.4±13.04 vs. 39.9±15.09; p<0.001) and more women had MS (x2=0.3, p=0.61). As expected MS subjects differ from non-MS in values of all MS components (p<0.001). Additionally, MS had higher values of haematocrit (p=0.008) and ACR (p=0.002) and lower eGFR 69.51±16.23 vs. 81.64±17.38; p<0.001). Natriuria was higher in MS (p<0.001) and was significantly associated with serum aldosterone values (r= -0.255, p<0.001). We failed to find difference in serum aldosterone (age, sex, natriuria adjusted) values between MS and non-MS (422 (303-558) vs. 357 (286-498), p=0.066). Age-sex adjusted aldosterone values were not a risk factor for MS (OR 1.0 (0.999-1.002; p=0.78). It was also not a risk factor when additionally adjusted to natriuria and eGFR (OR 1.0 (0.999-1.002; p=0.78).

Conclusions: Although serum aldosterone values were (non-significantly) higher in subjects with metabolic syndrome, based on results obtained in this cross-sectional study it could not be concluded that serum aldosterone is related to metabolic syndrome. Longitudinal studies are awaited.

PP.03.31 HIGHLY PREVALENT METABOLIC SYNDROME IN RURAL POPULATION IS STRONGLY ASSOCIATED WITH CHRONIC KIDNEY DISEASE

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Objective: Prevalence of metabolic syndrome (MS) is increasing worldwide reflecting unhealthy life-style. Particularly, alarming results are reported from some rural areas what was mostly attributed to lower level of education, poor socioeconomic status, but also to chronic kidney disease (CKD).Our aim was to determine prevalence and characteristics of MS in rural Croatian area using NCEP-ATPIII, IDF and WHO definitions.

Design and method: Data of 1118 adult villagers (mean age 49.4±18.1 yrs.; men 36.23%) who were consecutively enrolled (door-to-door) in the original Croatian rural study were analysed (participation rate 76%). Blood pressure (BP) was measured using Omron M6 device following ESH/ESC guidelines. Blood samples were obtained after a 12-hrs overnight fast and untimed morning urine sample was used for albuminuria-creatinine ratio (ACR). CKD was defined according to the KDIGO 2012 guidelines.

Results: Prevalence of MS according to NCEP-ATPIII, IDF and WHO definitions was 44.01%, 48.57% and 32.76%, respectively. Although 88.2% of concordance between NCEP-ATP III and IDF definitions was determined, difference in prevalence of MS using those two definitions was significant (p=0.03). For further analyse we used NCEP-ATP III definition. No difference in age was noticed between MS and non-MS subjects. More women had MS (x2=10.81, p=0.001). Fasting blood glucose and BP values above cut-off were more often presented in men while HDL-cholesterol and waist circumference were more frequently higher than cut-off in women (all p<0.05).

Less smokers were determined in the MS group (p<0.001). There were no differences between older (>65 yrs.) and younger subjects in MS prevalence as well as in frequency and number of MS components (p>0.05). Subjects with MS had more frequently CKD >= 3 stage (14.91% vs. 9.15%; x2=10.9, p=0.001), as well as ACR >= 30 mg/g (11.2% vs. 6.3%, x2=10.5, p=0.001).

Conclusions: Prevalence of MS is very high in Croatian rural area. WHO definition remarkably underestimates while IDF slightly overestimates prevalence of MS compared to the NCEP-ATPIII definition. CKD is more frequently presented in MS than in non-MS subjects what additionally or maybe independently could increase overall risk and influence clinical outcome.

PP.03.32 INFLUENCE OF OBESITY ON BLOOD PRESSURE VALUES IN A MEDITERRANEAN COHORT OF HYPERTENSIVE PATIENTS

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Objective: Obesity is known associates to blood pressure (BP) and hypertension. Aim of this study was to investigate the specific influence of somatometric variables on BP levels, in patients with Essential Hypertension.

Design and method: We studied 1174 hypertensives (445 men), of median age 60 (range: 19–87) years. The weight, height, waist and hip circumference and BP were measured. The Body Mass Index (BMI) and waist to hip ratio (W/H ratio) were calculated. Fasting blood samples were obtained in order to measure glucose, and a complete lipid profile. The metabolic syndrome (MetS) defined by the Adult Treatment Panel III criteria.

Results: Seven hundred eighty six out of 1174 patients (66.9%) met the criteria for MetS.
Both systolic (SBP) and diastolic (DBP) blood pressure values had a statistical significant positive correlation with BMI (p<0.01), waist (p<0.05) and hip circumference (p<0.01). Furthermore, DBP had an invert correlation with W/H ratio (p<0.05). Linear regression analysis revealed that only BMI correlated independently with SBP values (p=0.013), and hip circumference with DBP values (p<0.001).
On the contrary in hypertensives with MetS, there was no correlation between SBP values and any of the above somatometric variables, while DBP correlate positively only with BMI (p<0.01).

Conclusions: Our results suggest that BMI, waist and hip circumference had a positive correlation with both SBP and DBP values in patients with Essential Hypertension. However, all these correlations disappeared in the subgroup of hypertensives who met the criteria for MetS.

PP.03.33 METABOLIC SYNDROME (METS) IN THE ELDERLY

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Objective: The prevalence of MetS increase by age. but specific features of MetS in older age have been rarely described.
The aim of this study is to analyze the differences between elderly (>64yrs) and younger subjects affected by MetS. The ability of three different classification criteria for MetS (WHO,1999; NCEP-ATP III,2001; IDF,2005) in the discrimination between the two study population has been further evaluated.

Design and method: A sample of 404 pts afferent to the Clinica Medica "A. Murri" in the late two years has been studied: >64yrs: N 89 (mean age 70,4; M/F 39/50); < 64yrs N 315 (mean age 50,8; M/F 162/153). A complete clinical and biochemical evaluation has been ruled out; distribution of body fat has been made by ultrasonography; Intima Media Thickness has been measured by standard procedure.Data are M+SD.

Results: 1) on the basis of: WHO classification, older patients distinguished for hypertrygliceride distribution (28% vs 41%, p 0,02); ATP III classification, older patients were more frequently positive for MetS diagnosis (84% vs 74%, p 0,04) and for arterial hypertension (99% vs 88%, p 0,003) and less frequently positive for hypertryglicerides values (29% vs 42%, p 0,02); IDF classification, older patients differed only for hypertryglicerides values (29% vs 42%, p 0,02) and for hypertension (99% vs 88%, p 0,003). 2) older patients differed from younger group for preperitoneal fat (mm) (12,1+5,8vs13,8+6, p 0,006), subcutaneous fat (mm) (15,05+5,2vs16,3+6,6 p 0,04), visceral fat (79,6+24,6vs75,7+30,5, p 0,05), Framingham score (18,1+9,3vs9,6+8,7, p 0,00001), systolic pressure (138,9+16,6vs133,9+15,6, p 0,007), diastolic pressure (82,2+9,9vs85,5+10,1, p 0,003), total (195,3+57vs203,3+40,1, p 0,009) and LDL cholesterol (121,1+36,9vs131,5+34,7, p 0,007), ejection cardiac fraction (%) (55,3+3,3vs57,7+2,6, p 0,00001), ventricular mass (MVSI, g/mq) (41,2+12,6vs37,7+12,1, p 0,02), IMT (mm) (0,48+0,50vs0,40+0,40, p 0,003), No difference was found for WC, BMI, US steatosis, glycemia, HbA1C, insulinemia, HOMA index, microalbuminuria, tryglicerides, HDL cholesterol, protein C reactive, interventricular sept.
Conclusions: MetS in older people is characterized by prevalence of dislypidemia (high tryglicerides, low cholesterol both total and LDL), high value of systolic arterial pressure, cardiac alterations, distribution of regional fat (as evident by ultrasonography), higher cardiovascular risk.

PP.03.34 THE EFFICACY AND SAFETY OF VALSARTAN IN COMBINATION WITH LERCANIDIPINE IN THE TREATMENT OF MILD TO MODERATE HYPERTENSION IN PATIENTS WITH METABOLIC SYNDROME

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Objective: The aim of our non-interventional observational clinical study was to evaluate the safety of treatment with Valsartan in combination with Lercanidipine and to control changes of the metabolic syndrome related laboratory parameters.

Design and method: 86 patients, 50 women and 36 men (mean age 60 years) were included in a 4-month evaluation (two 2-monthly study visits). There were slightly more female patients with metabolic syndrome (>= 3 NCE ATP III risk factors) and poorly controlled hypertension. A standardized data collection form was used, blood pressure measurement was standardized as per the guidelines and laboratory samples were assessed in a certified laboratory. Valsartan (Nortivan) and Lercanidipine (Zanidip) were prescribed to patients with newly diagnosed hypertension and/or patients with poorly controlled hypertension at initial visit.

Results: The majority of patients (98.2%) completed the study. No adverse effects were reported during the study. Valsartan and Lercanidipine were mostly prescribed as an add-on treatment to other antihypertensives (82.4% patients) due to the lack of efficacy of the present antihypertensive treatment. The most frequent dose was 80 mg/day for Valsartan and 10 mg/day for Lercanidipine. A change to the treatment was performed in 8 (9.3%) of patients during the follow up visit and in 5 (5.8%) of patients during the last study visit. All parameters (blood pressure, body weight, waist circumference, total cholesterol, LDL- and HDL-cholesterol, triglycerides, glycaemia and pulse) have changed highly significantly (p < 0.001).

Conclusions: After the 4-month follow up, a highly significant change was observed to all monitored parameters. An addition of Valsartan and Lercanidipine to an existing treatment resulted not only in a reduction to blood pressure but also in highly significant changes to metabolic parameters without any significant modifications of the treatment. Treatment with Valsartan and Lercanidipine can be considered as metabolically neutral with an added value of positive effect on metabolic parameters. This is in line with the results of other studies.

PP.03.35 POSITIVE EFFECT OF WEIGHT LOSS ON BLOOD PRESSURE IN MIDDLE AGE PATIENTS WITH OVERWEIGHT/OBESITY AND HIGH NORMAL BLOOD PRESSURE

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Objective: Obese patients are prone to arterial hypertension. The aim: to evaluate the effects of dietary weight loss intervention in middle age with high normal blood pressure (BP) and overweight/obesity.

Design and method: Men and women aged 25-54 was from working population were observed within the prospective epidemiological study: in subjects with BMI >25 kg/m² and BP 130-139/85-89 mm Hg.

Results: Was found a strong correlation of systolic BP and BMI was revealed: p=0.0001 in women and p=0.0045 in men. The same was true for diastolic BP: p=0.0001 in women and p=0.0001 in men. Intervention and Control groups consisted of 455 subjects (203 and 252 respectively) were formed and followed for 3 years. Dietician's consultations were used in intervention group. An increase of BMI by 1 kg/m² was associated with increase of systolic BP in women and men (by 1.3 and 0.7 mmHg respectively), (p<0.05). For diastolic BP increase of BMI by 1 kg/m² was associated with increase in men and women (by 0.7 and 0.9 mm Hg respectively). In stepwise regression analysis body mass explains 27% of systolic BP variability and 11% of diastolic BP variability in men. In women it was 19% and

17% respectively. Last follow up visit attended more than 76% of the participants. After 3 years of intervention a weight loss was noted in the intervention group on an average at 1.17 kg in women ($p<0.05$) and 0.63 kg ($p<0.05$) in men. In controls body weight increased in women and in men (at 3.08 and 2.89 kg respectively) (all $p<0.05$). BP decreased in the intervention group - 3.27 for systolic BP and – 2.09 mm Hg for diastolic BP in women; - 1.92 and – 1.91 mm Hg in men respectively. In control group BP increased: 2.97 mm Hg systolic BP and 1.29 mm Hg for diastolic Bp in women and 2.56 mm Hg and 2.39 mm Hg in men respectively (all $p<0.05$).

Conclusions: Dietary approach to weight loss is effective tool in middle age men and women with high normal BP and overweight/obesity for prevention of hypertension.

PP.03.36 CARDIOVASCULAR REMODELLING IN PATIENTS WITH ABDOMINAL OBESITY: ROLE OF TISSUE INHIBITOR OF THE METALLOPROTEINASES 1 (TIMP-1)

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Objective: Previous studies and meta-analysis have suggested the role of the tissue inhibitor of the metalloproteinases 1 (TIMP-1) as biomarker of cardiovascular (CV) remodeling in hypertensive patients. There are no data about the relationship between TIMP-1 and cardiovascular remodeling in abdominal obesity. The aim of the study was to evaluate the correlation between plasma levels of TIMP-1 and left ventricular (LV) mass, carotid intima-media thickness (IMT) and aortic stiffness in visceral overweight/obese patients.

Design and method: We enrolled 100 patients not smokers, never treated with antihypertensive drugs or statins, without diabetes or CV diseases. Sixty-five subjects with Body Mass Index (BMI) > 25 kg/m2 and waist circumference (WC) >102 cm in men and > 88 in women, 35 control subjects with BMI < 25 kg/m2 and WC < 102 in men and < 88 in women. All the subjects underwent: echocardiography, 24 h blood pressure (BP) monitoring, carotid ultrasonography, arterial tonometry (central BP, augmentation index and pulse wave velocity, PWV) and TIMP-1 plasma measurement.

Results: The two groups did not differ in age, sex and 24h blood pressure values. The LV mass was higher in the overweight/obese group (37.5±7.0 vs 31.2±7.3 g/h2.7, $P<0.001$.). The values of carotid IMT were higher in the overweight/obese group (0.73±0.13 vs 0.64±0.11 cm, $P=0.001$). There were no significant differences between groups in augmentation index and PWV. Overweight/obese subjects showed a higher systolic aortic BP (123±14 vs 116±10 mmHg, $P=0.005$). The levels of TIMP-1 were not different between the two groups (5.1±0.4 vs 5.1±0.3 ng/ml). In a univariate analysis, TIMP-1 did not result to correlate to LV mass, central BP, PWV and carotid IMT.

Conclusions: In visceral overweight/obese patients, TIMP-1 values were similar to lean patients and didn't appear to correlate with CV remodelling.

PP.03.37 DISTORTED SELF-PERCEIVED WEIGHT STATUS AND UNDERESTIMATION OF WEIGHT IN DIABETES TYPE 2 PATIENTS

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Objective: Diabetes mellitus type 2 (DM 2) patients' self-perception of their weight status is very critical in diabetes care. We sought to investigate perception of weight status in a sample of 200 DM 2 patients attending an outpatient clinic at a Teaching Hospital and compared it with their BMI-measured weight status, with a focus on underestimation of their weight. Factors associated with underestimation of weight status in this sample were also explored.

Design and method: This cross-sectional study was conducted from January to July 2013. Anthropometric and clinical variables were assessed using appropriate tools. Questionnaires were used to collect socio-demographic data and self-perception of weight status. Self-perceived weight status was compared to BMI-measured weight status by cross-tabulation, Kappa statistics of agreement and Chi-Square for trend analysis.

Results: The prevalence of general overweight/obesity, abdominal and central obesity was 32.0% (n=64), 58.0% (n=116) and 77.0% (n=148) respectively. Generally, 58.0% (n=116) of the participants had a distorted weight perception in which 77.6% (n = 90) underestimated their weight status. Overweight/obese participants were several folds (OR = 21.0, 95% CI = 9.10 – 48.47, $p<0.0001$) at risk of underestimating their weight status compared to their normal weight counterparts. Other factors that were associated with underestimation of weight status among the participants were being; aged 40 years and above (OR = 4.2, 95% CI = 1.37 – 12.93, $p=0.0110$), unmarried (OR = 2.6, 95% CI = 1.31 – 4.99, $p = 0.0074$), hyperglycaemic (OR = 5.4, 95% CI = 2.37 – 12.35, $p<0.0001$) and never tried to lose weight (OR = 1.5, 95% CI = 1.25 – 4.76, $p = 0.0102$).

Conclusions: We found a substantial discordance between BMI-measured and self-perceived weight status. Factors that were associated with underestimation of weight status were being; overweight/obese, aged 40 years and above, unmarried, hyperglycaemic and never tried to lose weight. Diabetes patients should be provided with information about weight guidelines.

PP.03.38 AN INDEX OF CENTRAL RATHER THAN GENERAL OR PERIPHERAL ADIPOSITY IS INDEPENDENTLY ASSOCIATED WITH TISSUE DOPPLER INDICES OF LEFT VENTRICULAR DIASTOLIC DYSFUNCTION

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Objective: Myocardial tissue Doppler indexes (TDI) of left ventricular (LV) diastolic function independently predict the development of heart failure. Hypertension and obesity are independently associated with tissue Doppler indexes of LV diastolic dysfunction. Whether the risk for LV diastolic dysfunction is determined more by increases in central, as compared to general or peripheral fat deposits is unknown.

Design and method: We assessed the relationship between adiposity indices and a TDI index of moderate-to-severe LV diastolic dysfunction (the ratio of early transmitral blood velocity [E] to that of the mean of lateral and septal wall myocardial tissue lengthening at the level of the mitral annulus [e'] [E/e']) in 418 randomly recruited participants of a community-based study with a high prevalence of excess adiposity (45% obese).

Results: On bivariate analysis, waist circumference ($p<0.0001$), waist-to-hip ratio ($p<0.0001$) and the mean of triceps and subscapular skin-fold thickness ($p<0.0001$), but not body mass index (BMI) ($p=0.07$) were associated with log E/e'. On multivariate analysis with adjustments for age, sex, regular tobacco use, regular alcohol use, treatment for hypertension, pulse rate, the presence of diabetes mellitus or an HbA1c>6.1%, and systolic blood pressure; the relationship between waist circumference and log E/e' persisted (partial $r=0.19$, $p<0.0005$). However, with adjustments, no significant relationships between waist-to-hip ratio ($p=0.07$), skin-fold thickness ($p=0.48$) or BMI ($p=0.33$) and log E/e' were noted. Moreover, the relationships between waist circumference and E/e' were independent of BMI (partial $r=0.23$, $p<0.0001$), and skin-fold thickness. Further adjustments for LV mass index, LV relative wall thickness or the homeostasis model of insulin resistance did not change the relationships between waist circumference and E/e'.

Conclusions: In conclusion, indexes of central, but not general or subcutaneous adiposity are independently associated with a TDI measure of diastolic dysfunction. Hence, central adiposity may be more important than general or subcutaneous adiposity in contributing toward the transition to LV diastolic dysfunction.

PP.03.39 OVERWEIGHT/OBESITY IN MALAYSIA: MALAYSIAN CLINICAL PRACTICE GUIDELINE (MCPG) IDENTIFIED MORE ABNORMAL BODY MASS INDEX (BMI) AND CARDIOVASCULAR RISKS COMPARED TO WHO CRITERIA

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Objective: Evidence suggested that BMI criteria by World Health Organization (WHO) based on Western populations are inappropriate for Asian, as the latter have higher cardiovascular risk and body fat identified at lower BMI. Following

this, MCPG has outlined Malaysian modified criteria. However, often prevalence of obesity in Malaysia still uses an unstandardized criterion which causes incomparable surveillance. Hence, the study aimed to compare the prevalence of abnormal BMI, using MCPG and WHO criteria; identify demographic factors; and to determine cardiovascular risks using Malaysian data.

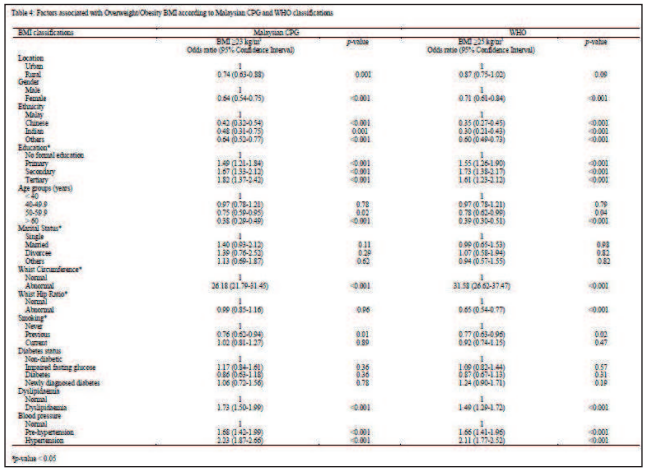

Table 4: Factors associated with Overweight/Obesity BMI according to Malaysian CPG and WHO classifications

BMI classifications	Malaysian CPG		WHO	
	BMI ≥23 kg/m² Odds ratio (95% Confidence Interval)	p-value	BMI ≥25 kg/m² Odds ratio (95% Confidence Interval)	p-value
Location				
Urban	1		1	
Rural	0.74 (0.63-0.88)	0.001	0.87 (0.75-1.02)	0.09
Gender				
Male	1		1	
Female	0.64 (0.54-0.75)	<0.001	0.71 (0.61-0.84)	<0.001
Ethnicity				
Malay	1		1	
Chinese	0.42 (0.32-0.54)	<0.001	0.35 (0.27-0.45)	<0.001
Indian	0.48 (0.31-0.75)	0.001	0.30 (0.21-0.43)	<0.001
Others*	0.64 (0.52-0.77)	<0.001	0.60 (0.49-0.73)	<0.001
Education*				
No formal education	1		1	
Primary	1.49 (1.21-1.84)	<0.001	1.55 (1.26-1.90)	<0.001
Secondary	1.67 (1.33-2.12)	<0.001	1.73 (1.38-2.17)	<0.001
Tertiary	1.82 (1.37-2.42)	<0.001	1.61 (1.23-2.12)	<0.001
Age groups (years)				
<40	1		1	
40-49.9	0.97 (0.78-1.21)	0.78	0.97 (0.78-1.21)	0.79
50-59.9	0.75 (0.58-0.95)	0.02	0.78 (0.62-0.99)	0.04
≥60	0.38 (0.29-0.49)	<0.001	0.39 (0.30-0.51)	<0.001
Marital Status*				
Single	1		1	
Married	1.40 (0.93-2.12)	0.11	0.99 (0.65-1.53)	0.98
Divorcee	1.39 (0.78-2.52)	0.29	1.07 (0.58-1.94)	0.82
Others	1.13 (0.69-1.87)	0.62	0.94 (0.57-1.55)	0.82
Waist Circumference*				
Normal	1		1	
Abnormal	26.18 (21.79-31.45)	<0.001	31.58 (26.62-37.47)	<0.001
Waist Hip Ratio*				
Normal	1		1	
Abnormal	0.89 (0.85-1.16)	0.96	0.65 (0.54-0.77)	<0.001
Smoking*				
Never	1		1	
Previous	0.76 (0.62-0.94)	0.01	0.77 (0.63-0.95)	0.02
Current	1.02 (0.81-1.27)	0.89	0.92 (0.74-1.15)	0.47
Diabetes status				
Non-diabetic	1		1	
Impaired fasting glucose	1.17 (0.94-1.61)	0.36	1.08 (0.82-1.44)	0.57
Diabetes	0.86 (0.63-1.18)	0.36	0.87 (0.65-1.15)	0.31
Newly diagnosed diabetes	1.06 (0.72-1.56)	0.78	1.24 (0.90-1.71)	0.19
Dyslipidaemia				
Normal	1		1	
Dyslipidaemia	1.73 (1.50-1.99)	<0.001	1.49 (1.28-1.72)	<0.001
Blood pressure				
Normal	1		1	
Pre-hypertension	1.68 (1.42-1.99)	<0.001	1.66 (1.41-1.95)	<0.001
Hypertension	2.23 (1.87-2.66)	<0.001	2.11 (1.77-2.52)	<0.001

*p-value < 0.05

Design and method: The REDISCOVER study is an on-going prospective community-based cohort study involving 18 urban and 22 rural communities from Malaysia, was conducted in 2007-2011. The analytic sample of baseline data consisted of 10,703 Malaysian adults aged >= 30 years (mean age 53.0±10.9). The cut-off points for abnormal BMI are <=23 and <=25 kg/m2 for MCPG and WHO criteria.

Results: The overall age-adjusted prevalence of abnormal BMI were higher using MCPG [72.7% (95% CI: 72.1- 73.8)] as compared to WHO recommended criteria [55.6% (95% CI: 54.7-56.6)]. Higher prevalence of abnormal BMI by MCPG criteria, were also seen by gender, location, ethnicity and education level. Male subjects (74.4%) has higher abnormal BMI than female (72.1%) (p=0.03) by MCPG criteria. When comparing urban and rural populations; MCPG (77.3% and 68.8%) showed higher than WHO criteria (58.9% and 52.4%), (p<0.001). MCPG conquered ethnicity prevalence with top in Malays (77.8% vs 61.6%), Indians (75.5% vs 56.6%) and Chinese (60.6% vs 37.5%), (p<0.001). The cardiovascular risk factors showed similar pattern of higher prevalence of diabetes, dyslipidaemia and hypertension by MPCG criteria. Subsequently, significantly higher ORs, 95% CIs were found for pre-hypertension (1.7, 1.4–2.0), hypertension (2.2, 1.8–2.7), and dyslipidemia (1.7, 1.5–2.0), by MCPG criteria as compared to WHO; (1.6, 1.4-1.9), (2.1, 1.7-2.5) and (1.49, 1.3-1.7), respectively.

Conclusions: This study highlighted that Malaysians have excess abnormal BMI and cardiovascular risks using MCPG as compares to WHO criteria. Emphasizing the use of MCPG modified criteria of abnormal BMI to classify overweight/obesity among Malaysians may be optimal to prevent chronic diseases.

PP.03.40 AGE-DEPENDENT CHANGES OF AORTIC NITRIC OXIDE GENERATION IN EXPERIMENTAL METABOLIC SYNDROME

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Objective: Metabolic syndrome (MS) is characterized as a cluster of risk factors that may lead to serious cardiovascular diseases. Nitric oxide (NO) represents an important relaxant factor involved in the blood pressure (BP) regulation. We aimed to determine NOS activity and mechanisms of its regulation in young (9 weeks) and adult (12 weeks) rats with MS.

Design and method: BP was measured by tail-cuff plethysmography. NOS activity and eNOS, iNOS and NF-κB (p65) expressions were determined in the aorta. Concentration of conjugated dienes (CD) was measured as well.

Results: NOS activity in the aorta of young MS rats was increased significantly comparing both normotensive WKY and spontaneously hypertensive rats (SHR). In the similar tissue, eNOS was increased while iNOS was decreased, yet without any changes in NF-κB (p65) expression. Despite increased aortic NOS activity, BP of young MS rats was on the similar level as BP of SHR. Concentration of CD was, however, higher in MS rats. NOS activity of adult MS rats decreased significantly comparing younger MS group. This decrease, however, did not lead to additional BP increase in adult MS rats.

Conclusions: In conclusion, increased aortic NOS activity was not accompany by BP decrease in young MS rats, probably due to increased reactive oxygen species production in this group. On the other hand, decreased aortic NOS activity in adult MS rats was not followed by additional blood pressure increase. Expression of both NOS isoforms and NF-κB did not seem to play a role in this regulation.

PP.03.41 ANGIOTENSIN-CONVERTING ENZYME ACTIVITY IN PATIENTS WITH METABOLIC SYNDROME X

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Objective: To evaluate the serum angiotensine-converting enzyme activity in patients with metabolic syndrome in comparison with clinical peculiarities and expression of metabolic disturbances.

Design and method: 94 patients with metabolic syndrome were observed. Mean age 54±1,5 years. Control group consisted of the patients with arterial hypertension and obesity. Arterial blood pressure, electrocardiographia, echocardiographia, antropometric examination were performed for 24-hours in all patients. The angiotensine-converting enzyme activity in blood serum was evaluated by spectrophotometry.

Results: The level of angiotensine-converting enzyme was reliably higher (38,2±2,4 mkmol x min$\bar{o}^1$ x | $\bar{o}^1$; p<0,001) in observed patients in comparison with control group (20,52±1,9 mkmol x min $\bar{o}^1$ x | $\bar{o}^1$) and healthy people (18,1±1,6 mkmol x min $\bar{o}^1$ x | $\bar{o}^1$). Reliably increasing of angiotensine-converting enzyme activity (p<0,001) was found in patients with metabolic syndrome and high blood pressure (II degree of arterial hypertension – up to 1,4 times higher, III degree – 1,6 times higher in comparison with I degree, p<0,001). The highest of angiotensine-converting enzyme activity was marked in patients with high blood pressure (50,3±4,6 mkmol x min $\bar{o}^1$ x | $\bar{o}^1$) in comparison with "dippers" (32,62±4,6 mkmol x min $\bar{o}^1$ x | $\bar{o}^1$) and "non-dippers" (33,7±2,4 mkmol x min $\bar{o}^1$ x | $\bar{o}^1$; p<0,01). Patients with metabolic syndrome and left ventricle hypertrophy had 26 % (p<0,5) higher the angiotensine-converting enzyme activity in comparison with the patients with left ventricle hypertrophy absence. Higher (p<0,5) angiotensine-converting enzyme activity was found in patients with metabolic syndrome and disturb glucose tolerance in comparison with patients with diabetes mellitus type 2 (42,5±4,0 mkmol x min $\bar{o}^1$ x | $\bar{o}^1$ and 33,1±1,3 mkmol x min $\bar{o}^1$ x | $\bar{o}^1$, respectively). In patients with metabolic syndrome and stabile angina pectoris of IY – III functional class The angiotensine-converting enzyme activity was up to 116,5 % (p<0,5) and 94,4 % (p<0,01) respectively higher in comparison with patients with stabile angina pectoris of I functional class.

Conclusions: The angiotensine-converting enzyme activity in patients with metabolic syndrome depended on the blood pressure level, duration of blood pressure elevation, peculiarities of 24 – hour monitoring blood pressure, expression of left ventricle hypertrophy, accompanied stabile angina pectoris and expression of carbohydrate metabolism disturbances.

PP.03.42 METABOLIC SYNDROME, CHRONIC KIDNEY DISEASE AND THE RISK OF ALL-CAUSE MORTALITY IN THE TAIPEI CITY ELDERLY HEALTH EXAMINATION COHORT

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Objective: Previous studies reported an association between metabolic syndrome (MetS) and incident chronic kidney disease (CKD). However, the impacts of MetS and CKD on the all-cause mortality are unclear. This study examined the associations between metabolic syndrome and its components with CKD and all-cause mortality.

Design and method: In 2005, 41796 elderly citizens who participated in Taipei City Elderly Health Examination were followed to ascertain their survival status till the end of 2010. Estimated glomerular filtration rate eGFR) of kidney was calculated with the MDRD equation. CKD was defined as eGFR<60 ml/min/1.73m2. Cox proportional hazards models and competing risk analyses were used to study the associations between metabolic syndrome, its components (elevated BP, low HDL cholesterol, elevated serum triglycerides, impaired glucose metabolism, and central obesity), CKD and all-cause mortality while adjusting for demographics, comorbid conditions, use of relevant medications, renal function.

Results: There were 38,893 study subjects had information of MetS and CKD and were analyzed in the study. Forty four percent of the study population (n=17,035) had metabolic syndrome and 9937 (25.55%) study subjects were classified as CKD. In the multivariate-adjusted analysis, presence of metabolic syndrome was

associated with an increased risk for CKD (hazard ratio=1.69, 95% confidence interval=1.60, 1.77); Subjects with overweight or obesity were associated with an increased risk of all-cause mortality, while compared with subjects with normal weight during a mean follow-up of 5.2 years. All of the individual components of metabolic syndrome were associated with increased risk for CKD. Low HDL cholesterol was associated with higher risk of death, whereas obesity and high triglyceride were related to a low mortality.

Conclusions: Presence of metabolic syndrome is associated with CKD and with an increased risk of all-cause mortality in the Taiwanese elderly cohort.

Table 2: Association between metabolic syndrome, CKD and all-cause mortality

		Mortality(-) N=34992	Mortality(+) N=3901		HZ(95% CI)
		N(%)	N(%)		
CKD stage	1	2855(8.16)	335(8.59)	<.0001	1
	2	23738(67.84)	2028(51.99)		0.728(0.649-0.818)
	3a	6747(19.28)	895(22.94)		1.105(0.975-1.253)
	3b	1390(3.97)	452(11.59)		2.491(2.163-2.870)
	4	250(0.71)	176(4.51)		4.725(3.933-5.677)
	5	12(0.03)	15(0.38)		6.980(4.161-11.709)
CKD stage	1-2	26593(76.00)	2363(60.57)	<.0001	1
	3-5	8399(24.00)	1538(39.43)		1.966(1.844-2.097)
CKD stage	CKD stage 1-2 without MetS	20420(58.36)	1885(48.32)	<.0001	1
	CKD stage 1-2 with MetS	6173(17.64)	478(12.25)		0.842(0.761-0.931)
	CKD stage 3-5MetS	5582(15.95)	1032(26.45)		1.912(1.772-2.063)
	CKD stage 3-5 with MetS	2817(8.05)	506(12.97)		1.861(1.686-2.053)
		CKD stage<3	CKD stage≧3		
MetS	Yes	7838(23.26)	2136(41.13)	<.0001	1.685(1.603-1.771)
BMI	Underweight	1295(3.89)	159(3.15)	<.0001	0.819(0.716-0.937)
	Normal weight	15735(47.29)	2023(40.04)		1
	Overweight	10553(31.72)	1649(32.64)		1.240(1.176-1.308)
	Obesity	5688(17.10)	1221(24.17)		1.517(1.426-1.613)

Adjusted for sex and age

PP.03.43 FACTOR ANALYSIS OF THE INDIVIDUAL COMPONENTS OF METABOLIC SYNDROME AND THE RISK OF ALL-CAUSE AND CARDIOVASCULAR MORTALITY IN THE TAIPEI ELDERLY HEALTH EXAMINATION COHORT

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Objective: Previous studies using factor analyses of the components of metabolic syndrome have identified two to four factors. These factors have been suggested to be associated with survival in studies with small number of study subjects.
We conducted a prospective study to further investigate the association between those derived factors (from factor analysis) and the risk of all-cause and cardiovascular mortality in a large elderly population in Taiwan.

Table 1: Factor loading patterns after orthogonal rotation of principle components for the individual components of metabolic syndrome

	Female (N=16591)			Male (N=19280)	
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2
BMI	0.912		0.129	0.828	0.152
Waist	0.912		0.151	0.836	0.107
Diastolic BP		0.886			0.886
Systolic BP		0.885			0.888
HDL-C	-0.118		-0.855		
Log Triglyceride	0.141		0.840	-0.664	
Cumulative variation (%)	36.570	61.130	79.424	39.149	64.491

Table 2: The hazard ratio and 95% of confidence interval for the risk of metabolic syndrome factors of all-cause mortality and cardiovascular disease mortality by gender

	Female				Male			
	HR	95% CI		p-value	HR	95% CI		p-value
All-cause mortality								
Age	1.142	1.129	1.156	<0.0001	1.109	1.100	1.119	<0.0001
Factor 1	0.804	0.736	0.879	<0.0001	0.818	0.775	0.864	<0.0001
Factor 2	1.006	0.923	1.096	0.8956	0.887	0.838	0.938	<0.0001
Factor 3	1.078	0.988	1.177	0.0917				
Cardiovascular mortality								
Age	1.175	1.147	1.203	<0.0001	1.117	1.097	1.137	<0.0001
Factor 1	0.805	0.676	0.957	0.0141	0.914	0.815	1.024	0.1220
Factor 2	1.041	0.880	1.231	0.6418	1.010	0.899	1.135	0.8654
Factor 3	0.993	0.836	1.178	0.9319				

Design and method: We performed a factor analysis of the individual components of the metabolic syndrome among 35,871 non-diabetic elderly citizen (16591 female and 19280 male). Study subjects were those who participated in the Taipei City Elderly Health Examination in 2007 and were followed up to December 31, 2010 to ascertain their survival status. Prospective associations of the derived factors and all-cause and cardiovascular mortality during a four-year followed up were assessed by Cox regression model.

Results: The factor analysis revealed two factors in men and three factors in female. The first factor included BMI and waist circumference (WC) in female, BMI, WC, high density lipoprotein cholesterol (HDL-C) and triglyceride in men. The second factor included systolic and diastolic pressure in both sex. The third factor included HDL-C and triglyceride in female. The factors explained 79% (first factor, 37%, second factor, 25% and third factor, 18%) of the variation in female and 65% (first factor, 39% and second factor, 25%) in men. The first factor was significantly associated with decreased mortality in men (HR=0.82; 95% CI:0.78-0.86) and women (HR=0.80; 95% CI:0.74-0.88); The second factor was significantly related to decreased mortality in men (HR=0.89, 95% CI:0.84-0.94) and not in women.

Conclusions: Three factors (obesity, blood pressure, and dyslipidemia factors) were indentified in women and two factors (obesity/dyslipidemia and blood pressure factors) in men with factor analysis. The obesity factor and blood pressure factor were independently related to a decreased mortality in men, while only the obesity factor was associated with decreased mortality in women. Those clustering of individual components in metabolic syndrome demonstrated a short-term protective effect in men and women in the four-year follow-up period.

PP.03.44 LEPTIN RESISTANCE IN PATIENTS WITH HYPERTENSION AND METABOLIC SYNDROME

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Objective: To study leptin levels and of soluble leptin receptor (sOB-R) depending on carbohydrate disorders and body mass index (BMI) at patients with hypertension and metabolic syndrome.

Design and method: It has been surveyed 80 patients (pts) with hypertension and metabolic syndrome (MS) which have made four groups:1gr.- pts with hypertension fnd MS without carbohydrate disorders;2gr.- pts with hypertension and insulin resistance (IR) without DM and IGT; 3gr.- pts with hypertension and impaired glucose tolerance (IGT); 4gr.- pts with hypertension and diabetes mellitus (DM). In each group the analysis for men and women was carried out separately. Used the following methods of research: body mass index (BMI), waist circumference (WC), monitoring blood pressure, echocardiography, fast levels of sOB-R, leptin, glucose, insulin, with definition of an index of HOMA.

Results: The typical sign for all groups was changes leptin levels and of sOB-R depending on carbohydrate disorders and body mass index . The pts of 4 gr., had authentically more high leptin levels in comparison with the patients of the 1 gr. without carbohydrate disorders and non- obesity: at women (61,96±9,51 vs 27,99±5,65 ng/ml), at men (52,52±14,24 vs 12,42±2,73 ng/ml). The carbohydrate disorders displays associates with increase of abdominal obesity, leptin levels and reducing of concentration of sOB-R. In that time return dependence between of sOB-R levels and degree of carbohydrate disorders was revaled. Their progressive aggravation

from IR without IGT up to DM was accompanied by decreasing of sOB-R levels (from 17,5±0,1 to 15,0±0,4ng/ml) at women and (from 21,3±0,7 to 15,8 ±0,5ng/ml) at men.

Conclusions: Increase of signs of abdominal obesity associated with increase leptin levels and reduction in concentration of sOB-R receptors that is accompanied by occurrence of carbohydrate disorders.

PP.03.45 CHANGES OF VASCULAR ENDOTHELIAL GROWTH FACTOR BLOOD LEVELS IN PATIENTS WITH ESSENTIAL HYPERTENSION WITH AND WITHOUT ABDOMINAL OBESITY AND STABLE ANGINA PECTORIS

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Objective: The vascular endothelial growth factor (VEGF) is an important proangiogenic factor whose production may be activated by hypoxia of various tissues including those of myocardium and adipose. The aim of the study was to investigate the peculiarities of the changes of VEGF blood levels in patients (pts) with essential hypertension (EH) depending on the presence or absence of abdominal obesity (AO) or stable angina pectoris (SAP).

Design and method: 90 pts (mean age 53,9±4.3 years, 56 men) with EH grades 2-3 and with AO grades 1-2 (1st group); 52 pts (mean age 52, 7±4,9 years, 56 men) with EH grades 2-3 but without AO (2nd group) and 12 healthy controls were involved in the study. Class I and Class II SAP was revealed in 15 pts in 1st group and in 12 pts in 2nd group. The investigation involved measuring patients' height and weight with the subsequent calculation of body mass index, waist circumference, resting and exercise ECG, echocardiography, measuring of lipids and glucose blood levels. The blood level of VEGF was determined using an Enzyme-linked immunosorbent assay.

Results: There was a significant($p<0,001$) increase in VEGF blood level in both 1st (197,94 (161,42; 295,20) pg/ml) and 2nd (202,48 (135,66; 313,29) pg/ml) groups in comparison with healthy controls (65,56 (46,09; 90,90) pg/ml). However, both groups did not show significant changes in VEGF blood level. At the same time, there was a significant increase in the blood level of VEGF in pts with SAP as compared with pts without SAP in both groups (in 1st group: 285,38(254,94; 356,32) pg/ml vs. 192,20(160,90; 263,58) pg/ml vs. $p<0,01$, in 2nd group: 408,60 (351,02; 437,80) pg/ml vs. 176,11 (129,02; 257,72) pg/ml, $p<0,001$).

Conclusions: Our study revealed a significant increase in VEGF blood level in pts with EH. The greatest growth of this factor was observed in pts with EH in combination with SAP. There was no correlation with the presence or absence of AO. Thus, VEGF may play an important role in the development of EH in general and myocardial ischaemia in particular.

PP.03.46 SARCOPENIA, VISCERAL OBESITY AND PLASMA LEVELS OF BNP IN HEALTHY INDIVIDUALS: J-SHIPP STUDY

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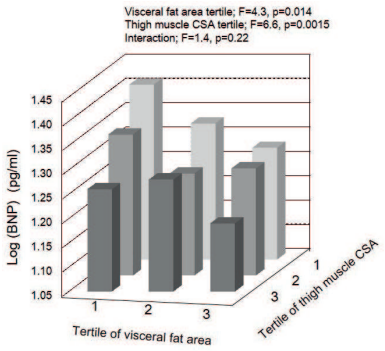
Objective: Obesity and visceral fat accumulation has been firmly shown to be associated with lower plasma levels of BNP. However, skeletal muscle component has not been fully investigated. In this study, we investigate underlying mechanisms linking negative association between BMI and plasma levels of BNP.



Corrected for all possible confounding parameters including body height and body weight .

Design and method: Subjects were 1431 middle-aged to elderly subjects recruited from consecutive visitors to the Anti-Aging Center at Ehime University Hospital. Visceral fat area and thigh muscle cross-sectional area (CSA) were measured using CT.
Plasma levels of adipokines; adiponectin and leptin, as well as central blood pressure were also measured as possible confounding factors. First, plasma BNP was compared in tertiles of BMI, visceral obesity, and thigh muscle CSA obtained in men and women separately. Multiple regression analyses were performed to ascertain whether muscle CSA and visceral fat area were associated with plasma BNP independently of other possible confounding parameters.

Results: Visceral fat area and thigh muscle CSA were significantly and negatively related to plasma BNP, while BMI was not significantly associated with plasma BNP after correction for confounding parameters including visceral fat area and thigh muscle CSA (Figure). Multiple regression analyses for BNP with several models further demonstrated the independence of the association between body composition parameters and plasma BNP.

Conclusions: Both visceral fat accumulation and high thigh muscle CSA were related to the association between higher BMI and lower BNP in the middle-aged to elderly healthy subjects.

POSTERS' SESSION

POSTERS' SESSION PS04
ATRIAL FIBRILLATION - ORGAN DAMAGE

PP.04.01 ARTERIAL HYPERTENSION MANAGEMENT IN PATIENTS WITH ATRIAL FIBRILLATION

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Objective: There is increasing evidence of atrial fibrilation (AF) in hypertensive patients in our country. The aim of the study was to assess: 1. Achieving goal values of blood pressure (BP) according to Guidelines ESC/ESH 2013; 2. Mean ventricular rate control. 3. Therapeutic decisions in the management; 4 Number of antihypertensive drugs used for treatment in hypertensive women and men with AF.

Design and method: We studied 123 consecutive treated hypertensive patients living in community Stari Grad during controlled examinations in out patient cardiology department during December 2013. They were divided into two groups: I group (women, n=61, mean age 74±7 y.) and II group (men, n=63 mean age 73, 20±8 y. ns); mean office treated BP in I group was 140/78 mmHg and in II group 138/77 mmHg. Mean heart rate in I group was 74±11 and in II group was 72,5±9, ns. We analyzed percentage of achieving goal BP values, drug chooses (monotherapy and polytherapy) and means number drugs used for therapy.

Results: Goal values (BP<140/90 mmHg) was achieved in 20 (33%) women and 26 (41%) in men. Mean ventricular rate in I group was 74±11 and in II group was 72,5±9, ns Monotherapy was used in 5 (4%) and polytherapy in 118 (96%) hypertensive patients. The most often used drugs were beta blockers (75%) than ACE inhibitors (71%) than calcium antagonists (61%), diuretics (50%) and ARB (9%) The fixed combination was used in 13 %. Mean number of drugs in I group was 2,82±0,87 and in II group was 2,85±0,79(ns). Mean number of drugs in BP<140/90 mmHg group in women was 2,4±0,9 and in men was 2,54±0,8 (ns).

Conclusions: Goal values were achieved in 37,39% hypertensive treated women and men. Mean ventricular rate control was similar in men and women. The most often used drugs were beta blockers than ACE inhibitors. Mean number of drugs need for achieving goal values in women was 2,50 and in men 2,54 drugs.

PP.04.02 PATIENTS PRESENTING WITH PALPITATION IN A GREEK PRIMARY HEALTH CARE CENTER (PHCC): AN EPIDEMIOLOGICAL STUDY

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Objective: Heart rhythm disorders are often intermittent or transient, causing diagnostic problems and occasionally are severe and disabling. The aim of this study was to investigate supraventricular arrhythmias among all patients presenting with palpitation.

Design and method: The study included 610 patients presenting with palpitation during January - October 2013. Among them 73 (11.97%) appeared with supraventicular tachycardia while the rest had sinus tachycardia, due to thyroid gland disorders, anxiety and panic disorders. Most participants were men (52.05%) aged 60-80 years (61.64%).

Results: The cause of patients' palpitations was: paroxysmal supraventricular arrhythmias (PAT) 49.31%, paroxysmal atrial fibrillation (PAF) 41.09% and atrial fibrillation (AF) of unknown start 9.60%. The co morbidities among patients were; hypertension (42.1%), coronary artery disease (26.95%), diabetes mellitus (19.65%) and dyslipidemia (11.3%). A 24.66% of the patients had a previous incident. Among them 17.81% had less than 3 incidents per year and 1.37% less than 4. The rest didn't mention the period of the incidents. Among the patients with PAF, 17.8% was taken anticoagulants and only 6.85% was controlled. The medication of choice for PAT was adenosine or verapamil upon failure. Two patients with Wolff-Parkinson-White syndrome were treated with amiodarone. The majority of patients with PAT achieved cardioversion (80.02%) in the PHCC while the rest were transported to hospital. In the cases of PAF of unknown start, there was an effort to control heart rate with beta-blockers and anticoagulants and the patients were referred to further examination. The medication given to those patients with PAF was amiodarone (70%). The majority of them (47%) were treated successfully and only 23% was transported to hospital. In 23% of patients with PAF were given b-blockers and in 7% that had already taken propafenone hydrochloride, the same medication was given.

Conclusions: Among all the patients presenting with palpitation in a PHCC in Greece, only few proved to have true arrhythmia. The experience of General practitioners to cardiological problems determines the successful treatment of the patients. A PHCC, although poorly equipped, can deal with patients' heart problems 24h/day and with adequacy.

PP.04.03 AUTOMATIC DEVICES FOR BLOOD PRESSURE MEASUREMENT WITH TECHNOLOGY FOR THE DETECTION OF ATRIAL FIBRILLATION-AFIB

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Objective: Conception and monitoring of a propriate antihypertensive treatment is based on specific values of blood pressure (BP) at home, ambulatory or Holter - mnonitorirane. Of utmost importance is the need and the patient's ability to carry out a proper control of BP at home for which automatic machines are particularly suitable. Contemporary gauges BP managed to eliminate a number of factors that could distort the results and lead to incorrect adjustment in ongoing therapy.
Aim of the study is to asses the accuracy of automatic devices for BP measurement with AFIB technology in patients with AF and also to detect new AF or consequent episode of AF.

Design and method: A prospective randomized study of 168 consecutively hospitalized patients in Department of Internal Diseases, University Hospital Alexandrovska, Sofia, Bulgaria- 112 men (66.7%) and 56 women (33.3%) at the avarage age of 60.49 ± 14.4 years. All patients were assest with automatic device for BP measurement with AFIB technology.

Results: Studied population was divided into two groups: with and without documentated AF. After risk stratification, from group with AF: 54.55% of people were smokers, 57.14% with AH, 63.64% - diabetes mellitus, chronic pulmonary disease in 75 % and vavlular heart disease in 87.5%. Thyroid pathology and pulmonary embolism was less common in patients with AF. About 58.06% of the subjects assest with max 10 points the comfort of using the divice with AFIB technology for measuring BP. There was no statistically significant difference in finding AF with the divice compared to the golden standart- ECG. We found persisting AF in 27.5% and 26.2% using ECG and divice with AFIB technology respectively.

Conclusions: In a conclusion, divices for measuring BP with AFIB technology are as acurate for measuring BP as enough sensitive and specific to recognise AF compared wit the golden standart ECG.

PP.04.04 LEFT VENTRICULAR DIASTOLIC FUNCTION AND AUTONOMIC BALANCE IN HYPERTENSIVE PATIENTS WITH ATRIAL FIBRILLATION

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Objective: To compare indices of left ventricular (LV) diastolic function and heart rate variability (HRV) in hypertensive patients with paroxysmal and persistent atrial fibrillation (AF).

Design and method: A total of 40 patients with the history of arterial hypertension and myocardial infarction (mean age 65±6 years) were divided into 2 groups: paroxysmal (n=18) and persistent (n=22) AF. To estimate LV diastolic function a Doppler method of transmittal flow velocity pattern (TMF) was used.

LA volume index (LAVI) was calculated by biplane method. To assess HRV the following time domain indices were analyzed: standard deviation of RR-intervals (SDNN) and the standard deviation of RR-intervals (rMSSD). All measurements were performed in the sinus rhythm period.

Results: In patients with paroxysmal AF mitral annulus velocity (E`) was significantly higher than in persistent AF (0,06±0,01vs 0,05±0,01, p<0,05). LA volume in paroxysmal AF was lower than in persistent AF (73±24 vs 94±23 ml, p=0,01), as well as LAVI (32±4 vs 48±11 ml/m², p=0,001) respectively. Isovolumic relaxation time (IVRT) was not significant between the groups (88±13 and 97±14 ms, p=0,06, respectively), but in persistent AF it was a bit higher. rMSSD value was comparable in both groups, SDNN was significantly higher in paroxysmal AF compared to patients with persistent AF (117±18 vs 95±26 ms, p=0,01); 3 (14%) patients in persistent AF group had SDNN<70 ms, in the other group no patient had SDNN<70 ms.

Conclusions: Patients with persistent AF had a more impaired LV diastolic dysfunction and heart rate variability than patients with paroxysmal AF.

PP.04.05 HELP CHECK: AN AUTOMATIC OSCILLOMETRIC SPHYGMOMANOMETER FOR ATRIAL FIBRILLATION SCREENING. PRELIMINARY DATA

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Objective: Atrial fibrillation is the most common supraventricular arrhythmia in patients with hypertension.
Cardioembolic risk and cardiovascular morbidity and mortality of this arrhythmia is known and greater the more the arrhythmia occurs so asymptomatic delaying the contact with doctor and the beginning of therapy.
Early diagnosis of atrial fibrillation and availability of diagnostic strategies able to detect its presence, or at least put a warning chime and to enable the individual to make contact with your doctor should acquire a central role in proper perspective cardiovascular prevention.
Evaluate sensitivity and specificity in detecting the presence of atrial fibrillation through the use of a new automatic oscillometric pressure device, (HELP CHECK ARTSANA PIC), which possesses a specific algorithm for the detection of hemodynamic stability (HSD) analyzing the period of the pulse waves to cuff deflation.

Design and method: We enrolled from September 2013 until now a total of 61 hypertensive patients referred to our center (39 males, 22 females). Of these, 39 were suffering from atrial fibrillation and 22 were in stable sinus rhythm.
Enrolled patients were subjected to clinical measurement of blood pressure with the unit HELP CHECK with three consecutive measurements (guidelines ESC / ESH) and at the same time in 12-lead ECG surface characteristics for the feedback of the patient's rhythm.
Was considered significant, for the possible presence of atrial fibrillation, the appears, on the display of the device, of the hemodynamic instability indicator during each of the three consecutive clinical measurements of blood pressure

Results: The sphygmomanometer used has shown, in detecting the presence of atrial fibrillation, a sensitivity of 100% in all three consecutive measurements, an average specificity between the three measurements 84.3%, accuracy 94%.

Conclusions: The reduced specificity can be explained by the algorithm of the device that evaluates accuracy of a measurement by detecting the HSD which can be influenced, in the course of a measurement, by different factors: psychological, physical, clinical as rhythm disorders which atrial fibrillation that permanently alters the period of the pulse waves detected.
Enrollment is continuing.

PP.04.06 CHARACTERISTICS OF HYPERTENSION AND DEVELOPMENT OF ATRIAL FIBRILLATION IN HIGH CARDIOVASCULAR RISK POPULATION IN PRIMARY CARE IN SPAIN

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Objective: The aim is to analyze the association between characteristics of hypertension (HT) as level of control, pulse pressure, blood pressure and antihypertensive treatment on the incidence of occurrence of AF in populations at high cardiovascular risk in the Valencian Region (Spain) in primary care centers.

Design and method: Observational study of a cohort of patients of high cardiovascular risk (patients with hypertension and / or dyslipidemia and / or type 2 diabetes mellitus) without AF at the time of study. Period: 2007 - 2010. Inclusion: age >= 40 yr, attended in primary care centers that have implemented electronic health recording. Primary endpoint is defined as onset of AF during the study. Patients with severe concomitant diseases, poor life expectancy or other criteria are excluded. Each patient is followed until their last visit or until AF event. Descriptive, bivariate and multivariate analyzes were performed.

Results: 31,875 patients were followed up for an average of 2.88 years. Of them, 824 developed AF during the study (incidence 9 cases/1000 person-years). Hypertensive patients who have prescribed antihypertensive therapy had their highest mean SBP (142.77±20.82 vs 140.72±18.14, p < 0.001) but not the pulse pressure (60.80±16.69 vs 60.72±15.80, ns) compared to those who performed lifestyle measures. In the multivariate analysis taking treatment for HT appears as predictor of increased risk for the incidence of AF.

Conclusions: In high cardiovascular risk population stresses that paradoxically pharmacologically treated hypertensive patients have greater risk of AF. They also have a mean SBP greater than 2 mmHg compared with controls.

PP.04.07 INCIDENCE AND PREDICTORS OF ATRIAL FIBRILLATION IN A HIGH CARDIOVASCULAR RISK MEDITERRANEAN POPULATION IN PRIMARY CARE: THE ESCARVAL STUDY

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Objective: The purpose is to analyze the incidence and predictors of atrial fibrillation (AF) in a primary care population with high cardiovascular risk in the Valencian Region (East coast in Spain).

Design and method: Observational study of a cohort of patients of high cardiovascular risk (patients with hypertension and / or dyslipidemia and / or type 2 diabetes mellitus) without AF at the time of study. Period: 2007 - 2010. Inclusion: age > or equal 40 yr, attended in primary care centers that have implemented electronic health recording. Primary endpoint is defined as onset of AF during the study. Patients with severe concomitant diseases, poor life expectancy or other criteria are excluded. Each patient is followed until their last visit or until AF event. Descriptive, bivariate and multivariate analyzes were performed.

Results: From 31,875 patients that were followed up for an average of 2.88 years, 824 developed AF during the study (incidence 9 cases/1000 person-yr). Characteristics of population: men (54.10%), BMI 29.86 kg/m2, PAS 139.01 mmHg, fasting glucose of 115.51 mg /dl. Taking drugs fro Hypertension 29.7%, dyslipidemia 23.5%, type 2 diabetes 12%, and antithrombotic 6%. Coronary heart disease 5.5%, prior stroke 2% and heart failure 1%. In the multivariate analysis the factors associated to the occurrence of AF were being male (OR 3.65), older age (OR 1.07), high BMI (OR 1,05), antihypertensive therapy (OR 1.50), and cardiovascular disease (heart failure [OR 1.68], ischemic heart disease [OR5.06] and stroke [OR 6.22]).

Conclusions: In high cardiovascular risk population, older age, male gender and cardiovascular comorbidities, have a high weight of developing AF.

PP.04.08 PROTHROMBOTIC DISODERS OF HEMOSTASIS PARAMETERS IN PATIENTS WITH PERMANENT ATRIAL FIBRILLATION ON THE BACKGROUND OF METABOLIC SYNDROME

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Objective: To study peculiarities of the coagulation and platelet hemostasis parameters in hypertensives with permanent form of atrial fibrillation (AF) background of metabolic syndrome (MS).

Design and method: The study included 70 hypertensives (25 male, 45 female), aged: 70±9 with permanent AF form and MS (ATP III, 2001). Blood pressure (BP) monitoring, electrocardiography (ECG) and coagulation hemostasis parameters for prothrombin index (PtI), fibrinogen, soluble fibrin-monomer complexes (SFMC), D-dimers and platelet aggregative activity (PAA) such as aggregation beginning, degree rate and speed and platelet von Willebrand factor (vWF) accordingly to body mass index (BMI) were measured. The control group consisted 20 healthy individuals.

Results: Basal BP levels were ranged 140/90 ± 10/7 mm Hg. By clinic and ECG symptoms AF permanent form was diagnosed. Abdominal obesity with BMI >30 kg/m2 was found in 57 (81.00%) cases. Among them in 32 (56.00%) cases II degree obesity with BMI 34.90 ± 3.92 kg/m2 and in 25 (44.00%) cases III degree obesity with BMI 43.41 ± 2.25 kg/m2 were diagnosed. MS was diagnosed that's why low risk of thromboembolism by CHADS2 and CHA2DS2-VASc indicators panel wasn't found. PtI; fibrinogen and SFMC parameters increas by 11.85%; 78.28% and 91.05% vs. 98.11±3.68%; 3.04±0.52 g/L and 3.80±0.8 mg/ml accordingly in control ($p<0.05$) were revealed. In patients with obesity hypercoagulable status with plasma positive D-dimers in 20 (35.00%) and increased PAA levels in 37 (65.00%) cases and in patients with overweight in 3 (25.00%) and 10 (75.00%) cases accordingly were found. In all patients the platelets number ranged in control 284.21±8.32×109/l ($p<0.1$).

Conclusions: Atrial fibrillation complicated by increased levels of aggregation and coagulation disorders of hemostasis under MS. Assessment of hemostasis disorders severity solely on the basis of PtI and fibrinogen is insufficient because it does not take into account other parameters of coagulation and platelet hemostasis, in particular, the level of circulating SFMC, D-dimers and PAA parameters according to the aggregation start parameters, the degree and rate of aggregation and vWF that are predictors of acute cardiovascular events and the definition of a high risk of thromboembolism by CHADS2 and CHA2DS2-VASc scales.

PP.04.09 THE HYPERTHYROIDISM IMPACT IN ATRIAL FIBRILLATION DEVELOPMENT AND HEART FAILURE PROGRESSION IN PATIENTS WITH CORONARY HEART DISEASE

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Objective: Hyperthyroidism is associated with increased morbidity and mortality from cardiovascular disease. Development of atrial fibrillation in patients with hyperthyroidism results in congestive heart failure progression, severe duration of the disease, unfavorable impact on prognosis, cardio-vascular endpoints and work capacity. Onset of atrial fibrillation on the background of thyrotoxicosis in absence of other cardio-vascular disorders results in 2-fold increase of mortality via cardioembolic complications and heart failure progression.
To assess the prevalence and impact of hyperthyroidism on the onset and progression of heart failure and atrial fibrillation.

Design and method: 34 patients (M/F: 5/19; mean age: 61,4±3,2 years) with ischemic heart disease and attendant hyperthyroidism were observed. Control group included 35 patients (M/F: 6/19; mean age: 62,1±3,1 years) with ischemic heart disease without thyroid dysfunction.

Results: Atrial fibrillation was diagnosed on admission in majority (54,3%) of patients with hyperthyroidism, which was 4,8 times more frequent ($p<0,001$) than in control (11,4%). Acute decompensated heart failure in patients with hyperthyroidism was diagnosed 6 times more frequent ($p<0,001$) than in control (34,3% versus 5,7%). Echocardiography revealed reliably higher left atrial ($p<0,001$), right ventricular ($p<0,001$) and left ventricular volume ($p<0,05$), as well as left ventricular posterior wall thickness ($p<0,05$) in patients with hyperthyroidism compared to control. The trend to systolic left ventricular dysfunction prevalence was observed in hyperthyroid patients, thus lacking reliable significance ($p>0,05$). The depression of fibrinolytic activity and extensive hypercoagulation in patients with attendant hyperthyroidism were established compared to control.

Conclusions: Our study indicates that it is necessary to carry out systematic research of thyroid function in all patients with cardiac arrhythmias, especially atrial fibrillation, and congestive heart failure. Thyroid function screening is recommended in all patients with new-onset atrial fibrillation.

PP.04.10 SHORT STATURE AND ISCHEMIC STROKE IN PATIENTS WITH NONVALVULAR ATRIAL FIBRILLATION: NEW INSIGHT INTO THE OLD OBSERVATION

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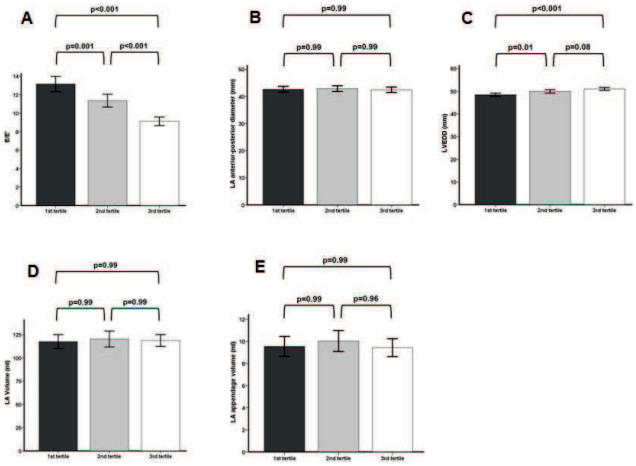
Objective: Atrial fibrillation (AF) serves as a major predisposing condition of ischemic stroke of which impact on mortality and morbidity is substantial. For decades, there have been repeated epidemiologic observations regarding the inverse relationship between stature and cardiovascular (CV) diseases including stroke. This study investigated whether patient's height is associated with remodeling of the heart and ischemic stroke in nonvalvular AF.

Design and method: All 558 AF patients were enrolled. Echocardiography and computed tomography were performed to evaluate cardiac structure and function. Characteristics were compared between the patients with and without ischemic stroke.

Results: (1) AF patients with ischemic stroke (n=211, 144 men, 68±10 years) are significantly shorter than without stroke (n=347, 275 men, 56±11 years) (164±8, vs. 169±8 cm, $p<0.001$); (2) short stature was an independent predictor of stroke (OR 0.93, 95%CI 0.91-0.95, $p<0.001$) along with left atrial (LA) anterior-posterior diameter and diastolic mitral inflow velocity (E) to diastolic mitral annuls velocity (E') (E/E'). Meanwhile, body mass index failed to predict ischemic stroke; (3) Height showed significant inverse correlation with E/E' independently, even after other variables, including age, sex and body weight and comorbidities were adjusted for (β -0.20, $p=0.003$); (4) when all patients were divided in 3 groups according to their heights, LA and LA appendage volumes do not depend entirely on stature, whereas left ventricular size increases according to height of the patients with AF.



Conclusions: Short stature is related with ischemic stroke and diastolic dysfunction in AF patients. Height is a nonmodifiable risk factor of stroke and might be more important than obesity in Asian AF patients who are relatively lean than western population.

PP.04.11 BI-ATRIAL REPOLARIZATION ALTERNANS HETEROGENEITY AND PAROXYSMAL ATRIAL FIBRILLATION

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Objective: Repolarization alternans, a beat-to-beat alternation in monophasic action potential (MAP), has been shown to initiate reentry in the ventricle and predicting ventricular arrhythmias. Recently, repolarization alternans reveals vulnerability to atrial fibrillation. This study aimed to investigate the biatriums repolarization properties to explore the substrates of the initiation and perpetuation of paroxysmal atrial fibrillation (PAF).

Design and method: Biatrial monophasic action potentials (MAP) were recorded with an Ag-AgCl catheter in 14 anesthetized dogs. Action potential duration (APD) alternans and paroxysmal atrial fibrillation (PAF) were induced by atrial burst pacing and programmed stimulation. Duration from the onset of upstroke to 90% repolarization of the APD (APD90) was measured.

Results: APD90 originated from LA was shorter than those recorded from RA in all dogs (157.4±43.5, 170.9±37.9, $P<0.05$). APD alternans was observed in 10 of 14 dogs at mean cycle length (CL) of 158.5 ± 23.2 ms (LA 8/14 vs RA 5/14). Paroxysmal atrial fibrillation (AF) was induced in 11 of 14 dogs at a mean CL of 137.4±21.3 ms (LA 9/14 vs RA 7/14). Of 16 biatrial pacing that developed AF, 10 progressive pacing first caused alternans of APD at mean CL of 162.9±25.4ms, followed by AF at mean CL of 137.2±21.6ms. Induction of AF was always preceded by APD alternans (10/16). In 12 biatrial pacing that did not develop AF, APD alternans was less common (3 /12, $P<0.05$), and occurred only at faster pacing (CL=110.4±26.3ms, $P<0.05$). In 11 dogs induced AF, the incidence of APD alternans preceding AF was significantly higher in LA than in RA (7/11 vs 3/11, $P<0.05$). In addition, CL induced APD alternans was also significantly longer in LA than in RA (165.1±21.7 vs 143.6±23.8 ms, $P<0.05$).

Conclusions: Rapid atrial pacing induced APD alternans and was associated with initiation of AF. The APD alternans between LA and RA was not uniform, which creates critical gradients or dispersion of repolarization and may serve as critical substrate for re-entrant arrhythmias and vulnerability to AF.

PP.04.12 FORECASTING ATRIAL FIBRILLATION PAROXYSMS IN PATIENTS WITH CORONARY HEART DISEASE ON LINEAR REGRESSION ANALYSIS OF BLOOD PRESSURE PARAMETERS

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Objective: To develope forecasting method for atrial fibrillation (AF) paroxysms in patients with coronary heart disease (CHD) on results of linear regression of blood pressure parameters (LRBPP).

Design and method: 94 patients with AF caused by chronic CHD were examined: group 1 - paroxysm AF (n=34, age 53.2±1.6 years old), group 2 - persistent AF (n=24, age 52.5±1.8 years old), group 3 - permanent AF (n=36, age 53.3±1.2 years old). All patients received antiarhythmic treatment. Blood pressure (BP) has been measured in each patient by auscultative method (more than 5 in everyone during first several days); the LRBPP was used for BP indices (systolic pressure on pulse pressure); 2 coefficients were received in each patient: coefficient a (index of heart-vessels interaction) which defines the hemodynamic type, and coefficient Q (nonpulse pressure). The follow-up observation was carried out within 8-13 months; Cox regression of proportional risks was made basing on coefficient a.

Results: The harmonious hemodynamic type was in 44.1%, 41.7%, 30.6% patients of group 1,2,3 respectively, other patients had pathological and borderline types, most frequent of them was diastolic dysfunctional type: 35.3%, 37.5%, 38.9% in groups 1,2,3 respectively. During follow-up observation AF paroxysms were in 10 (29.4%) patients of group 1 and in 12 (50.0%) patients of group 2. Cox regression analysis showed that decreased value of coefficient a is associated with an increased risk of AF paroxysms: the relative risk - 0.49 (95% CI 0.24-0.99, p=0.048). The discriminating value of coefficient a was found on characteristic curve: 0,43. If a is equal or less than 0.43, total risk of AF relapse is 0.39 (95% CI 0.16-0.97, p=0.039). Coefficient a was 0.62 (0.16-0.96) in patients who had relapse AF, in persons without repeated AF paroxysms, its value was significantly higher: 0.99 (0.5-1.39), p=0.01.

Conclusions: LRBPP allows forecasting AF paroxysms during 8-13 months in patients with CHD: coefficient a of LRBPP-model is associated with increased risk of AF relapse when its value is equal or less than 0.43.

PP.04.13 ARTERIAL STIFFNESS IS ASSOCIATED WITH INCREASED LEFT ATRIAL VOLUME IN PATIENTS WITH ATRIAL FIBRILLATION

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Objective: Hypertension and increased left atrial volume are important predictors for the development and maintenance of atrial fibrillation. Previous echocardiographic studies suggest a relation between arterial stiffness and increased left atrial dimensions in hypertensive patients. We sought to examine the relation of arterial stiffness to left atrial volume in patients with symptomatic atrial fibrillation (AFib).

Design and method: We enrolled 27 patients (mean age 59 ± 10.9 years, 16 males, 55.6% hypertensives) with highly symptomatic AFib (85.2% paroxysmal, 14.8% persistent), referred for catheter ablation. In all patients electrocardiogram-gated, multi slice, computed tomography was performed. Left atrial volume (LAV) and left atrial appendage volume (LAAV) were calculated with EnSite™ Verismo™ Segmentation Tool. Carotid-femoral pulse wave velocity (cf-PWV), central blood pressure and wave reflections (pressure augmentation, augmentation index, central pulse pressure) were assessed non-invasively in stable sinus rhythm using a commercially available SphygmoCor©-System before or after catheter ablation.

Results: In unvariate correlation analysis increased LAV was associated with higher cf-PWV (R = 0.503, p = 0.007) and age (R = 0.426, p = 0.026). LAAV was significantly and positively related to cf-PWV (R = 0.562, p = 0.002) but not with age. No significant association between LAV or LAAV and peripheral and central blood pressure levels or parameters of wave reflections were found. In multivariate regression analysis the relation of cf-PWV to LAV was not significant any more after correction for age (beta = 0.183, p = 0.33). Relation of LAAV and cf-PWV was independent of age in multivariate analysis (beta = 0.397, p = 0.04).

Conclusions: Arterial stiffness is associated with increased left atrial volume in patients with AFib. The relation of cf-PWV on LAV seems to be at least partly due to the effect of aging. Our findings suggest that arterial stiffness may be associated with left atrial structural remodeling and be a contributing factor to atrial fibrillation development and maintenance.

PP.04.14 THE RELATIONSHIP BETWEEN ATRIAL FIBRILLATION AND VASCULAR FUNCTION IN PATIENTS WITH HYPERTENSION AND THE POSSIBLE INFLUENCING FACTORS: A CROSS-SECTIONAL STUDY

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Objective: The mechanism of atrial fibrillation (AF) includes structural and electrical remodeling, but the specific pathogenesis is not fully clarified. Since hypertension is an independent risk factor of AF, our study is to investigate the relationship between AF and vascular function in patients with hypertension, and analyze the possible influencing factors.

Design and method: In this cross-sectional study, we recruited 162 consecutive patients with primary hypertension and AF (78 cases with paroxysmal AF, 84 cases with persistent AF) and 78 patients with only primary hypertension. All the patients came from West China Hospital outpatient service or inpatient department. We did baseline physical examinations for all patients and collected demographic data and laboratory parameters, ultrasonic cardiogram (UCG), and brachial-ankle artery pulse wave velocity (baPWV).

Results: The bilateral baPWV (right and left, R&L) in patients with AF were higher than that in patients with hypertension (P<0.001), and among AF group, bilateral baPWV in patients with persistent AF were higher than that in patients with paroxysmal AF (P<0.001). BaPWV (R&L) and left atrial diameter were positively related (R&L, P<0.05). Homocysteine and baPWV (R&L) were positively related (R&L, P<0.001). Uric acid and baPWV (R&L) were positively related(R&L, P<0.05).

Conclusions: BaPWV takes part in the development of AF and is influenced by homocysteine (Hcy) and uric acid (UA), at the same time, Hcy and UA affect development of AF directly. Early interventions of vascular function and blood Hcy and UA may slow down the progress of AF.

PP.04.15 CLINICS DIFFERENCES BETWEEN PATIENTS WITH OR WITHOUT ATRIAL FIBRILLATION ESCORT THYROID DISORDERS IN PATIENTS ADMITTED BY AN EPISODE OF HEART FAILURE

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Objective: Assess whether clinical or demographic differences among patients with atrial fibrillation who have thyroid disorders compared to those who do not.

Design and method: Discharge reports of patients admitted to an Internal Medicine and Cardiology Hospital 3o a level section of Heart Failure Cardiology and General plant in the period from 1 October, 2010 were reviewed to 31 December, 2013. Patients who had atrial fibrillation and they were divided into two groups were included, those with thyroid disorder or have had and those who did not.

Results: 1,099 discharge reports were reviewed objectifying 708 patients with atrial fibrillation. The average age is 81.30 years. Of the 708 patients with thyroid disorders ‘s 221, of which there are 70 men and 151 women . Among the 221 patients with no thyroid abnormalities with HTA 188 (85.5 %), 45 diabetics (20.4%) and 107 with ischemic heart disease (33.3%). Of the 98 without thyroid abnormalities are 53 men and 45 women. Of these, 37 were diabetic (37.8%) , 82 were hypertensive (83.7 %) and 41 with ischemic (48 %) disease. No significant differences in any of the groups with respect to sex (p = 0.084) , DM (p = 0.225), age (p = 0.201) and ischemic heart disease (p = 0.471) were found. However, if significant differences were found regarding patients with hypertension (p = 0.03).

Conclusions: In our patients with a very high average age (80 years) was observed. Thyroid abnormalities are present in a high percentage of patients, almost 31 %. The HTA is a causal factor for atrial fibrillation is associated with a high prevalence of episodes of heart failure. The HTA patients have thyroid disorders more often, compared to normotensive patients. Given the high average age of our patients with a high frequency of other diseases also associated with age such as hypertension, diabetes or ischemic heart disease is observed.

PP.04.16 EFFECT OF PAROXYSMAL ATRIAL FIBRILLATION ON ARTERIAL STIFFNESS IN HYPERTENSIVE PATIENTS

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Objective: To compare parameters of arterial stiffness in patients (pts) with arterial hypertension (AH) with/without paroxysmal atrial fibrillation (AF).

Design and method: Study included 39 pts with mild-to-moderate AH, mean age 64±9 years: 19 pts with paroxysmal AF of less than 1 year arrhythmic anamnesis (G1), 20 pts without AF (G2). The groups were similar in terms of age, body mass index, heart rate (HR) at rest during sinus rhythm, blood pressure (BP) at the radial artery and antihypertensive therapy. Augmentation index (AIx%), augmentation index at heart rate of 75 beats/min (AIx%75HR), augmentation pressure (AP), central aortic systolic and diastolic BP, heart rate, measured at the aorta (HRcentr), carotid-femoral pulse wave velocity (PWVcf) were measured by applanation tonometry.

Results: G1 and G2 did not differ on central aortic systolic and diastolic BP: 110/92±14/10 vs 113/91±18/14, respectively. Concerning AIx%, G1 compared to G2 pts had no differences in AIx% (28,7±10,2 vs 28,7±13,0%), as well as in AIx%75HR (25,0±8,9 vs 24,2±9,4 %), AP (11,9±7,6 vs 14,5±9,2 mm Hg), HRcentr (67,1±10,6 vs 65,7±14,0 bpm) and PWVcf (10,9±2,7 vs 11,6±3,1 m/s), (p=NS for all cases).

Conclusions: There were no differences in arterial stiffness characteristics in hypertensive pts with versus without paroxysmal AF of less than 1 year.

PP.04.17 EVALUATION OF THE ARTERIAL HYPERTENSION, CONCOMITANT CARDIOVASCULAR DISEASES AND ASYMPTOMATIC ATRIAL FIBRILLATION IN BULGARIAN URBAN POPULATION. A CROSS-SECTIONAL STUDY

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Objective: To assess arterial hypertension(AH) and concomitant cardiovascular disease as a search for asymptomatic atrial fibrillation in Bulgarian urban population according the Motto of the World Hypertension Day - 17th of the May 2013 Years "Healthy Blood Pressure Healthy Heart Beat".

Design and method: A cross sectional pilot study was performed by Bulgarian Hypertension League using open–air stands in 10 big Bulgarian cities. Blood Pressure (BP) was measured by automatic devices with AFIB technology of Microlife giving the opportunity to diagnose atrial fibrillation (AF) without ECG. 2019 persons participated voluntarily, aged 18-90 yr. with mean age 60.69 yr., 59% females and 41% males. Structured questionnaires were filled up with separate question about subjective feeling of palpitations that were described as short lasting (1-2 min) and long lasting (>10 min).

Results: From the participants with known AH were 58.5%. Drug treated hypertensive persons (HT) - 82.4%. With previously diagnosed AF were 4.54% HT and 1.69% normotensive persons (NT); Ishaemic Heart Disease was found in 16.70% of HT and in 4,24% of NT. Heart Failure was found in 4.98 of HT and in 4.27 of NT. Cerebrovascular Diseases were found in 5.75% of HT and in 1.42% of NT. Palpitations were reported as follows: a) short lasting 1-2 min and b) long lasting > 10 min, announced as follows: a) short lasting – in 53.13% of HT and in 39.69% of NT; b) long lasting – in 27.05% of HT and in 19.23% of NT. Newly diagnosed AF (using the AFIB automatic technology) was found in 61 participants, 3.02%, of them- 21 females and 40 males; in this group 40 participants - 67, 21% - were with arterial hypertension.

Conclusions: Bulgaria has high prevalence of arterial hypertension. Hypertensive persons have more cardiovascular diseases and have higher incidence of newly diagnosed asymptomatic atrial fibrillation as like as of subjective feeling of palpitations.

PP.04.18 COMPARATIVE EFFECT OF VALSARTAN AND RAMIPRIL ON ATRIAL FIBRILLATION RECURRENCE IN HYPERTENSIVE PATIENT WITH DIABETES MELLITUS AND RECURRENT LONE ATRIAL FIBRILLATION

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Objective: This study compare 18 month effect of treatment with Valsartan and Ramipril on atrial fibrillation (AF) recurrence in hypertensive patients with diabetes mellitus.

Design and method: In this study were enrolled two groups of patients with essential hypertension, diabetes mellitus in sinus rhythm, but at least with 2 episodes of atrial fibrillation in previous 9 month. The first group- 30 outpatients (20 men, 10 women) were treated with Valsartan 160mg/day and the second group-30 outpatients (20 men,10 women) were treated with Ramipril 10mg/day. Patients with known heart failure or left ventricular disfunction and with evidence of prior myocardial infarction were excluded from this study. P-wave dispersion (PWD) and procollagen type I carboxy-terminal peptide (PIP) were evaluated before and after 18 months of treatment. Clinic blood pressure (BP) and a 24-h electrocardiogram (ECG) were evaluated monthly. The age range was 45-60 years.

Results: After 18 month of treatment systolic blood pressure (SBP) and diastolic blood pressure (DBP) were similarly and significantly reduced in both group (SBP from 170 mmHg to 145 mmHg, DBP 95 mmHg to 75 mmHg). In all 24,4 % of patients treated with Ramipril had a recurrence of AF and 13,1% of patients with Valsartan. P-wave dispersion was reduced by Ramipril (-4.8 ms) and even more by Valsartan (-10 ms). PIP reduction in Valsartan and Ramipril group are similar (-51.4 and -48.2 µg/L, respectively).

Conclusions: These findings suggested that in these patients Valsartan was more effective than Ramipril in reducing AF recurrence as well as in improving PWD, despite a similar BP reduction and a similar improvement in cardiac fibrosis.

PP.04.19 SLEEP STRUCTURE AND RENAL FUNCTION IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME AND ARTERIAL HYPERTENSION

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Objective: The main goal of the presented study was to investigate the influence of impaired sleep structure on renal function in patients with obstructive sleep apnea syndrome (OSAS) and arterial hypertension (AH).

Design and method: The study involved 20 patients with OSAS and AH (gr.I) and 20 patients with OSAS only (gr.II). OSAS was diagnosed as apnea-hypopnea index (AHI)>5episode/hour. Glomerular filtration rate (GFR) was assessed using the Cockcroft-Gault formula. Normal rates for GFR were defined as 80-120 ml/m/1,73m2. Statistical analysis was based on Pearson correlation coefficient and the comparative analysis across GFR tertile groups in mean values of main sleep structure factors was based on Student t-test.

Results: Results of the conducted investigation suggest a negative correlation between percentage proportion of slow wave sleep S3, S4 deep stages and GFR values in gr.II ($p<0,02$). For the same group of patients, in the GFR 1:2 tertile group a decrease of percentage proportion (25,9-16,7%) of slow wave sleep S3, S4 deep stages was accompanied by an increase of the absolute values of GFR rates ($p<0,03$).

Conclusions: The reduction of slow-wave phase proportion in the total sleep structure can be considered a statistically significant risk factor contributing to the increase in absolute values of the glomerular filtration rate in patients with OSAS.

PP.04.20 ASSOCIATIONS BETWEEN BLOOD PRESSURE AND NEW-ONSET OF PROTEINURIA IN JAPANESE: MIYAKO (MULTICENTER INVESTIGATION FOR YEARLY MEDICAL CHECK ASSESSMENT IN KYOTO) SURVEILLANCE

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Objective: Proteinuria has been shown to be an independent risk factor not only for loss of renal function but also for increased cardiovascular morbidity and mortality. We examined the associations between blood pressure (BP) and new-onset of proteinuria (NOPU) in Japanese population, as a retrospective cohort study.

Design and method: MIYAKO surveillance consisted of the data of 29,677 and 21,824 Japanese who underwent an annual medical checkup in Takeda Hospital from 1998 to 2009 and NTT West Kyoto Hospital from 1996 to 2009, respectively. In this study, subjects were 23,322 individuals (mean age, 47.1; mean BMI, 23.0kg/m2) without proteinuria defined as >=1+ of dipsticks and treatment of hypertension, diabetes mellitus, and dyslipidemia at the first visit, who had at least more than two visits, and whose first visit was before 2005. Primary endpoint was new-onset of proteinuria during the follow-up period. Hazard ratios of systolic BP and diastolic BP for NOPU were calculated with the Cox regression analysis adjusted for age, gender, estimated glomerular filtration rate, body mass index, fasting blood sugar, uric acid, and one of the following lipid parameters: total cholesterol, high density lipoprotein cholesterol (HDL-C), Triglyceride, and non-HDL-C.

Results: During 6.0 years of mean follow-up, 1,806 cases of NOPU were observed. The multiple Cox regression analyses showed that high level of systolic and diastolic BP at the first visit were significantly associated with the increased risk of NOPU, respectively. When categorically analyzed, the risk significantly increased at BP>=130/80 mmHg category compared to BP<120/70 mmHg category. We further examined the associations between BP and new-onset of proteinuria, considering both baseline BP and mean BP during follow-up period. We found that high mean BP during follow-up period increased the risk at the same category of baseline BP.

Conclusions: The risk of NOPU is already high at the lower levels than diagnostic criteria of hypertension. Early intervention for subjects with high normal BP may decrease the risk.

PP.04.21 CORRELATION BETWEEN SUBCLINICAL ORGAN DAMAGE AND CARDIOVASCULAR RISK STRATIFICATION IN BOTH GENDERS OF HYPERTENSIVE PATIENTS

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Objective: Assessment of correlation between subclinical organ damage and cardiovascular risk stratification in both genders of hypertensive patients.

Design and method: We divided 50 patients with arterial hypertension in two groups: A: 25 women; B: 25 men. The average age of them: A: 55 yrs and B: 57 yrs. Ankle-brachial index (ABI), pulse wave velocity (PWV) and carotid intima-media thickness (IMT) were evaluated. We assessed cardiovascular risk according to: SCORE and Framingham scales.
Statistical calculations were performed in the StatSoft Statistica 10. The t-student test was used for the statistical analysis, ρ Spearmann was taken to analyze the correlation of statistically significant values.

Results: We revealed following results in both groups: A (women) and B (men) respectively (SD) [*for p<= 0,05; **for p<0,001; NS- negligible statistically]: ABI: 0,94(0,16) NS 1,01(0,14); IMT [mm]: 0,73(0,15) * 0,81(0,17); PWV [m/s]: 10,68(2,29) * 12,54(3,01); SCORE: 3,16(2,49) ** 7,00(5,10); Framingham: 6,84(5,44) ** 12,24(6,59).
In the group with hypertension women were characterized by a lower IMT and PWV. The cardiovascular risk according to risk SCORE and Framingham scales in men was significantly higher than in women.
In this group the parameters were correlated with the cardiovascular risk according to SCORE and Framingham scales.

Scale	Gender	HT+		
		ABI	PWV	IMT
SCORE	A (n= 25)	* p<0,05 [R= -0,56]	NS	* p<0,05 [R= 0,59]
	B (n= 25)	NS	NS	NS
Fram.	A (n= 25)	* p<0,05 [R= -0,43]	NS	* p<0,05 [R= 0,55]
	B (n= 25)	* p<0,05 [R= -0,51]	NS	NS

In this group there were significant negative correlations between ABI and Framingham scale in both groups: men and women. Only in the women there were significant correlations between: ABI and SCORE scale, IMT and SCORE scale, IMT and Framingham scale.

Conclusions: 1. Among women with hypertension, IMT and ABI had a significant impact on the cardiovascular risk according to SCORE and Framingham scales.
2. Measurements of PWV in hypertensive patients of both sexes, was of little use in prediction of the cardiovascular risk according to SCORE and Framingham scales.
3. Women with hypertension were characterized by a lower IMT, PWV and cardiovascular risk according to SCORE and Framingham scales than men.

PP.04.22 ARTERIAL STIFFNESS AND LEFT VENTRICULAR DIASTOLIC FUNCTION IN WHITE-COAT AND MASKED HYPERTENSION

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Objective: Ambulatory blood pressure monitoring (ABPM) allows to diagnose masked (MH) and white-coat hypertension (WCH) among patients referred to hypertensive units. The study was aimed to compare arterial stiffness and echocardiographic parameters in subjects from general population with newly diagnosed MH or WCH.

Design and method: We recruited 138 (mean age, 39.3 years; none on antihypertensive treatment; 48% women) members from randomly selected families. SpaceLab 90207 monitors were programmed to obtain BP readings every 15 min. during daytime and every 30 min. at night. Peripheral and central pulse pressure (pPP; cPP) and augmentation index (pAI; cAI) were evaluated by means of an oscillometric sphygmomanometer and pulse wave analysis (SphygmoCor software). Relative wall thickness (RWT), left atrial (LA) diameter, ascending aorta (AO) diameter and ratio of early and late diastolic peak of transmitral flow velocities (E/A) were assessed by echocardiography (VIVID 7).

Results: In the study group, there were 80 (58%) sustained normotensives (NT), 13 (9.5%) sustained hypertensives (HT), 10 (7.2%) with MH and 35 (25.3%) with WCH. We detected between-group differences in pPP, cPP, LA, E/A and AO (p<0.001), while pAI, cAI or RWT did not differ (p>0.09). In post-hoc analysis with Bonferroni correction WCH subjects had significantly higher pAI and cAI, lower E/A and larger LA or AO diameter (p <0.03) in comparison to normotensives. MH participants as compared to NT subjects had similar pAI, cAI, LA and RWT (p> 0.1) whereas higher pPP, cPP and E/A (p<0.02) and lower AO diameter (0.009). Only pPP and cPP were independently predicted by office SBP along with age and gender in WCH but not in MH.

Conclusions: White-coat hypertensives display more pronounced arterial and heart involvement than normotensive participants. The study demonstrates a high prevalence in general population of special conditions like masked and white-coat hypertension that deserve special attention of physicians.

PP.04.23 DIETARY POTASSIUM SUPPLEMENTATION REDUCES CARDIAC AND RENAL LESIONS RELATED GENE EXPRESSION INDEPENDENTLY OF BLOOD PRESSURE IN DEOXYCORTICOSTERONE-ACETATE/ SALT MICE

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Objective: Animal and human studies have demonstrated that potassium depletion or hypokalemia in the presence of high mineralocorticoid and high salt state contributes to the pathogenesis of hypertension, stroke, ventricular arrhythmias, chronic heart and kidney diseases in association with tissue oxidative stress, endothelial dysfunction, inflammation, and fibrosis. We have previously reported that administration of deoxycorticosterone-acetate (DOCA) plus salt loading to one-renin gene mice induced hypokalemia, cardiac and renal hypertrophy, perivascular fibrosis, and left ventricular dysfunction independently of blood pressure (BP). Potassium supplementation can prevent DOCA/salt induced renal and cardiac hypertrophy. The aim of this study is to investigate the impact of dietary potassium supplementation on cardiac and renal remodeling and inflammation gene expression in DOCA/salt one-renin gene mice.

Design and method: DOCA/salt model was generated in male C57BL/6J one-renin gene mice for 3 months. After 5 weeks of the DOCA/salt treatment, the mice received additional 0.4% KCl drink fluid for 6 weeks. Intra-arterial BP was measured in conscious mouse. Gene expressions (mRNA) in heart and kidney were measured by quantitative RT-PCR. Fibrosis was examined with Masson staining. Serum and urinary sodium and potassium were analyzed by flame photometry. Urinary protein was detected by a urine protein assay.

Results: Chronic DOCA/salt administration to C57BL/6J one-renin gene mice caused hypokalemia, cardiac and renal lesions without hypertension, and the increased mRNA expression in transforming growth factor (TGF-β), tumor necrosis factor alpha (TNF-α), osteopontin, intercellular adhesion molecule 1 (ICAM, also named CD54), plasminogen activator inhibitor-1 (PAI-1), fibronectin, collagen types I and III etc without hypertension. Correcting hypokalemia by dietary potassium supplementation to the DOCA/salt mice in part reversed cardiac and renal lesions, and reduced the expression of most of the above genes in heart and kidney.

Conclusions: Dietary potassium supplementation can partially reverse high mineralocorticoid (DOCA) and high salt induced cardiac and renal lesions, and reduce the inflammation and remodeling related gene expressions independently of BP in one-renin gene mice. The data provide strong evidences that potassium supplementation in the food might convey cost-effective cardiovascular protection to salt-sensitive patients with hypertension and related diseases.

PP.04.24 ARTERIAL STIFFNESS: A MARKER OF SUBCLINICAL CARDIAC DAMAGE IN HYPERTENSIVE PATIENTS WITH AND WITHOUT TYPE 2 DIABETES

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Objective: Arterial stiffness is involved in the development of cardiac dysfunction in hypertensive patients. Type 2 diabetes mellitus is often associated with arterial hypertension, resulting in synergistic effects on target organs. The purpose of this study is to reveal the presence of arterial stiffness in hypertensive patients with and without type 2 diabetes and to determine its relationship with subclinical cardiac damage.

Design and method: A group of 50 hypertensive patients, 25 of them with type 2 diabetes, was evaluated by transthoracic echocardiography and tissue Doppler imaging at the level of mitral annulus for evidence of subclinical cardiac damage. Arterial stiffness was measured by oscillometric method using TensioMed Arteriograph device. All subjects were in sinus rhythm. Patients with heart failure, ischemic heart disease, significant valvular disease, myocardial or pericardial diseases were excluded. Statistical analysis was performed using SPSS version 19.

Results: The recorded values of pulse wave velocity were significantly higher in diabetic patients as compared to non-diabetic patients (10.8 ± 1.1 m/s versus 9.6 ± 1.4 m/s, p = 0.002). These values were correlated with parameters of left ventricular diastolic function: E/A ratio of transmitral flow (r = - 0.375, p = 0.007), E-wave deceleration time (r = 0.324, p = 0.022), the average velocity of E' wave (r = - 0.429, p = 0.002), the average value of E/E' ratio (r = 0.312, p = 0.031), the average velocity of A' wave (r = 0.371, p = 0.009), the average value of E'/A' ratio (r = - 0.592, p <0.001). Augmentation index was correlated with parameters of left ventricular diastolic function, like isovolumetric relaxation time (r = 0.586, p = 0.001) or left atrial surface index (r = 0.522, p <0.001) and with relative wall thickness (r = - 0.386, p = 0.006).

Conclusions: Arterial stiffness is enhanced in hypertensive patients associating type 2 diabetes. It correlates with echocardiographic parameters of left ventricular diastolic function and concentric remodeling in patients without clinical manifestations of heart disease, highlighting the relationship between arterial stiffness and subclinical cardiac damage.

PP.04.25 FACTORS ASSOCIATED WITH IN-HOSPITAL MORTALITY IN HYPERTENSIVE CRISIS

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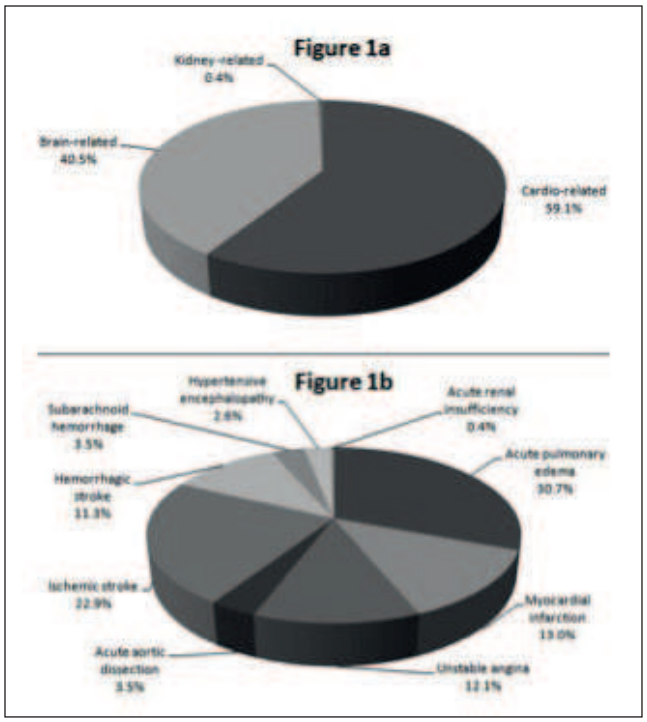
Objective: Hypertensive crisis (HC) stands out as a form of acute elevation of blood pressure and can manifest as hypertensive emergency [HE - with target-organ damage (TOD)] or hypertensive urgency [HU - without TOD] usually accompanied by levels of diastolic blood pressure >=120 mmHg. Thus, this study had as objective to demonstrate predictors of in-hospital mortality in patients admitted to hospital presenting HC.

Design and method: Prospective study in patients attended in hospital emergency during one year with HC. The sample consisted of 362 individuals (231 with HE and 131 HU). Blood pressure level, age, gender, lifestyle, waist circumference, previous history and treatment of hypertension/diabetes, and biochemical parameters were studied. Student's t or Mann-Whitney test were used for quantitative variables and x2 or Fisher exact test for qualitative variables. Variables that had a significance level p<0.05 were included in a multivariate logistic regression model, being first described as continuous variables and subsequently divided into quartiles. Value-p was considered significant < 0.05.

Results: The figure shows the distribution of patients with HE in according to target-organ damage (1a) and the etiology (1b). Patients with HE had higher mean age (63.4±13.4 vs. 57.1±15.6; p<0.0001), hyperglycemia on admission (150.2±73.9 vs. 124.5±62.1; p=0.001) and higher in-hospital mortality (16.0% vs. 0.8%; p<0.0001) when compared to those with HU. Among the 38 deaths observed (10.5% of the sample), they were preferably of the HE group (p<0.0001), had higher age (p=0.039) and hyperglycemia (p=0.002) than those who survived to the HC. In logistic regression, there was statistical significance for the last two quartiles of glycemia (114 to 160 mg/dL, OR=5.73, 95%CI 1.15-28.58; p=0.033, and >160 mg/dL, OR=13.77, 95%CI 2.88-65.83, p=0.001; respectively). There was no significant difference on the previous diagnosis of diabetes (25.7% vs. 22.9%) or hypertension (88.2% vs. 90.5%) among those who died and those who survived to the HC.

Conclusions: The presentation as HE and hyperglycemia are predictors of higher in-hospital mortality in patients admitted with HC. The appropriate control of cardiovascular risk factors is extremely important to reduce morbidity and mortality due to inadequate management of hypertension.



PP.04.26 INFLAMMATORY MARKERS, METABOLIC SYNDROME AND RENAL DAMAGE IN PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: Subclinical inflammation is associated with metabolic syndrome (MS) and increase cardiovascular risk. An elevated C-reactive protein (CRP) or fibrinogen levels represent a pro-inflammatory and pro-thrombotic state and have been proposed as added components of MS. We analysed the association of these two parameters with MS and with the presence of renal involvement in patients with essential hypertension (EH).

Design and method: Observational, cross-sectional study in patients with EH, referred to our Hypertension Clinic. In all of them high-sensibility-CRP (Nephelometry, Siemens) and fibrinogen (coagulate method, Roche) was performed. MS was diagnosed according to ATP-III criteria, excluding patients with type 2 diabetes mellitus. We defined chronic renal failure (CRF) as an eGFR (MDRD4) <60 mL/min/1.73 m², albuminuria as an albumin/creatinine ratio>30 mg/g and an elevated CRP or fibrinogen levels those values above the 75th percentile.

Results: We included a total of 560 patients (51.6% women), mean age 61±12 years. The mean values were 3.85±1.38 mg/dl for CRP and 349±73 mg/dl for fibrinogen. 232 patients (41%) met the MS criteria. 64 patients (11.4%) had CRF, 56 (10%) albuminuria and 14 (2%) both. The CRP levels were higher in the presence of MS (4.04 mg/dl vs. 3.73 mg/dl, p< 0.0001) and there no were differences in fibrinogen levels (351±78 mg/dl vs. 348±69 mg/dl, p=0.614). The number of MS criteria was positively correlated with CRP (r=0.195, p<0.0001) but not with fibrinogen (r=0.055, p= 0.195). The MS was associated with the presence of albuminuria (14% of patients with MS vs. 8.3 % without MS, p=0.038), but not with CRF (13.5% vs.10.5 %, p=0284). However, adding to the MS criteria the presence of an elevated CRP, the prevalence of CRF showed significant differences (19.1% with MS+CRP vs. 10.1% without it, p=0.013).

Conclusions: In our hypertensive patients CRP was associated with the presence of MS and with the number of MS criteria. CRF was more frequent only in the MS with high CRP. However, we found no such associations with fibrinogen. In our patients with MS and EH, CRP determination, unlike fibrinogen, may be useful to assess the inflammatory status and renal risk.

PP.04.27 RED CELL DISTRIBUTION WIDTH IS A MARKER OF CARDIO-RENAL-ANEMIA SYNDROME

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Objective: Chronic heart failure (CHF) and chronic kidney disease (CKD) are major complications of hypertension. CHF and CKD cause anemia, and anemia exacerbates CHF and CKD. Thus, the interaction between CHF, CKD, and anemia forms a vicious cycle and termed as cardio-renal anemia syndrome (CRAS). Coefficient of variation of the red cell distribution width (RDW-CV) is a parameter of size variability of the red blood cell (RBC). We investigated whether RDW-CV could be a marker of CRAS in Japanese cardiovascular outpatients.

Design and method: Among patients who visited Department of Cardiology of Hyogo College of Medicine Hospital from May 2011 to February 2012, patients who received blood tests including complete blood count (CBC) and serum creatinine were enrolled. Exclusion criteria were histories of digestive system surgery, malignant tumors, major bleedings within one year, and inflammatory diseases. We collected data of blood tests, patient demographics, complications, and medications from patient charts. The estimated glomerular filtration rate GFR (eGFR) was calculated by the Japanese GFR equation. Anemia was defined as hemoglobin <12.0 g/dl. CKD was defined as eGFR<60 mL/min/1.73m². We statistically analyzed the relationship between these parameters and RDW-CV using SPSS ver.20 (IBM Japan).

Results: We enrolled 216 patients (age 70.2±10.8 years, 144 male). They suffered from hypertension (70.4%), dyslipidemia (50.0%), diabetes mellitus (39.8%), angina pectoris (29.2%), peripheral artery disease (28.2%), chronic heart failure (25.0%), and stroke (13.4%). RDW-CV was higher in the patients with CHF (14.0[1.7] vs. 13.6 [1.0], p<0.001)(median[quartile range]), CKD (13.9[1.2] vs. 13.5[1.0], p<0.001), anemia (14.3[1.7] vs. 13.6[1.0], p<0.001), stroke (14.2[1.2] vs. 13.6[1.1], p=0.004), diuretic use (13.9[1.5] vs. 13.6[1.1], p=0.003), antithrombotic agent use (13.8[1.3] vs. 13.4[1.0], p<0.001), proton pump inhibitor use (14.0[1.5] vs. 13.5[1.1], p<0.001) than without those factors. RDW-CV was negatively correlated with Hb (R=-0.390, p<0.001) and eGFR (R=-0.311, p<0.001). Multivariate analysis revealed that Hb, eGFR, CHF, stroke, and PPI use were independently associated with RDW-CV. RDW-CV was associated with increasing number of factors of CRAS (CHF, CKD, and anemia).

Conclusions: RDW-CV was associated with CHF, CKD, and anemia. RDW-CV could be a marker of CRAS.

PP.04.28 INCIDENT AND PERSISTENT RESISTANT HYPERTENSION DURING LONG TERM FOLLOW-UP IS ACCOMPANIED BY LACK OF REGRESSION OF LEFT VENTRICULAR HYPERTROPHY IN ESSENTIAL HYPERTENSIVES

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Objective: Blood pressure (BP) reduction produces regression of left ventricular hypertrophy (LVH) which is associated with improved prognosis. We sought to investigate the relationship of LVH regression with clinical characteristics in essential hypertension.

Design and method: We prospectively followed up for a median period of 3.8 years 1226 essential hypertensives (mean age 57.8 years, baseline office BP=143.6/89.3mmHg). Echocardiographic evaluation and laboratory examination was performed at entry and at follow up. LVH was defined as LV mass index >or=116g/m² in men and >or=96g/m² in women. Four groups were identified depending on presence or absence of resistant hypertension (RH) (office-based uncontrolled hypertension under >or=3 drugs including a diuretic or controlled hypertension under >or=4 drugs) at baseline and follow-up: 794 patients (64.7%) never having RH, 100 (8.2%) with resolved RH, 135 (11%) with incident RH and 197 (16.1%) with persistent RH.

Results: According to the presence of LVH at baseline (20.2%) and at the end of follow-up (15.9%) patients were divided in two groups: with normal LV mass index at both examinations or with LVH regression (n=1031, 84.1%, group 1) and with persistent or incident LVH at follow-up (n = 195, group 2). Hypertensives of group 2 compared to those of group 1 were older (by 6.3 years, p<0.001), more frequently females (by 19%, p<0.001) and had at baseline greater duration of hypertension (by 2.6 years, p<0.001), increased number of antihypertensive drugs (by 0.6, p<0.001) office pulse pressure levels (by 5mmHg, p<0.001), increased body mass index (by 0.8kg/m², p=0.024), glucose (by 7.4 mg/dl, p<0.001) and decreased creatinine clearance (by 10.5 ml/min/, p<0.001). At follow up hypertensives of group 2 exhibited a significantly increased prevalence of incident (15.4%

vs. 10.2%, p=0.034) and persistent RH (27.2% vs. 14%, p<0.001). Difference in LV mass index from baseline to the end of follow up related positively with the corresponding difference in office systolic BP (r=0.1, p<0.001).

Conclusions: During long term follow-up persistent RH is related with lack of regression of LVH in essential hypertensives, while changes in BP levels are accompanied by changes in myocardial size.

PP.04.29 THE GEOMETRY OF LEFT VENTRICLE AND THE ROLE OF METABOLIC SYNDROME IN TARGET ORGAN DAMAGE

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Objective: The aim of this study is to assess the prevalence of left ventricular geometry patterns in a large selected hypertensive population with verified Metabolic Syndrome and to determine the relations to several demographic and biochemical factors.

Design and method: A total of 3400 untreated and treated essential hypertensives consecutively attending, for the first time, our hospital out-patient hypertension clinic and included in METHOD Study (Metabolic syndrome Target of Hypertension Organ Damage Study), an observational ongoing registry of hypertension-related target organ damage (TOD), were considered for this analysis.
All patients underwent extensive clinical, laboratory and ultrasonographic investigations searching for cardiac (and extracardiac) TOD. Geometry Patterns were defined according to LVMI (Left Ventricular Mass Index) and RWT (Relative Wall Thickness) criteria.

Results: Eccentric Hypertrophy pattern was present in 950 (27.95%) patients, Concentric Hypertrophy pattern in 1365 patients(40.14%) and Concentric remodelling pattern in 573 (16.85%) patients. Compared with 512 (15.06%) patients with normal left ventricle geometry , those with eccentric or concentric hypertrophy as those with concentric remodelling the were older, more frequently overweight, had higher systolic blood pressure ,uric acid levels and included a greater proportion of subjects with diabetes hyperlipidaemia and renal impairment (Creatinine levels>1.4 in males or >1.2 in females). The prevalence of hypertriglyceridemia was similar in patients with normal geometry and those with concentric remodelling.
According to a logistic regression analysis, fasting blood glucose > 7.0 mmol/l, renal impairment, systolic and diastolic blood pressure ,age and female sex were the main independent predictors of eccentric hypertrophy pattern.
Finally independent predictors of concentric remodelling were fasting blood glucose > 7.0 mmol/l, Female Sex and Systolic Blood Pressure.

Conclusions: Hyperglycemia, Age and female sex component of metabolic syndrome seems to be the majors denominators of the different geometry patterns of the left ventricle. Systolic blood pressure is common participant of factor of hypertrophy or remodeling whereas Diastolic Blood Pressure contributes mainly to eccentric hypertrophy. Hyperlipidemia and hyperuricemia play an important role in development concentric hypertrophy.

PP.04.30 RELATIONSHIP OF ANDROGENIC ALOPECIA WITH TARGET ORGAN DAMAGE IN NEVER TREATED YOUNG MALE HYPERTENSIVE PATIENTS

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Objective: An increased incidence of androgenetic alopecia (AGA) in hypertensive patients is under investigation. Aim of this study was to evaluate the relationship of target organ damage due to hypertension with the presence and severity of androgenetic alopecia in untreated young male hypertensive patients.

Design and method: We examined 57 newly diagnosed young male hypertensives with AGA (group A, mean age 44±6 years) and 34 ones without AGA (group B, mean age 43±8 years). Carotid to femoral pulse wave velocity (PWV) and office pulse pressure (PP) were assessed as indices of arterial stiffness. Intima-media thickness of carotid arteries (IMT) was measured by ultrasonography. Left ventricular hypertrophy (LVMI) and coronary microcirculation (CFR) were estimated by echocardiography. 24h urine collection was performed for microalbumin (MAU) estimation. AGA was classified according to the Hamilton-Norwood scale (severity), age of onset, duration and body hair growth. The significance of the early onset of AGA (before the age of 25 years) was further investigated in group A patients.

Results: No significant differences were found within groups regarding age, BMI, systolic and diastolic blood pressure, PP, PWV, IMT, LVMI, CFR and MAU. However, in AGA patients: i. CFR was related with the duration of alopecia (r= -0.28, p<0.05) and Hamilton-Norwood scale (r= -0.30, p<0.05), ii. PWV was related with increased body hair growth (r= 0.30, p<0.05) and iii. PP was related with Hamilton-Norwood scale (r= 0.27, p<0.05) and the early onset of alopecia (r= 0.30, p<0.05). Finally, we found that hypertensives with early onset of alopecia had a significantly increased PP (58±12 mmHg vs. 48±16 mmHg, p<0.05) which was strongly related with the duration of alopecia (r= 0.59, p<0.01).

Conclusions: The severity, the early onset, the long standing of AGA and the body hair growth are all related with target organ damage in young untreated males with newly diagnosed essential hypertension. If this relationship has an underline pathophysiologic mechanism based on the release of substances from hair follicles or the over expression of either androgen receptors or 5a-reductase in the kidney has to be further investigated.

PP.04.31 TIME EVOLUTION OF HYPERTENSION AND TARGET ORGAN DAMAGE

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Objective: To determine the effect of hypertension (HBP) time evolution on the development of target organ damage (TOD).

Design and method: Blood pressure (BP) was measured and classified according to ESH/ESC 2013 Guidelines as well as ultrasound left ventricular mass index (LVMI) and left ventricular diastolic function. Central aortic pressure (CAoP) was measured with a tonometer and Anglo Cardiff study values were considered as references. Glomerular filtration rate (GFR) was measured according to MDRD formula and microalbuminuria (MAu) measured as the mean of 2 other week morning urine samples. Patients (p) were divided in three groups: G1 < 40 years; G2 41 – 60 years; G3 >= 61 years. Statistical analysis: continuous variables are reported as means with their standard deviations, and discrete variables as absolute values and percentages, students test for differences in means and proportions was applied, and statistical significance was considered a p value < 0.05.

Results: 298 p were included; mean age 59,2+-12,5 years; mean BP duration 8,4+-9,7 years; male gender 162 p (54,4%); mean BP 135+-15/76+-10 mmHg. G1 24 p (8,1%); G2 124 p (41,6%); G3 150 p (50,3%). There were no statistically significant differences in systolic and diastolic BP and pulse pressure. The table summaries TOD data, all of them wiith statistically significant differences..<FILE IMAGE='33322_20140314154202.jpg'> LVMI increased 0,58 g/m2/year BP evolution in G1 and 2,9 g/m2/year BP evolution in G2. E/E`ratio increased 0,47 year BP evolution in G1 and 0,9 year BP evolution in G2. GFR decreased by 7,4 ml/min/1,73m2/year in G1 and by 15,6 ml/min/1,73m2/year in G2. MAu increased 1,3 mg/g/year in G1. Elevated CAoP increased 2,3 %/year in G1.

Conclusions: Time evolution of HBP has a strong effect on TOD even when blood pressure is well controlled.

PP.04.32 RESTING HEART RATE AND BLOOD PRESSURE ARE ASSOCIATED WITH GAMMA-GLUTAMYLTRANSFERASE IN NORMOALBUMINURIC TYPE 1 DIABETIC PATIENTS

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Objective: γ-glutamyltransferase (GGT) is an independent risk factor for the development of hypertension, coronary artery disease, left ventricular diastolic dysfunction, and chronic kidney disease. Blood pressure and heart rate (HR) is a strong and independent predictor of all-cause death and major cardiovascular complications and increased prevalence and severity of chronic kidney disease. The aim of this study was to explore the relationship between GGT, systolic and diastolic blood pressure and HR in type 1 diabetic patients with normal renal function.

Design and method: Study included 313 normoalbuminuric type 1 diabetic patients (estimated glomerular filtration rate (eGFR) > 60 ml min-1 1.73m-2) with no medical history of liver, renal and cardiovascular diseases and before any interventions with statins, ACE inhibitors or angiotensin II receptor blockers. Blood pressure was measured twice in the sitting position with a mercury sphygmomanometer after a resting period of 10 minutes. HR was determined using a standard 12-lead ECG after a resting period of 10 minutes and expressed in beats per minute. Urinary albumin excretion rate (UAE) was measured from at least two 24-h urine samples and determined as the mean of 24-h urine collections.

Results: Mean values of systolic (122±14 mmHg), diastolic (78±9 mmHg) blood pressure, HR (72 (44-114) beats/min)), and GGT (22±14 units/L) were in the reference range for patients with diabetes. GGT significantly correlated with systolic (r=0.13, p<0.05), diastolic blood pressure (r=0.11, p<0.05), and HR (r=0,14, p<0.05). Subjects in the lowest quartile of HR (<59 beats/min) had significantly lower GGT (18 vs 24 units/L, p<0.05) compared to those in the highest quartile of HR (>90 beats/min). Low-normoalbuminuric subjects (UAE<11 mg/24h) had lower levels of GGT (18 vs 26 units/L, p<0.05) in contrast to high-normoalbuminuric subjects (UAE>11mg/24).

Conclusions: In this study of normoalbuminuric type 1 diabetic patients we have shown that GGT is positively associated with systolic and diastolic blood pressure and HR. Higher GGT in type 1 diabetic patients may indicate that those subjects are not only at risk of hepatic disease, but also at risk of coronary artery disease and progression of renal disease.

PP.04.33 RESTING HEART RATE IS ASSOCIATED WITH AN INCREASED PREVALENCE OF NONPROLIFERATIVE AND PROLIFERATIVE/LASER-TREATED RETINOPATHY IN NORMOALBUMINURIC TYPE 1 DIABETIC PATIENTS

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Objective: Identification of the determinants of the onset of early diabetic retinopathy is essential for reducing the morbidity and mortality associated with diabetes. Many studies have identified poor glycemic control, duration of diabetes and blood pressure as most important risk factors for development of retinopathy. The aim of this study was to evaluate the associations of clinical and metabolic parameters with nonproliferative (NPR) and proliferative/laser-treated retinopathy (PR) in normoalbuminuric T1DM.

Design and method: Study included 333 (198 without retinopathy, 135 with NPR and PR) normoalbuminuric T1DM with normal or mildly decreased renal function (estimated glomerular filtration rate (eGFR) > 60 ml min-1 1.73m-2) and before any interventions with statins, ACE inhibitors or angiotensin II receptor blockers. eGFR was calculated using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) formula. Microalbumin was measured spectrophotometrically by turbidimetric immuno-inhibition. Diagnosis of retinopathy was made by fundoscopy after pupillary dilatation. Resting heart rate was determined using a standard 12-lead ECG after a resting period of 10 minutes and expressed in beats per minute.

Results: Patients without retinopathy compared to those with NPR and PR were younger (32±9 vs 39±9 years, p<0.001), had longer duration of diabetes (8.6±6.8 vs 19.6±8.1 years, p<0.001), lower hemoglobin A1c (7.2±1.5 vs 7.8±1.6%, p<0.001), lower total cholesterol (4.9±0.8 vs 5.2±0.9 mmol/L, p=0.01), lower LDL cholesterol (2.8±0.7 vs 3.0±0.8 mmol/L, p=0.04) lower heart rate (HR) (71±12 vs 79±13 beats/min, p<0.001), lower urinary albumin excretion rate (UAE) (11.4±6.9 vs 13.4±7.5 mg/24h, p=0.01) and higher eGFR (108±15 vs 103±16 ml/min, p=0.005). Stratifying clinical and metabolic characteristics of patients for degree of HR, trends across quartiles for age, sex, duration of diabetes, serum creatinine, and UAE were statistically significant. In logistic regression analysis, after adjustment for risk factors, only higher HR was significantly associated with risk of retinopathy in our subjects (p<0.001), with odds ratios of 1.02 to 1.06.

Conclusions: Resting HR is associated with increased prevalence of NPR and PR in normoalbuminuric type 1 diabetic patients with normal or mildly impaired renal function.

PP.04.34 LEFT VENTRICULAR MASS INDEX AND ECHOCARDIOGRAPHIC PARAMETERS OF INCREASED FILLING PRESSURE IN HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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Objective: Left ventricular mass was significantly associated with cardiovascular mortality. Patients with an acute myocardial infarction (AMI) and hypertension antecedent to the acute coronary event present an elevated left ventricular end-diastolic pressure (LVEP) which is prognostic indicator. Aim of the study was to find the correlation between left ventricular hypertrophy (LVH) and echocardiographic parameters of increased LVEP in hypertensive patients with AMI.

Design and method: A number of 98 hypertensive patients (56 males and 42 females), admitted with AMI with ST-segment elevation were evaluated during the first week of hospitalization before discharge by: clinical examination, 12 lead standard ECG, echocardiographic measurements of: left ventricle mass index (LVMi); cut off values for LVH were LVMi>115g/m2 in males and>95g/m2 in females, left atrial volume index (LAVi); pulsed Doppler echocardiography for mitral inflow, tricuspid inflow, pulmonary venous flow evaluation, pulsed tissue Doppler echocardiography at lateral and medial corner of mitral annulus, color Mmode echocardiography. E/e' ratio, E/vp ratio and ar-A duration were calculated. Pulmonary artery sistolic pressure (PASP) was determinated by applying modified Bernoulli's ecuation: the tricuspid gradient evaluated by continuous Doppler echocardiography of tricuspid regurgitant jet was added to the right atrial pressure. LVEF measured by Simpson method was less than 45% in all patients.

Results: Using chi squared (CS), odd ratio (OR) and relative risk (RR) we found statistically significant correlations between: 1.LVH and LAVi>32ml/m2 (CS:12,65518, OR:4,949495, RR:1,724074) 2.LVH and E/e' ratio>13 (CS:4,874022, RR:3,528409, RR:1,374579) 3.LVH and E/vp>1,5 (CS:0,380435, OR:19,99552, RR: 0,109375) and correlations but without statistical significance between: 1.LVH and aR-A>30ms (CS:3,406644, OR:2,461538, RR:1,292308) 2.LVH and PASP>35mmHg (CS: 0,439169, OR:1,6875, RR:1,211538).

Conclusions: 1. Hypertensive patients with increased LVMi in acute phase of myocardial infarction had elevated LVEP. This was revealed by correlation with echocardiographic parameters used for filling pressure evaluation. 2. Stastistically significant correlations were obtained between LVMi and LAVi, E/e' ratio and E/vp.

PP.04.35 TARGET ORGAN DAMAGE IS ASSOCIATED WITH GLYCEMIC CONTROL AND SUBCLINICAL INFLAMMATION IN HYPERTENSIVES

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Objective: Hypertension is associated with increased subclinical inflammation and several markers of subclinical target organ damage (TOD). Glycemic control, as assessed by hemoglobin A1c (HbA1c) levels, is an independent predictor of cardiovascular morbidity and mortality in hypertensives. The present study investigated the relationship between inflammatory biomarkers and glycemic control with markers of TOD in never-treated hypertensives.

Design and method: We enrolled 1225 consecutive essential hypertensives (mean age 52.9±11.7 years, 728 males). Markers of subclinical TOD [left ventricular mass index (LVMI), pulse wave velocity (PWV), estimated glomerular filtration rate (eGFR), blood creatinine, ankle-brachial index (ABI) and augmentation index (AIx)] were evaluated in all patients. LVMI was assessed echocardiographically using the Devereux formula. eGFR was estimated using the MDRD formula. Subclinical organ damage was defined as described in the European guidelines for the management of arterial hypertension. Subclinical inflammation was assessed by measurement of high-sensitivity C-reactive protein (hsCRP). HbA1c was measured in venous blood samples.

Results: In multivariable regression analysis, hsCRP exhibited significant association with LVMI, PWV, ABI, eGFR and blood creatinine (p<0.001 for all), which was independent of age, gender, mean blood pressure, body-mass index, smoking habits, blood glucose and low-density lipoprotein. Similarly, HbA1c exhibited significant association with LVMI, PWV and ABI (p<0.001 for all). In further analysis, receiver operating characteristic (ROC) curves were generated to evaluate the ability of hsCRP and HbA1c to discriminate subjects with TOD. The area under the curve (AUC) and 95% CIs of the ROC curves for left ventricular hypertrophy, PWV>10m/s, ABI<0.9, decreased eGFR and increased creatinine were AUC=0.68 (95% CI: 0.65-0.71, p<0.001), AUC=0.72 (95% CI: 0.68-0.77, P<0.001), AUC=0.80 (95% CI: 0.70-0.90, p<0.001), AUC=0.66 (95% CI: 0.61-0.71, p<0.001) and AUC=0.69 (95% CI: 0.61-0.76, p<0.001), respectively. Similarly, for HbA1c AUC=0.67 (95% CI: 0.64-0.70, p<0.001), AUC=0.77 (95% CI: 0.73-0.81, P<0.001), AUC=0.75 (95% CI: 0.64-0.87, p=0.001), AUC=0.65 (95% CI: 0.60-0.70, p<0.001) and AUC=0.68 (95% CI: 0.60-0.76, p<0.001), respectively.

Conclusions: Our findings support the close relationship of glycemic control and subclinical inflammation with TOD in hypertension, as well as, the predictive ability of hsCRP and HbA1c levels for TOD.

PP.04.36 THE CHANGES IN BLOOD PRESSURE WERE INSIGNIFICANTLY CORRELATED WITH THE REDUCTION IN MICROALBUMINURIA: KANARB METS STUDY

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Objective: Microalbuminuria is important predictors of both adverse cardiovascular disease (CVD) and renal outcomes. Patients with a better BP reduction are less likely to develop microalbuminuria. Treatment with ARB delayed the onset of microalbuminuria independent of the baseline BP and the degree of BP reduction. But some data in patients with proteinuria have demonstrated that long-term renoprotection is mainly achieved in irrespective of the BP response. This suggests that a treatment approach just focusing on BP reduction would not be the most efficacious way to achieve renoprotection. We aimed to investigate the individual impact of initial responses in systolic blood pressure (SBP) to Fimarsatan, newly developed angiotensin II receptor blocker (ARB) treatment on urinary albumin excretion (UAE) in drug naïve hypertensive subjects.

Mean(+/-SD) and estimated means value (95%CI) of UACR according to quartile of change SBP

	~-39.0	-39.0~-26.3	-26.3~-15.15	-15.13~	*p for trend*
Mean	14.9(+/-31.8)	3.3(+/-22.8)	7.7(+/-29.8)	3.4(33.9)	<0.001
Estimated mean*	15.0[10.5,19.5]	3.3[-1.2,7.8]	7.7[3.3,12.2]	3.3[-1.2,7.8]	0.001
Estimated mean**	15.0[10.5,19.5]	3.1[-1.4, 7.6]	7.9[3.4,12.4]	3.3[-1.2,7.8]	0.009

* Adjusted for age and gender
** Adjusted for age, gender, BMI, Triglyceride, LDL-C, HDL-C, fasting glucose and eGFR

Design and method: Overall, 865 patients with drug naïve hypertensive subjects at baseline (defined by a SBP/DBP >=140/90 mmHg or use of antihypertensive medication) received fimarsatan once daily. Additional antihypertensive drugs (except angiotensin-converting enzyme inhibitors or ARBs) were used as needed to lower blood pressure (BP). Quantitative microalbuminuria was tested at the beginning and at the end of the study Documented outcomes included blood pressure (BP) reductions, ans changes in albuminuria and adverse events throughout the 12-week treatment period.

Results: Patients had a mean(+/- SD) age of 53.5(+/- 9.9) years, 47.0% were male and the mean body mass index was 25.0 (+/- 3.0) kg/m2. The mean baseline SBP and DBP were 154.0(+/- 14.2)/95.3(+/- 9.8) mmHg. And the mean SBP and DBP after 12 weeks fimasartan treatment were 127.2(+/- 13.3)/80.5(+/-9.4) The mean UACR at baseline and follow up were 19.1(+/- 31.5) and 11.8(+/- 33.0). The changes in blood pressure were insignificantly correlated with the reduction in microalbuminuria. The adjusted mean [95%CI] reduction of microabumionuria according to quartile of change in SBP were 15.0[10.5,19.5], 3.1[-1.4, 7.6], 7.9[3.4,12.4] and 3.3[-1.2,7.8] (p for trend =0.009).

Conclusions: The newly developed ARB, fimasartna is highly effective in lowering blood pressure microalbuminuria. The changes in blood pressure were insignificantly correlated with the reduction in microalbuminuria.

PP.04.37 THE CORRELATIONS BETWEEN INSULIN-RESISTANCE PARAMETERS AND INTIMA-MEDIA THICKNESS IN HYPERTENSIVE PATIENTS WITH TARGET ORGAN DAMAGE

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Objective: The aim of this study was to evaluate the relationship between surrogate measures of insulin resistance such as homeostasis model assessment-estimated insulin resistance (HOMA-IR) and quantitative insulin-sensitivity check index (QUICKI) and intima-media thickness in hypertensive patients with target organ damage.

Design and method: The study comprised 162 patients with arterial hypertension associated with metabolic syndrome or type 2 diabetes mellitus. Carotid intima-media thickness (IMT) was assessed by high resolution B-mode ultrasound imaging according to the Mannheim Consensus.

Results: The values of carotid IMT was significantly higher in hypertensive patients with DM compared to hypertensive patients with metabolic syndrome (1.31±0.04 vs 1.27 ± 0.03 vs 1.00 ± 0.18 mm, all $p < 0.001$). It was obtained with Pearson correlation test a positive and significant correlation between carotid IMT and HOMA-IR index in all studied groups ($r = 0.67$, $p < 0.001$). A negative and significant correlation was obtained between carotid IMT and QUICKI index ($r = -0.77$, $p < 0.001$).

Conclusions: These findings suggested that increased values of HOMA-IR and QUICKI were associated with subclinical atherosclerosis evaluated by carotid IMT and may be considered useful indicators for evaluating insulin-resistance in hypertensive patients with metabolic syndrome or diabetes mellitus.

PP.04.38 COMPARISON OF 12-LEAD AVERAGED AND CONVENTIONAL ECG EFFECTIVENESS IN DYNAMIC LEFT VENTRICULAR HYPERTROPHY EVALUATION ON MEDICAL TREATMENT OF ARTERIAL HYPERTENSION

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Objective: The aim of the study was to compare the ability of 12-lead time averaged and conventional ECG to determine left ventricular hypertrophy (LVH) changes during short-term treatment of arterial hypertension (AH).

Design and method: The study involved 14 patients with AH (age 45-60 years) who received treatment with combined preparation of perindopril (5-10 mg) with amlodipine (5-10 mg) for 3 months examined at entry, after 2 weeks and 3 months of treatment. 12-lead ECG recordings were acquired during 5 minutes using computerized ECG device at each examination for conventional and averaged ECG analysis. Mathematical averaging of ECGs in each lead at 5 min interval was performed using original program 'HR ECG'. Standard ECG criteria of LVH were used as control parameters.

Results: Changes of LVH criteria for conventional and time averaged ECG on the treatment are depicted in the table. Despite the trend to decrease of LVH parameters these changes were not significant on conventional ECG analysis. In contrary, all studied LVH criteria decreased significantly after three months of treatment when using time averaged ECG analysis with significant changes of Sokolow-Lyon index after 2 weeks of treatment.

	2 weeks	3 months
Conventional ECG		
Sokolov-Lion index, mm	-2.5 (-5.7 – 0.3)^	-2.0 (-4.9 – 0.5)^
Cornel voltage, mm	0 (-2.4 – 1.9)^	-1.4 (-3.5 – 0.8)^
Cornel product, mm×ms	-24 (-163 – 140)^	-111 (-329 – 48)^
Averaged ECG		
Sokolov-Lion index, mm	-2.3 (-4.8 – -0.2)*	-2.7 (-5.3 – -0.3)*
Cornel voltage, mm	-0.3 (-2.2 – 1.5) ^	-1.7 (-3.0 – 0.1)*
Cornel product, mm×ms	-50 (-202 – 117)^	-165 (-244 – -46)**
Note: ^ – not significant changes; * – p<0.05; ** – p<0.01; data presented as median and 25-75 quartiles of distribution		

Conclusions: Thus, due to its higher reproducibility the 12-lead time averaged ECG is effective and superior to conventional ECG in determining minor changes of LVH parameters during relatively short-term medical treatment of AH even in small groups of patients. The use of the method in studies of AH with LVH as an end-point may significantly decrease the time of a study or groups size needed to reach statistically significant differences.

PP.04.39 EARLY STRUCTURAL ALTERATIONS IN THE CARDIOVASCULAR SYSTEM OF NEWLY DIAGNOSED OF HYPERTENSIVE PATIENTS

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Objective: The early structural and functional alterations of the cardiovascular system contribute to the development of hypertension and its cardiovascular complications.

Design and method: We investigated parameters of early vascular structural alterations in aorta and parameters of early alterations in myocardial function and structure in young hypertensive patients.
We studied 19 never-treated patients with newly diagnosed hypertension, otherwise healthy, and compared them with normotensive subjects matched for age, sex and BMI. Were evaluated blood pressure, the parameters derived from aortic pulse wave analysis (Sphygmocor: central pressure, Subendocardial Viability Ratio-SEVR (index of impaired coronary microcirculation), augmetation index (AI), pulse wave velocity (PWV) and those derived from ecocardiocolor-Doppler (ECD) examination.

Results: The two groups were matched for age (44±1.4years), sex, and BMI which resulted in the normal range. The central aortic pressure was increased in hypertensive patients (131±7.8/92±6.1mmHg-vs-107±10.6/75±8.5mmHg, p<0.001). The AI (an early index of vascular stiffness and impairment of peripheral resistance) was increased in hypertensive patients (22±9%-vs-14.7±10%, +49.6%, p<0.05) while the PWV and SEVR were similar in the two groups. The left ventricle ejection fraction was preserved and similar in both groups. The Midwall Fractional Shortening (MFS) was increased in patients with hypertension (38.6%±5.7%-vs-34.8±3.5%, +11%, p<0.04), whereas the fractional shortening (FS) was similarly preserved in the two groups. The S wave at tissue Doppler (index of ventricular longitudinal shortening) was reduced in hypertensive patients (13.8±2cm/sec-vs-16.2±2cm/sec, +15% p<0.03). Left ventricular mass (MVSh2.7) was increased in patients with hypertension (38.7±8.3g-vs-26.3±10.3g, +47%; p<0.002), although in the normal range. The Stroke Work (parameter of ventricular walls tress) was increased in hypertensive subjects (115±29.8gmm2-vs-1.9±22.7gmm2; +25% p<0.03). The central systolic pressure correlated positively with AI (Rho46%,p<0.05) only in patients with hypertension. The SEVR correlated positively only in hypertensive patients with the following ECD parameters: MVSh2.7 (Rho72%,p<0.003), stroke volume (Rho71%,p<0,003), Stroke Work (Rho67%;p<0,007) and MFS (Rho72%,p<0.002).

Conclusions: Newly diagnosed hypertensive patients presented abnormalities of early parameters of aortic stiffness. Those are closely related to the pressure load and may contribute to the early abnormalities of both systolic and diastolic cardiac performance such as the impairment of the longitudinal shortening components of the myocardium.

PP.04.40 AMBULATORY BLOOD PRESSURE BEYOND CONVENTIONAL PREDICTORS OF LV MYOCARDIUM MASS

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Objective: In terms of determination of left ventricle hypertrophy (LVH) office blood pressure is inclined to be overestimated (white coat hypertension) or underestimated (nocturnal hypertension), has higher measurement variability and does not account the time of haemodynamic load on myocardium.
We aimed to assess the impact of ambulatory blood pressure monitoring (ABPM) indices and conventional determinants on LV myocardial mass index (LVMI) variability in unselected population.

Design and method: In the frame of series of epidemiological studies (MONICA, EPOGH and local Russian project) we examined a population sample in Novosibirsk, Russia (men and women aged 18-64 years). Optionally, in a random subsample (n=2018), we performed echocardiography (Vivid 7, GE) and ABPM (n=302, SpaceLabs 90207). LV mass was calculated by anatomically validated formula (Devereux) indexed by body surface area. To establish LVH we computed sex-specific reference criteria of LVMI in apparently healthy subsample selected from general population. We applied multiple linear regression analysis (SPSS package v.13.0).

Results: In basic regression model LVMI was associated with age, systolic BP, BMI, education level (p<0.001 for all), heart rate (p=0.003), physical activity level (p=0.042) and anti-hypertensive treatment (p=0.043). Thereby, conventional determinants explained LVMI variability by 39.7%. Incorporation of ABPM indices into statistical model increased explanation of LVMI variability by 63.9%. In this approach, there were preserved associations of LVMI with age (p<0.001), office systolic BP (p=0.059), BMI (p=0.019) and heart rate (p=0.001). Additionally, positive association of LVMI with 24 hrs systolic BP (p=0.042) and negative association with percentage of nocturnal systolic blood pressure reduction (p=0.008) were revealed independently from conventional factors.

Conclusions: In association analysis we confirmed moderate impact of conventional determinants on LV myocardium mass index variability (40%). Applying ABPM measures the LVMI distribution was incrementally explained on 24% else reaching totally 64%. Among ABPM measures, 24-h SBP and percentage of nocturnal SBP decline were the most significant and independent determinants of LVMI.

PP.04.41 ESTIMATE RENAL FUNCTION AND THE PREVALENCE OF RENAL DYSFUNCTION IN ESSENTIAL HYPERTENSIVE PATIENTS

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Objective: The shortcoming of serum creatinine (SCr) as an index of renal function is well known, patients can have significantly decreased glomerular filtration rates (GFR) with normal range SCr values, making the recognition of renal dysfunction more difficult. The aim of our study was to estimate renal function and the prevalence of renal dysfunction in essential hypertensive patients.

Design and method: Study population included 50 patients (22F/28M, 32-84 years old, middle age 61.1 years) with arterial hypertension. GFR was estimate with the help of CKD-EPI creatinine equation and Cockroft-Gault and MDRD formulas. Renal function was classified as normal when SCr < 97 in women and 115 μmol/l in men and GFR (> 60 ml/m, respectively) within the above written formulas.

Results: Clinical characteristics of patients are presented in Table 1.
With any formula the percentage of patients with impaired renal function was much higher than indicated by the plasma creatinine alone (14% for SCr) vs 42-44% (GFR < 60 ml/m) according to the 3 formulas. Correlation analysis revealed the dependence of GFR on age (r=-0.63, p<0.001) and sex (r=0.47, p<0.05).

Age, years	61.0±2.1
Duration of artery hypertension, years	14.7±1.8
Body mass index,	26.7±0.8
GFR (CKD-EPI), ml/min/1.73 m^2	67.8±3.7
GFR (Cockroft-Gault formula), ml/min	71.3±3.8
GFR (MDRD formula), ml/min/1.73 m^2	68.8±3.7
Serum Creatinine, μmol/l	100.7±7.1
Urine protein, g/l	0.043±0.025

Conclusions: This study documents the substantial prevalence of abnormal renal function in essential hypertension. Estimation of GFR may help to facilitate the early identification of patients with renal impairment.

PP.04.42 CAN ARTERIAL STIFFNESS AND AORTIC PULSE PRESSURE BE REDUCED BETTER IF ANTIHYPERTENSIVE TREATMENT IS PERFORMED ACCORDING TO LARAGH AND ALDERMAN IDEA?

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Objective: The aim of the study was to check if plasma renin activity (PRA) is helpful for reduction of arterial stiffness- one of subclinical organ damages. According to PRA value hypertensive patients should be divided into two subtypes low and high renin (PRA over or below 0.65ng/ml/h). According to Laragh and Alderman algorithm high renin "R" hypertension should be treated by RAA-system antagonists. Low renin "V" hypertension is connected with sodium-volume overload and should be treated by diuretics or calcium channel blockers (anti-"V"drugs).

Design and method: PRA was measured in 95 never treated patients, with HT stage 1 or 2. 59 patients were "high renin", 36- "low renin". Irrespectively of PRA patients were randomized to 6 months monotherapy with: quinapril, amlodipine, hydrochlorothiazide, losartan or bisoprolol. Finally four groups were compared for mentined above subclinical organ damage: group 1 (high renin, anti-RAA drugs), group 2 (high renin, anti-V drugs), group 3 (low renin, anti-RAA drugs), group 4 (low renin, anti-V drugs). Before and then after 1, 3 and 6 months of treatment pulse wave velocity (PWV) by using COMPLIOR, SPHYGMOCOR and ARTERIOGRAPH devices were performed. Moreover aortic pulse pressure (AoPP) was analysed from pulse wave in applanation tonometry by using SPHYGMOCOR device.

Results: At the baseline no differences between groups were observed in PWV. ANOVA for repeated measurements revealed for all groups significant decrease in PWV (p<0.05). No differences appeared between groups 1-4 in above effect.
AoPP decresed significantly during observation period in all examined groups. However ANOVA analysis performed for each of 5 prescribed drugs (each drug in 19 patients) revealed that this trend for bisoprolol was expressed weakly.

Conclusions: Irrespectively of chosen drug and PRA value we observed similar effect for PWV and AoPP drops. PRA value and chosen antihypertensive drug don't affect arterial stiffness and AoPP decrease.

PP.04.43 CENTRAL AORTIC SYSTOLIC PRESSURE AND LEFT VENTRICULAR HYPERTORPHY IN LEVEL 1 HYPERTENSIVE PATIENTS

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Objective: Blood pressure (BP) is the main variable involved in hypertension (HBP) myocardial damage. Hemodynamic load imposed by increased stiffness of large arteries may play a role in the development of hypertrophy (LVH) and left ventricular dysfunction. Objectives: to determine the importance of elevated central aortic pressure (CAoP) in HBP grade 1 in the development of LVH and systolic and diastolic left ventricular dysfunction.

Design and method: BP and ultrasound (U) left ventricular mass index (LVMI) and ventricular systolic and diastolic function were measured and classified according to ESH/ESC 2013 Guidelines. CAoP was measured with a tonometer and Anglo Cardiff study values were considered as reference. Statistical analysis: Continuous variables are reported as means with their standard deviations, and discrete variables as absolute values and percentages, students test for differences in means and proportions was applied, and statistical significance was considered a p value < 0.05.

Results: 508 consecutive first consultation treated patients were included, of which 100 patients (19.7 %) had grade 1 HBP, of whom 12 patients had elevated CAoP, 55 patients (55 %) were male, mean age of the sample was 58.5+-13.5 years. The mean arterial pressure was 145.5+-5.5/80.1+-9.9 mmHg, with a pulse pressure of 65.5+-11.6 mm Hg and a mean arterial pressure 107.9+-6.8 mm Hg. No differences between groups in mean age, male frequency, systolic BP, diastolic BP, pulse pressure and mean pressure were detected. Ultrasonography parameters are described in the table.

Variable	Elevated CAoP	Normal CAoP	p value
U Mean LVMI (gr/m2)	100,7+-34,2	87,4+-22,3	NS
U LVH (n-%)	6 – 50	18 – 20,5	> 0,05
U Mean E` wave (cm/sec)	7,3+-2,4	9,3+-1,1	> 0,05
U Mean E/E` ratio	12,8+-4,6	10,8+-4,1	NS
U E/E` > 13 (n-%)	5 – 41,7	17 – 19,3	NS
U Mean S wave (cm/sec)	7,2+-1,5	7,9+-0,7	NS

Conclusions: Grade 1 HBP patients with high CAoP had more frequently LVH and diastolic dysfunction than patients with the same level of BP but normal CAoP. Clinical implications: the increased stiffness of large central arteries, assessed by tonometry, is an additional load to LVH and dysfunction development.

PP.04.44 ESH/ESC 2007 VS 2013 GUIDELINES: ARE THE LEFT VENTRICULAR HYPERTROPHY DIAGNOSTIC TOOLS CHANGING?

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Objective: Left ventricular hypertrophy (LVH) diagnosis is based on arbitrary criteria defined by consensus. R. Devereux 1986 criteria are proposed by ESH/ESC 2007 Guidelines with cutoff <110 gr/m2 in women and <125 gr/m2 in men. American Society of Echocardiography's (ASE) Guidelines and Standards Committee and the Chamber Quantification Writing Group Recommendations with cutoff <= 95 gr/m2 in women and <= 115 gr/m2 in men are proposed criteria by ESH/ESC 2013 Guidelines.
To determine the relevance for routine medical practice of these recommended changes for the diagnosis of LVH.

Design and method: 2D and M-mode echocardiography left ventricular mass index was measured according to the recommendations of the ASE. The means with standard deviations and the frequencies of LVH according to ESH/ESC 2007 and 2013 proposals, and the agreement between them was analyzed. The discontinuous variables are reported as absolute values and percentages.Statistical analysis: students test for differences in means and proportions, reason analysis and intra-group correlations, statistical significance was considered a p value <0.05.

Results: 503 patients (p) were included, 254 p (50.5%) male, mean age 59.8+-12.3 years. The mean left ventricular mass according to ESH/ESC 2007 was 101+-21.8 gr/m2 and according to ESH/ESC 2013 was 88.8+-17.6 gr/m2 (p <0.001). The correlation coefficient between them was r=0.98 and the reason 0.88+-0.3. The mean eccentricity index was 0.36+-0.05. The frequency of LVH according to ESH/ESC 2007 was 23.9 % (120 p) and with ESH/ESC 2013 was 20.3 % (102 p) (p= NS). The ESH/ESC 2007 and 2013 measurements agreed on the diagnosis in 94.4 % of cases (475 p), presenting LVH 23 p (4.6%) alone with ESH/ESC 2007 and with ESH/ESC 2013 alone 5 p (1%). The table compares the Guidelines.

	ESH/ESC 2007 LVH +	ESH/ESC 2007 LVH -	TOTAL
ESH/ESC 2013 LVH +	98 p – 19,5 %	5 p – 1 %	103 p – 20,5 %
ESH/ESC 2013 LVH -	23 p – 4,6 %	377 p – 74,9 %	400 p – 79,5 %
TOTAL	121 p – 24,1 %	382 p – 75,9 %	503 p – 100 %

Conclusions: 1) Left ventricular mass index was on average 12% less with ESH/ESC 2013 Guidelines, 2) the diagnosis is consistent between the Guidelines in 94.4% of cases, 3) the new proposed ESH/ESC 2013 Guidelines criteria does not imply a significant change to standard medical practice in the diagnosis of LVH.

PP.04.45 SYNERGISTIC EFFECT OF IMPAIRED KIDNEY FUNCTION AND MICROALBUMINURIA ON ARTERIAL STIFFNESS IN HYPERTENSIVE PATIENTS

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Objective: Chronic Kidney disease (defined either as eGFR<60 ml/min/1.73 m² or microalbuminuria> 30 mg/24h) is considered as target organ damage in arterial hypertension and has been associated with increased cradiovascular risk. Arterial stiffness is an independent determinant of cardiovascular and total mortality in several populations, including hypertensive patients. The relationship of arterial stiffness with microalbuminuria has been demonstrated in the past, but whether the combination of decreased eGFR and microalbuminuria may aggravate arterial stiffness, is not well established.

Design and method: We studied 1375 patients with never treated arterial hypertension. Patients were classified into two groups according to eGFR values (1. eGFR<60 ml/min/1.73 m² N=138 and 2. eGFR> 60 ml/min/1.73 m², N=1237) and the presence of microalbuminuria (1. microalbuminuria >30 mg/24h, N=263 and 2. normoalbuminuria < 30 mg/24h, N=1112). Arterial stiffness was assessed by measuring carotid-femoral pulse wave velocity (PWV) using the Complior device.

Results: Patients with eGFR<60 ml/min/1.73 m² exhibited higher PWV compared to patients with eGFR>60 ml/min/1.73 m² (9.09±2.06 vs 8.07±1.50 m/s, p<0.001).
Accordingly, patients with microalbuminuria had higher values of PWV compared to patients with normoalbuminuria (9.11±1.96 vs 7.95±1.41 m/s, p<0.001). The association of PWV with decreased eGFR and microalbuminuria was independent of classic risk factors. When the combined effect of reduced eGFR and microalbuminuria on PWV was studied, a significant synergistic effect was demonstrated after adjustment for age, gender, smoking, BMI and systolic blood pressure (p=0.02).

Conclusions: The combination of microalbuminuria and reduced eGFR has a detrimental, synergistic effect on arterial stiffness in never treated hypertensive patients. Given the adverse prognostic role of arterial stiffness, therapeutic interventions in hypertensive patients should aim to both microalbuminuria reduction and delay (or even regression) of impaired kidney function.

PP.04.46 DIFFERENTIAL RELATIONSHIP BETWEEN CEREBRAL BLOOD FLOW PULSATILITY AND ARTERIAL STIFFENING WITH AGEING

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Objective: Increased cerebral blood flow pulsatility has been linked with cerebrovascular disorders such as stoke. Our aim was to examine the relationship between cerebral blood flow pulsatility and arterial stiffening with healthy aging.

Design and method: 94 individuals, free from cardiovascular acting medication, were dichotomized according to age; those < 50 years (age: 36±8 yrs; height: 171±8 cm and weight: 76±18kg) and > 50 years (age: 61±7 yrs; height: 168±10 cm and weight: 77±11kg). Middle cerebral artery blood flow velocity was obtained using transcranial Doppler from which pulsatility index (MCAPI) was subsequently calculated according to Goslings equation: Peak systolic velocity – end diastolic velocity/mean velocity. Aortic Pulse Wave Velocity (aPWV), augmentation index (AIx) and augmentation pressure (AP) were obtained using applanation tonometry.

Results: In all participants, age correlated positively with aPWV ($r = 0.62$), AIx ($r = 0.70$) and AP ($r = 0.75$) (all $P < 0.05$), but not with MCA PI ($r = 0.14$, $P > 0.05$). When the subjects < 50 years were considered, MCA PI shared an inverse relationship with AIx ($P < 0.05$; Fig. 1) and AP ($r = -0.28$, $P < 0.05$) but no relationship with aPWV ($r = 0.09$, $P > 0.05$) or age ($r = 0.25$, $P > 0.05$). In contrast, in those aged > 50 years, increases in MCA PI shared a positive relationship with AIx (Fig. 1) and AP ($r = 0.61$) (both $P < 0.05$) but were not associated with age ($r = 0.28$ $P > 0.05$).

Conclusions: Cerebral blood flow pulsatility correlates differentially with large artery stiffening between healthy younger and older individuals. This differential relationship may provide an insight into the association between cerebrovascular disorders and increased cardiovascular risk such as endothelial dysfunction, microvascular remodelling and stroke occurring through healthy aging. Given the lack of relationship between age and MCA PI, these data further highlight the importance of individual markers of vascular, rather than chronological aging upon cardiovascular risk factors for stroke.

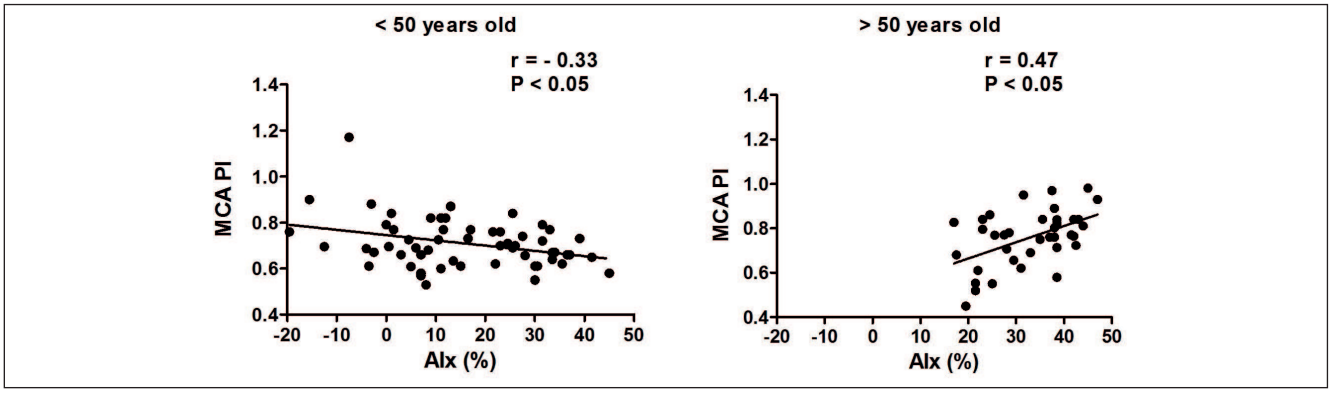

Fig. 1: Differential relationship in young and old individuals between AIx and MCAPI.

POSTERS' SESSION

POSTERS' SESSION PS05
EXPERIMENTAL HYPERTENSION

PP.05.01 CALCIUM SENSITIZATION IN DAHL RATS: GENETIC PREDISPOSITION AND THE ROLE OF ENDOGENOUS VASOACTIVE SYSTEMS

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Objective: Salt hypertension in Dahl rats is characterized by attenuation of renin-angiotensin system (RAS), enhancement of sympathetic nervous system (SNS) and relative NO deficiency. The important role of enhanced calcium entry through L type voltage-dependent calcium channels (L-VDCC) in the development and maintenance of high blood pressure (BP) of salt hypertensive Dahl rats is well known, but less attention was paid to calcium sensitization mediated by RhoA/Rho kinase pathway in salt hypertension.

Design and method: Our study was aimed to determine calcium sensitization in salt-sensitive (DS) and salt-resistant (DR) Dahl rats fed either low-salt (LS, 0.3% NaCl) or high-salt diet (HS, 5% NaCl). Dose-dependent administration of Rho kinase inhibitor fasudil, calcium channel opener BAY K8644 or norepinephrine (NE) to rats with different state of endogenous vasoactive systems (RAS, SNS and/or NO) was used to reach this goal. BP response to fasudil administration and the impact of fasudil pretreatment on BP response to NE or BAY K8644 were performed in conscious animals in which endogenous vasoactive systems were intact or inhibited by captopril, pentolinium or L-NAME.

Results: Increasing fasudil doses caused greater BP reduction in DS than DR rats with intact endogenous vasoactive systems, the effect being prominent in DS-HS rats. If rats with combined inhibition of RAS and SNS were studied, fasudil pretreatment caused greater rightward shift of NE dose-response curve and larger attenuation of the magnitude of BAY K8644 dose-response curve in DS than DR rats, but these differences were not influenced by high salt intake in either strain. To clarify different BP response to fasudil in intact DS-LS and DS-HS rats, we also studied rats subjected to NO synthase blockade or to a combined RAS, SNS and NOS blockade. Acute NO-deficiency augmented fasudil-induced BP reduction in both strains but preserved the difference between DS-LS and DS-HS rats, which was almost abolished by additional RAS and SNS blockade.

Conclusions: Our data suggest that increased calcium sensitization in DS rats (due to a genetic predisposition) is further augmented by chronic high salt intake via enhanced SNS activity.

PP.05.02 CARDIAC (PRO)RENIN RECEPTOR EXPRESSION IS INCREASED IN HYPERTENSIVE RATS WITH AORTIC CONSTRICTION

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Objective: (Pro)renin receptor ((P)RR), a specific receptor for renin and prorenin, was identified as a member of the renin-angiotensin system (RAS) by Nguyen et al. (P)RR is a 350 amino acid protein with a single transmembrane domain and is widely expressed in various tissues. While implicated in a broad range of diseases, studies to date have focused on the kidney. We sought to examine the expression of the (P)RR and its relationship with the expression of PLC-b3 in the heart in hypertensive rats induced by abdominal aortic constriction.

Design and method: Sixty SD rats were divided into 4 groups (n=15/group) as following: sham operated (SO), rats with the aortic constriction (AC), AC rats were given (P)RR inhibitor HRP (4μg kg-1 d-1, SC), and AC rats given PLC-b3 inhibitor U73122 (40μg kg-1 d-1, SC). MAP was recorded using a tail-cuff method. After 4 weeks of treatment, levels of (P)RR and PLC-b3 in the heart were examined by RT-PCR, western blot and immunohistochemistry. (Pro)renin activity (PRA) was measured by radioimmunoassay.

Results: The partial aortic ligation led to an increase in blood pressure and cardiac hypertrophy in rats. The expression level of (P)RR was significantly increased (1.5-fold, $P < 0.01$), and PLC-b3 also increased (1.8-fold, $P < 0.01$) in the left ventricle of the heart in hypertensive rats, compared with that in sham operated ones. There was a correlation between the expression of (P)RR and PLC-b3. Treatment of HRP significantly reduced the expression of (P)RR. Similarly, the level of PLC-b3 was suppressed in the heart with administration of U73122.

Conclusions: The enhanced expression of activated (P)RR was observed in the heart with hypertrophy inhypertensive rats that were aortic constricted, and the similar response of PLC-b3 obtained in the animal model. Both were markedly suppressed in the heart in rats treated with HRP and U73122, respectively. These results suggest that cardiac PLC-b3 may play a role in hypertension and cardiac hypertrophy induced by (P)RR.

PP.05.03 PLASMA ALDOSTERONE CONCENTRATION IS POSITIVELY CORRELATED WITH PULSE PRESSURE IN HYPERTENSIVE POPULATION

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Objective: There is increasing evidence of a link between vessel stiffness and pulse pressure (PP), in which plasma aldosterone concentration (PAC) may play a role. The study was performed to explore the potential relationships between plasma aldosterone concentration and pulse pressure in patients with hypertension.

Design and method: We evaluated the relationship between baseline pulse pressure, measured by 24-hour ambulatory monitoring blood pressure and plasma concentration of aldosterone in supine, seated and upright positions in 195 general hypertensives. They were divided in three groups by tertiles of PP: PP<=44mmHg (n=70), 44mmHg<PP<=51mmHg (n=63) and PP>=51mmHg(n=62). The PAC in different postures was compared respectively.

Results: (1) The baseline characteristics of the patients when segregated by tertiles of PP showed that statistically significant differences were found in K+ concentration, 24-hour Systolic blood pressure(BP), 24-hour diastolic BP, sex, upright PAC, and sitting PAC. (2) The levels of PAC were significantly different in 3 levels of PP groups whatever postures takes by multifactor ANOVA analysis, the individuals with PP>=51mmHg had the highest levels of PAC. On contrast, the subjects with higher baseline level of Ald (PAC>12ng/dl) showed greater PP than those with lower Ald (PAC<=12ng/dl). (3) Weak association between pulse pressure and upright ($r=0.288$, $P<0.001$), seated ($r=0.265$, $P<0.001$) and supine posture ($r=0.191$, $P=0.008$) respectively were detected by using simple correlation analysis. After corrected plasma potassium, age and sex, the partial correlation coefficients did not change greatly. (4) The Logistic regression model was constructed with PP>=40mmHg or PP<40mmHg as the dependent variable, the plasma potassium and Ald were included as contributing factors, in which the plasma Ald played a risk role [OR=0.025,95% CI:0.35(0.13-0.88)] in higher PP rather than the plasma potassium showed a protective factor[OR=0.043,95%CI:1.09(1.00-1.12)].

Conclusions: Although these data provide weak evidence for a link between pulse pressure, which is related to vessel stiffness, and plasma aldosterone concentration in general hypertensive patients, the PAC indicated to be a risk factor for higher pulse pressure.

PP.05.04 IS ATRIAL KICK REPRESENTS THE USEFUL INFORMATION FOR THE BAROREFLEX SENSITIVITY OF TOTAL ARTIFICIAL HEART (TAH)?

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Objective: No one control the hypertension in TAH circulation.
In severe cases of the profound biventricular failure, heart transplantation and artificial heart have been the last option. However, the number of cases for transplantation had been limited not only in Japan, but also in the all over the world. Ventricular assist device has been the one of the most important therapeutic option. However, in severe biventricular failure, satisfactory therapeutic results could not be able to be obtained till now. TAH must be one of the last candidates.

In TAH circulation, no one control the hemodynamic condition, because there is no control center like human brain.
In this paper, we want to propose the new artificial baroreflex system to control the TAH based on the sinus mode rhythm.

Design and method: Six healthy adult goats were used in the experiments for the removal of the natural ventricles and implantation of the rotary blood pumps (Sun Medical, Suwa, Japan). After weaning the cardiopulmonary bypass, rotary blood pumps maintained the circulation under the condition of the atrial contraction restart without both ventricles.
In the system of the pneumatically driven TAH, both ventricles had been removed and driving ventricle would be implanted. So, surgical procedure of our TAH system is same.

Results: This surgical results had meant the TAH in the anatomical meaning. Furthermore, we can achieve the measurements of the atrial contraction due to the sinus rhythm. So, we can control the rotary blood pump control based on the information of the sinus node rhythm. Furthermore, the Rotation of blood pump can be controlled by the information of the blood pressure changes by our automatic control system.

Conclusions: Yes, we can achieve the artificial baroreflex system for TAH, because we can control the rotational speed of rotary blood pump by the use of the information of atrial kick.

PP.05.05 AEROBIC EXERCISE TRAINING IN HYPERTENSIVE RATS PROMOTES IMPORTANT CARDIAC MORPHOFUNCTIONAL ADAPTATIONS WITHOUT MODIFICATIONS IN BLOOD PRESSURE

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Objective: To investigate the relationship between hemodynamic morphological and functional cardiac adaptations resulting from aerobic physical training (APT) in young spontaneously hypertensive rats (SHR).

Design and method: Eighteen-week–old SHR (N=8) and Wistar-Kyoto (WK) (N=7) were submitted to APT by swimming for 10 weeks. Arterial blood pressure (BP) and heart rate (HR) were measured using the tail plethysmography; cardiac morphology and function were evaluated by means of 2-D echocardiography. All evaluations were performed before and after the period of the APT. Statistical analysis was done using Sigma-Stat® software. The values are presented as mean ± standard error of the mean. The Student's t-test was used, followed by the Mann-Whitney test when necessary. Ethics Committee on Animal Experiments (n. 092/2012).

Results: The APT promoted bradycardia in both groups (SHR and WK), however, it did not reduce the BP. The SHR group presented significant adjustments after the APT: increase in cardiac output (78.6 ml/min ± 8.5 vs. 110.50 ml/min ± 8.4; $p = 0.018$); in systolic volume (234.4 µl ± 23 vs. 323.9 µl ± 26.8; $p = 0.024$); and in the end-diastolic volume (384 µl ± 28.4 vs. 633 µl ± 31.5; $p < 0.001$). We also observed changes in cardiac morphology characterized by an increase in the diastolic area (81.6 mm² ± 4.1 vs. 111 mm² ± 3.3; $p < 0.001$) and in the systolic area (47 mm² ± 3.7 vs. 74.4 mm² ± 3.1; $p < 0.001$). In contrast, the WK group only had an increase in the end-diastolic diameter (7.6 mm ± 0.15 vs. 8.9 mm ± 0.52; $p= 0.049$), end-systolic diameter (4.4 mm ± 0.15 vs. 5.7 mm ± 0.54; $p = 0.037$) and in the shortening fraction (13.4 % ± 1.4 vs. 19.3 % ± 1.9; $p = 0.040$).

Conclusions: APT caused greater changes in the SHR group, mainly those related to functional variables. Also based on the literature, it was observed that, although this training protocol has not significantly reduced the SHR rats' blood pressure, it was effective in preventing the progress of hypertension between the 18th and 28th weeks of life.

PP.05.06 ATORVASTATIN, EPA AND DHA EXHIBIT ACUTE ANTIARRHYTHMIC EFFECTS AND FACILITATE TERMINATION OF VENTRICULAR FIBRILLATION IN HEREDITARY HYPERTRIGLYCERIDEMIC AND HYPERTENSIVE (HTG) RATS

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Objective: Statins and omega-3 FA (omega-3) exhibit antiarrhythmic effects in clinical practice but underlying mechanisms are not fully elucidated. We have previously shown that prolonged treatment of HTG rats with these compounds reduced the incidence of ventricular fibrillation (VF) that was attributed in part to modulation of cardiac cell-to-cell electrical coupling via connexin-43 channels. To elucidate further underlying antiarrhythmic mechanims this study was aimed to examine whether these compounds exert acute antiarrhythmic effects.

Design and method: Experiments were conducted on adult, male and female HTG rats known to be much prone to VF than healthy rats. The heart was excised from anesthetized rats and perfused with oxygenated Krebs-Henseleit solution at constant flow. VF inducibility was tested in control hearts and compared with the hearts, which were pre-treated during 10 min prior el. stimulation with either Atorvastatin, eicosapentanoic acid (EPA) or docosahexanoic acid (DHA) in concentration 1.5, 7, 15 µmol.

Results: Sustained VF was induced in all HTG rat hearts without treatment. In contrast, the hearts subjected to atorvastatin, EPA and DHA were less susceptible to inducible VF and incidence of sustained VF was reduced to 30%, 70% and 80% in male and to 60%, 75% and 60% in female rats. Atorvastatin suppressed VF inducibility in male rats already in concentration 1.5 µmol while EPA and DHA were efficient at higher 7 and 15 µmol. Moreover, bolus (150 µmol) of EPA and DHA administered directly to fibrillating heart terminated VF in 6 of 6 hearts and atorvastatin in 3 of 6 hearts.

Conclusions: Atorvastatin likewise EPA and DHA exhibit clear antifibrillating and defibrillating efficacy when acutely applied. This fact suggests that these compounds might affect directly connexin-43 channels and likely other channel function involved in arrhythmogenesis. Findings point out the importance of pleiotropic effects of statins and diet-related approaches in prevention of malignant arrhythmias.

PP.05.07 SIMILAR EFFECTS OF DIFFERENT CLASSES OF RAS-BLOCKING AGENTS ON PRINCIPAL VASOACTIVE SYSTEMS IN REN-2 TRANSGENIC RATS

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Objective: In humans, direct renin inhibitors were postulated to have higher effects on sympathetic nervous system than other classes of renin-angiotensin system (RAS) blockers. We were interested whether different classes of blockers of renin-angiotensin system vary in their effects on distinct vasoactive systems contributing to blood pressure (BP) maintenance in a model of angiotensin II-dependent hypertension, i.e. heterozygous Ren-2 transgenic rats (TGR).

Design and method: Young (5-week-old) male heterozygous TGR rats were given either angiotensin receptor blocker (ARB) losartan (10 mg/kg/day in the drinking fluid), angiotensin converting enzyme inhibitor (ACEi) captopril (20 mg/kg/day in the drinking fluid), or direct renin inhibitor (DRI) aliskiren (30 mg/kg/day via osmotic minipumps) for 4 weeks. BP was monitored with tail-cuff plethysmography (Hatterras). At the end of the study basal BP and acute responses to consecutive blockade of renin-angiotensin (RAS) (10 mg/kg captopril), sympathetic nervous (SNS) (5 mg/kg pentolinium), and nitric oxide (NO) (30 mg/kg L-NAME) systems were determined in conscious rats. Moreover, BP response to acute inhibition of nifedipine-sensitive calcium influx through voltage-dependent calcium channels was measured.

Results: All three classes of RAS inhibitors similarly decreased BP (122±6 mm Hg for aliskiren; 111±3 mm Hg for captopril and 114±2 mm Hg for losartan). The BP lowering effects of all three groups of RAS-blocking agents was achieved mainly via the attenuation of captopril-sensitive (RAS-dependent) vasoconstriction, the strongest effect being exerted by losartan. Sympathetic vasoconstriction was moderately reduced in all three treated groups of TGR rats with the lowest effect of losartan. NO-dependent vasodilation was similarly reduced in all three RAS-blocked groups. Moreover, calcium channel blockade with nifedipine normalized BP in all treated groups of TGR rats.

Conclusions: The effects of all three classes of RAS-blocking agents on principal vasoactive systems are comparable, with no beneficial effects of direct renin inhibitors.

PP.05.08 SUPPRESSION OF AUTOANTIBODY PRODUCTION TO BETA1-ADRENERGIC RECEPTOR BY OMEGA-3 FATTY ACIDS DEMONSTRATED IN EXPERIMENTAL HYPERTENSION

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Objective: Autoantibody production to the adrenergic beta-1 receptors (b1-AAB) is known to contribute to development of dilated cardiomyopathy and arrhythmogenic substrate. Hypertension if not properly controlled is deleterious to health due to inflammation, myocardial remodelling and enhancement of b1-AAB. Numerous reports, including ours, indicate cardioprotective effects of omega-3 FA in condition when omega-3 index is low. We hypothesized that omega-3 intake may affect production of b1-AAB, myocardial remodelling and connexin-43 (Cx43) mediated electric cell-to-cell coupling in aged spontaneously hypertensive rats (SHR).

Design and method: Male and female 12-month-old SHR as well as their age-and-sex-matched healthy Wistar rats were used. Rats fed by standard laboratory chow were compared with those supplemented with pure omega-3 ethyl ester (200 mg/kg b.w. /day) for two months. Blood serum was used for the detection of b1-AAB. Expression of Cx43, myosin heavy chain (MyHC), activity of matrix metalloproteinase 2 (MMP2) and ultrastructure were examined in left ventricular tissue. Susceptibility to electrically-induced ventricular fibrillation (VF) was tested using Langendorff-perfused heart.

Results: Comparing to healthy rats, male and female SHR exhibited significant increase of serum levels of b1-AAB, activity of MMP2, shift of alpha to beta MyHC isoform, down-regulation and miss-localisation of Cx43 and subcellular injury of the cardiomyocytes. It was associated with higher incidence of VF. Omega-3 intake resulted in significant decrease of BP, b1-AAB levels and MMP2 activity in both male and female SHR. In addition, there was a clearcut increase of Cx43 mRNA and protein expression, partial elimination of Cx43 miss-localisation and preservation of subcellular integrity of cardiomyocytes and their junctions. MyHC profile was not affected by treatment either male or female SHR but incidence of VF was significantly reduced.

Conclusions: Suppression of beta1-adrenoceptors autoantibody production and extracellular MMP-2 activity is a novel mechanism implicated in cardioprotective effects of omega-3 fatty acids. It was linked with up-regulation of myocardial Cx43, improvement of cardiomyocytes integrity and protection from VF.

PP.05.09 OXIDATIVE STRESS AND VASCULAR DYSFUNCTION IN THE OFFSPRING OF PROTEIN-RESTRICTED HYPERTENSIVE RATS

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Objective: It has already been revealed that protein restriction during pregnancy may affect health and diseases after birth (so-called DOHaD theory). Reactive oxygen species (ROS) may have an important role in the potential mechanism underlying the programming of hypertension in utero. However, it is still unclear how ROS may induce hypertension or vascular dysfunction in the offspring of protein-restricted dams. In this study, we investigated the effects of ROS on vascular function in the stroke-prone spontaneously hypertensive rats (SHRSP) offspring of protein-restricted dams.

Design and method: Male and female SHRSP offspring were obtained from dams fed either a control diet containing 20% casein or a protein-restricted diet containing 9% casein with pair feeding until gestation (control group and protein-restricted group, respectively). Oxidative stress was induced in 12-week-old offspring by administering phorbol 12-myristate 13-acetate (PMA; NADPH oxidase activator) by osmotic mini pump for 4 weeks. At 16 weeks of age, anti-oxidant enzyme activities in red blood cell fraction and plasma diacron-reactive oxygen metabolites (dROMs) contents were assessed. Using thoracic aorta, we investigated the vascular reactivity and the expression of endothelial nitric oxide synthase (eNOS) and soluble guanylic acid cyclase (sGC) by Western blot analysis.

Results: Although no significant differences were found in body weight of dams fed the protein-restricted or control diet, the birth weight of male and female offspring of the protein-restricted group was lower than that of the control group. No significant difference was found in blood pressure between the two groups. Plasma d-ROMs level was significantly higher in the protein-restricted group than in the control group, whereas anti-oxidant enzyme activities were similar in both groups. In the thoracic aorta, acetylcholine-induced relaxation was significantly reduced in the protein-restricted group. Expression of eNOS was lower and expression of sGC was higher in the protein-restricted group.

Conclusions: We conclude that protein restriction during pregnancy may induce hyper-sensitivity to oxidative stress and vascular dysfunction in SHRSP offspring. Thus, administration of antioxidant(s) may be useful to prevent or treat hypertensive vascular injury in mature offspring exposed to a poor intrauterine environment.

PP.05.10 TENASCIN-C MAY ACCELERATE CARDIAC FIBROSIS BY ACTIVATING MACROPHAGES VIA INTEGRIN ALPHAVBETA3 /NF-KAPPAB/IL-6 AXIS

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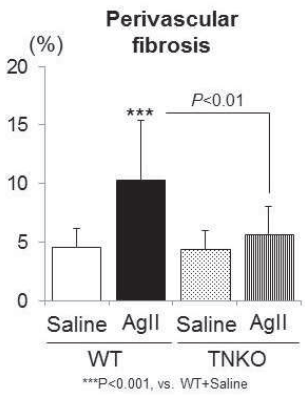
Objective: Tenascin-C (TN-C) is an extracellular matrix glycoprotein, which is undetectable in the normal adult heart but expressed under various pathological conditions. We have previously reported about enhanced TN-C production and accumulation of macrophages in the perivascular region of mouse models with angiotensin II (AgII)-induced cardiac fibrosis. To clarify the molecular role of TN-C, we analyzed the effect of TN-C in a hypertensive heart by comparing wild-type (WT) and TN-C knock-out (TNKO) mice. Furthermore, to assess whether TN-C is involved in macrophage activation, we performed an in vitro study using macrophages isolated from the peritoneal cavity of WT mice.

Design and method: At 8 weeks of age, Balb/c WT and TNKO mice were subcutaneously implanted with an osmotic minipump which released AgII (560 ng/kg body weight/min) and euthanized 4 weeks later (WT/AgII and TNKO/AgII); they were subsequently analyzed using histological and molecular biological approaches.

Results: We found that AgII treatment (WT/AgII and TNKO/AgII) increased blood pressure, heart weight/body weight ratio, atrial and brain natriuretic peptide expression level and cardiomyocyte size, compared with non-AgII treated control groups (WT/Saline and TNKO/Saline). However, no significant differences were detected between WT/AgII and TNKO/AgII mice. In TNKO/AgII mice, interstitial collagen fibers (5.68±2.36 vs. WT/AgII: 10.29±5.09%, $p<0.01$) and accumulation of mac-3 positive macrophages (28±11.45 vs. WT/AgII: 50±15.13 cells/section, $p<0.01$) were reduced significantly compared with those of WT/AgII in the perivascular region. Additionally, mRNA expressions of interleukin (IL)-6 (0.72±0.36 vs. WT/AgII: 1.85±0.39 fold, $p<0.01$) and monocyte chemoattractant protein (MCP)-1 (2.10±0.49 vs. WT/AgII: 3.20±0.53 fold, $p<0.05$) were decreased. Using an in vitro migration assay, we found that TN-C accelerated macrophage migration in the presence of MCP-1. Western blotting and Immunofluorescence staining indicated that TN-C activated NF-kappaB rapidly. Quantitative PCR analysis demonstrated that TN-C up-regulated IL-6 (39.90±18.10 fold, $p<0.01$) and MCP-1 (3.14±0.11 fold, $p<0.001$) mRNA in an NF-κB dependent manner. Interestingly, NF-κB activation and IL-6 mRNA expression were suppressed by integrin αVβ3 antagonist P11.

Conclusions: TN-C accelerates IL-6 production by activating integrin αVβ3/NF-κB on macrophages and aggravating perivascular inflammation, thereby accelerating fibrosis in a hypertensive heart.



PP.05.11 THE EFFECTS OF IRON RESTRICTION ON HYPERTENSION AND RENAL INJURY IN ALDOSTERONE/SALT-INDUCED HYPERTENSIVE MICE

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Objective: Excess iron is associated with the pathogenesis of several cardiovascular diseases. We have previously shown that dietary iron restriction (IR) prevents hypertensive cardiovascular remodeling in Dahl salt-sensitive hypertensive rats. However, it has not been investigated the effects of IR on hypertensive renal injury. The aim of this study is to investigate the effects of dietary IR on the development of hypertension and renal injury in aldosterone/salt-induced hypertensive mice.

Design and method: Ten-week-old male C57BL/6J mice (25-27g) were uninephrectomized and infused aldosterone (0.15μg/hr) with osmotic minipumps for 4 weeks. Aldosterone-infused mice were divided into 2 groups: one fed a high-salt diet (Aldo, n=8) and the other fed a high-salt with iron-restricted diet (Aldo-IR, n=8). Saline-infused mice given a normal diet were served as controls (Control, n=6).

Results: Aldo mice showed progressive increase in systolic blood pressure compared with Control mice (114±8 vs 146±4mmHg, $p<0.05$), while it was suppressed in Aldo-IR mice (146±4 vs 119±5mmHg, $p<0.05$). Urinary albumin/creatinine ratio was increased in Aldo mice compared with Control mice (35.7±7.1 vs 361.5±67.7μg/mg, $p<0.05$), which was attenuated by IR (361.5±67.7 vs 162.9±34.6μg/mg, $p<0.05$). Moreover, urinary 8-Hydroxydeoxyguanosine/creatinine ratio was markedly increased in Aldo mice compared with Control mice (9.4±0.6 vs 20.8±2.1μg/mg, $p<0.05$), whereas its ratio was decreased by IR (20.8±2.1 vs 13.7±1.1μg/mg, $p<0.05$). In addition, renal histology revealed that Aldo mice exhibited glomerulosclerosis and tubulointerstitial fibrosis. In contrast, these histological changes were attenuated in Aldo-IR mice compared with Aldo mice. Interestingly, Western blot analysis showed that the renal expression of transferrin receptor 1 (TfR1), which is iron transport protein, was up-regulated in Aldo mice compared with Control mice. Immunohistochemistry further showed that TfR1 was expressed in the renal tubules in Aldo mice.

Conclusions: Dietary iron restriction attenuated the development of hypertension and renal injury in aldosterone/salt-induced hypertensive mice. Dysregulation of renal iron transport may be involved in the mechanism of salt-sensitive hypertension.

PP.05.12 MARKERS OF DYSFUNCTION OF AORTA AT EXPERIMENTAL ARTERIAL HYPERTENSION

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Objective: To evaluate vasomotor activity of the aorta in experimental modeling of hypertension.

Design and method: Hypertension in rats simulated by blocker of NO- synthase -N- nitro-L- arginine (received per os 50 mg / kg / day during 8 weeks) causes a persistent increase in blood pressure, reaching values of hypertension III degree (table 1) .We investigated vasomotor function of rats aorta by changing of diameter of it via assessment of magnetic resonance imaging before and after administration of vasodilators (acetylcholine and nitroglycerin) and vasoconstrictor (N- monomethyl -L-arginine and norepinephrine). The quantity of vasomotor responses calculated according to the formula : vasomotor response = (d2 - d1 / d1) × 100 %, where d1 - original diameter of aorta, d2 - diameter of aorta after the test . Variation of diameter of aorta less than 10 % after test considered as pathological vasomotor reaction.

Results: Contravention of vasomotor function of aorta estimated in experimental hypertension. Injection of acetylcholine and nitroglycerin caused a small increasing of diameter of aorta, which indicates a lack of vasodilation (table 1). Injection of N- monomethyl -L-arginine induced unequal pathological vasodilatation of aorta and the same time Injection of norepinephrine didn't cause expected vasoconstriction of aorta (table 1).

Index	The control groop	The experimental groop
Systolic blood pressure	123,9±9,9	182,13±13,4*
Diastolic blood pressure	76,8±5,6	111,9±4,4*
EDVD, % (Injection of acetylcholine)	+ 11,5 ±1,25	+5,59±0,58*
EUDVD % (Injection of nitroglycerin)	+ 17,8±0,98	+2,85±0,34*
EDVC, % (Injection of N- monomethyl -L-arginine)	- 7,9 ±0,14	+0,95±0,09*
EUDVC, % (Injection of norepinephrine)	- 5,4 ±0,12	-6,23±0,22*

Note: EDVD – endoteliodependent vasodilation; EUDVD – endotelioindependent vasodilation; EDVC - endoteliodependent vasoconstriction; EUDVC endotelioindependent vasoconstriction; * - the significant differences between the control and experimental groups, p <0.05

Conclusions: Simulation by hypertension induced by L-NAME NO deficiency causes a persistent increasing of blood pressure in rat and, consequently, impaired endothelial vasomotor function of aorta connected with insufficiency of vasodilator part of regulation and missing equal reaction to vasoconstriction.

PP.05.13 MARKERS OF ENDOTHELIAL DYSFUNCTION OF CEREBRAL ARTERIES IN EXPERIMENTAL ARTERIAL HYPERTENSION

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Objective: To evaluate endothelial vasomotor activity of the cerebral vessels in experimental modeling of hypertension.

Design and method: Hypertension in rats simulated by blocker of NO- synthase -N- nitro-L- arginine (received per os 50 mg / kg / day during 8 weeks) causes a persistent increase in blood pressure, reaching values of hypertension III degree (table 1) .We investigated vasomotor function of cerebral vessels in rats by changing of diameter of the middle cerebral artery via assessment of magnetic resonance imaging before and after administration of vasodilators (acetylcholine and nitroglycerin) and vasoconstrictor (N- monomethyl -L-arginine and norepinephrine). The quantity of vasomotor responses calculated according to the formula: vasomotor response = (d2 - d1 / d1) × 100 %, where d1 - original diameter of artery, d2 - diameter of the artery after the test. Variation of diameter of middle cerebral artery less than 10 % after test considered as pathological vasomotor reaction.

Results: Contravention of vasomotor function of cerebral vessels estimated in experimental hypertension. Injection of acetylcholine and nitroglycerin caused a small increasing of diameter of middle cerebral artery, which indicates a lack of vasodilation (table 1). Injection of N- monomethyl -L-arginine and norepinephrine induced unequal vasoconstriction of cerebral vessels (table 1).

Index	The control group	The experimental group
Systolic blood pressure	123,9±9,9	182,13±13,4*
Diastolic blood pressure	76,8±5,6	111,9±4,4*
EDVD, % (Injection of acetylcholine)	+ 11,89±0,98	+ 6,87±0,88*
EUDVD % (Injection of nitroglycerin)	+ 17,84±1,25	+ 7,93±0,53*
EDVC, % (Injection of N- monomethyl -L-arginine)	- 7,9 ±0,14	- 1,58±0,15*
EUDVC, % (Injection of norepinephrine)	- 5,4 ±0,12	- 3,17±0,12*

Conclusions: Simulation by hypertension induced by L-NAME NO deficiency causes a persistent increasing in blood pressure in rat and, consequently , impaired endothelial vasomotor function of cerebral vessels connected with insufficiency of vasodilator part of regulation.

PP.05.14 ALBUMINURIA BREAKTHROUGH IS ASSOCIATED WITH AN ENHANCEMENT OF OXIDATIVE STRESS IN HYPERTENSIVE PATIENTS UNDER CHRONIC RENIN-ANGIOTENSIN SYSTEM SUPPRESSION

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Objective: We investigated whether albuminuria escape observed in hypertensive patients under chronic renin-angiotensin system (RAS) suppression could be related to an increase in oxidative stress at systemic level.

Design and method: We studied normoalbuminuric (n=21) and de-novo albuminuric (n=20) patients in stage 2 chronic kidney disease (CKD) arriving to our hospital-based Hypertension Unit. The relationship between albuminuria breakthrough and circulating biomarkers for both oxidative damage, i.e. carbonyl and malondialdehyde (MDA), as well as anti-oxidant defense, i.e. reduced glutathione, thiol groups, uric acid, bilirubin, or catalase and superoxide scavenging activity, was assessed.

Results: We found that only patients with albuminuria escape showed an important increase in carbonyls ($P<0.001$) and MDA ($P<0.05$) compared to normoalbuminuric patients. This increase in oxidative damage was also accompanied by a rise in catalase activity ($P<0.05$) and low-molecular-weight antioxidants only when they were measured as total antioxidant capacity ($P<0.01$). In order to establish the specific oxidative status of each group new indexes of oxidative damage and antioxidant defense were calculated with all these markers following a mathematical and statistical approach. Although both prooxidant and antioxidant indexes were significantly increased in de-novo albuminuric patients, only the oxidative damage index positively correlated with the increase of albumin/creatinin ratio ($P=0.0024$).

Conclusions: We conclude that new-onset albuminuria may amplify oxidative damage in patients in early stage of CKD. These results indicate that chronic RAS protection must be directed to avoid development of new-onset albuminuria and oxidative damage.

PP.05.15 INVESTIGATION OF AGE-RELATED CHANGES ON LEFT VENTRICULAR MYOCARDIAL SYSTOLIC DEFORMATION IN SPONTANEOUSLY HYPERTENSIVE RATS

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Objective: An accurate assessment of age-related changes on left ventricular(LV) contractile properties together with LV remodling in spontaneously hypertensive rats(SHR) could provide a scientific basis for selecting appropriate time point in related research in an animal models. This study aimed to investigate myocardial multi-dimensional systolic deformation at 12 to 82 weeks of SHR using 2-dimensional strain echocardiography (2DSE) and to explore the age-related changes on left ventricular contractile properties.

Design and method: Sixty 12-week old male SHR were divided into six groups and studied at 12,16,28,45,66and 82 weeks of age respectively. Echocardiographic measurements were acquired including LV diameter, wall thickness, left atrial size and LVEF; 2DSE measurements included endsystolic LV longitudinal strain (SL) , radial strain (SR),circumferential strain (SC). Invasive LVEDP and LV±dp/dtmax were detected within 2 hours after echocardiagraphic studies.

Results: LV wall thickness increased after 28 weeks,and to the peak at 66 weeks($p<0.05$); LV diameter, LVMI and left atrial size were significantly increased from 16 to 82 weeks; Decreased LVEF was only found at 82 weeks. Myocardial strain(SC, SR, SL) began to increase from 16 weeks, and to the peak at 28 weeks ($p<0.05$), no significant difference among the groups of 28, 46 and 66 weeks($p>0.05$), lowered only at 82 weeks ($p<0.05$). LV±dp/dtmax increased from 12 weeks to 16 and 28 weeks and then decreased form 28-82weeks(all $p<0.05$). Myocardial SC,SR,SL were found correlated with LVMI positively($r=0.61\sim0.71$, all $p<0.05$) when LVMI<17.5g/m2 and negatively($r= 0.50\sim0.75$, all $p<0.05$) when LVMI>17.5g/m2.

Conclusions: Age-related changes of LV myocardial systolic deformation occurred in SHR, with increases before 28 weeks and attenuation after that, suggesting a developmental as well as compensted myocardial contractile function when LVMI increase slightly in the early stage and a hypertensive pathologic decreases in the later period.

PP.05.16 EFFECT OF SUB ACUTE HYDRATATION VARIATIONS ON CENTRAL AND BRACHIAL PULSE PRESSURE

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Objective: We aimed to evaluate the effect of extracellular volume changes induced by dietetic and pharmacological interventions on central and brachial pulse pressure.

Design and method: 74 healthy male subjects, age (median [IQR]) 23,9 [5,7] years, non-smokers, were assigned to a low sodium/high potassium diet during seven days, followed by a high sodium/low potassium diet for 14 days, the last seven with concomitant administration of amiloride. Brachial blood pressure was measured using a validated electronic device (OMRON M6, Omron Co., Kyoto, Japan) and common carotid artery pressure waveforms were recorded non-invasively by aplanation tonometry (SphymoCor®, Atcor Medical, Sydney, Australia). Measurements were taken after 10 min of rest, at baseline, at 7th, 15th and 21st days. At baseline, 6th, 14th and 20th days patients had a 24h ambulatory blood pressure measurement, using SpaceLabs 90207 monitors.

Results: Changes in diet sodium content led to significant changes in weight, sodium urinary excretion, plasma aldosterone concentrations and renin activity, reflecting extracellular volume variation. Brachial pulse pressure significantly decreased during the dehydration period, increased during the hyperhydration period and came back to normal at day 21 whereas central pulse pressure remained stable during the three periods. In a mixed model analysis, age and visits at day 7 and 21 were independent determinants of changes in brachial pulse pressure.

Conclusions: Short time in increase in extracellular volume in associated with a decrease in peripheral pulse pressure but not central pulse pressure.

PP.05.17 THE IMPACT OF MASKED AND WHITE COAT HYPERTENSION ON APELIN AND RELAXIN PLASMA LEVELS

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Objective: Recent evidence demonstrate that masked hypertension (MH) is a significant predictor of cardiovascular disease, while white-coat hypertension (WCH), a common phenomenon is associated with impaired endothelial function, increased cardiovascular risk and is considered as a prognostic marker for the future development of established hypertension. On the other hand hypoapelinemia and hyporelaxinemia may contribute to vascular damage accelerating atherogenesis.
Aim of our study was to examine apelin and relaxin plasma levels in patients with MH and compare the findings to those of patients with WCH matched for age, sex, body mass index and the rest of risk factors.

Design and method: Out off one hundred-thirty (60 M, 70 F) healthy subjects mean age 45±12 yrs underwent 24 hour ambulatory blood pressure monitoring (ABPM). According to the BP recordings 24 individuals (8M, 16 F) had MH (daytime systolic blood pressure >= 135 mmHg or daytime diastolic blood pressure >= 85 mmHg - group A) and 32 healthy subjects (20M, 12F,) had WCH Apelin and relaxin plasma levels were determined in both groups (ELISA method).

Results: Our findings and the comparisons between the two groups are shown in the table below:

	Group A (n=24)	Group B (n=32)	p
Apelin (pg/ml)	200±111	305±127	<0.01
Relaxin (pg/ml)	35,2±6,7	46.8±23.6	<0.01

Conclusions: Our finding suggest that subjects with we have significantly lower apelin and relaxin plasma levels compared to subjects with VCH. This observation may have prognostic significance for future cardiovascular events in subjects with masked hypertension and needs further investigation.

PP.05.18 HYPERTENSION AND IMMIGRANTS

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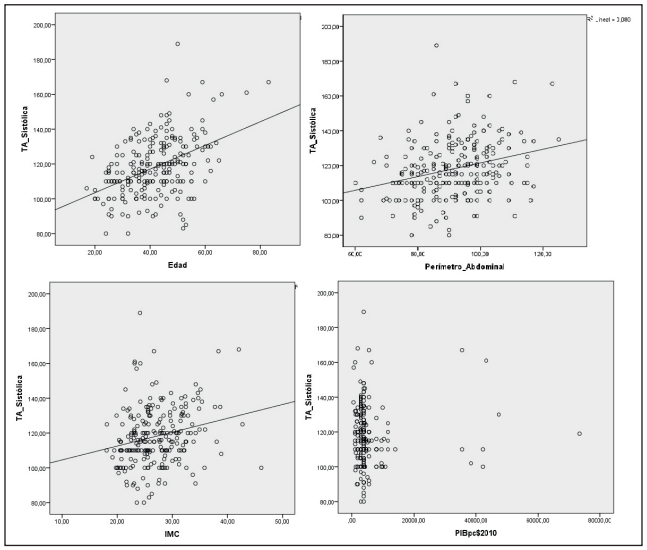
Objective: Hypertension correlates with other variables such as age, body mass index and per capita income in the country of origin.



Design and method: We conducted a descriptive observational study of a population sample of 234 patients obtained by simple random sampling from a population of 5 quotas urban health center in the period between January 15 and June 30, 2012, with a range of 95% confidence limit and a minor error at 0.05.

Results: In the statistical analysis the following results were obtained using Pearson correlation of different variables: SBP (systolic blood pressure) with BMI (body mass index) of 0.227 (p <0.01), 0.446 TAS with age (p <0.01) and TAS with PBIpc (gross domestic product per capita of the country) being -0.50 p 0.234 for this case. To DBP (diastolic blood pressure) the following results, TAD and 0.219 BMI (p <0.01) and age TAD 0.445 (P <00.1) and DBP were obtained with 0.28 PBIpc being 0.666 wt.

Conclusions: Both systolic blood pressure and diastolic blood pressure have a positive and significant correlation with increasing age and BMI as other studies have already demonstrated.
Moreover, the per capita income in the country of origin appears to be associated with increased odds tensions.

PP.05.19 SOLUBLE ADENYLYL CYCLASE IN VASCULAR ENDOTHELIUM: GENE EXPRESSION CONTROL OF ENAC-ALPHA, NA+/K+-ATPASE-ALPHA/-BETA AND THE MINERALOCORTICOID RECEPTOR

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Objective: Components of the Renin-Angiotensin-Aldosterone-System (RAAS) are expressed and regulated in vascular endothelial cells. In particular, the epithelial Na+-channel (ENaC), the mineralocorticoid receptor (MR), and the Na+/K+-ATPase have been reported to regulate endothelial stiffness in response to serum Na+. In the current work, we determined the effect of sAC inhibition on endothelial stiffness. Furthermore, we analyzed sAC-dependent CRE-mediated transcriptional activation and the effects of sAC inhibition on ENaC-α, Na+/K+-ATPase-α/-β and MR expression on mRNA and protein levels.

Design and method: We determined the contribution of sAC to transcriptional activation in vascular endothelial cells (EC) and kidney collecting duct cells. Inhibition of sAC by the specific inhibitor KH7 reduced CRE-mediated promoter activity via reduction of CREB phosphorylation. KH7 and anti-sAC siRNA decreased mRNA and protein levels of ENaC-α and Na+/K+-ATPase-α. In Chromatin Immunoprecipitation (ChIP) experiments, sAC-dependent changes of CREB-p binding at ENaC and Na+/K+-ATPase-α promoter regions were analyzed. Using atomic force microscopy (AFM), a nano-technique that measures stiffness and deformability of living cells, we detected endothelial cell softening in mice aortae after sAC inhibition.

Results: Pharmacological inhibition of sAC by KH7 significantly decreased transcriptional activity of the CRE control vector ($p<0.05$). In addition, phosphorylated CREB was significantly reduced after KH7 treatment ($p<0.05$), whereas unphosphorylated CREB remained unaffected. Inhibition of sAC by KH7 and siRNA reduced expression of ENaC-α, Na+/K+-ATPase-α1/β1 and sAC (all p values <=0.011). Additionally, sAC inhibition by siRNA decreased ENaC-α and Na+/K+-ATPase-α protein levels (all p values <=0.05). ChIP experiments in ECs revealed binding of CREB-p to ENaC-α and Na+/K+-ATPase-α promoters under basic conditions which was prevented by sAC inhibition. AFM measurements revealed that KH7-treated mouse aorta ECs were significantly softer than untreated cells and aldosterone-induced stiffening of mouse aorta ECs was prevented by sAC inhibition (all p-values<0.05).

Conclusions: Selective sAC inhibition prevents aldosterone-induced endothelial stiffening. The underlying mechanism involves gene expression regulation of ENaC-α and Na+/K+-ATPase-α1 and -β1. Additional studies are warranted to investigate the protective action of sAC inhibitors in humans for potential clinical use.

PP.05.20 EFFECT OF IRON RESTRICTION ON MONOCROTALINE-INDUCED PULMONARY VASCULAR REMODELING IN RATS

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Objective: Pulmonary hypertension (PH) is characterized by pulmonary vascular remodeling leading to right ventricular (RV) failure. Recently, iron deficiency is reported to be prevalent in patients with PH. However, the mechanism by which iron deficiency occurs in patients with PH remains unknown. Here, we investigate the effects of dietary iron restriction on the development of monocrotaline-induced pulmonary vascular remodeling and the involved mechanisms.

Design and method: Male Sprague-Dawley rats were subcutaneously injected with monocrotaline (60 mg/kg). Afterwards, monocrotaline-injected rats were randomly divided into two groups and were given a normal diet (n=6) or an iron-restricted diet (n=6) for 4 weeks. Saline-injected rats given a normal diet were served as controls (n=6).

Results: Monocrotaline-injected rats showed pulmonary vascular remodeling, increased RV pressure, RV hypertrophy, and decreased RV ejection fraction, followed by RV failure after 4 weeks. In contrast, iron restriction attenuated the development of pulmonary vascular remodeling and RV failure. Of interest, expression of cellular iron transport protein, transferrin receptor 1 was increased in the pulmonary remodeled artery and the failing right ventricle of monocrotaline-injected rats, as compared with the controls. Moreover, a key regulator of iron homeostasis, hepcidin gene expression was increased in the failing right ventricle of monocrotaline-injected rats.

Conclusions: Iron restriction attenuated the development of monocrotaline-induced pulmonary vascular remodeling and RV failure. Cellular iron transport might be involved in the pathophysiology of PH and PH induced RV failure.

PP.05.21 PRENATAL CORTISOL EXPOSURE AFFECTS THE BLOOD PRESSURE IN LATER LIFE

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Objective: It is known that the prenatal stress is a risk factor for the metabolic disease and emotional disorders. This change is permanent and induced by epigenomic changes. The aim of this study is to investigate whether fetal stress would affect the blood pressure control in the central nervous system.

Design and method: We injected dexamethasone (200mg/kg/d, Dex group) or saline (Control group) intraperitoneally to pregnant Sprague-Dawley rat (from F15 to F20).

Results: The body weight of Dex group (14.8±0.5 g) at the 7 post-natal day (P7) is lower than Control group (15.2±0.4 g , $p<0.05$), whereas it is much higher at the 12 weeks (Dex:552.5±3.9 g, C: 393.8±9.4, $p< 0.001$)
To investigate whether the blood pressure is elevated in the Dex group, we measured blood pressure using telemetry system or direct measurement via carotid artery with normal, 8% salt (HS), and 0.05% salt (LS) diet loading at the 12 weeks. Blood pressure is elevated after salt loading in Dex group (Dex_HS 159.5±3.4mmHg, Dex_NS group:142.8±1.9mmHg, $p<0.05$). Next we evaluated urine catecholamine, which was suppressed by salt loading, and its degree was weaker in the Dex group than Control group. Importantly this phenomenon is one of the causes of salt sensitivity.
To examine whether DNA methylation status is affected by dex, we evaluated the mRNA expressions of methylation enzyme (DNMT1, DNMT3a, 3b) in hypothalamus and DNMT3a and 3b were downregulated in the Dex group. Further, we injected demethylating agent, 5-Aza-2'-deoxycitydine intraventricularly to the male SD rats, measured the blood pressure loading HS and LS by telemetry system. Importantly DNA demethylation in the CNS induced salt sensitive hypertention.
We hypothesized that renin-angiotensin system and ROS would be affected by metylation enzyme. However, mRNA expressions of the AT1a, AT1b, NR3C1 and NR3C2 were not different between Control and Dex group, nor NOX2 or NOX4, NADPH oxidase component, though the mRNA change by salt loading were different between groups.

Conclusions: The DNA methylation state in the hypothalamus changed with the stress exposure in an embryo and a possibility that it had contributed to salt susceptibility high blood pressure was suggested.

PP.05.22 OSTEOGENIC FACTORS, OSTEOPROTEGERIN AND FETUIN-A ARE NEW PLAYERS IN VASCULAR DAMAGE ASSOCIATED WITH HYPERTENSION

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Objective: Osteoprotegerin (OPG) and fetuin-A (FetA) are inhibitors of vascular calcification, while at the same time they are associated with cardiovascular risk in cardiovascular diseases. The direct vascular effects of OPG and FetA remain unclear. Here we postulated that in hypertension increased levels of osteogenic factors may promote vascular injury.

Design and method: Aortic tissue and vascular smooth muscle cells (VSMCs) from WKY and SHRSP (16-18 weeks) rats were studied. VSMCs were stimulated with recombinant OPG and FetA (25 – 500ng) from 1 to 30 minutes. Vascular calcification was assessed by Von Kossa staining. OPG, TRAIL, FetA expression, as well as JNK, p38 and ERK1/2 activation were assessed by immmunoblotting. ROS generation was studied by chemiluminescence.

Results: Aorta from SHRSP, but not WKY, exhibited positive Von Kossa staining. Levels of osterix (86%), OPG (20%), and TRAIL (28%) were increased in VSMCs from SHRSP rats. OPG stimulation of VSMCs from WKY and SHRSP induced ROS generation (100ng/5min: WKY – 40% increase; SHRSP – 75% increase, $p<0.05$ vs vehicle); an effect blocked by c-Src inhibitor PP2 and Nox4/1 inihibitor (GKT137831) but not Nox1 inhibitor (ML171). FetA stimulation also induced ROS generation in VSMCs from WKY and SHRSP rats (50ng/5min: WKY – 50% increase; SHRSP – 50% increase, $p<0.05$ vs vehicle), which was blocked by PP2 and Nox1 inhibitors (GKT137831 and ML171). JNK (75% WKY; SHRSP 200%), p38 (110% WKY; 100% SHRSP) and ERK1/2 (100% WKY; 100% SHRSP) were activated by OPG 50ng ($p<0.05$). FetA only increased ERK1/2 (50%) in VSMCs from WKY and; in SHRSP, increased ERK1/2 and p38 by 75% and 50% respectively ($p<0.05$). In addition, OPG (75%) and FetA (40%) levels were increased in LinA3 mice, a mouse model which has chronically elevated Ang II levels. Ang II (10-7mol/L) stimulation of VSMCs from WKY rats induced an increase of OPG levels.

Conclusions: These data suggest that in hypertension, OPG and FetA may influence vascular damage through redox-sensitive signalling. Identification of vascular calcification-derived osteogenic factors as modulators of VSMCs biology provides new insights into molecular mechanisms of vascular injury in hypertension.

PP.05.23 DIFFERENCES IN NITRIC OXIDE SYNTHASE ACTIVITY DOES NOT AFFECT BLOOD PRESSURE IN RATS WITH METABOLIC SYNDROME

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Objective: The aim of this study was to determine nitric oxide synthase activity (NOS) in the peripheral organs and in the parts of central nervous system of young and adult rats with metabolic syndrome (MS) represented by obese, spontaneously hypertensive rats [SHR/ND mcr-cp (cp/cp)].

Design and method: Animals were divided into four groups: male young 8-9-week-old and adult 14-15 week-old MS rats and control, normotensive, age-matched Wistar Kyoto rats (WKY). Blood pressure was measured by tail-cuff plethysmography. NOS activity was determined by measuring the formation of L-[3H] citrulline from L-[3H] arginine in the peripheral organs (aorta, heart, kidney) and brain parts (cerebellum, brain cortex and brain steam).

Results: Blood pressure of young WKY rats was 120±4 mmHg and did not change within six weeks. Interestingly, NOS activity of adult WKY in the peripheral organs increased significantly in comparison with young WKY, while it was not changed in the brain parts investigated. On the other hand, NOS activity of adult MS rats decreased significantly in both peripheral organs and brain regions in comparison with young MS rats. This decrease, however, did not affect blood pressure of adult MS rats. There were no changes in NOS activity of young MS rats and age-matched WKY except of the aorta. NOS activity in this respective tissue was higher in young MS rats. Since both blood pressure and NOS activity of brain parts in young and adult WKY did not changed we hypothetised that nitric oxide produced in the brain may be responsible predominantly for blood pressure maintenence in WKY. In MS rats, however, despite decreased NOS activity in the brain, blood pressure remained on the level of young animals.

Conclusions: In conclusion, our results indicate that other mechanisms than NO/cGMP pathway may be responsible for blood pressure maintenance in rats with metabolic syndrome.

PP.05.24 HETEROZYGOUS DISRUPTION OF ACTIVIN RECEPTOR-LIKE KINASE 1 IS ASSOCIATED WITH INCREASED ARTERIAL PRESSURE

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Objective: The Activin receptor-like kinase-1 (ALK-1) is a type I cell surface receptor for the TGF-β family of proteins. Hypertension, a predominant risk factor for stroke, coronary heart disease or chronic kidney disease, is related to the ALK-1 ligand TGF-β1 as increased TGF-β1 expression correlate with an elevation in arterial pressure (AP) and TGF-β expression and signalling is also up-regulated by the renin-angiotensin-aldosterone system. Thus the purpose of this study has been to assess the role of ALK-1 in regulating AP using a mice model of ALK-1 haploinsufficient (ALK-1+/-), as ALK-1 KO mice are not viable (Oh P et al. Proc Natl Acad Sci U S A. 2000;97:2626-31).

Design and method: AP and heart rate were measured by the tail cuff method and by radiotelemetry. Locomotor activity was also measured by telemetry. Transthoracic echocardiography was performed using a) cardiac ultrasound machine equipped with a 10-14-MHz transducer. Telemetric electrocardiogram (ECG) were performed using an implantable telemetry system.

Results: Systolic or diastolic AP measured either by tail-cuff or by telemetry showed higher values in ALK-1+/- than in ALK-1+/+ mice with no significant differences in heart rate. All functional and structural parameters, either directly measured by echocardiography or calculated, were similar in both groups of animals. Electrocardiographic analysis revealed no apparent abnormalities in control or ALK-1+/- mice. ALK-1+/- mice shows alterations in arterial pressure

circadian rhythm: the lower arterial pressures in ALK-1+/+ mice were observed during the light period (from 10 am to 8 pm) whereas ALK-1+/- mice maintain higher arterial pressure than ALK-1+/+ mice during most of the light period. ALK-1+/- mice show neither alterations in the nitric oxide -cGMP vasodilator system nor in the peripheral renin-angiotensin system. ALK-1+/- mice shows sympathetic nervous system overactivation characterized by and increased hypotensive response to the β-adrenergic antagonist atenolol and increased plasma levels of epinephrine and norepinephrine.

Conclusions: These data suggest that high AP shown by ALK-1+/- mice is explained mainly by the sympathetic overactivation shown by these animals, and that the ALK-1 receptor for TGF-β and BMPs is involved in the control of arterial pressure.

PP.05.25 RENOPROTECTIVE EFFECT OF VASOPRESSIN V2 RECEPTOR ANTAGONIST TOLVAPTAN IN DAHL RATS WITH END-STAGE HEART FAILURE

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Objective: Tolvaptan is the highly selective and orally effective arginine vasopressin V2 receptor antagonists, and is potentially useful for treatment of heart failure (HF) patients. However, the renoprotective effect of long-term tolvaptan therapy and its underlying mechanisms remain unknown. We evaluate the effects of chronic treatment with tolvaptan on renal dysfunction, podocyte injury, inflammation, and oxidative stress, Rho-kinase, epithelial-mesenchymal transition (EMT), and extracelluar signal-regulated protein kinase (ERK1/2) pathway in the renal cortex of Dahl salt-sensitive hypertensive (DS) rats with end-stage severe HF.

Design and method: DS and Dahl salt-resistant rats were fed a high-salt diet at 6 weeks of age. DS rats were treated with vehicle and tolvaptan (0.05% concentration in diet) from the age of 11 to 18 weeks.

Results: Vehicle-treated DS rats developed proteinuria, renal dysfunction, glomerulosclerosis, and interstitial fibrosis, which were ameliorated by tolvaptan without changing blood pressure. Decreased expression of nephrin and podocin and increased desmin-positive area in failing rats were restored by tolvaptan. Upregulation of NAD(P)H oxidase p22phox, p47phox, and gp91phox, EMT marker such as transforming growth factor-β1, vimentin, and fibronectin expression, and Rho-kinase and ERK1/2 phosphorylation in DS rats was significantly suppressed by tolvaptan. Tolvaptan administration resulted in significant inhibition in tumor necrosis factor-α and monocyte chemoattractant protein-1 expression, and nuclear factor-κB phosphorylation.

Conclusions: We concluded that long-term tolvaptan therapy may improve renal dysfunction, glomerulosclerosis, podocyte injury, and inflammation associated with oxidative stress, EMT, ERK, and Rho-kinase pathway in failing heart of DS rats. Thus, tolvaptan may be a therapeutic strategy for end-stage severe HF.

PP.05.26 RENOPROTECTIVE MECHANISMS OF TELMISARTAN ON RENAL INJURY AND INFLAMMATION IN SHRSP.Z-LEPRFA/IZMDMCR RATS

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Objective: SHRSP.Z-Leprfa/IzmDmcr (SHRSP fatty) rats create a new animal model of metabolic syndrome. However, the renoprotective effect of telmisartan therapy and its underlying mechanisms in SHRSP fatty rats remain unknown. We evaluate the effects of long-term telmisartan therapy on renal dysfunction, podocyte injury, inflammation, and transforming growth factor-β1 (TGF-β1)/Smad, epithelial-mesenchymal transition (EMT), mitogen-activated protein kinase (MAPK), Rho-kinase, and cell-cycle progression pathway in the renal cortex of SHRSP fatty rats.

Design and method: Seven-week-old male SHRSP fatty rats were treated with vehicle, telmisartan, and hydralazine for 8 weeks. Age-matched male Wistar-Kyoto/Izumo rats served as a control group.

Results: Vehicle-treated SHRSP fatty rats developed proteinuria and renal dysfunction, which in the telmisartan group was less than the vehicle and hydralazine group without changing blood pressure. Glomerulosclerosis and interstitial fibrosis were impaired in SHRSP fatty rats, and these renal damage in the telmisartan group was less than the vehicle and hydralazine group. Decreased expression of nephrin and podocin and increased desmin-positive area in SHRSP fatty rats were restored by telmisartan but not hydralazine. TGF-β1/Smad, EMT marker, MAPK, Rho-kinase, and cell-cycle progression pathways were upregulated in SHRSP fatty rats, and these increased proteins in the telmisartan group were less than the vehicle and hydralazine group. Telmisartan administration resulted in significant suppression in tumor necrosis factor-α expression and nuclear factor-κB phosphorylation.

Conclusions: Long-term telmisartan therapy may improve renal dysfunction, glomerulosclerosis, podocyte injury, and inflammation associated with EMT, TGF-β/Smad, MAPK, Rho-kinase pathway in SHRSP fatty rats. Thus, telmisartan may have significant therapeutic potential for metabolic syndrome.

PP.05.27 ACTIVATION OF NUCLEAR FACTOR-KAPPA B UPREGULATES ENOS IN CENTRAL NERVOUS SYSTEM

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Objective: Several studies have suggested the different nuclear factor NF-kappaB (NFkB) activation by nitric oxide (NO) in central nervous system (CNS) and cardiovascular system (CVS).

Design and method: The aim of our study was to determine NO and NF-kB generation at the level of CNS as well as CVS in normotensive and hypertensive rats. Male 9-week-old rats were divided into two groups: control Wistar Kyoto rats (WKY) and spontaneously hypertensive rats (SHR).
In our study was blood pressure measured by tail-cuff plethysmography. NO synthase activity was determined by measuring the formation of L-[3H] citrulline from L-[3H] arginine in the aorta, heart, cerebellum, brain cortex and brain stem. Protein expressions of endothelial NOS (eNOS), neuronal NOS (nNOS) and NF-kB were determined by Western blot analysis in the same tissues.

Results: Blood pressure was increased by 55% in SHR in comparison with age-matched control Wistar Kyoto rats. NOS activity was decreased significantly in the aorta and there was a decreased tendency in the heart. On the other hand, NOS activity in CNS was increased in the brain cortex and brain stem. While the expression of eNOS and NFkB was not changed in CVS, the expression of eNOS and NFkB was enhanced in CNS of SHR in comparison with normotensive WKY rats. No changes in nNOS expression were determined either in CVS or CNS.

Conclusions: This study indicates that increased NFkB expression as well as activation may upregulate eNOS leading to increased NOS activity and NO generation in the brain. Increased generation of NO seems to be however insufficient to counterbalance increasing blood pressure in SHR.

PP.05.28 COMPARISON OF METABOLIC PARAMETERS WITH HYPERTENSION. DETERMINATION AIDS

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Objective: Comparison of simple metabolic parameters with blood pressure values are shown. Determination aids prognosis and avoids interpretation artefacts. The special role of lactate tests in the development of stress and hypertension is discussed.

Design and method: Out of 100 microliters of capillary blood of 25 officer trainees of the Theresian Military Academy of Wiener Neustadt in Austria, pH, pCO2 and lactate were determined by a NOVA Biomedical Phox-M device before and after a moderate run of 2400 m in standardized 11.5 minutes. Additionally, blood pressure values were measured under exercise.

Results: A significant negative correlation ($p < 0.05$) between systolic blood pressure values before the run and pCO2 after the run suggests that breathing frequency during moderate sports linearly depends upon basal systolc blood pressure values.
However, correlation between pH and pCO2, both after the run shows that exactly those participiants, who exclusively form the upper left end of the (systolic blood pressure values before/pCO2 after exercise) correlation, exhibit extremely low pH and pCO2 values along with very high lactate levels after the run, untypical for the majority of the group.
Removal of those outliners has a dovetailing effect: the significance of the (systolic blood pressure before/pCO2 after run) correlation fades away and the pH/pCO2 correlation after the run suddenly turns negatively significant ($p < 0.01$), typical for the reaction to a moderate workload.
This means that uncontrolled acceptance of even unobtrusively increased systolic blood pressur values in a group can easily lead to wrong conclusions and artefacts of interpretation of data, unless additional metabolic parameters like pCO2 or even lactate are introduced.
Disproportional lactate increases after the run are totally unpredictable by metabolic values before the run. Only their systolic blood pressure values are among

the highest values before the run. Accordingly, if any oversensitive reactions of participants to a moderate run should take place, the persons are to be found among those with the highest systolic blood pressure values before exercise.

Conclusions: The data presented here indicate that a sizeable increase of knowledge and safety of interpretation can thus be gained by a lactate test.

PP.05.29 ANTIHYPERLIPIDEMIC EFFECT OF MELOTHRIA MADERASPATANA LEAF EXTRACTS ON DOCA-SALT INDUCED HYPERTENSIVE RATS

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Objective: To investigate the antihyperlipidemic effect of crude ethanolic extract of Melothria maderaspatana (M. maderaspatana) leaf (CEEM) on deoxycorticosterone acetate (DOCA)-salt hypertensive rats.

Design and method: A midscapular incision was made on each rat and the left kidney was excised after ligation of the renal artery. The surgical wound was closed using an absorbable suture. After one week recovery period, hypertension was induced by subcutaneous injection of DOCA-salt solution, twice a week, and the rats received a 1% sodium chloride solution as drinking water throughout the experimental period. CEEM or nifedipine was administered orally once a day for 6 weeks.

Results: In DOCA-salt hypertensive rats, the level of plasma and tissues of total cholesterol (TC), triglycerides (TG), free fatty acids (FFA) and phospholipids (PL) significantly increased and administration of CEEM significantly reduced these parameters towards normality. Further, the levels of low density lipoprotein-cholesterol (LDL-C) and very low density lipoprotein-cholesterol (VLDL-C) significantly increased while high density lipoproteincholesterol (HDL-C) decreased in hypertensive rats and administration of CEEM brought these parameters to normality which proved their antihyperlipidemic action. Histopathology of liver, kidney and heart on DOCA-salt induced rats treated with CEEM showed reduced the damages towards normal histology.

Conclusions: These findings provided evidence that CEEM was found to be protecting the liver, kidney and heart against DOCA-salt administration and the protective effect could attribute to its antihyperlipidemic activities.

PP.05.30 FRACTAL ANALYSIS OF THE VARIATIONS IN ARTERIAL PRESSURE, HEART RATE, AND LOCOMOTOR ACTIVITY IN CONGENIC RATS

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Objective: Congenic rats (SHRSPwch1.0) were derived from stroke-prone SHR/Izumo (SHRSP/Izm) and Wistar-Kyoto/Izumo (WKY/Izm) rats. We found that the SHRSPwch1.0 rats exhibited lower systolic arterial pressure (SAP) and heart rate (HR) values than the SHRSP/Izm rats. However, the SHRSPwch1.0 rats displayed markedly higher locomotor activity (ACT) than the SHRSP/Izm rats. The purpose of this study was to investigate the degree of long-range (>24 hours) fractal variability in the fluctuations in SAP, HR, and ACT seen in SHRSPwch1.0 rats.

Design and method: We used ten male mature SHRSPwch1.0 rats and ten male age-matched SHRSP/Izm rats as controls. The rats' SAP, HR, and ACT were monitored using radiotelemetry, and the variations in these parameters were subjected to the fast Fourier transformation for spectral analysis and detrended fluctuation analysis (DFA) to assess the parameters' long-range correlations.

Results: The SHRSPwch1.0 rats displayed lower SAP (194±7 vs. 229±7mmHg, P=0.0098) and HR (310±24 vs. 381±16 beats/min, P=0.0001) values than the SHRSP/Izm rats. The ACT counts of the SHRSPwch1.0 rats were higher than those of the SHRSP/Izm rats (62±47 vs. 26±26 counts/10sec, P<0.001). The frequencies of the variations in SAP, HR, and ACT all exhibited gradients of 1/f β in both rat strains. Spectral analysis revealed that the SAP and HR β values of the SHRSPwch1.0 rats were lower than those of the SHRSP/Izm rats (mean ± SD; SAP, 0.9715±0.0517 vs. 1.3091±0.0494; HR, 0.8105±0.0525 vs.1.0904±0.0587; both P<0.0002). However, the β value for ACT did not differ between the SHRSPwch1.0 and SHRSP/Izm rats. DFA analysis revealed that the α values for SAP, HR, and ACT ranged from 0.5-1.0 in both rat strains. However, the SHRSPwch1.0 rats demonstrated a markedly lower ACT α2 value than the SHRSP/Izm rats (0.2569±0.1354 vs. 0.8180±0.1116, P=0.0040).

Conclusions: Therefore, the variations in the SAP and HR of SHRSPwch1.0 rats are less fractal than those seen in SHRSP/Izm rats, and the ACT variations of SHRSPwch1.0 rats do not exhibit any long-range correlations.

PP.05.31 HYPOTENSIVE MECHANISM OF TELMISARTAN IN HIGH SALT-LOADING HUMAN RENIN AND ANGIOTENSINOGEN TRANSGENIC MICE

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Objective: Hypertension is associated with an increase in sympathetic nerve activity. It is well known that excessive salt intake and/or activation of renin-angiotensin system (RAS) increases blood pressure partially via an increase in sympathetic nerve activity. Although high salt intake reduces circulating level of RAS, local tissue RAS is still activated. For example, it is reported that high salt intake increases angiotensin II in kidney and plasma. Here, we investigated the effect of salt loading on RAS activated mice and the preventive effect of telmisartan in these mice.

Design and method: Tsukuba hypertensive (TH: hRN/hANG-Tg) mice generated by cross-mating of human renin (hRN) and human angiotensinogen (hANG) transgenic mice were used in this study. Ten-week-old male TH mice were administrated control chow or 8% NaCl chow with or without 1 mg/kg/day telmisartan in drinking water for 8 weeks. Blood pressure was assessed by radio telemetry method. Urine samples were obtained before and 2, 4 and 8 weeks after salt-loading. Concentration of urine adrenalin and noradrenalin 8 weeks after treatment was measured by ELISA method.

Results: Body weight did not differ in all groups. Survival rate 8 weeks after treatment was decreased in salt-loading TH mice. This decrease was improved by treatment with telmisartan. Blood pressure in salt loading TH mice was significantly higher compared with control TH mice. Treatment with telmisartan in salt-loading TH mice significantly decreased blood pressure. Urinary sodium concentration was increased in salt-loading TH mice compared with control TH mice. Treatment with telmisartan in salt loading TH mice increased urinary sodium concentration compared with salt loading TH mice. Concentration of urinary adrenalin and noradrenalin were increased in salt-loading TH mice compared with control TH mice. This increase was attenuated by treatment with telmisartan.

Conclusions: These results suggested that salt-loading enhanced an increase in blood pressure and mortality in TH mice. Treatment with telmisartan increased survival rate through decrease in blood pressure, enhancement of natriuresis and attenuation of sympathicotonia.

PP.05.32 HYPOTENSIVE EFFECT OF CEREBELLAR ADRENOMEDULLIN

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Objective: Adrenomedullin (AM) is a 52-amino acid peptide which has important functions in cardiovascular regulation. In effect, peripherally administration of AM causes a marked decrease in blood pressure (BP). AM has two specific receptors formed by the calcitonin-receptor-like receptor (CLRL) and receptor activity-modifying protein (RAMP) 2 or 3. These are known as AM1 and AM2 receptors, respectively. In addition, AM has appreciable affinity for the calcitonin gene-1 related peptide receptor (CGRP1), composed of CRLR and RAMP1. In brain, AM and their receptors are located in localized areas, including cerebellum. Autoradiography and quantitative densitometry showed an increase in the AM density binding sites in the cerebellum during hypertension, suggesting a role of cerebellar adrenomedullinergic system in blood pressure control. Thus the objective was to assess the functional role of in vivo of cerebellar AM by in situ microinjection of AM in the cerebellar vermis.

Design and method: For this purpose, adult male spontaneously hypertensive rats (SHR) and control Wistar Kyoto (WKY) were used. The animals were anesthetized and cannulated in the cerebellar vermis. After recovery, animals were divided into three groups: AM (0.02 to 200 pmol/5µL), ANG II (200 pmol/5µL) and vehicle. Baseline blood pressure and after the treatments were determined by non invasive plethysmography. Cannulation was verified post-mortem with in situ microinjection of a dye solution.

Results: Our results demonstrate that microinjection of AM into the cerebellar vermis caused a profound dose dependent hypotensive response in SHR, but not in normotensive WKY rats (N=17, $p<0.05$). The hypotensive effect was specific, since in situ microinjection of vehicle or angiotensin II did not cause significant changes in BP.

Conclusions: Our findings suggest that cerebellar AM plays an important role in the regulation of BP and they constitute a novel mechanism of BP control which has not been described so far.

PP.05.33 LOSARTAN METABOLITE EXP3179 NORMALIZES CARDIAC HYPERTROPHY IN L-NAME INDUCED HYPERTENSION

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Objective: Cardiac hypertrophy is an independent marker of mortality in hypertension. Losartan, an angiotensin II type 1 receptor antagonist, is able to attenuate cardiac hypertrophy associated to hypertension. Two active metabolites of the angiotensin type 1 receptor blocker losartan have been described previously, EXP3174 and EXP3179. Whereas EXP3174 is the main antihypertensive AT1 receptor-blocking metabolite, the role of EXP3179 is widely unknown. We investigated the effects of metabolites EXP3174 and EXP3179 on cardiac hypertrophy in L-NAME induced hypertension.

Design and method: The study was carried out in six groups of 10-week-old Wistar rats. Three groups were treated with vehicle, with EXP3179 (5 mg/kg/day), or with EXP3174 (5 mg/kg/day). The other 3 groups were exposed to L-NAME (30 mg/kg/day) and treated with vehicle, with EXP3179 (5 mg/kg/day), or with EXP3174 (5 mg/kg/day). During the period of treatment (10 weeks), systolic blood pressure and cardiac morphology and function was recorded by telemetry and echocardiography, respectively.

Results: The group of L-NAME rats developed hypertension and concentric cardiac hypertrophy, characterized by increased left ventricular mass index and relative wall thickness. The group of EXP3174-treated L-NAME rats was normotensive, although the EXP3174 did not prevent the concentric cardiac hypertrophy. The group of EXP3179-treated L-NAME rats developed also hypertension, although the EXP3179 was able to prevent the concentric cardiac hypertrophy. In addition, the higher expression of atrial natriuretic peptide in the heart of L-NAME rats was only prevented in the group of rats treated with EXP3179.

Conclusions: Thus, EXP3179 is able to prevent cardiac hypertrophy in the experimental hypertension associated with a chronic depletion of nitric oxide levels. It is proposed that the pleiotropism of the EXP3179 metabolite may confer to losartan specific capacities in the treatment of cardiac hypertrophy in arterial hypertension.

PP.05.34 PHYSICAL TRAINING ASSOCIATED WITH THE CHRONIC CHOLINERGIC STIMULATION IN HYPERTENSIVE RATS. EFFECTS ON ARTERIAL PRESSURE AND CARDIOVASCULAR AUTONOMIC CONTROL

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Objective: To study and compare the effects of aerobic physical training associated with the chronic cholinergic stimulation on autonomic and cardiovascular hemodynamic parameters in Spontaneously Hypertensive Rats (SHR).

Design and method: 96 rats (20 weeks) were divided into 4 groups: sedentary SHR (SED-H2O); sedentary SHR treated with pyridostigmine bromide (20mg/kg) (SED-PYR); SHR submitted to physical training by swimming (TRE-H2O); and SHR trained and treated with pyridostigmine bromide (TRE-PYR). The swimming occurred for 10 weeks, and the chronic cholinergic stimulation for 2 weeks with pyridostigmine bromide.
Polyethylene cannulae were inserted into the left femoral vein and artery of the animals in the end of the treatments, and, in this way, were analyzed using different approaches: 1) pharmacological evaluation of autonomic tonus 2) analysis of heart rate (HRV) and systolic arterial pressure variability (SAP); 3) spontaneous baroreflex sensitivity (BRS).

Results: SED-PYR group had a reduction of heart rate (HR) and mean arterial pressure (MAP) compared to SED-H2O group (322±6 vs. 355±4 bpm; 138±3 vs. 151±3 mmHg). In turn, TRE-H2O and TRE-PYR groups also had reduced HR and MAP (324±6 and 297±6 bpm; 140±4 and 130±5 mmHg, respectively) associated with a reduction in the intrinsic HR (325±6 and 322±5 vs. 340±3 bpm). Considering the autonomic parameters, the SED-PYR group presented an increased vagal tone and a reduction in variability of low-frequency oscillations in SAP. The group TRE-H2O presented similar autonomic responses to those in SED-PYR group, but also lower LF oscillations and an increase in high-frequency oscillations of HRV compared to the SED-H2O. Pyridostigmine bromide treatment in trained animals (TRE-PYR) showed higher prevalence of vagal tone in determining basal HR compared to other groups. However, it also presented higher LF oscillations and reduced HF oscillations of HRV. Additionally, baroreflex sensitivity did not differ between groups.

Conclusions: As observed with physical training, chronic cholinergic stimulation with pyridostigmine bromide reduced the MAP and improved some parameters of cardiovascular autonomic control. However, the association of both did not intensify the effects observed. Thus, further studies should be conducted to investigate the possible physiological mechanisms involved.

PP.05.35 EFFECTS OF DIFFERENT ANTIHYPERTENSIVE PHARMACOLOGICAL TREATMENTS ON THE CARDIOVASCULAR AUTONOMIC CONTROL EVALUATED BY DIFFERENT EXPERIMENTAL APPROACHES IN ANIMAL MODEL

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Objective: To study and compare the effects of different antihypertensive pharmacological treatments on the cardiovascular autonomic control in spontaneously hypertensive rats (SHR).

Design and method: Eighteen-week-old SHRs (N=36) were divided into different groups: control group (vehicle) and five groups treated for 10 weeks with the following antihypertensive drugs: Enalapril (ENL), Losartan (LOS), Hydrochlorothiazide (HCTZ), Propranolol (PRO) and Amlodipine (AML). The animals received daily doses of drugs diluted in drinking water. In the last week of treatment, polyethylene cannulae were inserted into the left femoral vein and artery for drug administration and measurement of heart rate and blood pressure, respectively. The animals were analyzed using different approaches: 1) pharmacological evaluation of autonomic tonus 2) analysis of heart rate (HRV) and systolic arterial pressure variability (SAPV); 3) spontaneous baroreflex sensitivity (BRS). For statistical analysis, Sigma-Stat® software was used.

Results: When compared to the vehicle group, all groups had reduced systolic blood pressure, however, only the ENL and LOS groups had significant reductions in diastolic blood pressure. In addition, the PRO group showed reduced basal HR (373 bpm+13 x 421+42 bpm), and the ENL group presented reduced intrinsic pacemaker HR (308 bpm+26 x 343+30 bpm).
The vehicle group showed sympathetic dominance in determining the basal HR, in contrast, the PRO group showed vagal dominance in determining the baseline HR when compared to the ENL, HCTZ and AML groups, considering that for these animals the chronotropic response after the administration of propranolol was significantly lower, when compared to the response obtained after the administration of methylatropine.
For HRV, the pharmacologically treated group showed no significant difference in the values of low frequency band and higher power in high frequency band, compared to the vehicle group. The analysis of systolic arterial pressure variability revealed that the ENL group showed a reduction in the LF band, compared to the vehicle, LOS, PRO and HCTZ groups.

Conclusions: None of the pharmacological treatment was able to completely attenuate the adverse effects of hypertension on the autonomic parameters in spontaneously hypertensive rats, however, the group treated with Enalapril showed a positive effect on the SAPV.

PP.05.36 GASTRIN AND D1 DOPAMINE RECEPTOR INTERACT TO INDUCE NATRIURESIS AND DIURESIS

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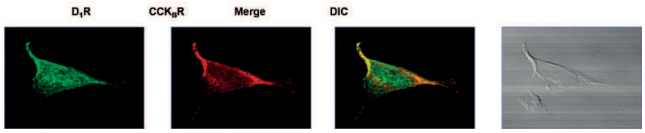
Objective: Oral NaCl intake produces stronger natriuresis and diuresis than venous infusion of same amount, indicating the existence of renal-gastric axis. Gastrin, from gastrointestinal tract, is dominant one due to its natriuretic effects and taken-up by the renal proximal tubule (RPT) cells. We hypothesize that gastrin interact with do-

pamine receptors in kidney, resulting in synergistically increased sodium excretion. The impaired interaction might be involved in hypertension.



Design and method: Wistar-Kyoto (WKY) rats, spontaneously hypertensive rats (SHR) and RPT cells were stimulated or blocked through D1-like dopamine and gastrin receptors to observe Na +-K +-ATPase activity and natriuresis.

Results: Gastrin infusing WKY rats via renal artery induced natriuresis and diuresis, which was blocked in the presence of CI988, a gastrin receptor blocker. Similarly, effect hereinbefore of fenoldopam, a D1-like receptor agonist, was blocked by D1-like receptor antagonist, SCH23390, indicating gastrin and fenoldopam play natriuretic and diuretic effect through individual receptors. Lower dosages of gastrin or fenoldopam failed to induce natriuresis and diuresis alone, while putting together induced the effects. The above-mentioned effects were lost in SHRs. Natriuresis and diuresis was partially blocked by SCH23390 or CI988, indicating the interaction between gastrin and D1-like receptor. Stimulation of either receptor increased the expression of the other and inhibited Na+-K+-ATPase activity, while the inhibitory effect of Na+-K+-ATPase activity was partially blocked through its corresponding receptors due to respective existence of SCH23390 and CI988.

Conclusions: It indicated the synergistic effect between gastrin and D1-like receptor would increase the sodium excretion in WKY rats; the impaired interaction might be involved in the pathogenesis of hypertension.

PP.05.37 OMACOR PROTECTS THE HEART OF MELATONIN-DEFICIENT SPONTANEOUSLY HYPERTENSIVE RATS (SHR) FROM MALIGNANT ARRHYTHMIAS

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Objective: Data from literature indicate that melatonin in addition to regulation of circadian rhythm exhibits antihypertensive, free radicals scavenging and antiarrhythmic effects as we have shown recently. While melatonin deficiency observed in pts suffering from CHD and hypertension as well as in SHR can contribute to disease progression and pro-arrhythmia. Continuous light suppresses melatonin production that is deleterious to the heart. We aimed to explore whether cardioprotective compound Omacor might be beneficial in these conditions.

Design and method: Males SHR and age-matched healthy Wistar rats were housed under standard 12h light/dark cycle or exposed to continuous light under 24h light/day for 6 weeks. Half of these rats received Omacor (omega-3 ethyl ester, 25g/kg diet). Left ventricular tissue was analyzed for mRNA of electrical coupling protein, connexin-43 (Cx43), proinflammatory NFkB and iNOS using real time PCR while protein expression of Cx43 and PKCε by western blots. Inducible ventricular fibrillation (VF) was examined using isolated-perfused heart.

Results: Comparing to healthy rats plasma levels of melatonin were lower in SHR. Continuous light caused mild elevation of BP in healthy rats and enhanced it in SHR and caused decrease of threshold to induce VF in both groups of rats comparing to rats under normal light cycle. Myocardial Cx43 mRNA level was not altered but Cx43 protein and its functional phosphorylated forms (which affect electrical coupling) were decreased in SHR due to continuous light and partially restored by Omacor. Treatment with Omacor also attenuated continuous light-induced increase of myocardial iNOS (which down-regulates Cx43) and proinflammatory NFkB gene expression as well as increased threshold for VF.

Conclusions: Findings indicate that continuous light-induced melatonin deficiency itself impairs myocardial Cx43 channels-mediated intercellular electrical coupling that may contribute to enhanced increased risk for malignant arrhythmias in hypertensive rats. These adverse effects can be, in part, eliminated by treatment with Omacor.

PP.05.38 PROTECTIVE EFFECT OF (-)-EPICATECHIN ON BLOOD PRESSURE, VASCULAR FUNCTION AND NITRIC OXIDE BIOAVAILABILITY IN SPONTANEOUSLY HYPERTENSIVE RATS

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Objective: This study investigated the antihypertensive effect of purified (-)-epicatechin (Epi) on blood pressure (BP) and vascular function of the femoral artery (FA) in adult (22-week) spontaneously hypertensive (SHR) rats.

Design and method: SHR males were divided into control group and Epi-treated group,Wistar-Kyoto (WKY) rats were used as a negative control (n=6 in each). Epi was administered six days in the daily dose approximately 250 mg/kg. BP was determined by tail-cuff plethysmography, nitric oxide (NO) synthase activity by conversion of [^{3}H] L-arginine in the aorta and vascular function (FA) using a wire myograph.

Results: Six-day administration of Epi reduced BP by about 13% and elevated aortic NO-synthase activity by about 173% in SHR, as compared to control ($p<0.05$). Noradrenaline-induced constriction of the FA was elevated in SHR vs. WKY and Epi partially normalized this parameter. Endothelium-dependent relaxation was evaluated using acetylcholine (ACh) test as the responses of serotonin (Ser, 1 μmol/l) pre-contracted preparations in the FA. ACh-induced relaxation of the FA was lower in SHR group than in the WKY group ($p<0.05$). Epi restored vascular function in SHR to the level observed in the WKY group. Interestingly, maximal ACh-induced endothelium-dependent relaxation of the FA was in Epi group significantly elevated compared to SHR and WKY ($p<0.05$). This improvement was associated with a significant elevation of NO-dependent component of ACh-induced relaxation. Sodium nitroprusside (SNP)-induced endothelium independent relaxation was similar in each groups.

Conclusions: In conclusion, dietary Epi reduced BP and improved vasorelaxation and NO synthase activity in genetically hypertensive rats by the increase of vascular NO bioavailability. Effect of Epi on blood pressure and vascular function indicates a promising use of Epi in nutritional or pharmacological procedures in the prevention and treatment of arterial hypertension in humans.

PP.05.39 INCREASED PROPENSITY OF HYPERTENSIVE RAT HEART TO MALIGNANT ARRHYTHMIAS IS RELATED TO LOWER OMEGA-3 INDEX

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Objective: Low ω-3 index was suggested as a risk factor for cardiovascular diseases and sudden cardiac death. We have previously shown that hypertensive rats benefit from ω-3 fatty acid (FA) intake. Aim of this study was to explore relationship between ω-3 index and susceptibility of aged male and female spontaneously hypertensive rats (SHR) to ventricular fibrillation (VF).

Design and method: One year-old SHR and age-matched healthy Wistar rats (WR) fed with ω-3FA (Vesteralens, Norway, EPA+DHA 200mg/day/2month) were compared with untreated rats. Gas chromatography was used for analysis of red blood cells (RBC) ω-3FA composition: alfa-linolenic acid, eicosapentanoic acid (EPA), docosahexanoic acid (DHA) and ω-6FA composition: linoleic acid, arachidonic acid (AA), gama-linolenic acid. ω-3 index was calculated as RBC level of EPA + DHA expressed in percentage of total FA. Susceptibility of the heart to electrically induced VF was examined using Langedorff-perfused heart preparation.

Results: RBC levels of EPA and particularly DHA were lower in SHR than WR regardless the sex. Comparing to healthy WR ω-3 index was lower in both male and female SHR, i.e. 0.73% and 0.44% versus 1.75% and 1.17%. This parameter was significantly increased due to ω-3 FA intake to 2.38% and 3.34% in male and female SHR. Moreover, treatment was associated with a decrease in AA/EPA ratio in SHR. Non-treated male and female SHR were much prone to inducible VF (100% males and 65% females) comparing to WR (65% males and 35% females) but this propensity was significantly reduced to 35% in males and 25% in females SHR due to ω-3FA intake.

Conclusions: Results suggest an inverse relationship between ω-3 night index and susceptibility of hypertensive rats to VF.
This findings support the hypothesis that lower ω-3 index might be a marker of increased propensity of the heart to malignant arrhythmias.

PP.05.40 ESTRADIOL AND HYPOXIC PULMONARY HYPERTENSION IN FEMALE GONADECTOMIZED AND MALE WISTAR RATS

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Objective: The incidence of pulmonary arterial hypertension (PAH) among women of different ages greater than that among men (Pugh, Hemnes, 2010). Gender-dependent differences in the manifestation of PAH suggest involvement of sex hormones in these processes. Animal experiments revealed that chronic administration of estradiol (E2) both male and female rats with monocrotaline- and bleomycin-induced forms of PAH reduces development of this disease (Umar et al., 2012). The aim of current research was to investigate role of estradiol in developing of hypoxic PAH (hPAH) in male and female Wistar rats.

Design and method: White male and female gonadectomized Wistar rats were used. The procedures followed the FELASA/ICLAS for use of the laboratory animals (Guide for use of the laboratory animals, National Academy Press, Washington, D.C.1996). The rats were divided into 4 experimental groups, which were injected subcutaneously during 2 weeks with: 1,2-propandion (vehicle, 200mkl/rat/day (male and female rats)); E2 (15mkg/kg/day (female gonadoectomized rats) and 75mkg/kg/day (male rats)). Then half of experimental animals were exposed to hypobaric hypoxia. Rats were housed in a hypobaric chamber at simulated altitude of 5000m, 10h a day, 2wk. The other half of experimental animals was used as normoxic control.
Right ventricular systolic pressure (RVSP) and index (RV weight/(Left ventricular+Septum weight)) was measured as indication of PAH developing.

Results: Two weeks after hypoxia exposure male rats from hypoxic control and E2 groups developed PAH (the degree of RVSP and RV index was greater in hypoxic groups versus appropriate control). RVSP in hypoxic E2 group was tended to decrease versus hypoxic non-E2 group (p=0,08). In gonadoectomize female rats, RVSP increased only in hypoxic E2 group (versus normoxic E2 group (21,6%) and hypoxic non-E2 control (18,3%)). RV index was higher in both female hypoxic groups, but hypoxic E2 rats demonstrated significant increase of RV index compare with hypoxic non-E2 control (13,0%).

Conclusions: Estradiol seems to play protective role during developing of hPAH in male Wistar rats whereas in female gonadectomized Wistar rats estradiol injection led to significant amplification of hPAH symptoms (RVSP and RV index).

PP.05.41 ZINC DEFICIENCY DURING INTRAUTERINE AND POSTNATAL GROWTH INDUCES AORTIC MORPHOLOGICAL AND FUNCTIONAL ALTERATIONS IN RATS

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Objective: Moderate zinc deficiency during intrauterine and postnatal growth induces an increase in blood pressure levels in adult males related to cardiovascular and renal disorders. To evaluate aortic morphology and function in adult male rats exposed to fetal and postnatal zinc deficiency.

Design and method: Female Wistar rats received during pregnancy up to weaning low (L:8 ppm) or control (C:30 ppm) zinc diet. After weaning, male offspring fed low (l) or control (c) zinc diet during 60 days (Cc, Ll, Lc). At day 81, we measured systolic blood pressure (SBP,mmHg, tail-cuff technique) and we evaluated the thoracic aorta morphology (Sirius red staining): artery area (Aa, mm2), media area/lumen area (Ma/La, %), collagen in tunica media (Fibrosis, arbitrary score, scale 0 to 4). In aorta we measured basal nitric oxide synthase (NOS) activity, and endothelial (eNOS), neuronal (nNOS) and inducible (iNOS) isoforms activities (pmol 14C-L-citrulline/g.tissue.min).
In aortic rings, suspended in Krebs solution and preconstricted with phenylephrine 10-5M, we evaluated the maximal relaxation (ACh Emax, %) with acetylcholine (10-10 to 10-3 M); we also measured the maximal contraction with angiotensin-II (Ang-II Emax, % maximal contraction with KCl 90mM, 10-10 to 10-6 M). Values are means±SEM, n=6/group. One way ANOVA, Bonferroni post-test.

Results:

	Cc	Ll	Lc
SBP	126±1	143±1*	146±2*
Aa	2.3±0.1	1.7±0.1*†	2.5±0.2
Ma/La	22.8±0.4	23.0±0.4	23.8±0.6
Fibrosis	1.1±0.6	3.1±0.3*	1.6±0.3
NOS activity	225±5	172±4*	160±8*
ACh Emax	90±1	76±5*	77±3*
Ang-II Emax	32±3	23±2*	25±2*

*p<0.01vs Cc; †p<0.01vs Lc.
Basal NOS activity was not affected by nNOS and iNOS inhibitors, but was decreased by blocking Ca2+-calmodulin (Cc:55±2#, Ll:64±1#, Lc:61±9#,#p<0.001 vs. basal) in all groups.

Conclusions: Zinc is an important micronutrient for arterial development and function. Moderate zinc deficiency during whole life is associated to a reduced aortic size with preserved Ma/La relation and higher signs of fibrosis in tunica media. Zinc deficiency during fetal and/or postnatal life programs a lower endothelial nitric oxide production that could explain the vascular hyporesponsiveness to ACh and an unexpected reduced contractile response to Ang-II probably due to alterations in Ang-II receptors in this model.

POSTERS' SESSION

POSTERS' SESSION PS06
HEART

PP.06.01 VALIDATION OF SERUM BIOMARKERS IN PATIENTS WITH SEVERE AORTIC STENOSIS AND HYPERTENSION

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Objective: The aim of the study was to estimated role of osteoprotegerin/RANK/RANKL and hypertension in calcific aortic stenosis (AS).

	BAV, n=31	TAV, n=30	Control, n=31	p
OPG,pmol/l	6.2±0.5*	6.7±0.5**	4.85±0,3	*p=0.04 vs Ctrl **p=0.02 vs Ctrl
RANKL,pmol/l	0.48±0,03*	0.42±0,03	0.38±0,02	*p=0.008 vs Ctrl
HN, n (%)	22 (71)	28 (93)	0	
OBPs, mm Hg	135±3	141±4*	125±6	*p<0.05 vs Ctrl
OBPd, mm Hg	81±2	83±2	80±3	
OBPs – office systolic blood pressure; OBPd – office diastolic blood pressure				

Design and method: Patients with peak aortic velocity (Vmax) more than 4.0 m/s were included. 61 pts with aortic valve stenosis (AS): 31 pts with bicuspid aortic valve (BAV) (57.3 ±1.0 yrs; m:f 1.8:1) and 30 pts with tricuspid aortic valve (TAV) (59.7 ±0.7 yrs; m:f 1:1) and 31 healthy persons as a control (57.6 ±0.8 yrs; m:f 1.1:1) were examined. Pts with infective endocarditis and rheumatic disease were excluded. Serum osteoprotegerin and sRANKL were performed in all pts by enzyme-linked immunosorbent assay.

Results: Patients with BAV and TAV were comparable for age, gender and ECHO parameters. Serum sRANKL and OPG levels weren`t different in groups with BAV and TAV. However serum concentration of OPG was increased in pts with TAV and BAV vs control group, while sRANKL level was increased in pts with BAV (tab.1). sRANKL concentration was correlated with office systolic and diastolic BP only in pts with TAV (r=0.4, p=0.02 and r=0.4, p=0.02 respectively). Whereas OPG concentration were negative correlated with office systolic BP in this group (r=-0.52, p=0.004). There wasn't correlation between BP and osteoprotegerin/sRANKL level in pts with BAV.

Conclusion: Systemic arterial hypertension is the key risk factor for OPG/RANKL/RANK system activation in pts without congenital heart disease. But traditional risk factor such as hypertension may contribute to the activation of OPG/RANKL/RANK system and progression of different etiology aortic stenosis.

PP.06.02 DECARTOGRAPHIC PARAMETERS OF REPOLARIZATION AS THE PREDICTORS OF RESPONSE TO ACUTE PULMONARY VASODILATOR TESTING IN PATIENTS WITH PULMONARY ARTERIAL HYPERTENSION

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Objective: To assess the possibilities of decartographic parameters of repolarization as the predictors of response to acute pulmonary vasodilator testing in patients with pulmonary arterial hypertension.

Design and method: 64 patients (mean age 41.4±12.4 years; 81% women) with pulmonary arterial hypertension who underwent right-heart catheterization and acute pulmonary vasodilator testing were evaluated. Digital orthogonal electrocardiograms were recorded and studied with the use of dipole electrocardiotopography (DECARTO). We studied the "recovery acceleration map", which shows the distribution of the dipole component of the depolarized state duration shortening over the heart surface. For a quantitative analysis the magnitude G (in ms) and spatial components Gx, Gy, Gz of the "recovery acceleration" vector (directed to the left, inferior, and anterior) were used.

Results: There were 24 responders (37.5%) to acute pulmonary vasodilator testing. Responders had lower mean pulmonary artery pressure (47.7±10.8 mm Hg versus 61.7±19.3 mm Hg, p <0.01), pulmonary vascular resistance (837±447 dyn•s/cm5 versus 1386±741 dyn•s/cm5, p <0.01), heart rate (69.7±10.6 bpm versus 82.0±13.6 bpm, p <0.01), and higher values of Gx (26.1±18.1 ms versus 5.9±19.1 ms, p <0.001) and Gy (26.7±16.9 ms versus 8.3±8.1 ms, p <0.001) as compared with non-responders. Receiver operating characteristic curve analysis identified an optimal cutoff value for Gx>8 ms to predict response, with sensitivity of 88% and specificity of 63% (the area under the ROC curve 0.78, SE 0.06) and cutoff value for Gy>14 ms with sensitivity of 75% and specificity of 88% (the area under the ROC curve 0.87, SE 0.05). There were more responders among patients with Gx>8 ms than with Gx<=8 ms (58% vs. 11%, p <0.001) and among patients with Gy>14 ms than with Gy<=14 ms (78% vs. 15%, p <0.001).

Conclusions: The use of repolarization process mapping by DECARTO technique may be helpful for predicting the results of pulmonary vasodilator testing in patients with pulmonary arterial hypertension.

PP.06.03 CARDIAC STRUCTURE AND FUNCTION IN RELATION TO HYPERTENSION SUBTYPES AND AMBULATORY BLOOD PRESSURES IN UNTREATED PATIENTS

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Objective: Cardiac structural and functional abnormalities are well accepted cardiovascular risk factors. We aimed to investigate the association of cardiac structure and function with ambulatory hypertension subtypes and blood pressures (BP) in untreated patients.

Design and method: We enrolled consecutive untreated subjects referred to a hypertension clinic for the 24-hour ambulatory BP monitoring. In total, 656 patients (mean age, 50.9 years; 49.8% women) had both the ambulatory BP measured by SpaceLabs 90217 monitors and cardiac structure and function by echocardiography. Isolated diastolic hypertension (IDH), isolated systolic hypertension (ISH) and combined systolic and diastolic hypertension (SDH) were defined according to the thresholds of average ambulatory BP of 130 mmHg systolic and 80 mmHg diastolic. We used the analysis of variance to compare the cardiac parameters between groups, and the multivariate linear regression to analyze the association of cardiac structure and function with ambulatory systolic and diastolic BP.

Results: Compared to normotensive subjects (n=253), SDH patients (n=223) had larger left atrium diameter (LAD), left ventricular diastolic diameter (LVDD), left ventricular mass (LVM) and longer isovolumic relaxation (IVRT) (P<0.05), ISH patients (n=22) had higher LVM and E/E' ratio (P<0.05) after adjustment for sex, age, body weight, body height, plasma glucose, serum cholesterol, current smoking, alcohol intake, and heart rate. In simple correlation analysis, LVDD and LVM were significantly associated with both ambulatory systolic and diastolic BP (r=0.12-0.28, P<=0.002), whereas E/E' ratio was only associated with 24-hour systolic BP (r=0.10, P=0.01). In regression models including both systolic and diastolic BP and aforementioned covariables, LVM and E/E' ratio remained significantly related to 24-h systolic BP (P<0.05), but not diastolic BP in both younger (age<51 years) and older (age>=51 years) groups.

Conclusions: Ambulatory hypertension was associated with the changes in cardiac structure and function irrespective of the subtypes. Left ventricular mass and diastolic function was mainly determined by systolic BP in both young and older subjects.

PP.06.04 THE ROLE OF PRENATAL CHRONIC HYPOXIA ON MYOCARDIAL ISCHEMIA / REPERFUSION INJURY IN ADULT RABBITS OFFSPRING

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Objective: To evaluate the role of prenatal chronic hypoxia on myocardial ischemia/reperfusion injury in adult rabbits offspring and explore the relevant mechanism.

Design and method: The pregnant New-Zealand rabbits were divided randomly into normoxic (n=8) and hypoxic (12% O2 from days 10 to 28 of gestation, n=8) groups. One male offspring of each maternal rabbit was randomly selected to study. The offspring rabbits were subjected to heat stress (42°C for 15 min) at 6 months of age. After 24 h, left anterior decending branches were excised and subjected to ischemia for 30 min and reperfusion for 120 min. Cardiac histopathological observation was performed by light microscope. The expression of heat shock protein 70 (HSP70) in myocardium was detected by immunohistochemistry. Myocardial enzyme activity, apoptotic index and caspase-3 activity in myocardium were examined as well.

Results: Ischemia-reperfusion after heat stress pretreatment increased myocardial enzyme activity, apoptotic index and caspase-3 activity in prenatal chronic hypoxia rabbits (4720.31 ± 744.39 IU/L, 1849.13 ± 416.58 IU/L, 40.43 ± 5.03%, 12.43 ± 1.77 unit, respectively) when compared with control (3388.95 ± 532.43 IU/L, 1435.13 ± 92.08 IU/L, 34.40 ± 4.66%, 10.58 ± 1.42 unit, respectively). Heat stress pretreatment induced HSP70 significant expression in left ventricular myocardium was not observed in prenatal chronic hypoxia rabbits but in normoxic control rabbits.

Conclusions: Prenatal chronic hypoxia inhibits HSP70 synthesis in the heart of adult offspring in response to body heat stress, which might insult cardioprotection against ischemia-reperfusion injury.

PP.06.05 HOW OFTEN IS ARTERIAL HYPERTENSION AMONG PATIENTS IN SECONDARY PREVENTION OF SUDDEN CARDIAC DEATH PRESENT? PROFILE OF PATIENTS ADMITTED DUE TO IMPLANTATION OF CARDIOVERTER DEFIBRILLATOR

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Objective: The mortality reduction achieved by implantable cardioverter-defibrillators (ICD) in primary and secondary prevention of sudden cardiac death (SCD) are well known, and have been confirmed by many randomized trials. Many of these trials created the backbone of currently valid guidelines on primary and secondary prevention of SCD. Management of patients after the reverse SCD is still at the forefront of not only arrhythmologists, as well as cardiologists, internists, emergency physicians. The aim of this work was to evaluate the profile of patients after the reverse sudden cardiac death before ICD implantation.

Design and method: A retrospective analysis of all patients after the reverse of SCD consecutively admitted to our center in 2011-2012 that have underwent implantation ICD system.

Results: Patients from our center were 171, mean age (61±11.05 years), significant higher amount of men 145 (85.96%) vs 26 (14.04 %). Diagnosis of arterial hypertension was known in 152 (88.90%) patients. Mean blood pressure at the admittance was 128.71/86.7 mmHg. In ECHOKG parameters, the mean EF 39.26 % ± 10,43, distribution of patients by NYHA functional class NYHA was 27.65% 1 41.76% NYHA 2 and 17.1% NYHA 3 In 75.29% of patients was documented ventricular tachycardia, in 19.3% patients was ventricular fibrillation.

Conclusions: Analysis of patients after reversed sudden cardiac death proves that it is a heterogeneous group of patients. Arterial hypertension is not typical for this group of patients, in, although there are patients with heart failure based on hypertensive heart. Results of completed investigations contribute to improving the management of patients after the reverse sudden cardiac death.

PP.06.06 THE INFLUENCE OF LONG-TERM COMBINED THERAPY WITH ZOFENOPRIL PLUS INDAPAMIDE ON LEFT VENTRICULAR HYPERTROPHY AND DIASTOLIC DYSFUNCTION IN PATIENTS WITH MILD TO MODERATE HYPERTENTION

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Objective: To assess the influence of long term combined therapy with Zofenopril plus Indapamide on left ventricular diastolic dysfunction and hypertrophy in patients with mild to moderate arterial hypertension.

Design and method: This study included 54 hypertensive patients, 21 men and 33 women (mean age 58.5±6.2 years). Mean duration of hypertension was 7.2±5.2 years. Initial systolic blood pressure (SBP) – 157.9±13.4mmHg, diastolic blood pressure (DBP) – 97.6±6.8mmHg, heart rate - 84.4±2.7bpm. Left ventricular mass index (LVMI)>120g/m2 for men and >100g/m2 for women considered as left ventricular hypertrophy (LVH). Diastolic heart function was assessed by the following Doppler parameters: early (E) and late (A) peak velocities, E/A ratio, isovolumic relaxation time (IVRT) and deceleration time of early peak velocity (DT).
All patients were treated with Zofenopril 30 mg plus Indapamide 2.5mg once daily for 1 year after one-week washout period. Doppler echocardiographic parameters of diastolic function and left ventricular mass index were determined at baseline and every 3-month. Systolic and diastolic blood pressure and heart rate were measured every month. The relationship between parameters was established by Spearman correlation analysis, $p<0.05$ was considered statistically significant.

Results: After 1 year of the treatment LVMI was decreased from 134.4±5.5g/m2 to 115.1±3.3g/m2 ($p<0.001$), E/A ratio increased from 0.83±0.22 to 1.02±0.24 ($p<0.002$), shortened isovolumic relaxation time (IVRT) from 116±11ms to 98±10ms ($p<0.001$), and decreased deceleration time (DT) from 216±22ms to 187±18ms ($p=0.002$). SBP and DBP were reduced from 157.9±12.4 to 132.4±11.8mmHg ($p<0.001$) and from 97.6±6.8 to 83.6±6.8 ($p<0.001$).

Conclusions: The long-term combined therapy with Zofenopril plus Indapamide effectively controls SBP and DBP, significantly improves diastolic function and beneficially effects on LVH in patients with mild to moderate arterial hypertension.

PP.06.07 LEFT VENTRICULAR REMODELING AND ADENINE NUCLEOTIDES PATIENTS` WITH HYPERTENSIVE DISEASE AND TYPE 2 DIABETES MELLITUS

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Objective: To study the concentration of adenine nucleotides depending on the remodeling type of left ventricle (LV) in patients with hypertensive disease (HD) and diabetes mellitus (DM) type 2.

Design and method: 50 patients were examined (30 women and 20 men, age 59.5 [52; 63] years) with HD and DM type 2. Concentration of adenine nucleotides (adenosine triphosphate (ATP), adenosine diphosphate (ADP) and adenosine monophosphate (AMP) were studied in erythrocyte suspension.
All patients were conducted with echocardiography. The classification of A.Ganau. was used to diagnose the remodeling type of LV.

Results: In assessing the types of remodeling it was found that the normal geometry was observed in 14.3 % of patients, concentric remodeling in 23.8%, concentric hypertrophy - 45,2% and 16,7% persons were noted with eccentric hypertrophy. During the study of the level of adenine nucleotides - as a marker of hypoxia development, it was revealed that the highest rates of ATP -1.5 [1.49; 1.54] mmol / l, with minimum of AMP - 1.49 [1.45; 1.55] mmol / l, were typical to people with normal geometry of the heart, the group with concentric remodeling statistically was equal to the group with normal geometry of the heart, however, it was marked a little decrease of ATP at increase of concentration of AMP to 9% and ADP to 13%. The groups with hypertrophy myocardium were charactarized by statistically proved ($p<0,05$) decrease of concentration of ATP, in comparison with normal geometry at 21% in case of concentric hypertrophy and at 27% in case of eccentric hypertrophy at simultaneous increasing of level of AMP at 21% in patients with concentric hypertrophy and at 24% in patients with eccentric hypertrophy of LV.

Conclusions: In our study patients with HD and DM type 2 showed predominance of concentric hypertrophy and concentric remodeling of the LV. It was established that the concentric and eccentric hypertrophy of the LV myocardium is characterized by the development of energy-deficient states with significantly lower levels of ATP with significantly higher ADP and AMP in comparison with the normal geometry of the heart.

PP.06.08 EARLY DETECTION OF ASYMPTOMATIC LEFT VENTRICULAR SYSTOLIC DYSFUNCTION IN HYPERTENSIVE PATIENTS

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Objective: Development of overt congestive heart failure (CHF) may be preceded by a phase of asymptomatic left venrticular systolic dysfunction.
The aim of this study was early detection of alteration in left ventricular systolic function.

Design and method: 120 hypertensive patients, with preserved ejection fraction (EF), were divided in three groups according LVDD: normal (n=40), abnormal relaxation (Grade I, n=37) and pseudonormal (Grade II, n=43).
Left atrial volume index (LAVI), left ventricular mass index (LVMI), left ventricular dimensions and volume inexes (LVEDV/BSA and LVESV/BSA) and EF were estimated by echocardiography. We measured coresponding velocities

from tissue Doppler at the level of the septal mitral annulus (Em;Am;Sm), including E/Em and tissue Doppler myocardial performance index (tMPI). The same measurements were repeated after three years.

Results: Close correlations were found between Sm and EF (r=0.349;p=0.0009), LVMI (r=-0.222;p=0.015), LVEDV/BSA (r=-0.317;p=0.0004) and LVESV/BSA (r=-0.472;p=0.0005).
Levels of LVEDV/BSA (89.3vs103.8vs101.7; p=0.009), LVESV/BSA (34.0 vs42.9vs44.0; p=0.0004), LVMI (104.3vs112.5vs123.0; p=0.0004), LAVI (32.0vs35.5vs44.5; p=0.0001) and MPI (61.7vs72.1vs76.3; p=0.036) progressively increased from the normal group through LVDD Grade I and II groups. Significantly different values of EF (63vs61vs59; p=0.003) and Sm (0.074vs0.067vs0.059; p=0.003) were obtained between groups too, but with progressively decrease from the normal group through LVDD Grade I and II groups. General linear model for repeated measures showed increase of LVEDV/BSA (F=50.009;p<0.001), LVESV/BSA (F= 34.258;p<0.001), LVMI (F=27.648;p<0.001), LAVI (F=17.083;p<0.001) and tMPI (F=35.842;p<0.001) during three years, with significant time difference, but withot significant difference between groups, these parameters enarged in all groups almost at the same manner. Sm also significantly changed during three years with significant time difference (F=128.24;p<0.001) and with significant difference between groups (F=4.597;p< 0,012), Sm decrease in all groups, but most expressed in LVDD Grade II group.

Conclusions: Left ventriculae EF was not sensitive indicator for the detection of subclinical systolic dysfunction, but decrease of Sm appeared as the first sign of systolic abnormalities following established diastolic dysfunction and was the clear reflection of LV remodeling process. This suggests that Sm may aid in the identification of patients at high risk for development of CHF who need preventive treatment.

PP.06.09 AN ASSOCIATION BETWEEN DIPEPTIDLY PEPTIDASE-4 INHIBITORS TREATMENT AND LEFT VENTRICULAR STIFFNESS BY TISSUE DOPPLER IMAGING IN PATIENTS WITH TYPE 2 DIABETES

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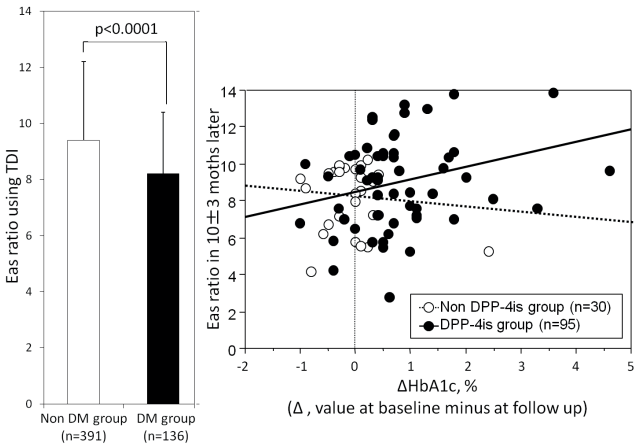
Objective: Left ventricular (LV) stiffness plays an important role in the pathogenesis of diastolic LV function. Since recent studies indicated that dipeptidly peptidase-4 inhibitors (DPP-4is) treatment might have non-glycemic beneficial effects, we estimated LV stiffness parameters of systolic and diastolic performance using tissue doppler imaging (TDI) in type 2 diabetes (T2DM) patients with or without DPP-4is treatment.

Design and method: This study enrolled 527 patients, 136 patients with T2DM were identified. In T2DM group, 55, 40 and 30 patients received sitagliptin, vildagliptin and non DPP-4is treatments for 10±3 months, respectively. We quantified Eas ratio, LV diastolic elastance index (Ed), arterial elastance index, LV end-systolic elastance index, ventricular-vascular coupling index, and total stiffness index (TSI).

Results: Ed (p<0.0001) and TSI (p<0.05) were significantly increased, and Eas ratio (p<0.0001) was significantly decreased in patients with T2DM. After DPP-4is treatment was associated with a stronger increase in Eas ratio. In addition, Eas ratio at follow-up was correlated with δHbA1c in DPP-4is group (r=0371, p<0.05), but non DPP-4is group. However, there were no significantly differences in LV stiffness parameters between sitagliptin and vildagliptin treatment.



Conclusions: The Eas ratio for evaluating LV stiffness was decreased in patients with T2DM, and increased after DPP-4is treatment.

PP.06.10 VOLUME OF CAROTID BODIES ESTIMATED BY COMPUTED TOMOGRAPHY ANGIOGRAPHY AND HEART RATE TURBULENCE IN PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: The study aimed at determination of a relationship between an estimated total volume of carotid bodies (V rCB+lCB), evaluated using computed tomography angiography (CTA) and heart rate turbulence (HRT) in patients with essential hypertension.

Design and method: The study was conducted on 32 consecutive patients with diagnosed and pharmacologically treated essential hypertension. In all the participants CTA of carotid arteries was performed with evaluation of carotid bodies (CB) volume as well as 24-hour Holter (ECG) monitoring with evaluation of heart rate turbulence. Volume of every carotid body was evaluated on the basis of scans obtained in CTA of carotid arteries, using the formula: 4/3 x π x transverse dimension of CB in axial projection x longitudinal dimension of CB in axial projection x craniocaudal dimension of CB in sagittal/frontal projection. In analysis of heart rate turbulence considered following parameters: turbulence onset (TO) and turbulence slope (TS). The analysed HRT indices allowed to define percentages of individuals with both normal parameters of HRT (HRT0), individuals with a single abnormal HRT parameter (HRT1) and individuals with both abnormal HRT parameters (HRT2).

Results: Mean values of TO were significantly higher while mean values of TS were significantly lower in the group of patients with essential hypertension manifesting V rCB+lCB values >= median value, than in the group of essential hypertension patients with V rCB+lCB values < median value (TO (%): -0.58 ± 0.51 vs. -1.67 ± 0.88; TS (ms/RR): 4.15 ± 1.81 vs. 6.71 ± 2.25; p<0.05). A significantly lower percentages of individuals with HRT0 was found in the group of essential hypertension patients with V rCB+lCB values >= median value than in the group of patients with essential hypertension manifesting V rCB+lCB values < median value (HRT0 (%): 57.1 vs. 92.9; p<0.05). Statistically significant linear relationships were demonstrated between V rCB+lCB on one hand and TO, TS on the other (correlation coefficient r: 0.47, -0.51).

Conclusions: In patients with essential hypertension an unfavourable relationship is noted between volume of carotid bodies, evaluated by CTA of carotid arteries, and heart rate turbulence.

PP.06.11 "PROTECTIVE" EFFECTS OF PREVIOUS ARTERIAL HYPERTENSION IN CARDIAC AL AMYLOIDOSIS

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Objective: Cardiac AL amyloidosis is caused by extracellular deposition of fibrillar aggregates of insoluble toxic protein, mainly composed by the N-terminus of a monoclonal immunoglobulin light-chain. Given the high prevalence of arterial hypertension in the general population, a rare disease like cardiac AL amyloidosis may develop in a hypertensive patient.
Aim of the study was to assess whether previous (or current) cardiac exposure to increased blood pressure has an impact on cardiac structural and functional response to amyloid deposition and on the subsequent prognosis.

Design and method: Presence or absence of arterial hypertension was defined according to history, previous or current antihypertensive treatment in 165 consecutive untreated cardiac AL amyloidosis patients (age 64 ± 10 years). Serum NT-proBNP, cardiac troponin I (cTnI) and free light chains (dFLC) - i.e. the most robust prognosticators that have been demonstrated so far - were assessed, and echocardiography was performed at diagnosis in all patients.

Results: A positive history of arterial hypertension was reported in more than one third of cardiac AL patients (n=60/165; 36%). When comparing hypertensive

vs. non-hypertensive cardiac AL patients, no difference was observed either in the prevalence of extracardiac organ involvement or in structural/ biochemical variables that can estimate the severity of the disease-associated cardiac amyloid load, such as left ventricular mass index or serum NT-proBNP [169 (140-191) vs. 175 (137-199) vs g/m2; 5431 (2579–12229) vs. 5487 (2256–9818) pg/ml; p=ns for both]. In contrast with the extent of diastolic dysfunction, systolic function was much less impaired in hypertensive patients, as assessed by stress-corrected midwall fractional shortening and longitudinal excursion of the mitral annulus. At Kaplan-Meyer analysis, hypertension was a univariable predictor of patients' survival after a median follow-up of 561 days (p<0.0017). At multivariable analysis, high levels of NT-proBNP, of cTnI and hypertension resulted independent survival predictors, whereas elevated dFLC did not enter the model.

Conclusions: In cardiac AL patients, a previous history of arterial hypertension is accompanied by a different functional adaptation to amyloid deposition, favorably affecting overall survival. Previous hypertension predicts a better prognosis independent of high NTproBNP or high TnI.

PP.06.12 POSSIBLE DETERMINANTS OF LEFT VENTRICULAR MASS INDEX AND THEIR ASSOCIATION WITH GLUCOMETABOLIC STATUS: A CROSS-SECTIONAL STUDY

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Objective: To explore possible determinants of left ventricular mass index (LVMI) and their association with glucometabolic status in middle-aged or older apparently healthy subjects.

Design and method: We examined cross-sectional associations between LVMI, markers of a) afterload (increased systolic blood pressure (SBP), N-terminal pro-brain natriuretic peptide (NT-proBNP), b) systemic inflammation (high-sensitivity C-reactive protein, interleukin 6, growth differentiation factor 15 (GDF-15)), c) fibrosis (procollagen type 1 N-terminal propeptide), and d) fasting plasma glucose (FPG) categorized as normal fasting glucose (NFG: FPG<=6.0mmol/L), impaired fasting glucose (IFG: FPG 6.1-6.9mmol/L) and diabetes mellitus (DM: FPG>=7.0mmol/L), in 524 men and 220 women aged 56-79 years without overt cardiovascular disease who received no cardiovascular, antidiabetic or lipid lowering drugs, using multiple linear regression analysis.

Results: In separate age- and sex-adjusted models, SBP (beta=0.22 (95% confidence interval (CI), 0.15-0.29; p<0.001), NT-proBNP (beta=0.18 (95% CI, 0.12-0.23); p<0.001), GDF-15 (beta=0.002 (95% CI, 0.000-0.004); p=0.045), and FPG category (beta=2.04 (95% CI, 0.06-4.02); p=0.04) were independently associated with LVMI. SBP (beta=0.008 (95% CI, 0.006-0.011); p<0.001) was significantly and positively associated with FPG category. In a subsequent model adjusted for age, sex, and FPG category, only SBP (beta=0.22 (95% CI, 0.14-0.29); p<0.001) and NT-proBNP (beta=0.17 (95% CI, 0.12-0.23); p<0.001) (adj. R2=0.176; p<0.001) remained independently predictive of LVMI. There was a significant interaction between GDF-15 and FPG category (NFG: beta=0.000 (95% CI, -0.003-0.002); IFG: beta=-0.003 (95% CI, -0.008-0.001); DM: beta=0.008 (95% CI, 0.004-0.013); p<0.001), but not between FPG category and SBP or FPG category and NT-proBNP. In patients with DM, only GDF-15 (beta=0.007 (95% CI, 0.004-0.011); p<0.001) and NT-proBNP (beta=0.17 (95% CI, 0.10-0.25); p<0.001) (adj. R2=0.176; p<0.001) were significantly associated with LVMI.

Conclusions: In a multiple linear regression model adjusted for age, sex, and FPG category, only markers of increased afterload, i.e. increasing SBP and NT-proBNP independently predicted LVMI. However, in patients with untreated DM, GDF-15 levels were also significantly associated with LVMI, suggesting a role for inflammation in the development of left ventricular hypertrophy in patients with DM.

PP.06.13 POSSIBLE MECHANISMS EXPLAINING THE DEVELOPMENT OF DIASTOLIC DYSFUNCTION IN PATIENTS WITH IMPAIRED GLUCOSE METABOLISM: A CROSS-SECTIONAL STUDY

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Objective: To explore possible mechanisms explaining the association between impaired glucose metabolism and left ventricular diastolic dysfunction in middle-aged or older apparently healthy subjects.

Design and method: We examined cross-sectional associations between the presence of grade 2 or 3 diastolic dysfunction, markers of a) hemodynamic load (increased systolic blood pressure (SBP), left ventricular mass index (LVMI), and N-terminal pro-brain natriuretic peptide (NT-proBNP)), b) dyslipidemia (triglycerides, total cholesterol, low- and high-density lipoprotein cholesterol) and myocardial ischemia (high-sensitivity cardiac troponin T (hsTnT)), c) systemic inflammation (high-sensitivity C-reactive protein, interleukin 6, growth differentiation factor 15) and fibrosis (procollagen type 1 N-terminal propeptide), and d) fasting plasma glucose (FPG) categorized as normal fasting glucose (NFG: FPG<=6.0mmol/L), impaired fasting glucose (IFG: FPG 6.1-6.9mmol/L) and diabetes mellitus (DM: FPG>=7.0mmol/L), in 507 men and 215 women aged 56-79 years without overt cardiovascular disease who received no cardiovascular, antidiabetic or lipid lowering drugs, using binary logistic regression analysis.

Results: The prevalence of diastolic dysfunction increased significantly with worsening glucometabolic status (NFG: 13%; IFG: 15%; DM: 25%; chi-square 10.56, p=0.005). In separate age- and sex-adjusted models, SBP (exp(beta)=1.01 (95% confidence interval (CI), 1.01-1.02); p=0.004), LVMI (exp(beta)=1.02 (95% CI, 1.01-1.03); p<0.001), NT-proBNP (exp(beta)=1.01 (95% CI, 1.00-1.02); p=0.04), and hsTnT (exp(beta)=1.04 (95% CI, 1.01-1.07); p=0.02) were significantly associated with diastolic dysfunction. After further adjusting for FPG category, only SBP (exp(beta)=1.01 (95% CI, 1.00-1.02); p=0.02) or LVMI (exp(beta)=1.02 (95% CI, 1.01-1.03); p<0.001) remained independently predictive of the presence of diastolic dysfunction. There was a significant interaction between FPG category and SBP (NFG: exp(beta)=1.03 (95% CI, 1.01-1.05); IFG: exp(beta)=1.01 (95% CI, 0.99-1.03); DM: exp(beta)=1.00 (95% CI, 0.98-1.02); p=0.03), but not between FPG category and LVMI.

Conclusions: In a binary logistic regression model adjusted for age, sex, and FPG category, only markers of increased load, i.e. SBP or LVMI, independently predicted diastolic dysfunction. The importance of SBP decreased with increasing impairment of glucose metabolism suggesting additional other mechanisms than load, dyslipidemia, ischemia, inflammation, or fibrosis for development of diastolic dysfunction in DM.

PP.06.14 ASSESSMENT OF ELECTROCARDIOGRAPHIC AND ECHOCARDIOGRAPHIC LVH IN A GENERAL POPULATION IN NORTHERN ITALY

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Objective: A large number of studies have demonstrated that left ventricular hypertrophy (LVH) detected with standard electro- and echocardiography is an independent predictor of future cardiovascular complications in various subsets of patients.
Due its low cost and wide availability electrocardiography represents the first line test for the assessment of cardiac organ damage in hypertensive patients.
However a significant limitation is represented by its low sensitivity in detecting LVH. Aim of this study was to evaluate the prevalence of LVH detected by electro- or echocardiography and the relationship between these two measures in a general population sample (Vobarno study).

Design and method: A total of 385 subjects (mean age 57±10years,44%males ,64%hypertensives,44% overweight and 16%obese)underwent clinical examination with blood pressure measurement, standard laboratory examinations, a 12 leads electrocardiogram standard and standard echocardiography. EKG-LVH was defined as the presence of a Sokolow-Lyon voltage>=38 mm and/ or a Cornell voltage QRS duration product>2440 mm*msec; Echo-LVH was defined as LVM>50 g/m2.7 in men and 47g/m2.7 in women.

Results: LVH prevalence was 5.1% and 16.3% with EKG and Echo, respectively. LVH was detected by both methods only in 2.0% of patients. The prevalence of EKG-LVH was 1.7% with Sokolow-Lyon voltage,4.2% with Cornell product and 5.1% with both EKG criteria. In hypertensives the prevalence of LVH was significantly greater than normotensives(6.8% vs 2.2% with EKG-LVH and 22.7% vs 9.6% with Echo).The concordance of the two techniques in identifying patients with LVH was only partial, and in particular, among patients with EKG-LVH a significant proportion(39%) did not have echo-LVH. However, patients with EKG-LVH but without Echo-LVH had greater LV mass index(39.9 vs 34.4 gr/ m2.7,p<0.01)and worse systolic and diastolic function (midwall fractional shortening:17.3 vs 19.5; E/Em 10.6 vs 8.1,all p<0.01)as compared with those without both EKG and Echo-LVH.A positive correlation was observed between LVMI and Sokolow-Lyon voltage (r=0.13,p<0.015), Cornell product (r=0.22,p<0.001), Cornell voltage (r=0.45,p<0.001) and R in Avl (r=0.38,p<0.001).

Conclusions: Our data confirm the greater sensitivity of echocardiography examination for detection of LVH. The presence of EKG-LVH is associated with greater LVMI and worse systolic and diastolic function, even in the absence of clear-cut echo-LVH. Our results confirm the importance of identifying cardiac organ damage with both methods for a better stratification of cardiovascular risk.

PP.06.15 MIXOMA ATRII SINISTRI: CASE REPORT

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Objective: Primary cardiac tumors represent a relatively rare diagnosis with autopsy frequency of only 0,001-0,03%,in which myxoma is the most commom type. Cardiac myxoma is usually solitary and develop in the atria,75% origina ting in the left atrium and 15%-20% in the right atrium .Women are more commonly affected, between third and sixth decades. The clinical features of myxomas are determined by location. size and mobility. Surgical extirpation is considered to be the tretament of choice.
In the present case we describe a asymtomatic patients in which diagnosis of mixoma is accidently discover.

Design and method: We present a clinical case of 50 year old female patient with mild to moderate hypertension, with non regulate blood pressure beside antihypertensive treatment. We performed several investigations during hospitalization: blood chemistry electrocardiograms (EKG), transtoracic echocardiography (TTE). transesophageal echocardiography (TEE), telecordis, and coronary angiography (CA).

Results: Biochemical parametars were normal, with normal EKG -sinus rithm with HR-75,without abnormalites of AV-conduction or ST segment. Telecordis was normal. TTE which is performed show Tu formation (34x26) in left atrium (42mm) with nonhomogenic structure and litlle calcification in the structure with a small stalk which attaches to the interatrial septum without obstruction or prolapse into the ventricule. TEE confirm the diagnosis of Tu formation in left atrum and a presense of litlle Tr in left atrum appendics. CA was performed with normal coronary artery. Patient was send to cardiosurgery centar ,and the mass was surgically removes with patch closure of the discontinuty of interatrial septum. Histological examination reveales mixoma cordis.
Three months later a routine contol TTE was performed and it was normal.

Conclusions: Mixoma cordis may present with cardiovascular related or constitutional symtoms, but sometimes a cardiac mass is discover incidentally during a imaging examination performed for an unrelated indication. Because of nonspecific symtoms early diagnosis may be a challenge.

PP.06.16 LEFT VENTRICULAR SYSTOLIC DYSFUNCTION IN ASYMPTOMATIC BLACK HYPERTENSIVE SUBJECTS

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Objective: Although hypertension has been established to be one the commonest causes of heart failure especially in sub-Saharan Africa, few data are available on the prevalence of asymptomatic left ventricular systolic dysfunction in a population sample of hypertensive subjects, especially in high risk groups such as blacks. The present study was therefore undertaken to assess the prevalence of asymptomatic left ventricular systolic dysfunction in hypertensive black African subjects.

Design and method: 1947 hypertensive subjects without heart failure presenting to the Cardiology Unit, Department of Medicine, University of Abuja Teaching Hospital from April 2006 to August 2013 had clinical and echocardiography evaluation.

Results: 953(48.9%) were male and 994(51.1%) were female. 93.3% had normal left ventricular systolic function (left ventricular ejection fraction (LVEF) > 54%), 4.4% had mild left ventricular systolic dysfunction (LVEF between 40-54%) and 2.3% had severe left ventricular systolic dysfunction (LVEF < 40%). Male subjects had worse left ventricular systolic function compared to women (LVEF of 73.2% versus 75.6%, p-value < 0.0001) and diabetic subjects had worse left ventricular systolic function compared to non-diabetic subjects (LVEF of 72.3% versus 75.7%, p=0.02). In regression analysis, lower left ventricular ejection fraction as continuous variable was associated with older age (r= 0.43, p< 0.0001), elevated serum creatinine level (r=0.16, p=0.02) higher relative wall thickness (r=2.2, p=0.02) and higher left ventricular mass index for height (r = 11.8, p< 0.0001). It was also associated with lower pulse pressure (r=3.2, p< 0.001), lower mean arterial pressure (t=2.3, p=0.02) and lower body mass index (r=5.3, p< 0.0001).

Conclusions: In a cohort of asymptomatic Black hypertensive subjects, up to 6.7% had left ventricular systolic dysfunction, and left ventricular systolic dysfunction was related to male gender, elevated serum creatinine, higher left ventricular mass, higher relative wall thickness and diabetes mellitus.

PP.06.17 THE ASSOCIATION OF UNCONTROLLED HYPERTENSION WITH CORONARY ARTERY CALCIUM SCORE, LEFT VENTRICULAR HYPERTROPHY, AND LEFT VENTRICULAR STRAIN

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Objective: To examine the association between hypertension and coronary artery calcium (CAC) score, electrocardiographic left ventricular hypertrophy (LVH), and electrocardiographic strain pattern.

Design and method: We conducted a modified case-control study in which 36 women and 19 men aged 19-80 years with uncontrolled hypertension (office systolic blood pressure (SBP) >= 140 mmHg and/or diastolic blood pressure >= 90 mmHg with or without antihypertensive treatment) and no cardiovascular disease (CVD) or diabetes mellitus (DM) were matched 1:2 (matching factors: age, sex, smoking status, body mass index (BMI)) with subjects from a randomly selected cohort of men and women either 50 or 60 years old without CVD or DM, and evaluated for differences in CAC (Agatston score), LVH (Sokolow-Lyon index (SLI) or Cornell voltage-duration product (CVDP)), and strain (Minnesota criteria). Between-group differences were tested using independent samples t-test or Pearson's chi-squared test, and the associations were further evaluated using multiple linear or binary logistic regression.

Results: CAC (170 vs. 32; p=0.02), SLI (27 vs. 18; p<0.001), and CVDP (2318 vs. 1544; p<0.001) were significantly higher in patients with uncontrolled hypertension than in controls. CAC > 99 (29% vs. 11%; p=0.006) and LVH (41% vs. 6%; p<0.001), but not CAC > 0 (51% vs. 37%; p=0.1) and strain (14% vs. 11%; p=0.7), were significantly more prevalent in hypertensive patients. After adjusting for age, gender, smoking status, SBP, heart rate, total cholesterol, high-density lipoprotein cholesterol, BMI, waist circumference, the use of lipid-lowering drugs, and number of antihypertensive drugs, uncontrolled hypertension remained independently predictive of CAC (beta=125 (52-198); p=0.001), SLI (beta=9.24 (6.76-11.72); p<0.001), CVDP (beta=625 (409-840); p<0.001), CAC > 99 (exp(beta)=3.68 (1.28-10.54); p=0.02), and LVH (exp(beta)=10.15 (3.91-26.35); p<0.001). When predicting CAC, there was a significant interaction between patient group and total cholesterol (uncontrolled hypertension: beta=-97 (-205-9); controls: beta=-10 (-31-10); p=0.03), and patient group and BMI (uncontrolled hypertension: beta=31 (10-51); controls: beta=1 (-3-6); p<0.001), respectively. No significant group-related interactions were detected in the prediction of SLI or CVDP.

Conclusions: The presence of uncontrolled hypertension was independently associated with higher values of CAC and a greater prevalence of electrocardiographic LVH.

PP.06.18 DETERMINANTS OF LEFT VENTRICULAR MASS IN RENAL TRANSPLANT RECIPIENTS

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Objective: Renal transplantation (RT) has been associated with a decrease in left ventricular mass (LVM) compared to pre-transplantation. However, little is known regarding the factors that may affect LVM after transplantation. The aim of the study was to identify determinants of LVM index (LVM adjusted to body surface area) in RT recipients (RTR).

Design and method: Forty-five RTR (mean age 50 years, 67% males, median time from RT 59 months) who attend the out-patient RT clinic of an academic hospital participated in the study. No patient had known cardiovascular disease. Conventional 2D and tissue Doppler echocardiography was used to assess cardiac function. Coronary flow reserve (CFR) in the left anterior descending artery using dipyridamole was also measured. Multivariate linear regression models were constructed using all variables that reached statistical significance at $p<0.1$ level in univariate correlation with LVM index.

Results: Hypertension and diabetes were reported in 87% and 16% of our population respectively. Thirty-one patients (69%) were previously on hemodialysis and the remainder on peritoneal dialysis. Triple immunosupression regime (calicineurin inhibitor based) was administered in 87% of RTR while the rest 13% of patients received a steroid-free, double regime. LV hypertrophy was found in 49% of patients. LVM index was associated with greater LV end-diastolic volume, stroke volume and left atrium size ($p<0.05$ for all). Increased systolic blood pressure, pulse pressure and time from transplantation, diabetes, and hemodialysis modality were all associated with greater LVM index ($p<0.05$ for all). LVM index was not related to CFR. In multivariate analysis, higher pulse pressure (B 1.16, $p<0.001$) and increasing time since transplantation (B 0.13 per month, $p=0.004$) were independent predictors of LVM index (R^2 0.41, $p<0.001$).

Conclusions: In conclusion, in RTR LVM index was associated with greater pulse pressure indicating the role of increased arterial stiffness. Furthermore, increased time from the transplantation procedure also predicted increased LVM. The role of stricter cardiovascular risk factor and blood pressure control, especially with increasing time since transplantation, on cardiac function remains to be elucidated in future studies.

PP.06.19 EFFECTIVENESS AND TOLERABILITY OF COMBINED THERAPY WITH ZOFENOPRIL AND LERCANIDIPINE IN ELDERLY PATIENTS WITH ISOLATED SYSTOLIC HYPERTENSION AND LEFT VENTRICULAR HYPERTROPHY

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Objective: This study aimed to evaluate the efficacy and tolerability of combined therapy with Zofenopril and Lercanidipine in elderly patients with isolated systolic hypertension (ISH) and left ventricular hypertrophy (LVH).

Design and method: 50 elderly patients (24/26 f/m) with ISH were studied during 32 weeks. Mean age of patients was 75.3±4.3 years. Mean duration of hypertension was 8.4±5.1 years.
All patients received Zofenopril 30mg and Lercanidipine 10-20 mg once daily for 32 weeks. Left ventricular mass, E/A ratio, left ventricular (LV) diastolic diameter, posterior wall and septal thickness were determined by EchoCG and Doppler examination at baseline and after 4 and 8 month of the treatment. Control examination of SBP and DBP were made every 2 weeks. Tolerability evaluations were based on adverse events, clinically relevant reports of abnormalities, laboratory tests, and patients requested to subjectively estimate their state, as excellent, good, satisfactory and unsatisfactory. The relationship between parameters was established by Spearman correlation analysis, $p<0.05$ was considered statistically significant.

Results: A distinct decrease in the level of SBP was noted already to the 2nd week from the beginning of the treatment. After 32 weeks SBP decreased from 168.2±15.8 to 134.4±10.5 ($p<0.001$). EchoCG and Doppler examination revealed reducing of LVMI from 133.6±4.4g/m2 to 114.5±3.1g/m2 ($p<0.005$), LV posterior wall and septal thickness reduced from 11.2±1.5 to 10.4±1.2 mm ($p<0.001$) and 12.65±1.15 to 11.2±1.4mm ($p<0.001$), E/A ratio increased from 0.78±0.17 to 0.86±0.14 ($p<0.002$). In the observed patients pulse pressure against the background of treatment by Zofenopril and Lercanidipine was reduced in 32 weeks by 40% of the initial level. Treatment was well tolerated; no clinically relevant or laboratory tests changes were induced by the treatment. None of the patients estimated his state as unsatisfactory.

Conclusions: This study shows that combined therapy with Zofenopril and Lercanidipine beneficially affects on left ventricular hypertrophy and blood pressure in elderly patients with isolated systolic hypertension, has a good tolerability and favorable effect on pulse pressure.

PP.06.20 LIPID PARAMETERS AND LEFT VENTRICULAR MASS IN ESSENTIAL HYPERTENSIVE PATIENTS

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Objective: Conflicting data exist about whether dyslipidemia plays a part in the development of ischemia-independent hypertensive heart disease. Moreover, little is known about the potential influence of gender on this relationship. Our aim was to assess the relationship of serum lipids with left ventricular (LV) mass in essential hypertensives (EHs).

Design and method: We enrolled 724 EH patients (mean age: 45 ± 12 years; 63 % males), free from cardiovascular complications and not treated with hypolipidemic drugs. In the patients previously pharmacologically treated for hypertension, treatment was withdrawn for at least 2 weeks. In all subjects total cholesterol (Tchol), serum triglycerides (TG) and HDL cholesterol (HDLc), were determined. Moreover, echocardiographic examination and 24-h ambulatory blood pressure (BP) monitoring, were performed. LV mass was indexed for body surface area (LVMI).

Results: In the overall population, and in men and women separately analysed, we did not observe any significant correlation of Tchol, LDLc and nonHDLc with LV mass. We found significant correlations of HDLc ($r = -0.14$, $p < 0.0005$) and of TG ($r = 0.11$; $p = 0.003$) with LVMI. Similar results were obtained in both sexes. The TG/HDLc ratio showed significant correlations with LVMI in the overall population ($r = 0.16$; $p < 0.0005$), in women ($r = 0.15$, $p = 0.03$), and in men ($r = 0.15$, $p = 0.002$). When, in multiple regression models exploring the independent correlates of LVMI, HDLc and TG were both included as explanatory variables, only HDLc remained associated with LVMI ($\beta = -0.108$, $t = -2.83$; $p = 0.0005$). When in the same models, instead of TG and HDLc, we added the TG/HDLc ratio, the association of this with LVMI was highly significant ($\beta = 0.14$, $t = 3.7$; $p < 0.0001$). Analysis of the interaction term "gender x TG/HDLc" revealed no significant effect of sex on the association of TG/HDLc with LVMI.

Conclusions: Our results seem to suggest that among serum lipids only HDLc and the TG/HDLc ratio are related to LVMI. Insulin resistance might be the link between these parameters.

PP.06.21 CORONARY PERFUSION AND BLOOD PRESSURE IN SHIFT WORKERS

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Objective: To assess the relationship between blood pressure values and coronary perfusion in shift workers.

Design and method: A total of 47 shift workers (2-4 shifts), aged 31±8 years, 32% male, underwent arteriography. Systolic and diastolic blood pressure (SBP and DBP), systolic blood pressure in the aorta (SBPAo), mean arterial pressure (MAP), diastolic reflection area (DRA) and diastolic area index (DAI) were measured.

Results: Coronary perfusion was impaired in 47% of the participants. SBP, DBP, SBPAo, DRA and DAI were: 120±13 mmHg, 69±14 mmHg, 110±15 mmHg, 53±12 and 51±4.27%, respectively. Significant negative correlations were found between DAI and MAP (r=-0.313) and SBP (r=-0.311), respectively. Linear and multiple regression analysis revealed significant associations between blood pressure values, the number of shifts and DRA and DAI. DAI was significantly associated with the SBP ($p=0.032$) and DBP ($p=0.01$) (multiple R=0.99, R square=0.981, adjusted R=0.957, significance F<0.01). Significant associations were also found between impaired coronary perfusion (DRA<50 or/and DAI<50 % and elevated blood pressure values. Impaired DRA was significantly associated with elevated SBP ($p=0.016$) and the number of shifts ($p<0.01$).

Conclusions: Impaired coronary perfusion is associated with high normal blood pressure and hypertension in shift workers. Detection and control of high normal blood pressure and hypertension could represent effective preventive tools for coronary heart disease in shift workers.

PP.06.22 SERUM MATRIX METALLOPROTEINASE-1/TISSUE INHIBITOR OF MATRIX METALLOPROTEINASE-1 AND HEART REMODELING IN HYPERTENSIVE PATIENTS

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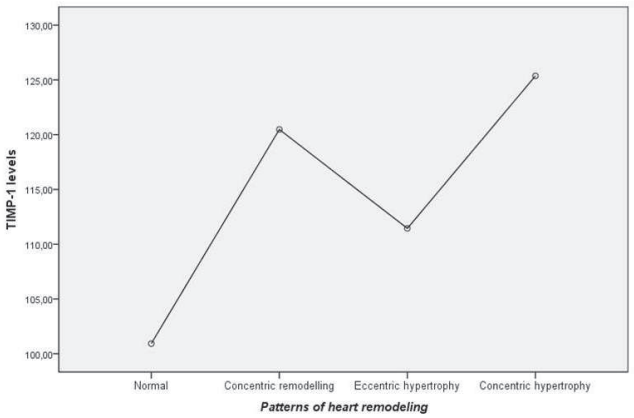
Objective: Increasing experimental evidence indicates that alterations in the extracellular matrix are implicated in hypertension and its chronic complications. The aim of our study was to determine if the plasma concentrations of matrix metalloproteinase-1 (MMP-1) and its tissue inhibitor (TIMP-1) are correlated with heart remodeling in arterial hypertension.



Design and method: We studied 159 consecutive patients with treated essential hypertension. An exhaustive evaluation of heart with echocardiography was performed to determinate left ventricular mass index (LVMI) and relative wall thickness (RWT), and plasmatic levels of MMP-1 and TIMP-1 were determined. Patients were categorized in four groups based in LVMI and RWT: 1) Normal geometry (58 patients); 2) concentric remodeling (54 patients); 3) concentric hypertrophy (42 patients); and 4) eccentric hypertrophy (5 patients).

Results: The mean age of hypertensive patients was 56 ± 13 years, with 67.3% male, 45.3% had dyslipidemia, 30% were diabetic and 27.7% smokers. 87.4% of patients were treated with antihypertensive drugs. In the comparative study, we observed that patients with ventricular hypertrophy (concentric and eccentric) and concentric remodeling had significantly higher plasma levels of TIMP-1 that patients with normal geometry (figure). There were no differences in MMP-1 levels. Furthermore a positive correlation between plasma levels of TIMP-1 and LVMI was found ($r = 0.326$, $p < 0.01$).

Conclusions: Our study shows higher plasma levels of TIMP-1 in patients with left ventricular hypertrophy and in those with concentric remodeling compared with hypertensive patients with structurally normal heart. TIMP-1 may have a role as a biomarker of heart remodeling in hypertensive patients.

PP.06.23 DETERMINANTS OF LEFT VENTRICULAR DIASTOLIC DYSFUNCTION IN HYPERTENSIVE PATIENTS

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Objective: To identify risk factors related to left ventricular (LV) diastolic dysfunction in hypertensive patients without the diagnosis of congestive heart failure and with normal systolic function.

Design and method: One hundred fifty eight patients were underwent tissue Doppler imaging (TDI) and M-mode and Doppler echocardiography transmitral and pulmonary venous flow, measurement of fasting and postprandial immunoreactive insulin concentration on 60 and 120 min of standard oral glucose-tolerance test (OGTT). Blood pressure (BP) was measured by ambulatory BP monitoring. Mean age of patients was 57.2±2.4 years, average duration of hypertension was 16.6±2.9 years, mean body mass index (BMI) was 28.7±0.3 kg/m².

Results: One hundred six (67%) showed LV diastolic dysfunction (grade I and II diastolic dysfunction) on Doppler echocardiographic studies. Patients with LV diastolic dysfunction were older than those without LV diastolic dysfunction. After adjusting for age and sex, BMI was higher, hypertension duration was longer, BP and LV mass index, plasma insulin concentration on 60 and 120 min of OGTT was higher in patients with LV diastolic dysfunction than in those without LV diastolic dysfunction. In order to determine risk factors affect LV diastolic parameters we selected E/e' and TDI parameters e'/a', e', a'. In model were included age, duration of hypertension, BMI, BP, LV mass index and relation wall thickness, LV posterior wall thickness and interventricular septum thickness and plasma insulin concentration. Multiple regression analysis demonstrated that predictor of E/e' was age (ß=0.383, p=0.009), predictor of e'/a' was interventricular septum thickness (ß=-0.579, p=0.0001), predictor of e' was diastolic blood pressure (ß=-0.515, p=0.0001), predictor of a' was relation wall thickness (ß=-0.309, p=0.013).

Conclusions: Abnormalities in LV diastolic function in hypertensive patients without the congestive heart failure were associated with age, increase of diastolic blood pressure and with the development and progression of concentric LV hypertrophy.

PP.06.24 INCREASED CIRCULATING MESENCHYMAL STEM CELLS IN PATIENTS WITH ESSENTIAL HYPERTENSION AND LEFT VENTRICULAR HYPERTROPHY

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Objective: Stem and progenitor cells are implicated in ventricular remodelling and have great clinical significance in many cardiovascular diseases. However, there are limited data regarding the involvement of mesenchymal stem cells (MSCs) in the pathophysiology of arterial hypertension. The aim of this study was to investigate the circulation of MSCs in patients with essential hypertension.

Design and method: We included 24 patients with untreated essential hypertension and 19 healthy individuals. All subjects underwent a complete echocardiographic study. In addition, peripheral blood samples from all participants were immunostained with antibodies against the cell surface markers CD34, CD45 and CD90. Using flow cytometry, we measured MSCs as a population of CD45-/CD34-/CD90+ cells and also as a population of CD45-/CD34-/CD105+ cells. The resulting counts were translated into the % percentage of MSCs in the total cells of peripheral blood.

Results: Hypertensive patients were shown to have increased circulating CD45-/CD34-/CD90+ compared to controls (0.0069 ± 0.012% compared to 0.00085 ± 0.0015%, respectively, p=0.039). No statistically significant difference in circulating CD45-/CD34-/CD105+ cells was found between hypertensives' and normotensives' peripheral blood (0.018 ± 0.013% compared to 0.015 ± 0.014%, respectively, p=0.53). Notably, CD45-/CD34-/CD90+ circulating cells were positively correlated with left ventNricular mass index (LVMI) (r=0.516, p<0.001).

Conclusions: Patients with essential hypertension have increased circulating MSCs compared to normotensives, and the number of MSCs is correlated with LVMI. Our findings contribute to the understanding of the pathophysiology of hypertension and might suggest a future therapeutic target.

PP.06.25 INTERACTION OF BLOOD PRESSURE LEVEL AND AGE ON HEART RATE VARIABILITY AND HEART RATE TURBULENCE IN ELDERLY HYPERTENSIVE PATIENTS

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Objective: To investigate the interaction of blood pressure (BP) level and age on heart rate variability (HRV) and heart rate turbulence (HRT) in elderly hypertensive patients.

Design and method: Six hundred and ten participants were eligible enrolled in health examination center affiliated to Shandong Academy of Medical Sciences. Participants were divided into four groups, namely, aged 60 or over hypertensive group (n = 155), aged 60 or over nomortensive group (n =142), aged less than 60 hypertensive group (n =162), and aged less than 60 nomortensive group (n =151) according to BP level and age. Using Century 3000 Holter system, following parameters of HRT were assessed: SDNN, SDANN, square rMSSD, pNN50, VLF, LF, HF, and LF/HF ratio. The parameters of HRT were assessed as follows: TS and TO.

Results: In aged 60 or over hypertensive group, for parameter of HRV, SDNN was 71.6±21.5ms, SDANN was 65.4±16.0ms, rMSSD was 21.2±5.4ms, pNN50 was 30.5±9.8%, VLF was 597±193ms2, LF was 571±175ms2, HF was 169±69ms2, and LF/HF ratio was 3.5±1.2; for parameter of HRT, TS was 5.0±1.1ms/RR and TO was0.2±0.8%. In aged 60 or over hypertensive group SDNN, SDANN, rMSSD, pNN50, VLF, LF, HF, and TS were significant lower, and LF/HF and TO were significant higher than those in the other 3 groups ($P < 0.005$). In aged less than 60

nomortensive group, SDNN, SDANN, rMSSD, pNN50, VLF, LF, HF, and TS were markedly higher, and LF/HF and TO were markedly lower than those in aged 60 or over nomortensive group and aged less than 60 hypertensive group (all $P < 0.05$). Either BP level or age significant impacted on heart rate variability and heart rate turbulence ($P < 0.05$).There were synergistic effects of BP level and age on SDNN, SDANN, rMSSD, VLF, LF, HF, LF/HF, TO, and TS (all $P < 0.05$).

Conclusions: BP level and age have synergistic effects on cardiac autonomic nervous dysfunction in elderly patients with hypertension.

PP.06.26 GLOBAL HEMODYNAMIC LOAD AS A PROGNOSTICATOR IN AORTIC STENOSIS

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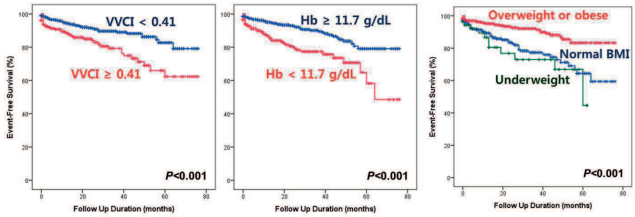
Objective: Valve area and global hemodynamic load are important predictors of adverse outcome in aortic stenosis (AS). However, only limited data have been available to provide risk stratification. We evaluated whether ventriculo-vascular coupling index (VVCI) can be used as a prognosticator reflecting systemic hemodynamic load.



Design and method: A total of 848 consecutive asymptomatic patients (mean age, 71±12) with mild to moderate AS (aortic jet velocity >2.0 m/s) were retrospectively analyzed. We excluded the patients who have aortic valve area <1.0 cm^2 or ejection fraction <50%. Cardiovascular death, aortic valve replacement and admission for heart failure were regarded as clinical events.

Results: During mean follow up duration of 23±21 months, 40 patients were died from cardiovascular cause, 25 patients experienced aortic valve replacement and 31 patients were admitted with heart failure. Estimated event-free survival was 93.0 ± 1.0% at 1 year, 86.0 ± 1.6% at 3 years, and 75.7 ± 3.0% at 5 years. In multivariate Cox regression analysis, VVCI turned out to be the most powerful predictor of clinical events (adjusted HR 5.39, [95% CI 1.85-15.66], P=0.002). The patients with higher VVCI (>=0.41; the best cut-off value in ROC analysis) experienced clinical events more frequently (8.3% vs. 16.6%; OR 2.2 [95% CI 1.40-3.43], P<0.001). BMI (adjusted HR 0.89 [95% CI 0.82-0.96], P=0.003), hemoglobin (adjusted HR 0.87 [95% CI 0.77-0.99], P=0.037) and peak aortic jet velocity (adjusted HR 1.76 [95% CI 1.18-2.62], P=0.006) were also independent predictor of outcome.

Conclusions: The actual cardiovascular event rate of mild to moderate AS is substantially high in real world. In addition to conventional parameters, BMI, hemoglobin and VVCI are also powerful independent predictors of clinical events in asymptomatic mild to moderate AS.

PP.06.27 BLOOD PRESSURE PROFILE IN PATIENTS WITH OBSTRUCTIVE AND NONOBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY

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Objective: There are few studies focused on blood pressure (BP) profile in patients with hypertrophic cardiomyopathy (HCM) and influence of obstruction on BP parameters. To assess difference in BP profile and arterial stiffness in patients with obstructive and nonobstructive HCM.

Design and method: We examined 12 patients: 7 patients (group I) with obstructive HCM (4 men, average age 56.6±6.5 years) and 5 patients (group II) with nonobstructive HCM (2 men, average age 57.9±16.9 years). 24-h BP monitoring («BPLab») with arterial stiffness and central BP assessment were performed after therapy has been withdrawn. Two groups were comparable in gender (p=0.34), age (p=0.64), clinical status (II functional class by NYHA p=0.58) and arterial hypertension degree (2.3±0.5 and 2.4±0.5, p=0.88).

Results: There were no significant differences between I and II groups in maximum systolic BP (SPB) (171.6±15.7 and 165.6±11.2, p=0.53 accordingly), maximum diastolic BP (DPB) (106.9± 20.4 and 102.0±10.9, p=0.99), minimum SPB (104.0±12.2 and 99.0±8.6, p=0.52), minimum DPB (57.4±10.6 and 45.4±10.0, p=0.15), average daytime SBP (134.3±13.9 and 128.4±16.7, p=0.43), average daytime DBP (81.3±10.0 and 73.2±8.04, p=0.27), daytime SBP and DBP time index (p=0.43 and p=0.27 accordingly). Significant differences were revealed in average nighttime SBP (134.6±18.9 and 111.2±6.3, p=0.005), nighttime SBP time index (54.4±40.5 and 6.8±9.5, p=0.03) and nighttime SBP variability (14.7±7.0 and 9.2±2.0, p=0.04). In group I these parameters were higher. In group I SBP non-dippers were prevaled (43%) and in group II - dippers (40%), although the difference was not statisticaly significant (p=0.4). Ambulatory arterial stiffness index (AASI) was higher in group I (0.57±0.15 and 0.30±0.2, p=0.03). Significant correlation was revealed between obstruction and average nighttime SBP (r=0.79, p=0.002), nighttime SBP time index (r=0.66, p=0.02), nighttime SBP variability (r=0.62, p=0.03) and AASI (r=0.66, p=0.02).

Conclusions: Obstruction of LV outflow tract in HCM patients was associated with higher night SBP parameters and higher ambulatory arterial stiffness index.

PP.06.28 PREVALENCE AND PATTERN OF HIV-RELATED CARDIAC DYSFUNCTION AMONG NIGERIAN PATIENTS

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Objective: Human immunodeficiency virus (HIV) infection has added to the ever increasing list of causes of cardiovascular morbidity and mortality especially in the era of highly active antiretroviral therapy (HAART). We determined the prevalence and pattern of cardiac dysfunction among Nigerian HIV-infected patients.

Design and method: The study involved two hundred consecutively recruited HIV-positive consenting adults 18 years and above. It was questionnaire based, followed by clinical examination, laboratory investigations, electrocardiography (ECG), two dimensional echocardiography and Doppler studies.

Results: The mean age of the participants was 37±9 years and 71% were women. The median CD4 cell count was 358 cells/mm3 and 84.4% were on HAART. HIV-related cardiac dysfunction (HRCD) was diagnosed in 39.5%. HRCD was more common in males (52% vs. 35%, p-value 0.01) and in patients with CD4 cell <200 cells/mm3 (72% vs. 29%, p-value <0.001). Left ventricular hypertrophy was the most common ECG abnormality (29.6%). Diastolic dysfunction and systolic dysfunction each was seen in 10.5%, pericardial effusion in 8.5% with a case of tamponade, dilated cardiomyopathy 4.5%, isolated left ventricular dilatation 4.0%, pulmonary hypertension 4.0%, and right ventricular dysfunction 0.5%. Ejection fraction (p<0.01), fractional shortening (p<0.01) and left ventricular internal diameter (p<0.01) differed significantly between patients with HRCD and those without.

Conclusions: Cardiac disease complicating HIV/AIDS is common and various patterns exist. Considering the consequences of late diagnosis for cardiac disease in the light of its increasing burden in an immune-compromised population, we recommend regular cardiovascular screening for high risk groups in order to institute early intervention.

PP.06.29 CENTRAL AUGMENTATION PRESSURE IS INDEPENDENTLY RELATED TO MYOCARDIAL CONTRACTION AND RELAXATION

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Objective: Central augmentation pressure (AP), an important component of central pulse pressure may be influenced by ventricular dynamics. We examined whether AP relates to myocardial contraction and relaxation independently of age, gender and left ventricular (LV) geometry in subjects with a wide range of blood pressure.

Design and method: We studied 120 subjects, evaluated for hypertension but otherwise free of clinically apparent cardiovascular disease aged 48.9±16.6 (mean ± SD) years with mean systolic blood pressure of 137.3±24.0 mmHg. Carotid pressure, obtained by tonometry calibrated from peripheral mean and diastolic BP, was used to calculate AP (difference between the second and first systolic peaks of the aortic waveform). Systolic (S) and diastolic (E') basal lateral segment velocities were measured by pulsed-wave Tissue Doppler Imaging, and early mitral inflow velocity (E) was measured by pulsed-wave Doppler from apical 4-chamber view. LV geometry was determined by LV mass over LV end diastolic volume (LVM/LVEDV) ratio.

Results: Augmentation pressure increased as the S wave decreased: 7.8±1.6,

13.0±1.6 and 16.2±1.7 mmHg (means±SE) for third, second and first tertiles of the S wave respectively (p=0.002) and increased as E/E' increased: 6.9±1.3, 11.9±1.2 and 18.2±2.1 mmHg for first, second and third tertiles of E/E', respectively (p<0.0001). After adjustment for age, gender and LVM/LVEDV, augmentation pressure was negatively associated with the S wave (standardized β=-0.31, p=0.001) and positively associated with E/E' (standardized β=0.35, p<0.0001).

Conclusions: Higher AP is associated with diminished longitudinal systolic contraction and impaired diastolic function independently of age, gender and LV geometry. These results do not determine the direction of causality between AP and ventricular dynamics but are consistent with ventricular dynamics being a determinant of AP.

PP.06.30 LOW DIASTOLIC BLOOD PRESSURE WAS ONE OF THE INDEPENDENT PREDICTORS OF ISCHEMIA-LIKE FINDINGS OF ELECTROCARDIOGRAM IN PATIENTS WHO UNDERWENT CORONARY ANGIOGRAPHY

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Objective: To investigate whether low diastolic blood pressure (DBP) causes myocardial ischemia or not, the authors examined the relationship between DBP and ischemia-like findings of ECG.

Design and method: We enrolled 187 patients who underwent coronary angiography (CAG). Patients with conditions affecting ECG (e.g., patients taking digitalis or those with old myocardial infarction, complete right bundle branch block, or hypokalemia) were excluded from the analyses. Ischemia-like ECG was defined as having one or more of the following: borderline Q wave (Minnesota code (MC) I-3), ST depression (MC IV-1, 2, 3), negative T wave (MC V-1, 2, 3), and complete left bundle branch block (MC VII-1). CAG findings, blood pressure and other cardiovascular risks were analyzed to determine the significant factors for ischemia-like ECG.

Results: Based on the above definition, 70 of 187 patients (37%) had ischemia-like ECG. Compared with the group without it, the group with ischemia-like ECG included more females (p<0.01), and had lower values of body mass index (p=0.01), DBP (p<0.01), estimated glomerular filtration rate (p<0.01), left ventricular ejection fraction (LVEF, p<0.01), and higher values of age (p<0.01) and left ventricular mass index (LVMI, p<0.01). The severity of coronary artery disease did not differ between the groups. Receiver operating characteristics (ROC) curve analysis revealed that 74.5mmHg was the optimal cut-off point of DBP to predict ischemia-like ECG (area under curve, 0.63; 95% confidence interval, 0.55-0.71, p=0.003). There were no significant relationships between systolic blood pressure or severity of coronary artery stenosis and ischemia-like ECG. A multivariate analysis showed that female sex, low DBP (= or < 74.5 mmHg), LVMI, and EF were the significant factors for the ischemia-like ECG. The odds ratio of low DBP was 2.53 (95% confidence interval, 1.19-5.40; p=0.02).

Conclusions: Low DBP was one of the significant predictors of the ischemia-like ECG in the present study. Myocardial ischemia may be a part of the cause of high cardiovascular morbidity in the population with low DBP.

PP.06.31 LEFT VENTRICULAR DIASTOLIC STIFFNESS ASSESSED BY DIASTOLIC WALL STRAIN WITH CONVENTIONAL ECHOCARDIOGRAPHIC STUDY: CLINICAL AND EXPERIMENTAL OBSERVATIONS

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Objective: The purpose of this investigation is to evaluate left ventricular diastolic wall strain (dws) based on the linear elastic theory, by echocardiography, in hypertensive patients (HT) and in spontaneously hypertensive rats (SHR).

Design and method: 15 consecutive HT and 15 normotensive (NT) for the same community and 24 rats, 8 normotensive (W) and 16 SHR: 8 controls and 8 treated (SHR T) with cariporide were studied. Echocardiography was performed in humans and animals to evaluate left ventricular (LV) structure and function. Dws was calculated according to Takeda et al. (J Cardiac Fail 2009;15:68-77). All the rats were sacrificed to weigh the heart, to measure the cross-sectional area of the myocytes, the fractional volume of collagen and the LV papillary muscle distensibility.

Results: LV mass index (LVMI) was higher (NT: 58,.89 ± 3.34 g/m2 ; HTA: 102.13± 8.6 g/m2, - p<0.01) and Dws was lower (NT: 0.46 ± 0.02, HTA: 0.38 ± 0.03- p<0.02) in HT; besides SHR also showed higher LVMI (W: 1.46±0.04 mg/g; SHR 2,31±0,15 mg/g – p< 0,01) with bigger size of myocytes (W: 285.26±18.47 m2, SHR: 447.38±36.94m2-p< 0,05), fractional volume of collagen (W: 2,50±0,30%, SHR:8,50±0,29%- p<0,05), worse papillary muscle distensibility (W: 0,013 ± 0,002 g/mm, SHR: 0,078 ± 0,0154 g/mm, p<0,05), and lowest Dws (W: 0,52± 0,01, SHR: 0,32±0,02- p<0,05). SHRT had LVMI (SHR-T: 1,59±0,14 mg/g, p<0,05), myocytes size (SHR-T: 287,32±20,52m2-p<0,05), and fraction volume of collagen (SHR T: 1,20±0,30%, p<0,05) reduction with improvement of papillary muscle distensibility (SHR-T: 0,010 ± 0,0021 g/mm - p<0,05) and Dws (SHR-T: 0,42±0,03% -p<0,05).

Conclusions: The analyzed results allow conclude that the utilization of an index of easy obtaining with transthoracic conventional echocardiogram, be effective to characterize the state of rigidity of the LV in human and animals model with arterial hypertension. This concept can be important to advance in the knowledge of the mechanisms that conduct to heart failure in this scenario.

PP.06.32 PREVALENCE OF PULMONARY HYPERTENSION IN PATIENTS WITH DEGENERATIVE MITRAL VALVE DISEASE IN ENUGU SOUTH-EAST NIGERIA

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Objective: Pulmonary hypertension is a common complication of degenerative mitral valve disease, and contributes significantly to both morbidity and mortality. The use of medications for reduction of pulmonary pressure in patients is not a common practice by most physicians in this part of the world because of the absence of data on pulmonary hypertension. The authors set out to find the prevalence of pulmonary hypertension in patients with degenerative heart diseases and to determine if there are gender differences in affectation. This will form a basis for future research on the treatment of pulmonary hypertension in Sub-Saharan Africa.

Design and method: The echocardiographic records of 1390 patients done over a 4-year period were retrospectively reviewed. The examinations were done with a Logic 500MD Echocardiographic machine. Tricuspid valve regurgitant velocity above 250cm/s defined pulmonary hypertension. Data obtained included presence of degenerative mitral valve disease, pulmonary hypertension, age and gender.

Results: A total of 1390 echocardiogram reports done at Conquest Medical Imaging, Enugu, from July 2009 to August 2013 were retrospectively reviewed. Degenerative mitral valve disease was noted in 260 patients (18.7%), made up of 150 males and 110 females with a mean age of 68.3±14.4 years. Pulmonary hypertension was present in 75 patients (28.8%). There was no statistically significant difference in the frequency of pulmonary hypertension by gender.

Conclusions: Pulmonary hypertension is common in patients with degenerative mitral valve disease in Enugu, and both males and females are affected equally.

PP.06.33 BETA-AGONISTS WITH DIFFERENT TIME OF ACTION IN PATIENTS WITH CARDIOVASCULAR AND BRONCHO-OBSTRUCTIVE DISEASES

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Objective: To evaluate the influence of beta-agonists with different time of action (short-acting, long-acting, ultra-long-acting) in patients with cardiovascular and bronchoobstructive diseases on blood pressure (BP) levels, heart rate (HR), ST-T changes, Qt/QTc changes.

Design and method: 30 patients with cardiorespiratory diseases (arterial hypertension and chronic obstructive pulmonary disease or bronchial asthma) were prospectively enrolled. All patients were examined initially. In the next three month patients were treated with 3 types of beta-agonists: at the 1st month – with salbutamol, at 2nd month –with formoterol, at 3rd month –with indacaterol. At the end of each month all patients underwent Holter monitoring recording and ambulatory blood pressure 24-monitoring. Results are presented as Mean±std.

Results: Patients were 64,36±6,5y.o., with BMI 29,6±4,8 kg/m2; Systolic BP 132,7±13,7 mmHg; Diastolic BP 83,1±10,4 mmHg. Baseline, 1-month, 2-month, 3-month BP, HR levels were similar among all patients (p=NS). During one month of treatment with ultra-long-acting beta-agonist QTc was lower than initially (421±25,9 vs 435±20,9, p=0,01). In contrast treatment with short-acting and long-acting beta-agonists caused no significant QTc change (421±25,9 vs 423,8±30,6, p=NS, 421±25,9 vs 430,5±33, p=NS, respectively).

Conclusions: Treatment patients with cardiorespiratory diseases by beta-agonists with different time of action during one month had not influence on blood pressure levels, heart rate, ST-T changes. However, treatment of patients by ultra-long-acting beta-agonists accompanied by reducing of QTc, which needs further investigations.

PP.06.34 TWELVE YEARS PROGNOSTIC SIGNIFICANCE OF ELECTROCARDIOGRAPHIC LEFT VENTRICULAR HYPERTROPHY IN PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: The aim of the study was to examine twelve years prognosis in patients (pts) with positive Lyon-Sokolow score and Cornell voltage QRS duration product and presence of echocardiographic left ventricular hypertrophy (LVH).

Design and method: We examined 104 pts (61 male and 43 female; mean age 55.3 ± 8.4 years) with echocardiographic LVH. The LVH cutpoints were 125 g/m² for male and 110 g/m² for female. Electrocardiographic LVH was defined as the presence of Lyon-Sokolow score (LS) > 38 mm and Cornell voltage QRS duration product (CP) > 2.440 mm*sec. The clinical and laboratory examination, electrocardiography, echocardiography, exercise testing, and 24-hours ambulatory blood pressure monitoring were done.

Results: Average left ventricular mass index (LVMI) was 170.8 ± 32.1 g/m² and duration of hypertension was 12.5 ± 7.7 years. During twelve years of follow-up in 31 (29.8%) pts occurred cardiovascular and cerebrovascular adverse events (ACE = myocardial infarction, cardiac or sudden death, angina pectoris, cerebrovascular insult). At the beginning of the study pts with ACE had greater: LVMI (190.4 ± 38.0 g/m² vs. 162.5 ± 25.2 g/m²; p < 0.001). Patients with ACE had greater QTc interval dispersion than patients without ACE (73.1 ± 19.7 ms vs. 54.0 ± 19.6; p < 0.001). There were positive correlations between LVMI and LS (r = 0.367; p < 0.01) and CP (r = 0.357; p < 0.01). ACE occurred in 9 (60.0%) pts of 15 pts with positive LS, and in 22 (24.7%) pts of 89 pts with negative score (odds ratio 4.57; 95% CI 1.46 to 14.28). ACE occurred in 11 (61.1%) pts of 18 pts with positive CP and in 20 (23.2%) pts of 86 pts with negative product (odds ratio 5.19; 95% CI 1.78 to 15.14).

Conclusions: Patients with echocardiographic LVH and positive LS and/or CP have additional risk for new cardiovascular adverse events than patients without electrocardiographyc LVH durin twelve years of follow-up and treatment.

PP.06.35 CARDIAC NITRIC OXIDE SYSTEM IS AFFECTED BY HYPOTHYROIDISM AND AGING

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Objective: The aim of this study was to evaluate the involvement of nitric oxide (NO) in the hemodynamic
alterations during hemorrhagic shock in hypothyroid adult rats.

Group	EC	EH	hC	hH
NOS A (pmol.10²/g.h)	5,10±0.50	56,14±2.57*	1,47±0.21#	23,7±1.14*
NOS V (pmol.10²/g.h)	1,63±0.014	1,88±0.015	4,4±0.018#	4,47±0,05
eNOS A (UA)	0.38±0.012	3.89±0.11*	0.88±0.02#	2.42±0.29*
eNOS V (UA)	0.51±0.004	0.9±0.3*	0.564±0.003	1.281±0.11*
iNOS A (UA)	0.33±0.01	0.848±0.002*	0.573±0.005#	0.923±0.003*
iNOS V (UA)	0.61±0.001	0.85±0.17*	0.56±0.002	0.99±0.19*

Design and method: Sprague-Dawley male rats, euthyroid (E) and hypothyroid (h), 18 months of age were divided into four groups: Group C: controls; Group H: hemorrhage (withdrawal of 20% of total blood volume); Group L+C: controls + L-NAME infusion (0,5 mg/kg/h IV = 100 µl/h) and Group L+H: L-NAME infusion + hemorrhage. The hypothyroidism was induced by metimazol treatment (0,02% in the drinking water) during 28 days. Mean arterial pressure (MAP) and heart rate (HR) were recorded during 120 minutes after bleeding. The right atria (A) and the left ventricle (V) were removed in order to determine NO synthase (NOS) activity ([14]-L-citrulline method) and protein levels (western blot). The results were expressed as X±SEM, n=6/group. ANOVA analysis followed by the Tukey test *p<0.05 vs. C; # p<0.05 vs EC.

Results: In the H group, the MAP decreased about 34%, stabilizing at 90 minutes. Among hypothyroids, the fall was 48% and there was no stabilization of this parameter. L-NAME treatment only recovered MAP in euthyroid rats. The bleeding induced bradycardia followed by tachycardic response. HR reached the stabilization phase at 90 minutes in the euthyroid group (FC=392±5 bpm). The L-NAME blunted these effects in euthyroid animals. Meanwhile, NOS inhibition attenuated them over hypothyroids. The hemorrhage increased NOS activity and eNOS as well as iNOS protein levels in all groups, being lower in hypothyroids animals. In the V, the bleeding did not modify the NOS activity but increased eNOS and iNOS protein levels in all groups

Conclusions: NO system is modified by the hypothyroidism, as it lightens the hemodynamic alterations induced by the hemorrhagic shock. Thyroid hormones would differentially modulate NO production depending on the heart chamber studied.

PP.06.36 VALUE OF HIGH-FREQUENCY MID-QRS ANALYSIS COMPARED TO EXERCISE TOLERANCE TEST IN PATIENTS WITH CHEST PAIN, NONDIAGNOSTIC ECG AND HIGH PREVALENCE OF LONG-STANDING HYPERTENSION

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Objective: Patients with acute chest pain (CP) and negative baseline screening for coronary artery disease (CAD) usually undergo exercise tolerance test (ETT) for risk-stratification. Analysis of ETT with high-frequency QRS components (HF-QRS) has been proposed, however the value of this novel technique has not been yet validated in patients with hypertension. The aim of this study was to compare the prognostic value of ETT to HF-QRS-analysis.

Design and method: Chest pain patients with normal ECGs, troponin, and echocardiography were enrolled, and excluded when presented QRS >=120 msec. All patients underwent maximal ETT, HF-QRS, and ETT-Echocardiography (ETT-echo). The ETT was considered positive when the ECG showed ST-segment depression >=2 mm or >=1 mm associated with CP. The ETT-echo if newer wall motion abnormalities were identified. The reduction of HF-QRS intensity >=50% of the signal recorded in two contiguous leads, at least, was considered positive.
The endpoint was the composite of coronary stenosis >=50% or acute coronary syndrome, revascularization, cardiovascular death at 3-month follow-up.

Results: Out of 175 patients considered, 142 were enrolled (mean age 58±17 years). At baseline, long-standing hypertension account for 50% of patients, dyslipidemia 29%, cigarettes smoking 24%, family history of CAD 22%, and diabetes mellitus 13%. Overall, 15 patients achieved the endpoint. At univariate analysis, hypertension (p=0.028, Hazard Ratio, HR, 3.84, Confidence Intervals, CI, 1.2-12.7), known ischaemic cardiovascular disease (p=0.015, HR, 4.0, CI, 1.3-12.0), positive HF-QRS-analysis (p=0.012, HR 4.7, CI 1.4-15.6), positive ETT (p=0.004, HR31.5, CI 3.0-326,8) and positive ETT-echo (p<0.001, HR 46.8, CI 11.3-193.7) were predictors of the endpoint. However, at multivariate analysis, only ETT-echo was predictor of the endpoint.
Interestingly, the HF-QRS-analysis was more sensitive (73% vs. 20%; p<0.01), but less specific (63% vs. 99%; p<0.001) than the ETT; when compared to ETT-echo it showed comparable sensitivity (73% vs. 80%; ps=NS) and lower specificity (63% vs 92%; p<0.001). The three techniques showed comparable negative predictive value (HF-QRS-analysis 95%, ETT 91%, and ETT-echo 98%; p=NS).

Conclusions: In patients with CP, high prevalence of hypertension, and baseline negative screening for CAD, the novel HF-QRS-analysis shows a valuable incremental prognostic value when compared with ETT.

PP.06.37 CASCADE TESTING FOR LONG QT SYNDROME IN SCOTLAND

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Objective: Long QT syndrome (LQTS) has a prevalence of 1 in 2,000 – 1 in 3,000 and is characterised by QT interval prolongation on the electrocardiogram (ECG). There is marked inter- and intra-familial variability in phenotype, with symptoms ranging from loss of consciousness (syncope) to life-threatening ventricular arrhythmias and sudden death. In the general population, QT interval prolongation is associated with an increased risk of sudden death, and a prolonged QT interval is a known risk factor for ischemic heart disease in hypertensive subjects.

Design and method: We sought to evaluate cascade testing for LQTS in Scotland up to 31st May 2013. Cascade testing is a mechanism for identifying people at risk of a genetic condition by a process of family tracing. Genetic testing is offered to relatives if a disease-causing mutation has been identified in the index individual (proband). LQTS testing was established in Aberdeen in 2006 with sequencing of the 5 commonest genes (KCNQ1, KCNH2, SCN5A, KCNE1 and KCNE2). Results are classed as follows: Class 5- definite pathogenic mutation, Class 4- likely pathogenic, Class 3- variant of unknown clinical significance and Class 2- unlikely pathogenic.

Results: Genetic testing for LQTS in 541 individuals identified 116 (21.4%) LQTS mutation positive (Class 5 & 4) probands. Families of 92 (79%) of them underwent cascade testing and 426 relatives came forward for testing generating 4.6 cascade tests per family. Of the 426 cascade tests, 223 (52.3%) were mutation positive. In compari-

son with other conditions tested at the same laboratory, there were 3.3 and 2.8 cascades per family for familial hypercholesterolaemia and BRCA1 respectively. Amongst probands tested for LQTS who were mutation (Class 5 & 4) negative, 22 probands had a Class 3 variant and 57 probands had a Class 2 variant detected.

Conclusions: Cascade testing for LQTS in Scotland successfully identifies cases where a pathogenic mutation has been found in the proband. More family members are coming forward for cascade testing in LQTS in comparison with some other conditions tested by the same laboratory.

PP.06.38 MICRORNA MEDIATED TELOMERE ATTRITION LEADING TO CARDIAC HYPERTROPHY

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Objective: Both the shortening of telomeres – the specialised DNA-protein structures that cap the ends of chromosomes – and abnormal expression of microRNAs – small, regulatory non-coding RNAs – have been associated with cardiac hypertrophy. The Hypertrophic Heart Rat (HHR) is a unique normotensive model of spontaneous polygenic ventricular hypertrophy that predisposes to cardiac failure and premature death. The aim of our study was to investigate whether there are changes in microRNA expression in the heart of the HHR that regulate telomeric genes and lead to cardiac abnormalities.

Design and method: Agilent arrays were used to measure the expression of cardiac microRNAs/mRNA in neonatal HHR in comparison to its control strain, the normal heart rat (NHR) (n=8/group) and differences were then validated by quantitative real-time PCR (qPCR). DNA was extracted from left ventricle tissue (n=16 neonates and n=21 adults) and circulating leukocytes (adults only), and relative telomere length measured by qPCR based on the Telomere to Single-copy gene (T/S) ratio method.

Results: miR-34a was the most differentially expressed microRNA in neonatal hearts, and validation by qPCR confirmed it was significantly over-expressed in both neonatal (P=0.0015) and adult (P<0.001) HHR hearts. Using miRNA prediction tools, we identified the target gene of miR-34a, Ppp1r10 (protein phosphatase 1 nuclear-targeting subunit [PNUTS]), which is known to regulate telomere length. PNUTS was down-regulated in neonatal (P=0.030) and adult (P=0.021) HHR. Telomeres were significantly longer (P=0.013) in the heart of neonatal HHR but shorter in the heart (P=0.012) and circulating leukocytes (P=0.007) of adult HHR. Both miR-34a and cardiac telomere length were correlated with heart size (P<0.05).

Conclusions: These data indicate that higher miR-34a expression leads to lower PNUTS mRNA and increased telomere attrition. Transient therapeutic suppression of miR-34a or increasing PNUTS activity could be beneficial to cardiac remodelling and function.

PP.06.39 LEFT ATRIAL VOLUME AND CARDIAC ECTOPIES IN ELDERLY ESSENTIAL HYPERTENSIVE PERSONS

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Objective: To assess prevalence of supraventricular and ventricular arrhythmias in elderly essential hypertensive persons depending on left atrial (LA) volume, indexed by body surface area (LAVI, ml/m²).

Design and method: We have taken 189 elderly (equal to or greater than 65 yrs old) essential hypertensive persons of the total sample (364 patients). 113 subjects had normal LAVI (23,6±3,3) and 79 patients had enlarged LAVI (35,2±6,8) (p<0,001). Cutoff value of enlarged LAVI was 29 ml/m². Persons with normal and enlarged LAVI were matched for age (65,3±3,4 vs 66±4,2 yrs, p=0,8), gender (the share of men – 49 vs 59%, p=0,17), body mass index (28,5±3,1 vs 28,3±3,0 kg/m², p=0,64). The office pulse blood pressure did not differ significantly (57,5±3,4 vs 60,5±4,1 mmHg, p=0,08). Subjects with valvular and thyroid diseases did not include in the research. All patients were underwent to 24-h electrocardiogram monitoring. Data are specified as mean ± standard deviation or as percents (%).

Results: Among patients with normal and enlarged LAVI the prevalence (in %) of frequent (equal to or greater than 30 beats per any hour of monitoring) supraventricular extrasystoles, atrial fibrillation, frequent ventricular extrasystoles were equal to 13,6 and 28,1 (p=0,05); 20,4 and 36,8 (p=0,001); 9,1 and 18,4 (p=0,02) respectively.

Conclusions: Enlarged LAVI is an important marker of not only supraventricular but and ventricular arrhythmias in elderly essential hypertensive persons.

PP.06.40 THE PREVALENCE OF AORTIC REGURGITATION IN HYPERTENSIVE ALBANIAN PATIENTS

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Objective: Association of hypertension with aortic root dilatation and aortic regurgitation (AR) is controversial. The degree to which AR is attributable to hypertension alone has been debated.
Our aim is to evaluate the prevalence of AR in hypertensive patients.

Design and method: We studied 915 patients (age 30- 75 years) with essential arterial hypertension and 159 normotensive age-matched subjects. M-mode and two echocardiographic analysis were performed to determine the aortic root diameter at the level of the sinuses of Valsalva, the chambers dimensions, wall thickness, left ventricular mass and left ventricular mass index. Color Doppler was performed to evaluate the presence and the degree AR.

Results: In the first group, 16.8% (154/915) of patients had AR, 1.75% (16/915) of them had moderate AR, whereas, 3.1% (5/159) of controls had mild AR (p<0.001). Aortic diameter at sinuses of Valsalva was 3.3± 0.44 versus 32.3± 0.36 cm (p=ns), in hypertensive versus normotensive subjects. In hypertonic patients AR was not related to sinuses of Valsalva diameter (r=0.077), but was related to aortic valve fibro-calcification (r=0.24), and left ventricular hypertrophy (r=0.28).

Conclusions: We found a higher prevalence of aortic regurgitation in hypertensive than in normotensive subjects. Careful echocardiographic evaluation is needed to prevent cardiac complications over the lifetime of hypertensive population.

PP.06.41 DEHYDRATION: NITRIC OXIDE SYSTEM AND CAVEOLINS ARE INVOLVED IN CARDIAC FUNCTION DURING AGING

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Objective: To evaluate the effects of osmotic stress caused by controlled long-term water restriction on cardiac NO system during aging.

Design and method: Male Sprague-Dawley rats of 2 (young) and 16 months (adult) of age were divided into E1: water restriction 3 days + 1 day of hydration (1 cycle) , repeating this cycle 8 times; C1: water ad libitum (1 month). At the beginning and end of each period we determined: a) systolic blood pressure by indirect method (SBP, mmHg), b) electrocardiogram and echocardiogram: heart rate (HR); end diastolic and systolic volume (EDV; ESV), systolic volume (SV) and ejection fraction (EF). Finally, animals were sacrificed and the left ventricle (LV) was extracted to evaluate NO synthase (NOS) activity (conversion to [14C]-L-arginine to [14]-L-citrulline and NOS and cav 1 and 3 protein levels (Western Blot). Data are expressed as mean (X) ± standard error of the mean (SEM). To analyze the data we used ANOVA followed by Tukey -b test for multiple variables and Tamhane - T2 test. Significancewas 5 % probability.

Results:

	Young		Adult	
	C1	E1	C1	E1
Body weight (g)	303 ± 11	194 ± 7*	611 ± 14†	414 ± 16* †
Hematocrit (%)	47 ± 1	56 ± 1*	49 ± 1	62 ± 2*
Plasma Osmolarity (mOSM)	310 ± 2	355 ± 7*	308 ± 2	337 ± 4*
SBP (mmHg)	109 ± 1	91 ± 3*	108 ± 2	82 ± 3*
HR (lpm)	335± 6	379 ± 4*	357 ± 6	327 ± 5*†
EDV (ml)	0.11±0.01	0.09±0.01	0.26±0.02†	0.27±0.01†
ESV (ml)	0.020±0.001	0.013±0.002	0.070±0.001†	0.067±0.002†
SV (ml)	0.090±0.003	0.080±0.011	0.193±0.021†	0.220±0.015†
EF (%)	81 ± 3	82 ± 2	73 ± 4	76 ± 2

* P<0,05 vs. respective control, † P<0,05 vs. respective young rats (C1, E1)
In control adult LV animals, NOS activity was higher in comparison to the young group; however, endothelial NOS, cav-1 and cav-3 protein levels were lower in this age group. NOS activity decreased after controlled water restriction in both age groups. NOS isoforms were not affected by the dehydration. Cav-1 and 3 protein levels increased after water restriction, being this increase lower in adult animals.

Conclusions: Water restriction induced a hypovolemic state in both age groups, evidenced by the decrease in body weight and changes in biochemical parameters. Cardiac NO system and its regulatory proteins cav changes in order to preserve cardiac function and to compensate the functional alterations induced not only by the aging process but by hypovolemic state as well.

PP.06.42 FEBUXOSTAT AMELIORATES DOXORUBICIN-INDUCED CARDIOTOXICITY IN RATS

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Objective: Doxorubicin, a routinely used chemotherapeutic agent, has its use highly limited by the occurence of cardiotoxicity as an adverse reaction, which is a manifestation of free radical production. As a result, we evaluated an antioxidant, febuxostat, a xanthine oxidase inhibitor, in rats exposed to doxorubicin.

Design and method: Male albino Wistar rats were divided into four groups: Control (Normal saline 2.5 mg/kg/day on alternate days, a total of 6 doses; Dox (2.5 mg/kg/day on alternate days, a total of 6 doses), doxorubicin + febuxostat (10 mg/kg/day for 14 days) and doxorubicin + carvedilol (30 mg/kg/day for 14 days).

Results: Febuxostat significantly ($p<0.05$) ameliorated the deranged cardiac functions (as evidenced by decreased left ventricular end diastolic pressure and improved inotropic and lusitropic states) in doxorubicin-administered rats. It also preserved the myocardial architecture on light and electron microscopy by decreasing fibrosis. These changes were corroborated with biochemical markers, wherein febuxostat reduced thiobarbituric acid reactive substances levels and elevated glutathione (reduced form) levels and manganese superoxide dismutase activity. It also reduced cardiac injury markers (creatine kinase-MB and B-type natriuretic peptide activity) and expression of inflammatory and apoptotic proteins (TNF-alpha, nuclear factor-kappa B, Bax, Bcl-2 and caspase 3). All these changes were similar to those produced by carvedilol.

Conclusions: The antioxidant effect of febuxostat contributes to its cardioprotection against doxorubicin-induced cardiotoxicity

PP.06.43 INFLUENCE OF NITRIC OXIDE SYSTEM AND OXIDATIVE STRESS IN THE CARDIAC ALTERATIONS INDUCED BY ZINC DEFICIENCY

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Objective: Moderate zinc deficiency during intrauterine and postnatal growth induces cardiovascular disorders in adult males, characterized by an increase in blood pressure levels and a decrease in wall thickness and left ventricular (LV) contractility. In turn, coronary arteries exhibited a hypertrophic remodeling associated with increased blood pressure.
To evaluate nitric oxide (NO) system and oxidative stress levels in adult male rats exposed to fetal and postnatal zinc deficiency.

Design and method: Female Wistar rats received during pregnancy up to weaning low (L:8 ppm) or control (C:30 ppm) zinc diet. After weaning, male offspring fed low (l) or control (c) zinc diet during 60 days (Cc, Ll, Lc). At day 81, we measured systolic blood pressure (SBP,mmHg,tail-cuff technique) and we evaluated in LV: basal NOS and endothelial(eNOS), neuronal(nNOS) e inducible(iNOS) isoforms activities (pmol 14C L-citrulline/g.tissue.min); eNOS protein expression (western blot; optical density eNOS/β-actin relative to Cc) and mRNA expression (RT-qPCR; eNOS/GAPDH relative to Cc), lipid peroxidation end products (TBARS, nmol/mg protein) levels, catalase(pmol/mg protein), glutathione peroxidase(GPx, µmol/min.mg.protein), superoxide dismutase(SOD, USOD/mg protein) activities and glutathione concentration(GLUT, mg/mg protein).
Values are means±SEM, n=6/group. One way ANOVA, Bonferroni post-test

Results:

	Cc	Ll	Lc
SBP	126±1	143±1*	146±2*
NOS activity	204±6	164±10*	157±11*
eNOS protein expression	1,0±0,1	0,9±0,1	1,3±0,2
eNOS mRNA expression	1,00±0,07	1,24±0,10	0,93±0,03
TBARS	0.21±0.02	0.78±0.08*	0.47±0.02*†
GLUT	1.8±0.3	0.6±0.1*	1.6±0.3
SOD	3,7±0,5	6,3±0,7*	6,4±0,4*
GPx	80±3	99±7*	92±2

*p<0.01vs Cc; †p<0.01vs Ll.
Basal NOS activity was not affected by nNOS and iNOS inhibitors, but was decreased by blocking Ca2+-calmodulin(Cc:47±2#,Ll:52±2#,Lc:49±2#,#p<0.001 vs. basal) in all groups. Catalase activity is similar in all groups.

Conclusions: Moderate zinc deficiency during fetal and postnatal life programs a lower production and bioavailability of cardiac NO, mostly, due to decreased activity of eNOS and increased levels of oxidative stress. The greater antioxidant enzymes activities would be a compensatory response to the increase in free radicals. Oxidative stress and NO impairment, jointly with other humoral, inflammatory and apoptotic mechanisms, could contribute to the cardiac disorders observed in adult males. Adequate zinc diet after weaning was unable to total avoid the cardiac alterations induced during fetal life.

PP.06.44 THE INFLUENCE OF COMBINED THERAPY WITH NEBIVOLOL AND LERCANIDIPINE ON LEFT VENTRICULAR DIASTOLIC FUNCTION AND HYPERTROPHY IN PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: To assess the effectiveness of combined therapy with Nebivolol and Lercanidipine on left ventricular diastolic dysfunction and hypertrophy in patients with essential hypertension.

Design and method: This study included 44 hypertensive patients, 22 men and 22 women (mean age 55.6±8.2 years). Mean duration of hypertension was 8.1±4.2 years. Initial systolic blood pressure (mmHg) – 164.5±11.4, diastolic blood pressure (mmHg) – 95.8±8.8, heart rate (bpm) - 89,4±2,7. Left ventricular mass index (LVMI) >120 g/m2 (for men) and >100 g/m2 (for women) considered as left ventricular hypertrophy (LVH). Diastolic heart function was assessed by the following Doppler EchoCG parameters: early (E) and late (A) peak velocities, E/A ratio, isovolumic relaxation time (IVRT) and deceleration time of early peak velocity (DT).
All patients were treated with Nebivolol 5 mg plus Lercanidipine 10-20 mg daily for 8 month after one-week washout period. Doppler EchoCG parameters of diastolic function and left ventricular mass index were determined at baseline and every 2-month. Systolic and diastolic blood pressure and heart rate were measured every month.
The relationship between parameters was established by Spearman correlation analysis, $P < 0.05$ was considered statistically significant.

Results: After 8 month of the treatment LVMI was decreased from 131,5±4.3 g/m2 to 116.1±3,3 g/m2 ($p < 0.001$), E/A ratio increased from 0,84±0,22 to 1,01±0,22 ($P < 0.002$), shortened isovolumic relaxation time (IVRT) from 117±11 ms to 97±11 ms ($p < 0.001$), and decreased deceleration time (DT) from 217±22 ms to 186±16 ms ($p = 0.002$). Systolic and diastolic blood pressure was significantly reduced from 164,5±11,4 to 132,2±11,4 mmHg ($P < 0.001$) and from 95,8±8,8 to 82,6±5,8 ($P < 0.001$), heart rate from 89,4±2,7 bpm.to 71,2±5,6 bpm ($P < 0.001$).

Conclusions: These results indicate that combined therapy with Nebivolol and Lercanidipine effectively controls systolic and diastolic blood pressure, heart rate and significantly improves diastolic function in patients with essential hypertension.

PP.06.45 RESTING BLOOD PRESSURE IS LIMITING FACTOR OF MAXIMAL FUNCTIONAL AEROBIC CAPACITY IN PROFESSIONAL MALE ATHLETES

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Objective: Hypertension as a strong determinant of cardiovascular risk has been documented among elite athletes. Even increased blood pressure (BP), but still no hypertension, could be also negative predictive factor for maximal oxygen uptake (VO2 max). The aim of the study was to evaluate the influence of the resting BP values to the maximal functional aerobic capacity of the cardiovascular system.

Design and method: A total of 585 men professional athletes from a variety of sports were examined. BP levels were divided according to the ESH/ESC guidelines in 4 groups (group I- optimal: <120/80, group II – normal: 120/80-129/84, group III – high normal: 130/85-139/89 and group IV - hypertension: >140/90 mm Hg). Maximal exercise and recovery characteristics were obtained during a graded treadmill test until exhaustion: maximal oxygen uptake (VO2 max), heart rate (HRmax) and blood pressure (TA max).

Results: The players mean age was 21,5 years (13-58), heart rate 62 ± 10 bpm, and mean BP 115/73 ± 10/8 mmHg. 462 (79,2%) athletes had optimal blood pressure, 83 (14.2%) had normal BP, while groups III and IV counted 32

(5,5%) and 6 (1%) athletes respectively. VO2 max was 52± 7 ml/min/kg, mean maximal heart rate was 187±11 bpm and mean BP was 178/54± 19/16 mm Hg. There was a statistically significant difference between the BP groups and HR max and VO2 max. Athletes with optimal BP had statistically significant higher HR compared to athletes from the group II, p = 0.017. Athletes with optimal rest BP had significantly higher VO2max compared to all other athletes. p = 0.01. Also, the strongest effect size (eta-squared = 0.06) correlation existed between rest BP and maximal systolic pressure in all groups, p <0.01). There was a significant negative linear relationship between maximal systolic blood pressure, maximal oxygen uptake and HR max, p<0.01.

Conclusions: Optimal BP in athletes is very important for the best maxinal functional aerobic capacity. BP elevation, even in the range of still not pathological values, is negative predictive factor for maximal oxygen uptake (VO2 max).

POSTERS' SESSION

POSTERS' SESSION PS07
ENDOTHELIUM

PP.07.01 DIAGNOSTIC SIGNIFICANCE OF ESTIMATION OF THE LEVELS OF ENDOTHELIN-1 AND NITRATES/ NITRITES IN ENDOTHELIAL DYSFUNCTION AMONG SUBJECTS WITH ARTERIAL HYPERTENSION

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Objective: The most important vasoactive substances secreted by vascular enthothelium are nitric oxide (NO) and endothelin.The aim of the study was to evaluate the possibility to diagnose endothelial dysfunction (ED) in subjects with stage II arterial hypertension (AH) by the content of endothelin-1 (end-1) and nitrite/nitrate in blood serum.

Design and method: We performed a cross-sectional cohort study of 141 women with AH stage II (50,8±6,0 years). We determined the content of vasoconstrictor end-1 in blood serum (n=90) using the IBL reagent (Germany) with the help of the immunoenzymatic analyzer Sunrise (Austria). We also determined the total content of the end metabolites of NO – nitrites/nitrates (NOx) in blood serum which reflect the production of vasodilators by vascular endothelium using Griess method. We evaluated endothelium-dependent vasodilation (EDV,%) using the reactive hyperemia test by means of impedance rheography. EDV was considered to be preserved if Δ dz/dt >=12%, EDV<12% considered as ED. Statistical analysis was performed with the help of «STATISTICS 10.0». Significance of the level of end-1 and NOx for diagnosis of ED was assessed by means of ROC-analysis.

Results: Patients were divided into two groups: group 1- without ED, group 2- with ED. EDV in group 1 was 34[23;53]%, in group 2 -5[-18; 5]%. In group 2 the level of end-1 was higher (0.57±0.18 pg/ml,p=0.032), and NOx lower (15.2[11.1; 29.9] µmol/l,p=0.0005), than in group 1 (0.49±0.21 pg/ml and 22.8[16.9;33.0] µmol/l, respectively). In group 1 there was a correlation relationship between EDV and end-1 (R=-0.26; p=0.044), in group 2 - between EDV and NOx (R=0.36;p=0.011). The optimal cut-off point which allowed with 76% sensitivity predict ED corresponded to the level of end-1 >=0,53 pg/ml, specificity being 62%. The optimal cut-off point which allowed with 69% sensitivity predict ED corresponded to the level of NOx <=16,5 µmol/l, specificity being 66%.

Conclusions: The level of end-1>=0.53 pg/ml and NOx<=16.5 µmol/l with high sensitivity and specificity allows to diagnose presence/absence of ED in females with stage II AH.

PP.07.02 RELATIONSHIP BETWEEN VITAMIN D, PARATHYROID HORMONE AND ENDOTHELIAL FUNCTION IN FEMALES WITH ARTERIAL HYPERTENSION

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Objective: The aim of the study was to assess the effect of vitamin D and parathyroid hormone (PTH) on the values of systolic and diastolic blood pressure (SBP, DBP) as well as endothelial function.

Design and method: We performed a cross-sectional cohort study of 141 women (50,8±6,0 years) with arterial hypertension (AH) and 25 healthy women (46,8±6,5 years). We determined the content of vitamin D-total (25(OH) D2+25(OH)D3), PTH in blood serum using the DRG reagent (USA) and endothelin-1 (end-1) using the IBL reagent (Germany) with the help of immunoenzymatic analyzer Sunrise (Austria). Plasma nitrite/nitrate level (NOx) was determined using Griess method. We evaluated endothelium-dependent vasodilation (EDV) using the reactive hyperemia test by means of impedance rheography. EDV was considered to be preserved if Δ dz|dt exceeded 12%, if Δ dz|dt was less than 12% the condition was considered as endothelial dysfunction (ED).

Results: EDV was higher (p=0.05) in control group 23.9±14.7%, than in group with AH 15.3±28.0%. The levels of end-1 and NOx did not differ between the group with AH (0.52(0.38;0.59)pg|ml and 17.0(11.5;29.1)µmol|l) and the control group (0.53±0.07pg|ml and 18.2(13.2;24.4)µmol|l). The level of 25(OH) D-total also did not differ among the groups (23.8(16.3;33.1) and 24.87±9.99 ng|ml). The level of PTH was higher in control group (43.93±15.79pg|ml). In the group with AH there was a correlation between SBP and 25(OH)D-total (R=-0.23;p=0.034), SBP and PTH (R=0.28;0.003), PTH and NOx (R=-0.24;p=0.03). All the subjects were divided into two groups: group 1–without ED, group 2–with ED. In group-2 the level of end-1was higher (p=0.032), and NOx lower (p=0.0005), than in group-1. In group-2 correlation between PTH and NOx increased (R=-0.48;p=0.003). In group-1 the contribution of the cluster endothelial functions to the values of SBP and DBP was minimal. In group-2 relationship between SBP and NOx (R=-0,55), SBP and EDV (R=-0,47), as well as between DBP and NOx (R=-0,45), DBP and EDV (R=-0,31) was more pronounced.

Conclusions: The values of SBP are associated with the level of 25(OH)D and PTH. Endothelial function is regulated by 25(OH)D and PTH, and plays an important role in maintaining the values of SBP and DBP when ED develops.

PP.07.03 L-ARGININE AND ARGINASE PRODUCTS POTENTIATE CONTRACTIONS TO DEXMEDETOMIDINE IN THE RAT AORTA WITH ENDOTHELIUM IN THE PRESENCE OF N Ω-NITRO-L-ARGININE METHYL ESTER

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Objective: Dexmedetomidine is an anesthetic agent which can cause relaxation [by releasing endothelium-derived nitric oxide (NO)] or contraction (by activating α1 and α2-adrenoceptors) of isolated arteries. L-arginine is the common substrate for nitric oxide synthase (NOS) and arginase I and II, and thus can be converted to either NO or arginase products (urea and ornithine). The present study investigated whether or not L-arginine or the arginase products can augment the endothelium-dependent contractions to dexmedetomidine.

Design and method: Organ chamber studies:
Thoracic aortae with endothelium were isolated from male ten-weeks-old Sprague Dawley rats and suspended in organ chambers for isometric tension recording. Cumulative concentrations of dexmedetomidine were added to quiescent aortic rings, incubated with Nω-nitro-L-arginine methyl ester (L-NAME, NOS inhibitor), L-arginine, urea or ornithine for 40 minutes.
Immunofluorescent staining:
Frozen sections of rat aortae were incubated with anti-von Willebrand factor antibody (1:50) and anti-arginase I antibody (1:50) or anti-arginase II antibody (1:50) at 4 degrees Celsius overnight, followed by 37 degrees Celsius for one hour. Then, the sections were washed and incubated with corresponding secondary antibodies (1:50) for two hours in the dark. Antifade reagent with DAPI was then added. The sections were examined under a fluorescence microscope.

Results: Dexmedetomidine caused concentration-dependent contractions in the presence of L-NAME [EMax (% of 60 m MKCl): 48.19±5.48, logEC50: -6.61±0.18] and the maximal contraction was potentiated significantly by L-arginine [EMax: 81.76±4.42 (P<0.05), logEC50: -6.68±0.09], urea [EMax: 96.31±4.72 (P<0.05), logEC50: -6.91±0.09] or ornithine [EMax: 94.68±3.88 (P<0.05), logEC50: -6.91±0.07]. These potentiations were reversed by the arginase inhibitors (S)-(2-boronoethyl)-L-cysteine (BEC) and N-hydroxy-L-arginine (L-NOHA) and were absent in preparations without endothelium. The potentiations by urea and ornithine were reversed by the addition of L-arginine. Fluorescent staining of arginase I and II confirmed the presence of the two isoforms of arginase in rat aortic endothelial cells.

Conclusions: Both urea or ornithine, downstream products of the conversion of L-arginine by arginase, potentiate contractions to dexmedetomidine in rat aortae with endothelium.

PP.07.04 THE ROLE OF INTRAUTERINE CHRONIC HYPOXIA ON VASCULAR ENDOTHELIAL FUNCTION AND NOS EXPRESSION IN RATS OFFSPRING

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Objective: To investigate the effects of fetal intrauterine chromic hypoxia on the vascular endothelial function and the expression of NOS in the aorta from adult offspring rats.

Design and method: Pregnant Sprague-Dawley rats were subjected to hypoxia for 2 hours in low pressure cabin with an oxygen concentration of 10%±1% from 7 to 21 days gestation. Endothelial dependent diastolic function and the expression of iNOS and eNOS in the aorta were determined.

Results: The endothelial dependent diastolic function was 45.1±14.4% in the intrauterine hypoxia group, and 82.7±10.6% in the control group. There was significant difference in it between these two groups (t=5.14,P<0.001). Compared with the control, iNOS was up-regulated predominantly in intrauterine hypoxia group at both mRNA level and protein level. In contrast, the expression of eNOS was prominently down-regulated in intrauterine hypoxia group.

Conclusions: Intrauterine chromic hypoxia can induce impaired vascular endothelium function in adult offspring rats. This efficacy might be mediated by abnormal expression of iNOS and eNOS in the blood vessels.

PP.07.05 ENDOTHELIAL NITRIC OXIDE PRODUCTION WEAKENS ARTERIAL CONSTRICTOR RESPONSES IN MOST OF ORGANS DURING EARLY POSTNATAL DEVELOPMENT IN RATS

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Objective: During maturation the vascular system undergoes structural and functional alterations. We showed recently that saphenous arteries of young (10-12 day old) demonstrate increased eNOS expression and a tonic nitric oxide (NO) production which contribute to lower contractile responses compared to adult rats arteries (Gaynullina et al. Cardiovasc Res 2013, 99:612-21). Here we tested the hypothesis that vasorelaxing NO influence is present not only in cutaneous circulation but also in other organs of young rats.

Design and method: The segments of saphenous, intrarenal, small mesenteric and sural arteries were isolated from young (2 wk old) and adult (10-12 wk old) rats and mounted in isometric myograph. Anticontractile effect of NO was evaluated by increases of arterial spontaneous tone and the response to methoxamine (alpha1-adrenoceptor agonist) in the presence of NOS inhibitor L-NNA vs. its inactive analogue D-NNA. In addition, we estimated eNOS and Arginase-2 mRNA expression levels in arterial preparations by qPCR, nitrite/nitrate serum levels by Griess reaction and arterial pressure (AP) levels in conscious state by intra-carotid artery catheters.

Results: In all arteries studied except renal ones, L-NNA induced tonic contraction and prominently increased the contractile response to methoxomine. By 10-12 weeks, the effect of L-NNA was very small in mesenteric arteries and disappeared in sural and saphenous arteries. Although eNOS mRNA expression levels did not differ in arteries of 2-wk old and adult rats, Arginase-2 mRNA expression level was significantly lower in young rats compared to adults. Serum level of NO metabolites was 1.5-fold higher in young than in adult rats. Along with that, mean AP levels were more than twice lower in young rats (50.9±9.0 mmHg) as compared to adults (114.9±3.4 mmHg).

Conclusions: In young rats tonic NO production by the endothelium weakens contractile responses of arteries supplying skin, small intestine and skeletal muscles. Since these organs receive a high proportion of the cardiac output, influence of NO may contribute to lowering AP level in immature circulatory system. Insufficiency of endothelial function early after birth may be the reason of cardiovascular pathologies in adulthood.

PP.07.06 PREDIABETES IS ASSOCIATED WITH EARLY CHANGES IN MICROCIRCULATION

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Objective: Microangiopathy in patients with type 2 diabetes (T2D) results from previous microcirculation abnormalities (e.g. increased permeability, disturbance of intracapillary pressure and blood flow). Hyperglycemia as well as hesitance of glucose level in patients with prediabetes (impaired glucose tolerance and impaired fasting glucose) have negative impact on microvessel status.

Design and method: We included 131 patients with average age 49,03 ± 8,76 years old. Patients were divided into 2 groups: group 1 – 37 patients with prediabetes, group 2 – 35 patients with type 2 diabetes (with duration of disease no longer as 5 years and treated with oral blood glucose lowering drug) and group 3 – 59 almost healthy person. Microcirculation was measured by computer based conjunctival biomicroscopy (Malaja et al.), results were evaluated by the set of criteria for quantitative evaluation of conjunctival microcirculation: FC (number of active capillary tubes), AVA (arteriovenous anastomosis), Mean (vascular tortuosity), Sl (sludge), Mtr (microthrombosis). Severity of each criteria was scored and more sever changes had higher degree.

Results: Microcirculation abnormalities were revealed in patients with prediabetes: we registered statistically significant decrease of active capillary tubes (FC) (3,0[2,0;3,0] vs 2,0[2,0;3,0] in control group) (p1-3<0,025), increased number of AVA (2,0 [2,0; 4,0] vs 2,0 [2,0; 2,0] in control group) (p1-3<0,025) and Mtr (1,0[1,0;2,0] vs 0,0[0,0;1,0] in control group) (p1-3<0,001). Hence in patients with prediabetes we observed hypoperfusion and microthrombosis that predispose vascular wall to atherosclerosis.
We registered more significant changes in patients with T2D compared to patients with prediabetes and control group. Patients with T2D had more significant Mean (1,0[1,0;2,0]) compared to group 1 and 3 (1,0[1,0;1,0]) (p1-2 <0,05 and p2-3< 0,001 correspondingly), erythrocyte properties are also changed that is presented in sludge formation (2,0[2,0;4,0] vs 2,0[2,0;2,0] in groups 1,3) (p1-2 <0,05, p2-3<0,001 correspondingly).

Conclusions: Analysis of microcirculation demonstrate presence of changes in microvessel system during early disturbance of glucose metabolism (that is in prediabetes). T2D is associated with more significant changes in microcirculation. Damage of microvessel is one of the factors that leads to endothelial dysfunction and atherosclerosis.

PP.07.07 IMPACT OF TAI CHI EXERCISE ON THE ARTERIAL STIFFNESS ACCORDING TO DURATION IN MIDDLE-AGED FEMALE PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) is associated with increased risk of cardiovascular disease, and levels of early preclinical markers of atherosclerosis, such as those that reflect increased arterial stiffness, are commonly found to be higher in RA patients than healthy individuals. The aim of this study was to examine Tai-Chi exercise on arterial stiffness in middle-aged female patients with RA.

Design and method: Twenty-nine female patients aged 55-71 with RA who had been practicing Tai Chi for arthritis exercise program for 3 months were recruited from a regional hospital in Korea. We divided exercise group according to the duration of RA. Assessment of arterial stiffness was performed by using brachial-ankle pulse wave velocity (baPWV).

Results: Mann-Whitney test showed no significant difference of baPWV according to disease duration (baseline; 1691±349, p=0.080; 3 months later; 1603±291: p=0.102) After 12 weeks of Tai Chi exercise, however, we found that baPWV of the longer duration of RA patients (> 10 years) decreased from 1847±415 to 1712±349 (Wilcoxon signed rank test, p=0.013), without significant decrease in blood pressure.

Conclusions: This study shows that practicing Tai Chi exercise can improve the arterial stiffness of patients with RA. Moreover, Tai Chi could

be an attractive form of exercise for the longer duration of RA patients. Large-sized randomized clinical trials examining the effects of Tai Chi on cardiovascular outcomes are required.

PP.07.08 THE BENEFICIAL EFFECTS OF TAI CHI ON ENDOTHELIAL FUNCTION IN MIDDLE-AGED WOMEN WITH RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) is associated with increased risk of cardiovascular disease, and levels of early preclinical markers of atherosclerosis, such as those that reflect increased arterial stiffness, are commonly found to be higher in RA patients than healthy individuals. We investigated the effects of Tai-Chi exercise on endothelial function and arterial stiffness in middle-aged women with rheumatoid arthritis.

Design and method: Fifty-six age-matched, body mass index (BMI)-matched female patients aged 55-71 with rheumatoid arthritis were allocated to either an exercise group, practicing Tai Chi exercise program for 3 months, or controls receiving only information about the benefits of exercise. Participants were assessed for arterial stiffness and endothelial function by using brachial-ankle pulse wave velocity (baPWV) and flow-mediated dilatation (FMD). Data were collected at baseline and at the end of the intervention (3 months).

Results: At baseline, demographic, disease-related characteristics as well as baPWV and FMD were similar between Tai Chi exercise and control groups ($p>0.05$). After 3 months of Tai Chi exercise, Mann-Whitney test revealed a significant improvement in FMD in the Tai Chi exercise compared to control group ($p=0.016$), without significant decrease in blood pressure and lipid profile. However, baPWV decreased in the Tai Chi exercise compared to control group, but no significant improvement ($p=0.078$).

Conclusions: This study shows that practicing Tai Chi exercise can improve the endothelial dysfunction of middle-aged women with rheumatoid arthritis. Therefore, Tai Chi could be an attractive form of exercise for elderly rheumatoid arthritis patients. More large-sized case-control or randomized clinical trials examining the effects of Tai Chi on cardiovascular outcomes are required.

PP.07.09 DYSFUNCTION OF TRPV4-SKCA SIGNALING PATHWAY UNDERPINS IMPAIRED EDHF-MEDIATED RESPONSE IN MESENTERIC ARTERIES OF STROKE-PRONE SPONTANEOUSLY HYPERTENSIVE RATS

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Objective: Endothelium-derived hyperpolarizing factor (EDHF)-mediated responses are impaired in hypertension; however, the underlying mechanisms have not been determined yet. The activation of small- and intermediate- conductance of Ca2+-activated K+ channels (SKCa and IKCa) underpins EDHF-mediated responses. Recently, it has recently been reported that Ca2+ influx through endothelial transient receptor potential vanilloid type 4 (TRPV4) channels is a prerequisite for the activation of SKCa and IKCa in arterial endothelial cells. The aim of the present study was to investigate whether impairment of EDHF-mediated responses in hypertension is attributable to the dysfunction of TRPV4 and/or KCa channels.

Design and method: In the presence of phenylephrine, membrane potentials and contractile responses were recorded from the isolated superior mesenteric arteries of 20-week-old stroke-prone spontaneously hypertensive rats (SHRSP) and age-matched Wistar-Kyoto rats (WKY). Experiments were performed in the presence of indomethacin and NG-nitro-L-arginine to inhibit prostaglandins and nitric oxide, respectively.

Results: In mesenteric arteries of WKY, acetylcholine (ACh)-induced, EDHF-mediated responses were reduced by a combination of KCa channel blockers (apamin plus TRAM-34), or by blockade of TRPV4 with selective antagonist RN-1734. In mesenteric arteries of SHRSP, ACh-induced, EDHF-mediated hyperpolarization and relaxation were significantly impaired compared with WKY (hyperpolarization to 10-5 mol/L ACh: SHRSP -6±2 vs. WKY -20±2 mV, n=6-7, $P<0.05$). GSK1016790A, a selective TRPV4 channel agonist, evoked robust hyperpolarization and relaxation in arteries of WKY. In contrast, in arteries of SHRSP, GSK1016790A-evoked hyperpolarization was small and relaxation was absent (hyperpolarization to 10-8 mol/L GSK1016790A: SHRSP -1±1 vs. WKY -12±2 mV, n=5, $P<0.05$). Hyperpolarization and relaxation to CyPPA, a selective SKCa channel agonist, were significantly decreased in arteries of SHRSP compared to WKY. Hyperpolarization and relaxation to 1-EBIO, a selective IKCa channel agonist, did not differ between the two strains.

Conclusions: These findings suggest that TRPV4 and to some extent SKCa channels functions are compromised, leading to impaired EDHF-mediated responses in mesenteric arteries of SHRSP.

PP.07.10 ENDOTHELIAL FUNCTION AND PULSE WAVE VELOCITY IN PATIENTS WITH HYPERTENSION AFTER STROKE

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Objective: The aim of the study is assessment of endothelial function and arterial stiffness in patients with arterial hypertension with and without stroke.

Design and method: Study population includes 61 patients with arterial hypertension. Patients were divided into 2 groups depending of presents of stroke history. Group 1 includes 37 patients (7F/30 M, 47-62 years old, duration of hypertension 7.9±5.5 years) with arterial hypertension and stroke in history. Group 2 includes 24 patients (10F/14M, 30-63 years old, duration of hypertension 8.1±4.9 years) with arterial hypertension without stroke. Control group includes 47 healthy volunteers (14F/33M, 30-52 years old). Endothelial function was measured by impedance rheography. The forearm blood flow (FBF) was measured during reactive hyperemia to test endothelium-dependent vasodilatation. FBF was considered to be preserved if it exceeded 12%, less than 12% considered as endothelial dysfunction. Carotid femoral pulse wave velocity (PWV) was measured noninvasively.

Results: PWV in patients group 1 was higher to compare to group 2 and controls respectively (15.80±0.80 m/s; 9.33±1.26 m/s, $p<0.01$; 5.89±0.43 m/s, $p<0,0001$). FBF was smaller in patients group 1 to compare to group 2 and controls respectively (-8.21±2.71%; 6.11±2.51%, $p<0.01$; 21.84±1.71, $p<0.001$). Patients of group 1 have paradoxical reaction on reactive hyperemia as vasospasm in 75.7% cases, patients of group 2 – in 33.3% cases, controls have not paradoxical reaction on reactive hyperemia.
FBF negatively correlated with age ($r= - 0.37$, $p<0.05$) and negatively correlated with plasma cholesterol level ($r= - 0.36$, $p<0.05$) in patients of group 1.

Conclusions: Thus, patients with hypertension have increased PWV and signs of endothelial dysfunction. Quantitative assessment of endothelial dysfunction and PWV can serve not only as a diagnostic criterion, but also a dynamics of the target organ in the treatment of hypertensive patients. PWV and FBF measurements allow maximum early to identify additional risk group of hypertensive patients with minimal time and without the use of costly invasive techniques. Patients after stroke have significant increase in PWV and reduced FBF.
Such patients need correction of medicinal therapy based on the identified changes.

PP.07.11 THE EFFECT OF CAROTENOIDS AND FLAVONES ON ENDOTHELIAL FUNCTION

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Objective: Carotenoids and flavones are both have been described as powerful anti-oxidant natural substances. In previous studies we had demonstrated their blood pressure lowering effect. In the current study we aimed to evaluate the possible synergistic activity of these substances as anti-oxidant and anti inflammatory mediators on endothelial cells.

Design and method: Endothelial cells (EA.hy926) were pre-incubated with vehicle, lycopen, dissolved chocolate, epicatechin solution, combination of lycopen with chocolate and combination of lycopen with epicatechin solution for 18-24h. with or without induction with TNF-α for 6h. The activated cells were examined for protein abundance of: eNOs, adhesion molecules ICAM-1, VCAM-1 and osteopontin (OPN).

Results: There was a significant augmentation of NOx production after pre incubation with each substance separately. Moreover, the combination of lycopen with either chocolate or epicatechin resulted in synergistic effect. Lycopen with chocolate 8.1± 5.1 (OD) and lycopen with epicatechin 6.9±2.3 (OD), versus control 1.4±1.2 (OD) and lycopen 2.3±0.9 (OD) respectively ($p<0.005$). Pre incubation with lycopen, chocolate or

epicatechin didn't have significantly effect on the activation of VCAM-1 and ICAM-1by TNF-α. However, the combination of either lycopen and chocolate or lycopen with epicatechin inhibited significantly the expression of both VCAM-1 and ICAM-1induced by TNF-α (25.5±2.6 and 12.5±2.1 versus 46.6±11.6; 31.3±15.3 and 19.0±5.3 versus 45.3± 11.9 respectively p<0.001). Regarding the expression of eNOs, both lycopen, chocolate and epicatechin increased significantly the expression of eNOs. However, the combination of these sustenance didn't reach synergistic effect.

Conclusions: In the current study we demonstrated the superiority of the combination carotenoids and flavonoids compared to each substance alone, as oxidative stress and inflammation inhibitor.

PP.07.12 A NEW MARKER OF PLATELET ACTIVATION, SCUBE1, IS ELEVATED IN HYPERTENSIVE PATIENTS

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Objective: Hypertension is associated with an increase in platelet activation and endothelial dysfunction and leads to a tendency to cardiovascular events (CVEs). Signal peptide-CUB-EGF domain-containing protein 1 (SCUBE1) is a novel platelet activation marker. There are currently no studies showing the level of SCUBE1 in hypertensive patients. The purpose of this study was to determine the level of SCUBE1 in this patient group and to investigate the parameters affecting that level.

Table 1. A comparison of the demographic and biochemical parameters of the Hypertensive and Control group

	Hypertensive group (n:45) mean±sd or median (min-max)	Control group (n:21) mean±sd or median (min-max)	P values
Age	42.2±12.4	40.8±8.4	NS
Gender (F/M)	22/23	11/10	NS
BMI	28.0±4.2	26.6±3.9	NS
SBP(mmHg)	149.3±5.2	103.8±5.8	P<0.001
DBP(mmHg)	91.3±4.1	63.8±4.9	P<0.001
Glucose (mg/dL)	88.5±5.4	90.3±6.5	NS
Potassium (mmol/L)	4.5±0.4	4.5±0.4	NS
BUN (mg/dL)	12.0 (9-19)	12.0 (6-26)	NS
Creatinine (mg/dL)	0.7 (0.5-1.1)	0.7 (0.5-1.2)	NS
Uric acid (mg/dL)	4.7±1.0	4.0±1.1	P<0.05
T. chol (mg/dL)	102.0(41-281)	121.0(41-410)	P<0.05
Triglyceride (mg/dL)	163.7±100.2	111.4±60.3	P<0.05
HDL (mg/dL)	45.3±11.1	46.5±11.6	NS
LDL (mg/dL)	131.2±43.5	103.4±27.3	P<0.05
hsCRP (mg/dL)	0.3 (0-0.8)	0.3 (0-2.0)	NS
Hemoglobin(g/dL)	13.4±1.0	13.1±1.0	NS
Platelet (x10³/μL)	247.4±54.0	253.9±52.5	NS
PT(sn)	13.8±0.9	13.6±0.7	NS
aPTT(sn)	29.8±2.6	29.9±2.7	NS
Fibrinogen(mg/dL)	339.9±73.6	326.0±66.4	NS
D dimer (ng/mL)	0.7±0.2	0.6±0.3	NS

Data are presented as arithmetic mean ± standard deviation. Statistical significance was set at P<0.05.

Abbreviations: BMI: Body mass index; SBP: systolic blood pressure; DBP: diastolic blood pressure; BUN: Blood urea nitrogen; T. chol.: total cholesterol; HDL: high density lipoprotein; LDL: low density lipoprotein; High sensitive C-reactive protein (HsCRP), PT: prothrombin time, aPTT: activated partial thromboplastin time

Design and method: Forty-five newly diagnosed, untreated stage 1 hypertensive patients and 21 healthy individuals were included. Blood specimens were collected in order to determine SCUBE1, sCD40L, PT, PTT, fibrinogen, D dimer, hemogram, lipid parameters, BUN, creatinine and uric acid levels. The relation between SCUBE1 level and demographic data and biochemical parameters was then investigated.

Results: Hypertensive group SCUBE1 and sCD40L levels obtained from plasma specimens were significantly higher than those of the control group (p<0.001, P<0.05, respectively). Hypertensive group blood pressure (BP) values, uric acid, LDL, total cholesterol and triglyceride levels were also statistically higher than the control group. Parameters affecting SCUBE1 levels were systolic and diastolic BP, sCD40L, lipid parameters and uric acid levels.

Conclusions: We show, elevated levels of SCUBE1, a novel platelet activation marker, in primary hypertensive patients. We think that, when supported by further clinical studies, this newly described marker may be useful in the monitoring of CVEs in this patient group, in which platelet activation is known to be associated with such events.

PP.07.13 DOSE- AND TIME-DEPENDENT ACTIONS OF ENDOGENOUS CARDIOTONIC STEROIDS ON TRANSCRIPTOME OF HUMAN UMBILICAL VEIN ENDOTHELIAL CELLS: EVIDENCE FOR [NA+]I/[K+] I-MEDIATED EXCITATION-TRANS

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Objective: Ouabain and marinobufagenin (MBG) are known as major endogenous cardiotonic steroids (ECTS) involved in the pathogenesis of volume-expanded disorders, including hypertension, via its interaction with endothelial, vascular and neuronal cells. In spite of numerous effords, the role of Na+i/K+i-mediated and -independent signaling in cellular responses triggered by ECTS remains a unknown. This study examined the relative contribution of these signaling pathways in transcriptomic changes triggered by ouabain and MBG in human umbilical vein endothelial cells (HUVEC).

Design and method: HUVEC were incubated for 6 or 24 hr in the presence of 3, 30 and 100 nM of ouabain or MBG. Intracellular K+ and Na+ content was measured as the steady-state distribution of 86Rb, and 22Na, respectively. Total RNA was extracted and processed with a reverse transcription generating sense-strand cDNA as final product. cDNA was fragmented and labeled by Affymetrix GeneChip® kit.

Results: Six hr exposure to 30 nM ouabain did not significantly affected intracellular Na+ and K+ content whereas at concentrations of 100 nM ouabain increased the [Na+]i/[K+]i ratio by 10-fold. In contrast to 6 hr incubation, 24-hr exposure to 30 nM ouabain increased the [Na+]i/[K+]i ratio by 15-fold whereas 3 nM ouabain or MBG did not affect this parameter. In HUVEC treated with 100 nM ouabain for 6 hr or with 30 nM for 24 hrs, the total numbers of transcripts whose expression was changed by more than 1.2-fold (p<0.05) were 258 and 2185, respectively. In both cases, the list of transcripts whose expression was increased by more than 2-fold was abundant with immediate response genes such as EGR1, FOS, EGR3, JUNB, ATP3 as well as with genes encoding intermediates of cytokine signalling and prostaglandin-endoperoxide synthase PTGS2. We did not observe any transcriptomic changes in 6 hrs incubation with 30 nM as well as 24 hrs incubation with 3 nM ouabain or MBG.

Conclusions: ECTS affects transcriptome of endothelial cells via [Na+]i/[K+] i-mediated signaling pathway. The role of [Na+]i/[K+]i-independent signaling in altered functions of ECTS-treated cells should be examined further.

PP.07.14 HEART RATE VARIABILITY AND ENDOTHELIAL DYSFUNCTION IN PATIENTS WITH ARTERIAL HYPERTENSION AND CORONARY ARTERY DISEASE

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Objective: To study the features of heart rate variability and endothelial dysfunction in patients with arterial hypertension and coronary artery disease.

Design and method: 121 patients aged 40-70 years were examined with the aim to study the features of heart rate variability and endothelial dysfunction in patients with arterial hypertension and coronary artery disease. 18 patients were in the control group without arterial hypertension and coronary artery disease, 56 patients were in the group with arterial hypertension, 47 patients were in the group with arterial hypertension combined with coronary artery disease. For arterial pressure study and heart rate variability study the cardio monitors «Kardiotehnika-4000» («Inkart» company, Saint Petersburg) were used. Endothelial function status was assessed using sample with reactive hyperemia and sample with nitroglycerine.

Results: It was established that an increased activity of the sympathetic nervous system (SNS) influences on endothelial dysfunction (ED) formation in patients with arterial hypertension (though LF), in patients with arterial hypertension combined with coronary artery disease (through LF and VLF). Patients with arterial hypertension combined with coronary artery disease differed from patients with arterial hypertension by the presence of more evident sympatho-parasympathetic imbalance (LF/HF > 1) as compared with the reducing of all BPC indices (SDAN, SDNN, r-MSSD, HF, LF, VLF).

Conclusions: The negative influence of such factors as male sex and elderly age to endothelial dysfunction in patients with arterial hypertension combined with coronary artery disease was determined.

PP.07.15 GENDER DIFFERECES OF STABLE NITRIC OXIDE METABOLITES LEVELS IN ESSENTIAL HYPERTENSION

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Objective: To investigate gender differences of stable nitric oxide metabolites levels (NOx) in patients with essential hypertension (EH).

Design and method: We examined 124 untreated patients (45 men and 79 women) with EH (mean age 51.4±6.5 years, mean EH duration 8.5±7.6 years) and 25 healthy volunteers (10 men and 15 women) with comparable age (47.2±7.8years). Plasma NOx levels were measured by spectrophotometry. Results were processed with Statistica 6.0 software.

Results: Results were analyzed in accordance to EH grades and age: <40, 40-59 and >=60 years. NOx levels were significantly higher in hypertensives (43.2±21.0 μmol/l) compare to controls (28.3±9.6 μmol/l) (p<0,05). Males with EH had higher NOx concentration (49.5±19.1 μmol/l) than females (42.1±22.1 μmol/l) (p<0,05). Aging was related to significant increase in NOx concentration in males with EH (37.3±9.3 in persons <40 years old, 42.5±18.7 in 40-59 years, and 62.5±30.0μ mol/l in >=60 years, p<0,05), and had U-shape curve relation in females with EH (27.6±2.6, 44.8±23.7, and 31.9±8.4μ mol/l, relatively p<0,05). In male hypertensives the highest NOx level was at grade 1, lower – at the grade 2, and the lowest – at the grade 3 EH (53.9±26.2; 44.5±17.5, and 43.4±23.9 μmol/l, accordingly) (p<0,05). Whereas females with EH didn't have significant differences of NOx levels in accordance to EH grade: 42.6±2.2, 43.9±25.3, and 40.2±20.8 μmol/l relatively (p<0,05).

Conclusions: Hypertensives demonstrate more prominent endothelial dysfunction in males related to aging and EH severity.

PP.07.16 ENDOTHELIAL DYSFUNCTION AND SALT SENSITIVITY IN SUBJECTS WITH NORMAL BLOOD PRESSURE

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Objective: The aim of this study was to evaluate endothelium-dependent and –independent vasodilation in a group of normotensive people classified on the basis of salt sensitivity.

Design and method: Data from 22 living kidney donors that participated in the donor screening protocol with subsequent donation were included in the present analysis. Endothelial function was measured by analysis of digital volume pulse (DVP) waveform obtained by Pulse Trace system. Reflection index (RI) obtained from DVP reflects the small-size arteries vascular tone (endothelial function). To assess endothelium dependent arterial vasodilation, 400 ug of salbutamol (Salb) was given by inhalation. To assess endothelium independent arterial vasodilation, 300 ug of nitroglycerin (NTG) was administered sublingually. The arterial vasodilation, dependent on or independent of endothelial function, was defined as the maximum difference in Δ RI between baseline and the post-Salb or post-NTG period, respectively.

Results: We studied 14SR and 8SS, there were no significant differences in terms of age (46,6 ± 7 vs 40,4 ± 9 years old) and anthropometric measurements between groups SR and SS (weight 67,5 ± 8 vs 72,6 ± 15 kg, height 1,62±0,1 vs 1,62±0,1 mts, BMI 25±5 vs 27±4 and waist circumference 91±8 vs 93±10 cm). In basal conditions there were significant differences in blood pressure between SR and SS group (111±11/70±8 vs 121±16/79±8 mmHg p< 0,02 respectively) but we did not find statistical differences between them in RI (71±9 vs 69±9%). The RI after Salb was higher in SS than in SR group (RI= 68±9 vs 56±13 p<0,02) but there was no statistical difference after NTG (42±12 vs 40±13 % p=0,74). The arterial vasodilation, dependent on endothelial function, was significantly lower in SS than in SR group (Δ RI b/Salb 4±12 vs 22±16% p<0,02). We did not find significant differences between groups in the arterial vasodilation independent of endothelial function (34±15 vs 43±18% p=0,24).

Conclusions: Although the vascular tone of small-size arteries was similar between SS and SR in basal conditions, the endothelial function decreased significantly in SS healthy people.

PP.07.17 IS PULSE WAVE VELOCITY A VALUABLE TOOL IN THE DIAGNOSIS OF ENDOTHELIAL DYSFUNCTION IN PREHYPERTENSION?

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Objective: To show by Pulse Wave Velocity (PWV) determination and endothelium-dependent vasodilatation (EDVD) that prehypertension produces endothelial dysfunction and therefore should be managed.

Design and method: Pulse Wave Velocity was determined in normal, prehypertensive and established hypertensive clinically asymptomatic Belarussian subjects, by a non invasive method giving reproducible results (BPULS device) using the left external carotid and left dorsalis pedis arteries as central and peripheral points respectively, The arterial pulses were picked up by infrared sensors and recorded on a computer simultaneously with a single lead ECG. The time delay between the two pulses is determined. A shorter time delay or faster Pulse Wave Velocity indicates decreased arterial wall elasticity. Endothelium-dependent vasodilatation (EDVD) was assessed by measuring the responses of forearm blood flow to reactive hyperemia by venous occlusion plethysmography.
MATERIALS: A total of 155 clinically asymptomatic Belarussian subjects were examined. Age range - 30 to 65 years. Of this total, 21 had normal BP (120/80 or lower); 58 had prehypertension (Systolic - 121-140, Diastolic - 81-90); and, 76 were definitely established hypertensives (Systolic - >140 Diastolic - >90).

Results: Pulse Wave Velocity was increased in patients with prehypertension and established hypertension (10.9±0.4 m./sec., p <0.01; 11.3±0.3 m./sec., p <0.01, respectively) in contrast to normotensive individuals (9.3±0.4 m./sec). Endothelium-dependent vasodilatation was lower in patients with prehypertension and established hypertension (25.1±2.5%, p <0.05; 21.0±2.1%, p <0.05, respectively) in comparison with normotensive individuals (31.7±6.1%).
Endothelial dysfunction is associated with decreased arterial wall elasticity. Our study showed significantly decreased arterial elasticity even in prehypertensives compared to normotensives as shown by increased or faster PWV, This implies that arterial wall changes leading to arteriosclerosis already occur in prehypertension. Therefore these cases should be controlled by adapting healthy life style.

Conclusions: Pulse Wave Velocity determination shows arterial wall changes indicative of endothelial dysfunction in cases of prehypertension so they have to be controlled by adapting healthy life style. Pulse Wave Velocity, therefore, is a valuable tool in diagnosing endothelial dysfunction in prehypertension.

PP.07.18 EFFECTS OF BLACK RASPBERRY ON VASCULAR ENDOTHELIAL FUNCTION AND LIPID PROFILES IN PATIENTS WITH METABOLIC SYNDROME

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Objective: Black raspberry (Rubus occidentalis) has been known for its anti-inflammatory and anti-oxidant effects. However, short-term effects of black raspberry on vascular endothelial function and lipid profiles have not been investigated in patients with metabolic syndrome.

Design and method: Patients with metabolic syndrome (n=77) were prospectively randomized into the black raspberry group (n=39, 750mg/day) and placebo group (n=38) during the 12-week follow-up. Lipid profiles, brachial artery flow-mediated dilatation (baFMD), circulating levels of endothelial progenitor cells such as CD34/KDR+, CD34/CD117+, CD34/CD133+ cells, and inflammatory cytokines such as IL-6, TNF-alpha, high sensitive C-reactive protein, adiponectin, ICAM-1, VCAM-1 were measured at baseline and at 12-week follow-up.

Results: Decreases from baseline in total cholesterol levels (-22.8±30.4mg/dL vs. -1.9±31.8mg/dL, p<0.05, respectively) and total cholesterol/HDL ratio (-0.31±0.64 vs. 0.07±0.58, p<0.05, respectively) were significantly greater in the black raspberry group when compared to the placebo group. Increases in baFMD at 12-week follow-up were significantly greater in the black raspberry group when compared to the placebo group (0.33±0.44mm vs. 0.10±0.35mm, p<0.05, respectively). Moreover, decreases from baseline in IL-6 (-0.4±1.5pg/mL vs. -0.1±1.0pg/mL, p<0.05, respectively) and TNF-alpha levels (-2.9±4.7pg/mL vs. 0.1±3.6pg/mL, p<0.05, respectively) were significantly greater in the black raspberry group. Increases in circulating levels of CD34/CD133+ cells were significantly greater in the black raspberry group when compared to the placebo group (19±109/uL vs. -28±57/uL, p<0.05, respectively) during the 12-week follow-up.

Conclusions: The use of black raspberry significantly decreased serum total cholesterol levels and inflammatory cytokines with increases in circulating levels of CD34/CD133+ cells, thereby improving vascular endothelial function in patients with metabolic syndrome during the 12-week follow-up.

PP.07.19 ANDROGENS MODULATE ENDOTHELIAL NITRIC OXIDE PRODUCTION IN HUMAN ENDOTHELIAL CELLS

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Objective: Endothelial cells express androgen receptors and, therefore, are target of sex steroids. Endothelial cells release vasoactive compounds such as nitric oxide (NO). NO is the main regulator of vascular homeostasis and adequate levels are critical in the maintenance of a correct vascular physiology. NO bioavailability is key on sex vascular differences. Thus, the aim of this study is to investigate the effects of androgens on endothelial cells NO production to evaluate the different contribution of sex steroids in vascular biology.

Design and method: Primary human umbilical vein endothelial cells (HUVEC) were grown in EBM-2 medium (Lonza) and were exposed to physiological (1-100 nM) concentrations of testosterone and dihydrotestosterone (DHT) for 24 hours. Bicalutamide (1μM), an androgen receptor antagonist, was used to confirm androgen receptor contribution. NO production was measured with DAF-FM in an inverted fluorescence microscope (Nikon). Protein cuantification was determined by immunoblotting using specific antibodies for eNOS and Akt (Cell Signaling). ANOVA test and then Bonferroni's test were performed. Data are expressed as a percentage of control values as mean ± SEM.

Results: Androgens increase endothelial NO production at low concentration. Testosterone 1nM increased NO production up to 153±17% ($p<0.05$ vs. control) after 24 hours of exposure. DHT exerted a similar effect on NO production by increasing it to 128±13% at 1 nM ($p<0.05$ vs. control). Protein expression of eNOS (136±3%) and Akt (123±5%) was increased in endothelial cells by testosterone exposition. DHT also increased eNOS (185±8%) in HUVEC. These effects were mediated through the androgen receptor since were abolished by bicalutamide.

Conclusions: Testosterone and DHT, through the androgen receptor, increase NO production in HUVEC through an up-regulation of Akt-eNOS pathway.

PP.07.20 THE INFLUENCE OF HIGH SALT INTAKE ON VASCULAR RESPONSES OF MIDDLE CEREBRAL ARTERIES TO FLOW-INDUCED DILATION OF SPRAGUE-DAWLEY RATS

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Objective: Sprague-Dawley (SD) rats on high salt diet (HSD) remain normotensive and exhibit impaired relaxation responses to acetylcholine and hypoxia, as well as normotensive women on HSD, while there are no data of HSD effect on the flow-induced dilation (FID). The aim of the present study was to determine the effect of high salt intake on microvascular responses to flow-induced dilation in SD rats.

Design and method: 19 male SD rats were divided in two groups: a) control group (N=10) and b) group of rats on HSD for 7 days (4% NaCl; N=9). Prior to decapitation, rats were anesthetized with 75 mg/kg ketamine+2.5 mg/kg midazolam. Middle cerebral arteries were isolated and cannulated (DMT pressure myograph) for vascular reactivity measurements in response to stepwise increase in pressure (Δ 10- Δ 100), in the absence/presence of the NOS inhibitor L-NAME, COX-1,2 inhibitor indomethacin (INDO), selective inhibitor of microsomal CYP450 epoxidase activity MS-PPOH, and superoxide dismutase mimetic TEMPOL. To test differences among groups Two-way ANOVA was used, $p<0.05$ considered significant.

Results: FID was reduced in HSD group at each pressure gradient, but significantly at Δ 40, Δ 60 ($P<0.001$) and Δ 100 ($P<0.05$). The presence of L-NAME, INDO and MS-PPOH (independantly) significantly reduced FID in the control group at each pressure gradient ($P<0.05$) except Δ 10. L-NAME and INDO reduced FID in HSD group, but L-NAME significantly reduces FID at Δ 20 and Δ 40 ($P<0.05$). The presence of TEMPOL restores FID in HSD group to control levels at pressure gradients Δ 20- Δ 100 ($P<0.05$), while in control group TEMPOL had no effect.

Conclusions: These results demonstrate that: 1) High salt intake impaires vascular responses to FID; 2) Reactive oxygen species - superoxide anion radical (O2-) may contribute to impaired FID in rats on high salt diet; 3) Mechanisms of FID are different in control and HSD groups – while NO mediates FID in both groups of rats, metabolites of COX-1,2, and EETs could also contribute to FID in control group of rats.

PP.07.21 EFFECTS OF 12WK FLAVANOL-RICH COCOA ADMINISTRATION ON VASCULAR FUNCTION, BLOOD PRESSURE AND RENIN-ANGIOTENSIN SYSTEM IN HEALTHY SUBJECTS

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Objective: Cocoa flavonoids exert beneficial vascular effects and reduce the risk of cardiovascular morbidity and mortality.
To give an insight into the potential benefits deriving from cocoa even in prolonged periods of intervention, we tested the long term effects of low dose flavanol-rich and flavanol-free cocoa on office blood pressure (BP) levels, endothelium-dependent vasorelaxation, arterial stiffness and renin-angiotensin system (RAS) activity in healthy subjects.

Design and method: 25 healthy subjects were randomly and double-blindly assigned to receive low dose (20 g - 200 mg flavonoids) flavanol-rich or flavanol-free cocoa for 12 wks. Then, they will be crossed over for the other treatment. Treatments were separated by a one-week washout. The daily intake of dark chocolate (flavanol-rich or flavanol-free cocoa) varied a double blind, randomized, balanced cross-over design. Measurements (FMD, office BP, and PWV) were evaluated on baseline starting study and every 4 weeks of dark chocolate ingestion.

Results: Compared with control, flavanol-rich cocoa significantly increased FMD (from baseline 5,5±1,7% to 7.2±2.3%, to 7.1±2.1 and to 7.0±2.2% after 1, 2 and 3 months, respectively, $p<0.05$). The active treatment reduced office systolic and diastolic BP (from 117±14.6/68.1±8.7 mmHg to 110.3±10.1/63.5±6.62 mmHg, to 110.2±9.5/67.4±7.7 mmHg, to 111.2±9.7/66.6±6.0 mmHg after 1, 2 and 3 months of treatment, respectively, $p<0.05$). PWV significantly decreased after 3 months of treatment with flavanol-rich cocoa (from 6.7±1.3 m/s to 5.99±1.0 m/s), while no significant changes were reported in the control phase. No significant changes were observed on RAS activity.

Conclusions: Our findings indicate low dose flavanol-rich cocoa exerts significant effects on FMD, BP, arterial stiffness and wave reflection. These effects were observed in a longer-term investigation, maintaining the improvement during the intake for 3 months. The robust nature of our randomized, controlled, double-blind, crossover study design indicates dark chocolate ingestion, without additional calorie intake, can be reasonably incorporated into a dietary approach representing a consistent tool in cardiovascular prevention.

PP.07.22 ENDOTHELIAL FUNCTION IS IMPAIRED IN CONDUIT ARTERIES OF PANNEXIN1 KNOCKOUT MICE

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Objective: Vertebrate pannexins were discovered as homologs to invertebrate gap junction proteins (innexins). Pannexins were shown to participate in numerous physiological or pathological processes, but their role in vascular tone regulation is currently not completely understood. Pannexin1 is the main pannexins isoform expressed in murine arterial network, but the role this isoform plays in vascular tone regulation remains unclear.

Design and method: Quantitative PCR was performed to evaluate the levels of mRNA expression in endothelium-intact and endothelium–denuded murine saphenous arteries. We studied isometric contractions to alpha1-adrenoceptor agonists or high-K+ depolarization and acetylcholine-induced dilation of saphenous arteries of wild type and Pannexin1 knockout mice.

Results: Our data demonstrate that Pannexin1 is expressed predominantly in endothelium, but not smooth muscle of saphenous artery. Our functional measurements showed that genetic ablation of Pannexin1 significantly impaired the ability of endothelium-intact saphenous arteries for dilation to acetylcholine and increased contractile responses to a variety of stimuli such as alpha1-adrenoceptor agonists and high-K+ depolarization, the effect was not seen in endothelium-denuded arteries.

Conclusions: These findings suggest that Pannexin1 (i) serves as one of the important players in the regulation of endothelial influences on arterial tone and (ii) facilitates vessel dilation and attenuates constriction.

PP.07.23 MICROPARTICLES AND HYPERTENSIVE CARDIOVASCULAR DISEASE: EFFECTS OF ANTIHYPERTENSIVE AND LIPID-LOWERING THERAPY ON CIRCULATING MICROPARTICLES

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Objective: To evaluate the effects of rosuvastatin with or without valsartan, in patients ramdomly assigned to antihypertensive therapy with amlodipine or hydrochlorothiazide, in the circulating levels of microparticles, now recognized as biomarkers of vascular disease. The study was aimed to verify the effects of antihypertensive therapy on these new biomarkers alone and combined with other recognized therapies related to vascular protection (renin-angiotensin system blocker and statin).

Design and method: This was an open label, randomized, parallel-designed study with blinded endpoints. The patients were consecutively treated for a 4-week therapies (T1-T4) with quantification of microparticles at the end of each therapy. Platelet microparticles (PMP), monocyte microparticles (MMP) and endothelial microparticles (EMP) were quantified by flow-cytometry. T1 - patients under amlodipine 5 mg or hydrochlorothiazide 25 mg daily, alone; T2 - same T1 therapies with valsartan 160 mg added in both arms; T3 – same T2 therapies with rosuvastatin 20 mg added in both arms; T4 – same T3 therapies without rosuvastatin.

Results: There were no differences in arterial blood pressure (systolic and diastolic) between treatments based in amlodipine or hydrochlorothiazied throughout the study. After comparisons between groups (Mann-Whitney test), there were higher levels of MMP (p= 0.01) in the amlodipine group after T1 and higher levels of PMP in the same group after T4 (p= 0.003).
Conclusions: Despite similar blood pressure levels achieved, the choice of antyhypertensive therapy affects the circulating levels of microparticles. The concomitant use of statins and blockers of the renin-angiotensin system can reverse these differences.

PP.07.24 EFFECT OF XIONGDAN ON BLOOD PRESSURE, MESENTIRIC VASCULAR STRUCTURE AND FUNCTION IN SPONTANEOUSLY HYPERTENSIVE RATS

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Objective: To study the effect of Xiongdan on blood pressure, mesenteric vascular structure and function in Spontaneously Hypertensive Rats (SHRs).

Design and method: 24 male SHRs of 12 wks old were randomly divided into 3 groups: Xiongdan (SHR-X, n=8, A Chinese traditional herbal compound,800mg•kg-¹•d-¹), Rosuvastatin treated(SHR-R, n=8, 10mg•kg-¹•d-¹) and untreated controls(SHR, n=8,). Age- and weight-matched WKY rats served as controls(WKY, n=8). Systolic blood pressure (SBP) were measured by tail-cuff method at 0,4 and 8 wks after treatment. Serum 25-Hydroxyvitamin D(25(OH)D) was determined by ELISA. Wall to lumen area ratios(W/L) and the thickness of the wall to the radios of the lumen (TW/R1) in mesenteric arterioles(3rd grade branch) were assessed by morphormetic assay. Endothelium-dependent relaxation (EDdR), endothelium-independent relaxation (EDiR) were measured by PowerLab biological signal analytical system.

Results: SBP in X treated rats was significantly lower than that in untreated rats.[baseline in mmHg: (187.00±1.92) VS (190.91±2.93), P>0.05; 4 wks: (176.80±6.77)VS (199.58±5.71), P<0.05;8 wks: (169.42±4.52) VS (189.87±3.55), P<0.01].
SBP was higher than that in WKY during whole treatment period.Compared with SHR, Serum 25(OH)D is higher after 8 wks of X and R treated.[(6.81±1.59)(4.86±0.75) VS (3.15±0.33) ng/ml, P<0.01, respectively], but didn't reach the level of that in WKY. W/L and TW/R1 of mesenteric arterioles (3rd grade branch) in X and R treated rats were markedly lower than those of untreated SHR (P<0.001), and almost to the level of WKY(P>0.05). EDdR and EDiR of mesenteric arterioles (3rd grade branch) were increased in X and R group (both P<0.01, VS SHR).

Conclusions: The long-term therapy of Xiongdan may result in lowered blood pressure in SHRs, increase the plasma level of 25(OH)D, ameliorate the vascular structure and function.

PP.07.25 RELATIONSHIP AMONG OXIDATIVE STRESS, VASCULAR REACTIVITY CHANGES AND BLOOD PRESSURE IN HYPERTENSIVE PATIENTS ON AT1R ANTAGONIST THERAPY

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Objective: The aim of this study was to assess the effects of AT1-receptor antagonisms on the markers of oxidative stress and endothelial activation in relation to vascular function and arterial blood pressure (ABP) changes in hypertensive patients.

Design and method: 30 newly discovered hypertensive subjects of both sexes received AT1 antagonist (olmesartan, 10-20mg/day) during 8 weeks. At the beginning and 8 weeks after therapy flow-mediated dilation (FMD) of brachial artery (BA) was measured by ultrasound (Acuson Siemens X300; ultrasound probe VF10-5; 105 MHz). The BA diameter, relative change in the diameter (δr) and percentage of diameter change (FMD%) were calculated for pre-occlusion, and after occlusion duration for 1, 2 and 3min. Serum levels of 8-iso-prostaglendin F2-alpha (8iPGF2α), endoglin and sICAM-1, sVCAM-1 and E-selectin were assessed by commercial ELISA kits. Paired t-test, or t-test were used as appropriate with Pearson's correlation calculated; p<0.05 was significant (SigmaPlotv.11).

Results: Eight weeks after therapy, ABP was significantly reduced (<=139/89mmHg; p<0.001). sICAM-1 and sVCAM-1 levels were significantly increased and positively correlated to BP whereas sE-selectin was decreased and negatively correlated to BP. Although 8iPGF2α and endoglin levels did not significantly change, there was significant positive correlation between 8iPGF2α and diastolic BP (p=0.0383), as well as between endoglin and 8iPGF2α (p=0.0477). The BA diameter was significantly bigger at all measured points compared to pre-therapy values; δr was significantly reduced after 3min, and FMD% after 2 and 3min of occlusion. δr positively correlated to systolic (SBP) and diastolic (DBP) after 2 and 3 min. FMD% positively correlated to SBP after 3min, and to DBP after 2min of occlusion. 8iPGF2α positively correlated to FMD% after 1 and 2 min occlusion duration; and to delta r after 1min of occlusion.

Conclusions: Blood vessels were relaxed after therapy due to decreased BP leading to less vigorous FMD response. Level of oxidative stress affected FMD. Endoglin might be a new marker of endothelial dysfunction in systemic hypertension, related to the level of oxidative stress and AT1 receptors' function. Results suggest permissive role of AT1 receptors in maintaining normal vascular function despite BP normalization.

PP.07.26 SYMPATHETIC PREDOMINANCE IS ASSOCIATED WITH IMPAIRED ENDOTHELIAL PROGENITOR CELLS AND TUNNELING NANOTUBES IN CONTROLLED-HYPERTENSIVE PATIENTS

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Objective: Bone marrow-derived endothelial progenitor cells (EPCs) contribute to the repair and regeneration of the injured endothelium. Two distinct types of EPC have been identified by in vitro cell culture of the blood mononuclear cell fraction: early-EPC, that promote vascular repair by releasing key cytokines, and late-EPC by differentiating into endothelial cells and incorporating into blood vessels. Also, early- and late-EPC can rescue damaged endothelial cells by transferring organelles through tunneling-nanotubes (TNT). In rodents, EPC-mobilization from the bone marrow depends on sympathetic nervous system activity. Indirect evidence suggests a relation between autonomic derangements and human EPC-mobilization. In this context, we aimed at testing whether hypertension-related autonomic imbalances are associated with EPC impairment.

Design and method: Thirty controlled-essential hypertensive patients [SBP/DBP=130(120-137)/85(61-88) mmHg; 81.8% male], and twenty-healthy normotensives [(114(107-119)/75(64-79) mmHg; 80% male] were studied. Mononuclear cells were cultured on fibronectin- and collagen-coated dishes for early-EPC and late-EPC, respectively. Low-(LF) and high-frequency (HF) components of short-term heart rate variability were analyzed during a 5-min rest, an expiration/inspiration maneuver, and a Stroop color-word-test. Modulations of cardiac sympathetic and parasympathetic activities were evaluated by LF/HF (%) and HF-power (ms2), respectively.

Results: In controlled-hypertensive patients, the numbers of early-EPC, early-EPC that emitted TNT, late-EPC and late-EPC that emitted TNT were 41%, 77%, 50% and 88% lower than in normotensives (p<0.008). In controlled-hypertensive patients, late-EPC number was positively associated with cardiac parasympathetic reserve during the expiration/inspiration maneuver (Rho=0.45, p=0.031) and early-EPC with brachial flow-mediated dilation (Rho=0.655; p=0.049); also, late-TNT number was inversely related to cardiac sympathetic response during the stress-test (Rho=-0.426, p=0.045). EPC exposure to epinephrine or norepinephrine showed negative dose-response relationships on cell adhesion to fibronectin and collagen; both catecholamines stimulated early-EPC growth, but epinephrine inhibited late-EPC growth.

Conclusions: In controlled-hypertensive patients, sympathetic overactivity/parasympathetic underactivity were negatively associated with EPC, suggesting that reducing sympathetic/increasing parasympathetic activation might favor endothelial repair.

PP.07.27 ASSOCIATION BETWEEN ENDOTHELIAL FUNCTION AND CARDIOVASCULAR RISK

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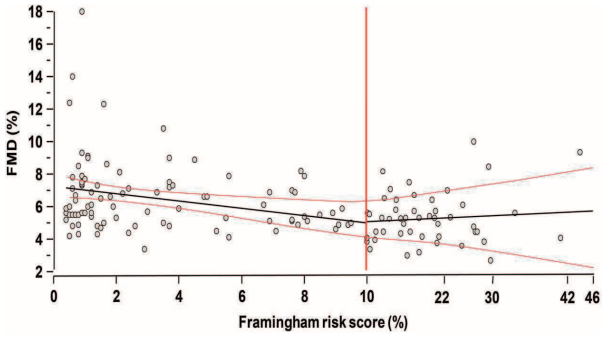
Objective: Endothelial dysfunction has been recognized as a surrogate marker of atherosclerosis. Flow-mediated-dilatation (FMD) is the most widely used non-invasive ultrasound method to asses endothelial function. However, the association between FMD and different levels of cardiovascular risk profile, as estimated by well-established risk scores in clinical practice, is still controversial.



Design and method: We included in our analysis 149 patients without previous cardiovascular events (mean age 45 ± 15; male subjects: 55%) referred to our laboratory for cardiovascular risk stratification. Using current guidelines, FMD was determined as percentage change of diameter in the brachial artery before and after cuff occlusion. The 10-year risk of cardiovascular events was estimated based on the Framingham risk score (FRS). Association between FMD and FRS was computed according to change point regression models.

Results: Overall, FMD was significantly associated with FRS (r=0.33, p<0.001). Nevertheless, using change point regression models (Figure), the significant association between FMD and FRS observed in patients with low-intermediate cardiovascular risk (FRS < 10%; p=0.010) was lost in patients with FRS >= 10% (p=0.435; Davies' test for change in the slope: p<0.0001).

Conclusions: Only in subjects at low-intermediate risk (FRS<10%), endothelial function estimated by FMD is related to 10-year cardiovascular risk. Our results suggest that the accuracy of ultrasonographic assessment of FMD as a measure of endothelial function is hampered in subjects with increased risk.
Conclusions: The combination of original perindopril/indapamide and simvastatin has advantages according to elimination of endothelial dysfunction and MAU and dominates from pharmacoeconomic point of view.

PP.07.28 CHOLECALCIFEROL SUPPLEMENTATION RESTORES ENDOTHELIAL FUNCTION IN ESSENTIAL HYPERTENSIVE PATIENTS WITH HYPOVITAMINOSIS D

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Objective: Hypovitaminosis D has been associatd with increased cardiovascular risk, but whether the effects of its supplementation on cardiovascular endpoints are still poorly studied. Aim of this study was to investigate the effect of cholecalciferol supplementation on vascular function and structure in essential hypertensive patients with hypovitaminosis D.

Design and method: 27 consecutive patients (11 men, mean age 49±15yr, age range 22-73yr, BMI 27±4 Kg/m2) with essential hypertension and hypovitaminosis D (defined as plasma 25(OH)D values<30ng/ml) underwent oral supplementation with cholecalciferol 50000 I.U./week for two months. At baseline and at the end of the study, endothelium-dependent (flow-mediated dilation, FMD) and –independent (glyceril trinitrate 25 mcg s.l.) vasodilation were obtained. Central BP, wave reflection (Augmentation index, AIx) and carotid femoral pulse wave velocity (PWV) were assessed by applanation tonometry. Plasma vitamin D levels (25(OH) D) were also evaluated.

Results: After 2-month cholecalciferol administration, all patients normalized plasma 25(OH)D values (from 19±9 to 33±14 ng/ml, p<0.001). No changes in brachial BP (from 138±12/81±7 to 136±11/83±11 mmHg, p=ns) and central BP (from 127±14/82±7 to 126±13/84±12, p=ns) were observed. FMD was significantly increased after cholecalciferol supplementation (from 3.3±2.1 to 4.4±2.6%, p<0.05), in the presence of a similar brachial artery diameter (from 3.9±1.2 to 4.0±1.1mm, p=ns) and endothelium-independent vasodilation (from 8.3±4.4 to 8.4±4.2%). PWV and AIx were not significantly modified (from 7.8±1.6 to 7.5±1.5m/s and 22±14 to 23±13% respectively, p=ns).

Conclusions: Cholecalciferol supplementation in essential hypertensive patients with hypovitaminosis D is able to improve conduit-artery endothelial function.

PP.07.29 THE IMPROVEMENT OF ENDOTHELIAL FUNCTION UNDER THE INFLUENCE OF COMBINED ANTIHYPERTENSIVE AND HYPOLIPIDEMIC THERAPY

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Objective: To compare efficacy of combinations of antihypertensive and hypolipidemic medications in order to improve Endothelium-Dependent Vasodilation (EDVD), to eliminate Microalbuminuria (MAU) and also to calculate Cost-Effectiveness Ratio (CER).

Design and method: 78 patients with moderate arterial hypertension accompanied by type 2 diabetes with dyslipidemia were studied. The patients were randomized in groups A, B or C. Patients of group A (25 individuals) received original perindopril/indapamide and original simvastatin, patients of group B (30 individuals) - generic enalapril/indapamide and generic simvastatin, patients of group C (23 individuals) - original enalapril/hydrochlorothiazide and original simvastatin. The groups were comparable according to initial data (p>0.05). The target level of BP was considered to be <130/80 mm per Hg. The target level of LDL was considered to be <2 mmol/L. Office BP and LDL were examined every four weeks with a possible correcting of the therapy. Initially and within the 12 weeks EDVD (Method of Celermajer) and MAU (the semiquantitative method with test strips) were evaluated. CER was calculated as a ratio of cost (included only drug costs) to efficiency.

Results: By the 12th week of treatment all of the studied combinations have reduced both systolic and diastolic BP and also LDL (p<0.05). In group A 18 of 25 patients improved EDVD by>4.5%, in group B - 6 of 30 patients, in group C - 4 of 23 patients. The cost of improvement of EDVD by>4.5% was 6180.16 rubles/case in group A, 10794.1 rubles/case in group B and 18189.52 rubles/case in group C. By the 12th week of treatment MAU remained in 2 of 12 patients with initial nephropathy of group A, in 7 of 12 patients of group B and in 5 of 9 patients of group C. The cost of elimination of MAU was 5080.92 rubles/case in group A, 5384.52 rubles/case in group B and 6817.72 rubles/case in group C. CER A < CER B < CER C.

Conclusions: The combination of original perindopril/indapamide and simvastatin has advantages according to elemination of endothelial dysfunction and MAV and dominates from pharmacoeconomic point of view.

POSTERS' SESSION

POSTERS' SESSION PS08
LARGE ARTERIES

PP.08.01 MECHANISMS OF IMPROVED AORTIC STIFFNESS BY AROTINOLOL IN SPONTANEOUSLY HYPERTENSIVE RATS

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Objective: This study investigates the effects on aortic stiffness and vasodilation by arotinolol and the underlying mechanisms in spontaneously hypertensive rats (SHR).

Design and method: The vasodilations of rat aortas, renal and mesenteric arteries were evaluated by isometric force recording. Nitric oxide (NO) was measured in human aortic endothelial cells (HAECs) by fluorescent probes. Sixteen-week old SHRs were treated with metoprolol (200 mg•kg-1•d-1), arotinolol (30 mg•kg-1•d-1) for 8 weeks. Central arterial pressure (CAP) and pulse wave velocity (PWV) were evaluated via catheter pressure transducers. Collagen was assessed by immunohistochemistry and biochemistry assay, while endothelial nitric oxide synthase (eNOS) and eNOS phosphorylation (p-eNOS) of HAECs or aortas were analyzed by western blotting.

Results: Arotinolol relaxed vascular rings and the relaxations were attenuated by Nω-nitro-L-arginine methyl ester (L-NAME, NO synthase inhibitor) and the absence of endothelium. Furthermore, arotinolol-induced relaxations were attenuated by 4-aminopyridine (4-AP, Kv channels blocker). Arotinolol produced more nitric oxide compared to metoprolol and increased the expression of p-eNOS in HAECs. These results indicated that arotinolol-induced vasodilation involves endothelium-derived NO and Kv channels. The treatement with arotinolol in 8 weeks, but not metoprolol, markedly decreased CAP and PWV. Biochemistry assay and immunohistochemistry showed that aortic collagen depositions in the arotinolol groups were reduced compared with SHRs with metoprolol. Moreover, eNOS phosphorylation was significantly increased in aortinolol-treated SHR compared with SHRs with metoprolol.

Conclusions: Arotinolol improves arterial stiffness in SHR, which involved in increasing NO and decreasing collagen contents in large arteries.

PP.08.02 CORRELATION OF INTIMA-MEDIA THICKNESS TO COGNITIVE IMPAIRMENT IN HYPERTENSIVE PATIENTS

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Objective: Elevated intima-media thickness (IMT) is a sign of atherosclerosis and is associated with hypertensive target organ damage. We tested the hypothesis weather there is a correlation between IMT as a marker of large arteries damage and mild cognitive impairment (MCI) – a clinical manifestation of brain target organ damage in hypertensive patients.

Design and method: 81 hypertensive patients on combined medical treatment were included in the study: 14(17.28%) males and 67(82.72%) females. The mean age was 68.54±8.77 years and the mean hypertension history - 11.44±8.74 years. Minimal follow-up period was 6 months. All the patients underwent complete anamnesis and physical examination, basic laboratory screening, echocardiography, carotid ultrasound, office- and home measurement of blood pressure, ambulatory blood pressure monitoring. The neuropsychological tests, which were used to assess the patients initially and during the follow-up visit were: Mini Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA). SPSS 19 was used for the descriptive statistics, t-test and the correlation analysis.

Results: The mean results for IMT were: left 0.83±0.11 cm and right 0.84±0.12 cm. The group of patients with MCI assessed with both MMSE and MoCA had significantly (p=0.002 for the left and p=0.04 for the right) higher IMT values than the group of patients without MCI. If only MoCA was considered as a screening tool for MCI for its higher sensitivity, the result was corresponding. The patients with MCI had significantly (p=0.006 for the left and p=0.002 for the right) higher IMT values than those without MCI. When correlation analysis was used to assess the strength and the direction of the correlation IMT – neuropsychological tests' results, a significant ($p<0.05$) negative correlation was found. The higher the IMT for both sides, the lower the MMSE and MoCA results both during the inclusion and the follow-up evaluation.

Conclusions: IMT and MCI are correlated - the higher the IMT, the more exacerbated MCI. IMT could be a valuable tool to rise the suspicion of the clinician for detection of target organ damage (MCI), as well as its persistence during follow-up.

PP.08.03 DECREASES IN AMBULATORY DAY IMPUTED AORTIC-TO-BRACHIAL BLOOD PRESSURE AMPLIFICATION ARE ASSOCIATED WITH LEFT VENTRICULAR MASS REGRESSION INDEPENDENT OF AMBULATORY BRACHIAL PRESSURE

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Objective: The relative role of aortic versus brachial blood pressure (BP) in cardiovascular disease is uncertain. Previous studies may be confounded by office BP measurements. The impact of in-treatment decreases in ambulatory aortic BP on end-organ changes has not been determined.

Design and method: We applied an imputation equation for central aortic pulse pressure to ambulatory day BP values and assessed the relationship between in-treatment increases in the day aortic-to-brachial amplification ratio (PPamp) and decreases in echocardiographic left ventricular mass index (LVMI) independent of changes in day brachial BP in 173 mild-to-moderate hypertensives treated for 4 months.

Results: Ambulatory day brachial systolic/diastolic BP (mm Hg) (154±15/101±8 to 132±15/88±10, $p<0.0001$), ambulatory day brachial PP (mm Hg) (53±11 to 45±9, $p<0.0001$), ambulatory day aortic PP (mm Hg) (43±10 to 35±8, $p<0.0001$) and LVMI (g/m2.7)(60.3±18.4 to 51.5±13.6, $p<0.0001$) decreased and ambulatory day PPamp increased (1.28±0.24 to 1.37±0.63, $p<0.0001$) over the 4 month treatment period. With adjustments for baseline LVMI, baseline PPamp and either decreases in day brachial PP (partial r=-0.17, 95% CI=-0.32 to -0.01, $p<0.05$) or decreases in day systolic BP (partial r=-0.18, 95% CI=-0.33 to -0.01, $p<0.05$), in-treatment increases in day PPamp were independently associated with decreases in LVMI. The brachial BP-independent relationships between changes in PPamp and LVMI were as strong as the relations between treatment-induced decreases in 24-hour brachial PP and decreases in LVMI (partial r=0.15, $p<0.05$). No relations between treatment-induced decreases in day PP or 24-hour or day systolic BP and decreases in LVMI were noted.

Conclusions: Independent of changes in brachial BP, in-treatment increases in day PPamp are associated with decreases in LVMI in mild-to-moderate hypertension. These data provide support for a key role of aortic BP in mediating increases in LVMI.

PP.08.04 AMBULATORY DAY IMPUTED AORTIC-TO-BRACHIAL BLOOD PRESSURE AMPLIFICATION IS ASSOCIATED WITH LEFT VENTRICULAR MASS INDEPENDENT OF AMBULATORY BRACHIAL PRESSURE

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Objective: Aortic blood pressure (BP) may be considerably lower than brachial BP. Conflicting results characterize studies reporting on the relative role of aortic versus brachial BP in cardiovascular disease. These studies may be confounded by office measurements. The impact of ambulatory aortic BP has not been determined.

Design and method: We applied an imputation equation for central aortic pulse pressure (PPc) to ambulatory day BP values and assessed the relationship between day PPc or the day aortic-to-brachial amplification ratio (PPamp) and echocardiographic left ventricular mass index (LVMI) independent of day brachial BP in a community-based sample of African ancestry.

Results: The imputation equation (derived in 1179 randomly recruited participants from a community-based sample), produced PPc values which closely approximated PPc determined from radial tonometry and SphygmoCor software (r2=0.96, mean difference [±2xSD] =-1.4±6.2 mmHg). In 485 participants from the community sample, where day PPamp was noted to be 1.40±0.18, ambulatory day PPc (partial r=0.13, p<0.01) and PPamp (partial r=-0.09 to -0.10, p<0.05) were associated with LVMI independent of ambulatory day brachial PP or systolic BP and additional confounders. Ambulatory day brachial BP-independent relationships between day PPc or day PPamp and LVMI were similar in strength to independent relationships noted between ambulatory day brachial systolic BP (partial r=0.11, p<0.05) or PP (partial r=0.15, p<0.005) and LVMI (p>0.05 for comparison of relations).

Conclusions: Ambulatory day aortic PP and day aortic-to-brachial BP amplification are associated with LVMI independent of ambulatory day brachial BP. These data provide support for a key role of aortic BP in mediating increases in LVMI.

PP.08.05 WAVE REFLECTION DOES NOT DIFFER BETWEEN PATIENTS WITH NORMAL AND WITH SEVERELY IMPAIRED SYSTOLIC FUNCTION

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Objective: Non-invasive estimates of wave reflection are independent prognostic markers in patients with normal systolic function, showing a direct relationship between the extent of wave reflection and cardiovascular risk. In systolic heart failure, wave reflection indices, based on pulse wave analysis (PWA), are reduced, whereas prognosis is impaired as well, as compared to normal systolic function. We aimed to investigate the amount of wave reflection by means of PWA and wave separation analysis (WSA) in patients with severely impaired systolic function.

Design and method: Wave reflection parameters were derived from PWA and WSA, with non-invasively generated aortic pressure waveforms and Doppler flow measurements in 61 patients with reduced (rEF; mean EF was 28%) and 122 patients with normal ejection fraction (nEF; mean EF was 69%). Both groups were matched for age, gender, and brachial blood pressures. Additionally we compared these measures with WSA-estimates from 3 different flow models (triangular, averaged, Windkessel).

Results: Central systolic blood pressure and central pulse pressure tended to be lower, heart rate was significantly higher (by 9 beats/minute), and ejection duration was significantly shorter in rEF. Augmentation Index as well as Pressure Augmentation were significantly lower in patients with rEF.
After adjustments for heart rate and ejection duration, all parameters of wave reflection were comparable for patients with rEF and nEF (Table). WSA parameters assessed with the Windkessel based model were similar to those derived from Doppler flow. Triangular approximation showed comparable results to Doppler flow only for rEF in opposite to the averaged waveform.

		bSBP	bDBP	pPP	cPP	AP	P1	|Pf|	|Pb|	PP amp	AIx	RM
	rEF	124.8±20.3	78.6±13.4	46.2±1.9	33.1±1.6	6.9±0.9	26.8±1.4	24.6±1.0	13.9±0.7	144±2.1	18.1±1.3	56.3±1.5
	nEF	126.6±13.7	79.1±9.4	47.5±1.0	36.4±0.9	9.4±0.4	27.0±0.8	24.7±0.6	15.2±0.4	132±1.3	24.8±0.9	62.1±0.9
	p	0.35	0.78	0.30	0.02 *	0.0001 *	0.95	0.68	0.02 *	<0.0001 *	<0.0001 *	0.0005 *
HR, ED	rEF			48.5±1.8	36.7±1.5	9.2±0.7	27.3±1.4	26.3±1.0	15.6±0.6	136.7±1.9	21.9±1.4	58.6±1.4
HR, ED	nEF			46.4±1.2	34.6±1.0	8.3±0.5	26.8±0.9	23.8±0.7	14.4±0.4	135.7±1.2	23.0±0.9	61.0±1.0
HR, ED	p			0.38	0.30	0.34	0.77	0.06	0.14	0.68	0.56	0.20

bSBP, bDBP... brachial systolic and diastolic blood pressure; cPP...central pulse pressure; AP ... Pressure Augmentation; P1 ... incident pressure wave height; Pf, Pb ... amplitudes forward and backward wave; PP amp... PP amplification; AIx...Augmentation Index; RM...Reflection Magnitude; HR...heart rate; ED...ejection duration.

Conclusions: The amount of wave reflection in the arterial system does not differ between patients with normal and patients with severely impaired systolic function.

PP.08.06 THE INCREMENTAL EFFECT OF ALCOHOL CONSUMPTION ON REDUCED ARTERIAL ELASTICITY IN EASTERN EUROPEAN IMMIGRANTS

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Objective: The association between excessive alcohol consumption and cardiovascular (CV) risk is robust. Arterial stiffness is an established down-stream marker of CV risk.We assessed the hypothesis that possible different alcohol consumption patterns between first generation Eastern European immigrants and native Greeks reflect different vascular age in the above mentioned populations.

Design and method: We studied 67 immigrants with newly diagnosed untreated stage I-II essential hypertension (EH), (aged=51.5±15 years, 35 male, office blood pressure (BP)=158/92 mm Hg) coming from Eastern Europe to Greece within the previous two years and 61 EH natives matched for age, gender and office BP. Arterial stiffness was evaluated on the basis of carotid-femoral pulse wave velocity (c-f PWV). Current alcohol intake was assessed by responding to a question on how many alcohol units they consumed during the day (0, < 1, 1-2, 3-5 and >5 units/day).

Results: Hypertensive immigrants compared to natives exhibited significantly higher values of c-f PWV (8.4±0.3 vs 7.1±0.5 m/sec, p=0.003). A significant greater proportion of immigrants reported excessive alcohol intake compared to natives (18% vs 5%, p= 0.02 - Image). In the immigrants group, c-f PWV was positively associated with alcohol intake (r= 0.28, p=0.004).

Conclusions: Hypertensive immigrants in the setting of similar hemodynamic load are characterized by higher alcohol consumption and stiffer aorta compared to natives. This unfavourable BP profile may contribute to the disproportionate CV risk of this frail population.

PP.08.07 GLYCEMIC CONTROL IS ASSOCIATED WITH ARTERIAL STIFFNESS AND LEFT VENTRICULAR HYPERTROPHY IN HYPERTENSIVES

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Objective: Hypertension is associated with left ventricular hypertrophy (LVH) and increased arterial stiffness, which are predictors of cardiovascular risk. Glycemic control, as assessed by hemoglobin A1c (HbA1c) levels, is an independent predictor of cardiovascular morbidity and mortality in hypertensives. We assessed the hypothesis that LVH and arterial stiffness are associated with glycemic control in never treated hypertensives.

Design and method: We enrolled 1225 consecutive essential hypertensives (mean age 52.9±11.7 years, 728 males, 86 diabetics). HbA1c was measured in venous blood samples. Left ventricular mass index (LVMI) was assessed by echocardiography. M-mode imaging was used for wall-thickness measurements. LVMI was calculated using the Devereux formula. LVH was defined as a LVMI>=125 g/m2 in men and >=110 g/m2 in women. Glomerular filtration rate (GFR) was estimated by the Cockcroft-Gault formula. Arterial stiffness was evaluated with carotid-femoral pulse wave velocity (cfPWV).

Results: In multivariable regression analysis, HbA1c exhibited significant positive association with LVMI and cfPWV, which was independent of age, gender, mean blood pressure, smoking habits, body-mass index, blood glucose, low-density lipoprotein, GFR and C-reactive protein (p=0.007, adjusted R2 of model=0.301 and p<0.001, adjusted R2 of model=0.418). HbA1c levels were significantly higher in patients with LVH compared with patients with normal ventricular mass (5.8 vs. 5.4%, respectively, P<0.001). In multivariable logistic regression models adjusting for the abovementioned confounders, HbA1c levels were significantly associated with LVH (OR=1.41, 95% CI:1.06-1.87, p=0.017) and cfPWV>=10m/s (OR=2.53, 95% CI:1.64-3.89, p<0.001).

Conclusions: Higher HbA1c is an independent predictor of increased LVM, arterial stiffness and LVH in essential hypertensives. These findings support the significance of adequate glycemic control in patients with hypertension regardless of the presence of diabetes.

PP.08.08 RELATION OF CARDIO-ANKLE VASCULAR INDEX, AN ARTERIAL STIFFNESS PARAMETER, TO CAROTID ATHEROSCLEROSIS IN HYPERTENSIVE PATIENTS

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Objective: Cardio-ankle vascular index (CAVI), blood-pressure independent arterial stiffness parameter, has been accepted as a good surrogate marker of cardiovascular disease. However, the significance of blood pressure independency

among different arterial stiffness parameters is not fully understood. The aim of this study is to assess the relation of blood-pressure dependent and independent parameters of arterial stiffness to carotid atherosclerosis in hypertensive patients.

Design and method: Subjects were 725 outpatients with hypertension. CAVI, heart-ankle pulse wave velocity (haPWV) , brachial-ankle PWV (baPWV) and ankle-brachial pressure index (ABI) were measured by VaSera VS-1000 (Fukuda Denshi Co., Ltd.). HaPWV was measured by length and time difference between aortic valve and ankle using photocardiogram and pulse wave analysis. Accordingly, central aorta, abdominal, femoral and tibial arteries were involved in measured portion of haPWV. CAVI is pressure independent arterial stiffness parameter using stiffness parameter beta and Bramwell-Hill's equation. The intima-media thickness (IMT) of carotid arteries was measured by ultrasonography (Aloka Co., Ltd.). Both mean and maximum IMT were calculated as structural atherosclerosis parameters.

Results: Mean age of subjects was 68 y/o, and 345 patients were females. Mean CAVI, haPWV, baPWV and ABI were 8.81,8.25m/sec,14.61m/sec, and 1.11. Average of mean and max IMT were 0.754±0.150 mm and 1.735±0.826mm. Mean IMT was closely related to CAVI, haPWV and baPWV (0.338,0.326,0.280) , and max IMT was also related to CAVI, haPWV and baPWV (0.221,0.185,0.177). However, ABI was a weak parameter to assess carotid atherosclerosis (-0.125, -0.053 in mean and max IMT). There were also positively correlated among CAVI, haPWV and baPWV. Both systolic and diastolic blood pressures were closely related to PWVs, but not CAVI (0.162,0.568,0.485 and -0.018,0.404,0.304 in CAVI, haPWV and baPWV).

Conclusions: In hypertensive patients, CAVI was weakly affected by blood pressure and a strong parameter to assess structural changes of carotid arteries among measured arterial stiffness parameters. These results suggested that blood pressure correction is important to assess arterial stiffness in hypertensive patients.

PP.08.09 POSSIBILITIES OF HIGH-RESOLUTION VESSEL ULTRASOUND IN DIAGNOSIS OF INFLAMMATORY WALL CHANGES IN PATIENTS WITH TAKAYASU ARTERITIS AND ARTERIAL HYPERTENSION

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Objective: Investigation of aortic stiffness in patients with TA, and determination of its relation with disease activity.

Design and method: Twenty three female with TA at the age of 43±13 years were examined, the blood pressure (BP) level was 140±12/80±8 mm Hg. Disease activity was assessed by measurement of C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). Patients were treated with immunosuppressive therapy, with statins and with antihypertensive medications. The control group consisted of 34 normotensive volunteers (27 men and 7 women) at the age of 42±5 years, the BP level was 120±8/78±6 mm Hg. Aortic regional stiffness – pulse wave velocity (PWV) was evaluated by visualize ultrasonic methods (PHILIPS EnVisorHD). The results are presented as median and 25-75 percentile.

Results: Aortic PWV was significantly higher in TA patients 9,3 (7,6;11) m/s compared with control group 5,2(4,8;5,5) m/s (p<0,001). Aortic PWV in patients with active phase of the disease (n=8) was 11,2 (7,7;13,6)m/s compared with 8,6 (7; 10,6) m/s in patients with clinical remission (n= 15) (p= 0.19). PWV mildly correlate with CRP (r=0,42, p= 0.04) but not with ESR.

Conclusions: PWV mildly correlate with parameter of disease activity in patients with TA. Our data show the influence of inflammatory morphological processes on the aortic stiffness in patients with TA. But PWV could not be justified as a criterion of inflammatory process activity in the vessel wall.

PP.08.10 THE POSSIBILITIES OF DIFFERENT INSTRUMENTAL METHODS IN DIAGNOSIS OF EARLY INFLAMMATORY ARTERIAL CHANGES IN PATIENTS WITH TAKAYASU ARTERITIS

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Objective: Takayasu arteritis (TA) is a chronical inflammatory large-vessel vasculitis that occurs predominantly in young females. The diagnosis is not usually established before arterial stenoses or occlusions are present. The aim of our study to compare the posibilities of MSCT-angiography high-resolution vascular ultrasound in diagnosis of early inflammatory arterial changes in patients with Takayasu arteritis.

Design and method: 32 female with TA aged from 17 to 76 (42, 68±14,45) year were detected. The duration of TA amounted to 19.3±16.9 years. Ultrasound examinations of both common, internal, external carotid arteries, both subclavian arteries were performed to all patients (Acuson 128 XP 10 (Siemens, Germany), VIVID 7 (GE), iU-22 - Philips). MSCT-angiography (Aquilion 64, Toshiba, Japan) was made in 22 pts.

Results: Arterial hypertension (AH) was detected in 27 of 32 (84%) pts, blood pressure (163±11,6/92±12,3 mm Hg).The estimation the diagnostic significance of each method in the definition of the wall thikness of the common carotid arteries (CCA) was obtained by using statistical analysis. The hypothesis about absence of connection between the results obtained according to the MSCT angiography and ultrasound of high resolution was tested. Using Fisher's two-tailed test this hypothesis was rejected and the connection between the results obtained by ultrasound and MSCT angiography was statistically significant. Moreover, it was noted that the results of ultrasound and MSCT angiography on this criteria coincide 76.2% of cases and do not coincide in 23.8% of cases. As it turned out, in all the different cases ultrasound was a more precisely method than MSCT angiography (this hypothesis is tested by the criterion of McNemar x2, p=0,0003).

Conclusions: High-resolution vascular ultrasound is more accurate in the diagnosis of early changes in the CCA than MSCT in TA patients.

PP.08.11 PROGNOSTIC ROLE OF STRUCTURAL CHANGES OF LARGE ARTERIES AND PERIPHERAL BLOOD FLOW IN PATIENTS WITH CHRONIC HEART FAILURE

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Objective: To investigate the dependence of structure of a.femoralis (a.F) and peripheral blood flow (PBF) on severity and 12-months survival prognosis of chronic heart failure (CHF).

Design and method: Ultrasonography of a.F, a.dorsalis pedis (a.DP) were performed in 129 patients (age 56.6±1.2 years; 89 males) with stable CHF (NYHA II-III) and LVEF<40% and in 40 age-matched healthy subjects. Diameter (D), intima-media thickness (IMT) of a.F, velocities (Vps and Ved) in a.DP were measured; index of relative wall thickness (RWT) of a.F: RWT=IMT/D; index of peripheral resistance (RI): RI=(Vps-Ved)/Vps. Kaplan-Meier 12-months survival analysis was performed for RWT as well as for Vps, Ved, RI in a.DP based on «below median vs. above median» approach.

Results: In pts with CHF IMT and RWT were significantly higher (IMT: 0.99±0.16 vs. 0.59±0.09 mm, p<0.001; RWT: 0.16±0.03 vs. 0.10±0.01 unit, p<0.001). Vps and Ved in a.DP were significantly lower in pts with CHF (39.3±2.1 vs. 56.4±6.6 cm/s, p<0.01 and 5.2±0.8 vs. 12.9±1.7 cm/s, p<0.01, respectively), and RI in a.DP was significantly higher (0.83±0.04 vs. 0.77±0.02 unit, p<0.01). These changes become more pronounced in pts with NYHA class III-IV than in NYHA class II (Vps 32.3±1.9 vs. 35.7±2.1 cm/s, p=0.03, Ved 5.8±0.7 vs.6.9±1.3 cm/s, p=0.03 and RI 0.84±0.03 vs. 0.82±0.02 unit, p=0.04, respectively). Kaplan-Meier 12-months survival analysis was performed in relation to the RWT (p=0.038), Vps in a.DP (p=0.04), Ved in a.DP (p=0.037) and RI in a.DP (p=0.04). Significantly lower survival was apparent in pts with RWT>0.16, Vps<36 cm/s, Ved<6 cm/s, RI>0.84 unit.

Conclusions: The present study indicates that remodeling of peripheral blood vessels is accompanied by decrease peripheral arterial blood flow and by increase in resistance of resistive vessels in patients with CHF. RWT, Vps, Ved and RI in a. dorsalis pedis may be used for mortality risk stratification in patients with CHF.

PP.08.12 EFFECT OF IVABRADINE AND ATENOLOL ON CENTRAL HEMODYNAMICS IN HYPERTENSIVE PATIENTS AFTER MYOCARDIAL INFARCTION

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Objective: We tried to compare effect of ivabradine in combination with atenolol (I+A) and atenolol (A) on central hemodynamics in hypertensive patients (pts) after myocardial infarction.

Design and method: The study included 40 hypertensive patients (88% male), mean age 63±8 years, with history of myocardial infarction and left ventricular systolic dysfunction. Two weeks before randomization all pts received atenolol 50 mg per day additionally to standard treatment. After that pts were randomly assigned to I (n=20) and A (n=20) dose up-titration for 2 weeks with achieving of target heart rate (HR) less 60 bpm at rest. Mean doses were 14,3 mg for I in I+A group pts and 135,8 mg in A group pts. Follow-up period was 12 weeks. Heart rate (HR), peripheral systolic blood pressure (SBP), central aortic systolic pressure

(CSP), carotid-femoral pulse wave velocity (PWV), AIx normalized for a heart rate of 75 bpm (AIx75), amplification of pulse pressure (APP) were estimated.

Results: HR decreased from 77 to 52 bpm with I+A and from 76 to 52 bpm with A (both p=0.001). SBP decreased by 4.0 mm Hg with I+A and by 10.0 mm Hg with A (p=0.03). CSP decreased by 7.0 mm Hg with I+A and 12.0 mm Hg with A (p=0.73). PWV decreased by 1.3 m/s after I+A and by 1.1 m/s after A (p=0.78). AIx75 decreased from 31 to 20% after I+A (p=0.001) and from 31 to 28% after A (p=0.06) 6 weeks after treatment and it then decreased to 16% in I+A group vs 23% in A group (p=0.001) when treatment ended. APP increased by 11% after I+A and it decreased by 11% after A (p=0.001).

Conclusions: Both I+A and A showed comparable reduction of HR, CSP and PWV. In contrast to atenolol combination of I+A was associated with more significant and faster decrease of AIx75 and increase of APP.

PP.08.13 ASSOCIATION OF LIPOPROTEIN APOA-I AND AORTIC STIFFNESS WITH PERIPHERAL ARTERIAL DISEASE: RESULTS OF A NINE-YEAR FOLLOW-UP

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Objective: We investigate whether incidence of peripheral arterial disease (PAD) defined as ankle brachial index (ABI) <0.9 is independently associated with aortic stiffness and lipoprotein apoA-I (apoA-I) in elderly subjects free from PAD at baseline.

Design and method: The present study included 96 elderly lecture attendees ("Continuing Adult Education") who were examined at baseline and after a median follow-up of 9.5 years. We used multiple linear and logistic regression analyses to assess predictors of ABI decrease and PAD. As independent covariates we considered parameters with known effect on arterial stiffness or ABI and use of antihypertensive medication.

Results: At baseline, mean age was 67.2±4.9 years, 79.2% were women, 33.3% of subjects had arterial hypertension, and 5.2% diabetes mellitus. During follow-up, the ABI decreased (1.15±0.12 vs. 1.00±0.19; p<0.0001) and there were 27 (28.1%) incident cases of PAD defined as ABI<0.9. While accounting for covariates, decrease in ABI was associated with lipoprotein apoA-I (β = +0.045±0.018; p=0.017) and PWV (β=–0.038±0.017; p=0.025). Additional adjustment for antihypertensive treatment started during the follow-up weakened the association between PWV and ABI decrease (p=0.091). The incidence of PAD was associated only with apoA-I (OR 0.55, 95%CI 0.32 – 0.97; p=0.038). PWV was not significant predictor of incident PAD either in basically adjusted model or in model adjusted also for antihypertensive treatment (p>=0.082).

Conclusions: In elderly subjects without manifest PAD at baseline, the lipoprotein apoA-I and aortic stiffness are associated with the ABI decrease. However, antihypertensive treatment started during follow-up moderates effect of aortic PWV on ABI decrease.

PP.08.14 AORTIC DISTENSIBILITY IS AN INDEPENDENT DETERMINANT OF MYOCARDIAL DIASTOLIC FUNCTION

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Objective: Hypertension causes increase in myocardial post load and in aortic stiffness. The aim of this study is to determine the relationship between aortic wall properties and left ventricle diastolic function.

Design and method: Cardiovascular magnetic resonance exam (1.5T Siemens) of the proximal aorta was performed. Ascending aortic diameters and strain were calculated using the ARTFUN software and an automated segmentation of SSFP cine acquisitions acquired in the axial view, during breath-holding, at the level of pulmonary bifurcation perpendicular to the aorta. Aortic strain was used to calculate aortic distensibility in each subject: distensibility (AD) =strain/cPP where cPP is the central pulse pressure obtained by tonometry (sphygmocor ®). The CARD-FLOW ® software allows a semi automated segmentation of transmitral and transaortic flows as well as myocardial septal wall velocities. Phase contrast ventricular sequences were analyzed to determine E, A, E'and A' waves velocities as well as Mitral Filling volume (Fv) Home Blood pressure (hBP) records were used to define BP levels. Carotido femoral pulse wave velocity (CfPWV) was assessed using just after MRI using Sphygmocor ®.

Results: Population included 55 treated hypertensives in primary prevention of mean age 53.4years and 16 normotensive controls matched for age/gender and body mass index. Male proportion was 55.5% and 50% of hypertensives had uncontrolled hBP (122/76 vs 150/94mmHg p<.01). AD differed between the 3 groups (p<.03): 33.2, 24.2 and 18.1 10-3kPa-1 in control subjects, controlled and uncontrolled hypertensives respectively. Cf-PWv differed between control subjects and uncontrolled hypertensives (10.4 vs. 11.8m/s p<.05).Diastolic parameters did not differ among groups. Univariate analysis showed strong association of AD and CfPWV with age (p<.001), central blood pressure and all diastolic parameters (E, E', E/A, E/E', A/Fv and E/Fv). Multivariate analysis showed after adjustment for age and central blood pressures that E' and A/Fv were independently linked to AD (p<.001) and that E' and E/E' were linked to CfPWV (p<.05).

Conclusions: In hypertension, Aortic stiffness indexes and especially AD are determinant of diastolic function independently of age and blood pressure levels.

PP.08.15 EXCESS PRESSURE IS INDEPENDENTLY RELATED TO MEASURES OF LV MASS AND CONCENTRIC GEOMETRY IN ESSENTIAL HYPERTENSION

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Objective: According to the reservoir theory, arterial pressure can be decomposed as the sum of reservoir (Pres) and excess (Pexc) pressure. Pres is constant along the entire arterial tree and results in the minimum left ventricular (LV) hydraulic work, while excess pressure is linked to the excess work of the heart. However, data about the relationship of Pres and Pexc with cardiac structural features in hypertension are still lacking

Design and method: 446 never-treated hypertensive subjects (mean age 48±11 years, 62% men, BP 148/92±16/10 mmHg) were evaluated through M-mode and 2D-echocardiography. Aortic pressure waveform was derived from radial applanation tonometry (SphygmoCor). Amplitudes of Pres and Pexc were calculated using ARCSolver algorithms which are solely based on central pressure curves. LV mass was indexed to height^2.7, LV hypertrophy was defined as LV mass>51 g/m^2.7. Relative wall thickness (RWT) was expressed as: 2 x posterior wall thickness/LV internal diameter. Concentric geometry was considered if RWT>0.43. All subjects underwent 24-h automatic BP assessment (SpaceLabs 90207, 1 measure/15').

Results: Pexc and Pres were both positively correlated with LV mass (Pearson's r= 0.15 and 0.17, respectively, both p<0.01) and RWT (r=0.16, p<0.01; r=0.11, p=0.02). After adjustment for age, sex, body mass index and 24-h systolic BP, subjects with LV hypertrophy had significantly higher Pexc (18.4±10.3 vs 17.0±5.4 mmHg, p=0.02), but not Pres (39.8±12.6 vs 37.5±24.2 mmHg, p=0.09). In a multivariate model adjusting for multiple cardiovascular risk factors and other confounders, an increased Pexc independently predicted both LV mass (β=0.08, p=0.04, multiple R=0.58) and RWT (β=0.10, p=0.02, multiple R=0.40), while these relationship were not observed for Pres.
Conclusions: LV mass and RWT are linearly and independently associated to aortic excess pressure (Pexc), but not to reservoir pressure (Pres) in untreated hypertensive subjects, even after taking into account the effect of 24-hour systolic BP. Structural cardiac abnormalities may be related to an increase of excess pressure. These results confirm the close functional connections between properties of proximal large arteries and LV structural remodeling.

PP.08.16 ARTERIAL STIFFNESS AND CENTRAL AORTIC BLOOD PRESSURE IN SUBJECTS WITH SICKLE CELL DISEASE

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Objective: Sickle cell disease is a disease of microcirculation, although several theories also suggest involvement of large vessels. However, data on central aortic blood pressure (CBP) and arterial stiffness of subjects with sickle cell disease are conflicting. The aim of the present study was to assess CBP and arterial stiffness in adult patients with sickle cell disease compared with control subjects.

Design and method: 86 subjects were recruited 46 patients (male=15), and 36 healthy controls (male=18). Mean age of the population was 43.3±9.9 years for patients and 40.0±11.2 years for controls (p>0.05). Demographic characteristics and anthropometric characteristics were comparable in the two groups. Central aortic systolic and diastolic blood pressure (CSBP and CDBP), augmentation index (Aix), and pulse wave velocity (PWV), were measured in both groups with the Sphygmocor (Atcor Medical).

Results: Sickle cell disease patients showed significantly lower CDBP compared to controls (70.0±8.3 mmHg vs 80.4±9.7mmHg). Interestingly Aix was higher in the patient group (24.9±9.6% for patients vs 12.9 ± 11.4% for controls, p<0.001). CSBP, and PWV however showed no difference between the two groups.

Conclusions: Despite the fact that sickle cell patients have lower central blood pressure levels, the Aix, which is an indirect index of arterial stiffness was higher in these patients. Other mechanisms and not arterial stiffness are responsible for the relative hypotension of sickle cell patients. These mechanisms remain to be identified.

PP.08.17 PREHYPERTENSION AND ARTERIAL STIFFNESS

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Objective: Prehypertension or high normal blood pressure, defined either as systolic blood pressure (SBP) of 130-139 mmHg and/or diastolic blood pressure (DBP) of 85-89 mmHg has been associated with increased cardiovascular risk and incident hypertension. Although there was evidence for feasibility of treating prehypertension, recent guidelines do not recommend treatment of high normal BP, even in patients at high risk. The aim of the present study was to investigate the impact of prehypertension on arterial stiffness, a significant contributor in the pathophysiology of hypertension and an independent predictor of cardiovascular events.

Design and method: We studied 226 healthy individuals whom we divided into two groups according to the range of normal BP levels (1. subjects with high normal BP: SBP of 130-139 mmHg and/or DBP of 85-89 mmHg, N=137 and 2. subjects with normal BP: SBP of 120-129 mmHg or lower and/or DBP of 80-84 mmHg or lower, N=89).
Arterial stiffness was assessed by measuring carotid-femoral pulse wave velocity (PWV) using the Complior device.

Results: Subjects with prehypertension were older (48.7±15.6 vs 41.3±12.8 years), with higher body mass index (BMI) (27.1±3.9 vs 24.9±4.2 Kg/m²), higher levels of total cholesterol (204.6±38.1 vs 190.7±35.2 mg/dl) and triglycerides (101.8±49.0 vs 87.2±35.8 mg/dl) compared to individuals with normal BP. Pulse wave velocity was increased in prehypertensives compared to those with normal BP (6.64±1.22 vs 6.15±1.11 m/s, p<0.01). However, this difference became non-significant after adjustment for age, gender, smoking, BMI and total cholesterol (p=NS).

Conclusions: There is no evidence of harmful effect of prehypertension on arterial stiffness. Albeit our study population comprised of subjects with low cardiovascular risk, the present findings reinforce the notion that prehypertension is a clinical condition that warrants no pharmacological treatment.

PP.08.18 COMPARATIVE EFFECTS OF INDAPAMIDE SR AND HYDROCHLOROTHIAZIDE ON CENTRAL BLOOD PRESSURE AND ARTERIAL STIFFNESS IN HYPERTENSIVE PATIENTS: A RANDOMIZED TRIAL

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Objective: Differential effects of antihypertensive drugs on central blood pressure (BP) and arterial stiffness may have prognostic significance. The aim of the study was to compare indapamide SR and hydrochlorothiazide (HTZ) effects on central BP and arterial stiffness when added to monotherapy with ACE inhibitor (ACEi).

Design and method: 44 hypertensive patients (30 male, 55.2±3.2 years (M±SD) with clinical BP > 150/90 mmHg and daytime BP by ABPM > 135/85 mmHg after monotherapy with an ACEi for 6 weeks were randomized for adding indapamide SR 1,5 mg or HTZ 25 mg to treatment regimen. Measurement of clinic BP, central BP and pulse wave velocity (PWV) was done before and after 12 weeks after diuretic administration. Treatment-induced changes were considered significant if p<0,05.

Results: Treatment with both diuretics resulted in significant and similar decrease in clinic BP: in indapamide SR-treated subjects from 157±6/95±5 to 124±3/78±3 mmHg (p<0,05), HTZ-treated subjects from 158±7/94±5 to 126±4/80±3 mmHg (p<0,05). The decrease in central systolic BP was significant and similar as well: in indapamide SR-treated from 142±13 to 115±10 mmHg, -27±3,2 mmHg, in HTZ-treated from 141±13 to 118±12 mmHg, -22±4,8 mmHg. Decrease in central pulse pressure (PP) and augmentation index (AIx@75bpm) was significantly more evident in indapamide SR group than in HTZ group: for PP, respectively, from 53±10 to 37±7 mmHg, -16±4,0 mmHg and from 53±8 to 42±8 mmHg, -11±2,5 mmHg, p<0,05 compared to indapamide SR; for AIx@75bpm, respectively, from 28±7 to 22±5%, 6±2,0% and from 29±7 to 26±8%, -3±1,0%, p<0,05 compared to indapamide SR. PP amplification increased in indapamide SR-treated subjects and decreased in HTZ-treated ones: respectively from 119±8 to 124±9%, 5±2,7 mmHg, for HTZ from 120±10 to 112±7%, -8±3,1 mmHg, p<0,05 compared to indapamide SR. The decrease in PWV was similar and not significant: for indapamide SR from 11.7±6.5 to 9.6±6.0 m/s, for HTZ from 11.9±7.2 to 10.1±5.2 m/s.

Conclusions: Despite similar reduction in clinic brachial BP, indapamide SR 1,5 mg is more effective then HTZ 25 mg in terms of CBP reduction due to its impact on reflected wave characteristics.

PP.08.19 THORACIC AORTA REMODELING: CORRELATION WITH ARTERIAL STIFFNESS AND CARDIOVASCULAR ORGAN DAMAGE IN MILD HYPERTENSIVES

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Objective: In hypertensive patients thoracic aorta dilatation is a common phenomenon; it entails high risk of developing severe diseases such as aneurysm or dissection. Aim of the study was to evaluate in early stage of hypertensive disease aortic thoracic morphological parameters and their correlation with blood pressure (BP), aortic stiffness, carotid and cardiac organ damage.

Design and method: In this prospective study we enrolled 119 consecutive patients without cardiovascular disease or diabetes, not smokers: 78 were never treated mild hypertensive (mean 24h-BP>130 and/or 80mmHg), 41 were normotensive subjects matched for age, sex, body mass index and body surface area (BSA). For each subject we evaluated office and 24 hours BP. Each patient underwent arterial tonometry (central BP and pulse wave velocity, PWV), echocardiography and carotid ultrasonography.

Results: 24h-hours BP, central BP and PWV were higher in hypertensives (131±9/84±7 vs 115±6/74±4mmHg, p<0.001; 124±12 vs 115±15mmHg, p=0.013; 7.1±2 vs 6.2±1m/s, p=0.04). Aortic root and ascending aorta were normal in all subjects but higher in hypertensives (32.3±4vs30.7±4mm, p=0.04, 29.3±3.7 vs 27.7±3.3mm, p=0.01). Transverse aortic arch diameter was normal and similar in two groups. Root and ascending aorta diameters did not show significant correlation with office systolic and diastolic BP or 24-hours BP while these correlated with central systolic aortic pressure (r=0.315, p=0.001, r=329, p=0.001) and PWV (r=0.196, p=0.04, r=0.227, p=0.02). They also showed significant correlation with left ventricular mass (r=0.179, p=0.05, r=0.249, p=0.007) and relative wall thickness (r=0.291, p=0.001, r=0.347, p=0.001) but not with carotid intima-media thickness. Aortic arch diameter didn't show any correlation with aforementioned cardiac or vascular parameters.

Conclusions: In our study aortic parameters (root and ascending aorta diameters) resulted higher in mild hypertensives; these parameters correlated with cardiac but not carotid organ damage. Aortic remodeling was related with central blood pressure better than office and 24 hours blood pressure. Our findings suggest potential usefulness of central pressure measurement in early hypertensives stages to better predict aortic remodeling.

PP.08.20 INFLUENCE OF BISOPROLOL AND VERAPAMIL ON PERIPHERAL AND CENTRAL PRESSURE, LEFT VENTRICULAR DIASTOLIC FUNCTION AND ARTERIAL STIFFNESS OF HYPERTENSIVE PATIENTS

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Objective: The aim of the study was to compare the effect of treatment β- blocker bisoprolol and calcium antagonist verapamil on peripheral and central pressure , left ventricular diastolic function (DFLV) and arterial stiffness of patients with hypertension.

Design and method: Included 60 patients (mean age 55 ± 12 years), 29 men, 31 women with hypertension I-IIst. and heart rate more 75 beat/min. Blood pressure, resting heart rate (HR), augmentation index (Alx %), systolic (cSBP) and pulse pressure (cPP) in the aorta, pulse wave velocity on carotid-femoral (PVWcf) and ankle - brachial (PWVab), DFLV were evaluatedat baseline and after 3 months of therapy with bisoprolol and verapamil.

Results: Both type of therapy significantly decreased SBP, DBP , PP, HR. Bisoprolol significantly decreased cSBP (from 142.7 to 136.6 mm Hg), cPP (from 49.7 to 43.3 mmHg); and Alx % was increased (from 31.5 to 35.2). Verapamil decreased cSBP significantly from 135.4 to 126.9 mm Hg. The changes of AIx% and cPP were not significant . DFLV dynamics were not found on both groups. PWVcf (-11.5 %) and PWVab (-7.5%)

were significantly decreased in the bisoprolol group. Bisoprolol showed antistiffening effect that was better than verapamil.

Conclusions: Both drugs showed a comparable reduction in the central and peripheral pressure, HR . In direct comparison with bisoprolol showed a more pronounced effect on surrogate prognosis marker PWV compared with verapamil.

PP.08.21 HIV INFECTION: ARTERIAL ALTERATION AND THEIR RELATIONSHIP WITH ANTIRETROVIRAL THERAPY

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Objective: Highly Active Anti Retroviral Therapy (HAART) has determined a dramatic change in the natural history of HIV infection causing an important decrease in infective cause of death. An increase in chronic comorbidities has been observed and both HAART and HIV infection itself has been advocate to be the cause. Aim of our study is to evaluate the arterial effects of HAART in HIV-infected subjects.

Design and method: We enrolled 55 HIV-infected subjects without known cardiovascular risk factors on HAART (group A; age 47.2±3.1years; female 16.3%; clinic BP 130/77±14.4/9.1mmHg), 34 healthy subjects served as control (group B; age 49±6.4years, female 17.6%; BP 126.2/77.6±7.3/5.5mmHg). Arterial stiffness was measured by aorto-femoral Pulse Wave Velocity and Pulse Wave Analysis (PWV and PWA, Sphygmocor) while carotid-IMT by a semi-automatic echotracking system (Esaote-WTS).

Results: For similar age and BP values group A shown an higher PWV (10±1.7 vs 9.4±1.1 for group A and B respectively; p=0.038) and Augmentation Index (22.9±12 vs 17.1±.9.8 for group A and B respectively; p=0.018) while IMT was superimposable between group (551.4±111.6 vs 568.2±95.1 for group A and B respectively; p=ns).
No correlation was seen between HAART (time on HAART and specific drugs) and chronic viral infection (time of infection, CD4, CD4 nadir and HIV-RNA) whit arterial parameter.

Conclusions: HIV subjects on ART shown an higher arterial stiffness when compared to an age and BP superimposable healthy group. HAART related arterial alterations can leads to the observed increase in cardiovascular events.

PP.08.22 ACUTE EFFECT OF DIALYSIS IN PATIENTS WITH CHRONIC KIDNEY DISEASE ON ARTERIAL FUNCTION

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Objective: The aim is evaluate the effect on vascular function, capacitive arterial compliance/large artery elasticity (C1) and oscillatory reflective compliance/small artery elasticity (C2) in acute dialysis on patients with chronic kidney dissease

Design and method: An observational cohort study , patients with chronic kidney diseasse on dialysis, to assesses changes in peripheral hemodinamics and vascular function C1,C2 and peripheral vascular resistance, using the HDI/Pulse Wave CR 2000, before and after dialisys.

Results: Twenty five patients with chronic kidney dissease were evaluated in a dialysis program, all of them more tan one year in the program, 13 women, 12 male, averege age 54 years, the prevalent etiology was arterial hypertension and diabetes in a 86% both.

Brachial pressure (BP), Pulse pressure(PP), Capacitive arterial compliance /large artery elasticity(C1),oscillatory/reflective compliance /small artery elasticity(C2), pre and post dyalisis . Hospital Central de San Cristóbal y UNETACA Táchira, 2012.

Parameter	Media	Standar desviation	Standar Error	95% Confidence interval		Significance test		
				upper	lower	t	gl	Sig. (bilateral)
BSP b – BSP a	- 3,59	23,54	5,71	-15,69	8,51	0,629	16	0,539
BDP b – BDP a	0,26	12,41	3,01	-6,12	6,64	0,086	16	0,933
PP b – PP a	2,59	9,42	2,38	-2,26	7,43	1,133	16	0,274
C1 b – C1 a	0,76	3,79	0,92	-1,19	2,72	0,831	16	0,418
C2 b – C2 a	0,02	1,51	0,37	-0,75	0,80	0,064	16	0,949

Note: (b) before - dyalisis, (a) after - dyalisis

Conclusions: Statistically significant changes after dialysis were observed in a components of diastolic blood pressure and small artery elasticity (C2). Not in systolic blood pressure or large artery elasticity (C1).Although effective dialysis by the KTv measurement. Dialysis improve endothelial function observed by C2 changes.

PP.08.23 PARAMETERS OF ARTERIAL STIFFNESS IN NORMOTENSIVE PATIENTS WITH VISCERAL OBESITY

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Objective: Visceral obesity (VO) is a factor of vascular remodeling and increased arterial stiffness (AS). At the same time, body mass index (BMI) and waist circumference (WC) reflect primarily metabolically neutral subcutaneous fat. The comparative analysis of AS parameters in normotensive patients with VO was held.

Design and method: 163 normotensive patients without cardiovascular disease were examined (mean age 45,0±5,4, 74,8% male), 81,0% with abdominal obesity (AO), 49,7% obese (BMI >=30 kg/m2). VO was diagnosed by ultrasound epicardial fat thickness (EFT) when it was equal to or exceeded 75 percentile value. Among patients with 31-45 years old it was 4,8 mm in AO patients, 3,5 mm without AO, 46-55 years old - 5,8 mm and 4,4 mm respectively. Blood lipid, glucose profiles, uric acid, creatinine and fibrinogen levels were estimated, bifunctional ambulatory blood pressure (BP) monitoring was performed using the portable recorder BP Lab®. The following AS parameters were assessed: average aortic daily pulse wave velocity (PWVao), augmentation index (Aix), average aortic daily systolic blood pressure (SBPao). Statistical analysis was conducted with t-test and multivariate linear regression analysis.

Results: VO was diagnosed in 28,8%. In patients with VO higher values of PWVao (7,9±0,7 m/s vs 7,5±0,5 m/s, p<0,001), Aix (-28,0±19,8% vs -40,3±16,5%, p<0,001) and SBPao (109,7±5,6 mm Hg vs 107,2±5,0 mm Hg, p<0,001) were found. Significant differences in other parameters were not found: average WC was 100,9±10,6 cm vs 100,1±8,4 cm, BMI - 30,9±4,7 kg/m2 vs 29,7±3,5 kg/m2, average daily BP levels - 118,7±6,4/74,0±4,0 mm Hg vs 117,5±6,1/72,5±4,1 mm Hg. More large values of AS parameters were in the group with VO in comparison with AO patients: 7,9±0,7 m/s vs 7,6±0,6 m/s (p<0,001), -28,0±19,8% vs -36,3±18,6% (p<0,001) and 109,7±5,3 mm Hg vs 108,4±5,1 mm Hg (p<0,001) respectively. The multivariate linear regression analysis was used for pre-dictive estimate of PWVao. The following regression equation was obtained: age*0,021+fasting blood glucose*0,134+EFT*0,139+SBP*0,023+ DBP*0,036. For this regression model the determination coefficient was 0.9.

Conclusions: Higher AS parameters were found in patients with VO diagnosed by measuring EFT. PWVao value was mainly depended from the age, BP, fasting blood glucose levels and EFT.

PP.08.24 COMPARISON OF AMBULATORY CENTRAL AND PERIPHERAL BLOOD PRESSURE BETWEEN THE SECOND AND THIRD DAY OF THE LONG INTERDIALYTIC INTERVAL IN HEMODIALYSIS PATIENTS

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Objective: The conventional thrice-weekly hemodialysis schedule includes two regular (about 2 days) and one long (about 3 days) interdialytic interval periods. During the long interval patients have to deal with a larger amount of metabolic products and volume accumulation and recent data suggest that the end of the 3-day period associates with the highest cardiovascular risk. This study compared for the first time ambulatory central blood pressure between Day 2 and Day 3 of a long interdialytic interval.

Design and method: Thirty-two end-stage renal disease patients receiving conventional hemodialysis (mean age 64.3±14 years and median time on renal replacement therapy 37.6 months) were included in the study. All underwent a 72-hour Ambulatory Blood Pressure Monitoring covering the large interdialytic interval, with the novel Mobil-O-Graph device (IEM, Stolberg, Germany). Mobil-O-Graph is a validated brachial cuff-based automatic oscillometric device that records brachial BP and pulse waveforms and calculates central BP through mathematical transformation. Daytime and night-time ambulatory BPs of Day 3 vs Day 2 were compared.

Results: Ambulatory central aortic SBP and DBP on Day 3 were significantly higher than on Day 2 (daytime, 124.3±17.8 vs 118.03±17.7 and 81.8±10.9 vs 77.4±11.3 mmHg, p<0.001; night-time 126.1±21.8 vs 120.26±23.1 and 80.8±14.5 vs 76.5±12.8 mmHg, p<0.001, respectively). Ambulatory brachial SBP and DBP followed the same pattern (daytime 136±22.1 vs 129.36±21.7

and 80.2±10.8 vs 75.5±11 mmHg, p<0.001; night-time 138.5±26.3 vs 131.4±26.4 and 79.4±13.7 vs 74.8±12.5 mmHg, p<0.001, respectively,). Central and peripheral pulse pressures were also significantly higher in Day 3 vs Day 2 and heart rate significantly lower, during daytime but not during night-time. Fourteen patients needed increase at their antihypertensive drugs specifically for Day 3.

Conclusions: This is the first study evaluating central BP during a 72-hour interval in hemodialysis patients. The significant increase in central BP during Day 3 follows the same pattern with that of peripheral BP and may be a major mechanism of elevated cardiovascular risk at the final hours of the week in this population.

PP.08.25 ASSOCIATION OF ARTERIAL STIFFNESS AND GLOMERULAR FILTRATION RATE IN UNTREATED HYPERTENSIVE PATIENTS WITHOUT CHRONIC KIDNEY DISEASE

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Objective: The relationship between arterial stiffness and kidney function in middle-aged patients with uncomplicated hypertension is not well studied. Accordingly the aim of the study was to investigate the association between estimated glomerular filtration rate (eGFR) and arterial stiffness in middle-aged patients with untreated arterial hypertension.

Design and method: A cross-sectional study included 101 non-diabetic patients (age 53,5±12,3 years, 48,5% males) with untreated arterial hypertension without target organ damage on routine examination with estimated glomerular filtration rate by CKD-EPI formula (eGFR) >60 ml/min/1,73m2 and albumin/creatinine ratio<30mg/g in a morning urinary spot. Arterial stiffness was evaluated by central pulse wave analysis and and pulse wave velocity measurement (SphygmoCOr, AtCor, Australia). Linear regression analyses were used to assess the cross-sectional associations between arterial stiffness parameters and eGFR. A two-sided p-value of < 0.05 was regarded as significant.

Results: PWV >12 m/s was found in 54 (53,5%) patients. In multivariate analysis decrease of eGFR<90,6 ml/min/1,73m² was a strong independent predictor (χ^2=7,6, p<0,01) of increased arterial stiffness along with metabolic risk factors and abdominal obesity. Arterial stiffness was assessed by eGFR quartiles: I > 94 ml/min/1,73m² , II 91-94 ml/min/1,73m², III 79-91 ml/min/1,73m² , IV 61-79 ml/min/1,73m². There was a progressive increase from I to IV quartile of PWV (9,9±3,8, 11,5±2,6, 12,6±3,3 (p<0,05 compared to I quartile), 12,7±2,5 (p<0,05 compared to I quartile) m/s), augmentation index@75 bpm (AIx) 14,8±13,5%, 24,9±10,5%, 26,3±13,0% (p<0,05 compared to I quartile), 31,5±5,9% (p<0,05 compared to I quartile). Central systolic BP, AIx and PWV were significant independent predictors of eGFR: respectively, β= -0,47, p<0,01, β= -6,2, p<0,01, β= -2,33, p<0,01.

Conclusions: There is strong association between increased arterial stiffness assessed by direct and indirect measures and decrease in eGFR in hypertensive subjects with normal kidney function.

PP.08.26 TEN-YEAR TENDENCY OF PULSE WAVE VELOCITY IN JAPANESE MEDICAL STUDENTS

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Objective: Atherosclerosis of the artery begins very early phase of life. Environmental factors have strong impact for the progression of atherosclerosis, and thus recent rise in health awareness may bring good influence for the condition of arteries. To investigate this expectation, we measured pulse wave velocity (PWV), a marker for arterial stiffness, on fifth year of medical student for ten years. Well matched backgrounds of the subjects will be advantageous for investigation of the tendency.

Design and method: PWV was measured using an automatic waveform analyzer (form PWV/ABI, BP-203RPE; Omron Colin, Tokyo, Japan). The measurement was curried in outpatient office of University of Miyazaki Hospital at 13:30 to 14:30 while small group of the students were attending clinical training. The outpatient office is well controlled in comfortable condition throughout the year.

Results: We measured 915 of the students (male 517, 24.9 ± 3.2 years old). Average blood pressure (BP) was 119.8 ± 12.5/67.4 ± 8.4 mmHg, and average PWV was 1152.8 ± 149.1 cm/sec. PWV was significantly correlated with systolic and diastolic BP, pulse rate and age as expected. PWV was significantly higher in male than female (1197.8 ± 152.0 vs. 1094.3 ± 122.7, p<0.0001), so gender specific analysis was done for annual changes of PWV. PWV in male students had a tendency to decrease and there was significant decrease of PWV (p < 0.05) between starting year (2003) and last two years (2011-12). On the other hand, there was no change in PWV of female students. Also, there were no changes of the BP in both genders.
Conclusions: Preferable decrease of the stiffness of artery in young male was observed in Japanese medical student.

PP.08.27 CAROTID ATHEROSCLEROTIC PLAQUES ASSOCIATED WITH ARTERIAL STIFFNESS

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Objective: Atherosclerotic plaques of carotid arteries increase the risk of cerebrovascular events. Arterial stiffness strongly associates with the development of atherosclerosis. This study aimed to elucidate the association between carotid atherosclerotic plaque and arterial stiffness at different arterial site.

Design and method: One hundred thirty-three subjects (M:F=62:71, mean age=54.4±11.7 years), among subjects who received carotid ultrasonography, the brachial-ankle pulse wave velocity (baPWV) and non-invasively semi-automated radial artery applanation tonometry (using Omron HEM-9000AI) in the Department of Internal Medicine, St. Vincent's Hospital, from July 2011 to February 2013 were enrolled in this study. Pulsatile stress (PS) was calculated as the product of heart rate and brachial PP.

Results: Sixty-seven subjects (mean age=58.2±10.1 years) had atherosclerotic plaques of carotid arteries. There were significant differences in age (odds ratio 1.076, 95% CI 1.038-1.116, p<0.0001), pulse pressure (odds ratio 1.055, 95% CI 1.019-1.092, p=0.003), PS (odds ratio 1.011, 95% CI 1.011-1.081, p=0.005), baPWV (odds ratio 1.044, 95% CI 1.002-1.006, p<0.0001), intima-media thickness (odds ratio 1.029, 95% CI 1.011-1.082, p=0.001) between subject without and with atherosclerotic plaques of carotid arteries. In multivariate analysis, baPWV (odds ratio 1.211, 95% CI 1.001-1.005, p=0.034) and PS (odds ratio 1.001, 95% CI 1.001-1.002, p=0.033) were associated with atherosclerotic plaques. maximum IMT was significantly correlated with age (r=0.382, p<0.0001), brachial PP (r=0.281, p=0.001), brachial PS (r=0.181, p=0.038), SBP2 (r=0.202, p=0.021), central PP (r=0.321, p<0.0001), central PS (r=0.302, p<0.0001), RaAIx (r=0.235, p=0.007). Mean IMT was significantly correlated with age (r=0.433, p<0.0001), systolic BP (r=0.256, p=0.003), brachial PP (r=0.369, p<0.0001), brachial PS (r=0.265, p=0.002), SBP2 (r=0.248, p=0.004), central PP (r=0.357, p<0.0001), central PS (r=0.351, p<0.0001), RaAIx (r=0.209, p=0.016).
In multivariate analysis, baPWV (odds ratio 1.211, 95% CI 1.001-1.005, p=0.034) and PS (odds ratio 1.001, 95% CI 1.001-1.002, p=0.033) were associated with atherosclerotic plaques. However, central hemodynamics was not correlated with atherosclerotic plaques.

Conclusions: We found that atherosclerotic change of vascular wall may be more affected by chronically increased pulsatile stress and baPWV. Therefore, it is suggested that atherosclerotic change of carotid artery may be influence on various parameters of arterial stiffness at different site of arterial tree.

PP.08.28 EFFECT OF HYPERBARIC OXYGENATION ON EPOXYGENASE PROTEIN EXPRESSION IN AORTA OF HEALTHY AND DIABETIC RATS

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Objective: In previous studies, we found that hyperbaric oxygenation (HBO) influences vascular reactivity, possibly through upregulation of epoxyeicosatrienoic acids (EETs). EETs, produced by specific epoxygenase enzymes, have a protective role in many conditions including atherosclerosis and hypertension. Impairment of this role of EETs contributes to endothelial dysfunction in hypertension and increase in EETs production attenuates abnormal renal function. Infusion of EETs decreases mean arterial pressure (MAP) in rats. The aim in this study was to evaluate the effect of HBO on epoxygenase protein expression and blood pressure in healthy or streptozocin-induced diabetic male Sprague-Dawley rats.

Design and method: Rats were divided into control and HBO groups. The HBO group was exposed to 100%O2 for 2 hours (with additional 15 minutes for compression/decompression) daily for 4 consecutive days. On the fifth day, anesthetized animals were sacrificed and aorta samples stored at -80ºC. Western blot analysis was performed with specific antibodies for rat epoxygenases (cytochrome P450 isoforms CYP2J3 and CYP2C11). Epoxygenase expression was quantified relatively to ß-actin expression. MAP was measured in separate anesthetized control and HBO animals after insertion of a femoral artery catheter. T-test or Mann Whitney U test was used to compare HBO and control values, depending on distribution normality.

Results: Relative CYP2J3/ß-actin expression was similar between the HBO and control group both in healthy (1.488±1.840 [n=11] vs.1.160±0.785 [n=9]) and in diabetic (1.119±0.495 [n=9] vs. 0.945±0.506 [n=11]) rats. Relative CYP2C11/ß-actin expression was similar between healthy HBO and control animals (1.295±1.031 [n=9] vs.1.425±1.174 [n=8]), but it was statistically significantly higher in the HBO group of diabetic rats compared to control (1.395±0.448 [n=7] vs. 0.796±0.534 [n=7]; P<0.05, t-test). The used HBO protocol did not significantly alter MAP in either healthy (118.9±8.4 HBO [n = 6] vs. 113.0±3.4 mmHg control [n=6]) or diabetic (105.9±4.7 HBO [n=6] vs. 102.3±5.0 mmHg control [n=6]) rats.

Conclusions: The significant upregulation of CYP2C11 protein expression in diabetic rats by HBO suggests that upregulation of EETs production might partially explain beneficial vascular effects of HBO in diabetic subjects. However, direct alteration of MAP with this HBO protocol was not observed.

PP.08.29 SEX DIFFERENCE IN CHANGES OF ARTERIAL STIFFNESS INDEXES AFTER ISOMETRIC HANDGRIP EXERCISE

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Objective: It has been shown that arterial stiffness is greater in women than men, especially after menopause. This study aimed to investigate the sex difference in dynamic changes of hemodynamic parameters and arterial stiffness indexes after isometric handgrip exercise.

Design and method: Thirty one subjects (14 postmenopausal women and 17 men) who underwent coronary angiography (CAG) were enrolled. After CAG, baseline arterial waveforms were traced at the aortic root and common iliac artery using right coronary catheters. Arterial waveforms were recorded at the same locations 3 min after the isometric handgrip exercise at 30~40% of the maximal handgrip power. Augmentation pressure (AP) and augmentation index (AI) were measured at the central aortic waveforms. Pulse wave velocity (PWV) was calculated using the ECG-gated time difference of the upstroke of the arterial waveforms and the distance between the aortic root and the common iliac artery.

Results: Age (W 66.9±9.0 vs. M 65.2±5.9 years), prevalence of hypertension, coronary artery disease, diabetes or hyperlipidemia, and medications were not different significantly between women and men. Baseline central pulse pressure (PP) was greater in women (W 65.7±16.9 vs. M 51.9±15.3 mmHg), but central systolic BP (SBP), AP, AI, and PWV were not significantly different. After handgrip exercise, central SBP, central PP, and AP increased in both women and men. AI did not changed, but delta-AI after exercise tended to be greater in men (W 1.27±3.96 vs. M 3.37±7.11%) without statistical significance. PWV inclined only in men, and delta-PWV after exercise was greater in men (W 0.24±1.08 vs. M 1.31±1.56 m/sec, p<0.05).

Conclusions: Compared to women, men showed greater changes of arterial stiffness indexes after isometric handgrip exercise although baseline central PP was lower.

	Women (n=14)		Men (n=17)	
	Baseline	Exercise 3 min	Baseline	Exercise 3 min
Heart rate (/min)	62.3±8.0	69.6±14.3*	64.5±10.5	69.5±10.6*
Central SBP (mmHg)	127.8±20.9	150.6±26.1*	116.5±18.6	136.4±19.4*
Central PP (mmHg)	65.7±16.9†	79.1±18.0*†	51.9±15.3	63.5±16.0*
Augmentation P (mmHg)	11.9±7.1	15.2±8.5*	9.5±6.5	13.8±10.2*
Augmentation index (%)	18.7±11.2	19.9±11.7	17.8±11.4	21.2±13.1
Peripheral SBP (mmHg)	134.9±19.1	149.5±26.9*	122.9±18.5	140.7±22.9*
Peripheral PP (mmHg)	73.5±16.7	87.1±21.3*	60.1±16.4	73.1±18.7*
PWV (m/sec)	10.47±1.63	10.72±1.92	10.36±1.79	11.67±2.45*

* p<0.01 vs. baseline, †p<0.05 vs. men
SBP; systolic blood pressure, PP; pulse pressure, PWV; pulse wave velocity

PP.08.30 BLOOD PRESSURE AMPLIFICATION IN RELATION TO PLASMA ADVANCED GLYCATION END PRODUCTS IN A CHINESE POPULATION

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Objective: Accumulation of advanced glycation end products (AGEs) in the human body might engender arterial stiffening. We investigated the association of plasma AGE concentration with blood pressure amplification in a Chinese population.

Design and method: The study subjects were recruited from a newly established residential area in the suburb of Shanghai in 2009. Using the SphygmoCor system, we recorded arterial waveforms. The central-to-brachial amplification was expressed as the systolic pressure difference (SPD), the pulse pressure difference (PPD), and the pulse pressure ratio (PPR). Plasma AGE concentration was measured by the ELISA method and logarithmically transformed for statistical analysis.

Results: The 1051 study participants (mean age 55.1±13.1 years) included 663 (63.1%) women, 390 (37.1%) hypertensive patients and 90 (8.6%) diabetic or prediabetic subjects. Men, compared with women, had higher plasma AGE concentration (5.62 vs. 5.07 μg/mL, P=0.02) and greater (P<0.0001) SPD (11.8 vs. 9.3 mmHg), PPD (13.0 vs. 10.5 mmHg) and PPR (133.9 vs. 126.6 %). Multiple regression analyses demonstrated that plasma AGEs concentration was significantly and negatively associated with PPR (-2.39% decrease per 10-time increase in plasma AGEs concentration, P=0.03) but not with SPD and PPD (P= 0.11 and 0.13, respectively). This association between plasma AGEs concentration and PPR became more prominent in men (-5.17%, P=0.01) and in the presence of at least one of the following three cardiovascular risk factors, overweight and obesity, diabetes and prediabetes or current smoking (-4.42%, P=0.006).

Conclusions: Plasma AGEs are associated with pulse pressure amplification as assessed by PPR, especially in men and in the presence of several common cardiovascular risk factors.

PP.08.31 BUCKBERG INDEX ASSOCIATES WITH VASCULAR DAMAGE IN A COHORT OF HYPERTENSIVE MALES

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Objective: Pulse wave analysis by applanation tonometry let us know by a non-invasive way, three different indexes of cardiovascular function: Augmentation index, ejection duration and subendocardial viability ratio (the Buckberg index, BI). When myocardial perfusión decreases and cardiac ischaemia appears, then BI falls under 50%.
The main objective les to assess relationship between BI and other different vascular damage markers in a cohort of male hypertensive subjects.

Design and method: A cross-sectional study was conducted in hypertensive males. 48-hour BP monitoring was performed using a validated device (Spacelabs 90207).
All subjects underwent radial artery pulse wave analysis by applanation tonometry with SphygmoCor Px®, Vx®, to obtain BI.
To assess vascular damage markers, following examinations were held: carotid artery ultrasound with intima/media thickness (IMT), carotid femoral PWV by Sphygmocor At Cor® and oscillometric measurement of ABI.

Results: A total of 256 hypertensive males were enrolled in the study (mean age: 54.4 years). Buckberg index was categorized by quartiles; 1st Q: < 126% (n: 44); 2nd Q: 126-146% (n: 62); 3rd Q: 146-166% (n: 61) and 4th Q: > 166%(n:89).
Those hypertensive males in the 1st Q, were elder (mean age: 62.25 years), lower dyastolic 48-hour BP, lower nocturnal blood pressure falling, higher heart rate, lower ABI and higher PWV compared to patients in the other quartiles. There were no differences regarding weight, waist circumference, body mass index, systolic 48-hour BP or IMT.

Conclusions: These data suggest that the subendocardial viability rate (Buckberg index) measured by applanation tonometry keeps relationship with other myocardial perfusion markers as heart rate or dyastolic blood pressure.
Those subjects with low BI are in a higher risk of increased arterial stiffness (higher PWV) and peripheral vascular damage (lower ABI). Thus, non invasive assessing of BI may help us to identify those hypertensive subjects with vascular disease.

PP.08.32 EFFECT OF GASOTRANSMITTERS ON THE CONTRACTILE ACTIVITY OF VASCULAR SMOOTH MUSCLES DURING HYPOXIA AND REOXYGENATION

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Objective: Hypoxia followed by reoxygenation causes damage not only cells of parenchymal organs, but primarily vascular cells, which leads to disruption their contractile function. Today is a very urgent problem of detail mechanisms and find ways to correct the hypoxic conditions. Great expectations associated with the role played gasotransmitters in regulation of contractile activity of smooth muscle in hypoxia and subsequent reoxygenation.
The study was aimed to elucidate (i) the ionic mechanisms of action of CO and H2S in contractile activity of vascular smooth muscle cells (VSMC) and (ii) the molecular interactions in the gaseous signaling system during hypoxia and reoxygenation.

Design and method: We used mechanography of the isolated endothelium-denuded rat thoracic aortic rings. The effects of H2S and CO donors (NaHS and CORM2, respectively) on VSMC contractions induced by membrane depolarization in high-K+ (30 mM KCl) solution and Phenylephrine were studied.

Results: Hypoxia causes a decrease in the contractile responses of vascular smooth muscle cells such as the action of a high potassium solution, and under the action of Phenylephrine.

Relaxing effect of hypoxia is mediated through increased potassium conductance of the membrane. During hypoxia reduced relaxing effects gasotransmitters CO and H2S.
Reoxygenation smooth muscle cells leads to a decrease in the contractile responses to high potassium solution and Phenylephrine, and also increases CO relaxing action on the contraction induced by Phenylephrine.

Conclusions: These data may indicate that for reoxygenation, presumably due to free radical flash molecular chain starts cellular events involved in the mechanism of carbon monoxide action relaxing receptacle. This molecular cascade includes the soluble guanylate cyclase and the Ca2 + - activated potassium channels of high conductivity.

PP.08.33 AUGMENTATION INDEX AND AORTIC STIFFNESS IN PATIENTS WITH ASCENDING AORTIC ANEURYSM

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Objective: The aim of the study was to compare aortic stiffness in thoracic aortic aneurysm (TAA) development in patients with with bicuspid (BAV) and tricuspid (TAV) valve.

	TAV M ± σ	BAV M ± σ	Control M ± σ
BMI, kg/m²	29,4 ± 3,9	28,2 ± 6,0	29,6 ± 5,3
Smokers, n (%)	27(50)	13(68)	29 (58)
HN, n (%)	48 (89)	15 (71)	38 (76)
Diabetes, n (%)	13(24)	5(24)	20(40)***
Office SBP, mm Hg	137 ± 18	138 ± 36	133 ± 27
Office DBP, mm Hg	82 ± 11*	80 ± 15*	75 ± 11
Aortic diameter in the sinuses of Valsalva	43,6 ± 4,7	41,1 ± 6,0	33,8 ± 4,0**
Index of Sinuses of Valsalva	21,2 ± 2,6	21,2 ± 2,9	17,3 ± 2,1**
Aortic diameter in the sinotubular junction, mm	46,6 ± 4,7	45,6 ± 8,4	33,3 ± 3,3**
Max aorta	48,0 ± 3,6	46,3 ± 7,7	34,3 ± 3,6**
Augmentation	23 ±10	30 ±10**	22 ±10
Period of blood	33,6 ± 3,4*	34,9 ± 3,5**	32,0 ± 3,8
PWV, m\sec	8,0 ±1,8	6,7 ±1,4*	7,9 ±1,9

⟨ - p < 0,05; ** - p < 0,001: *** p<0,0001 compared control group

Design and method: 75 pts with TAA: 21pts with BAV (mean age 52.8 ± 1.9 yrs; m:f=15:6), 54 pts with TAV (mean age 60.3± 0.8 yrs; m:f=39:15), and 50 pts with risk factors and without aorta pathology as control group (mean age 58.3 ± 0.8yrs; :1, m:f=35:15) were examined. Arterial stiffness was assessed by SphygmoCor device (Australia) using indirect carotid-femoral distance. The normal value of pulse wave velocity (PWV) was considered below 10 m/s. All pts were assessed at baseline and after 12 month.

Results: Pts with BAV and TAV were comparable in maximal and mean aortic diameter. We found no differences in pulse blood pressure in groups (55 ± 14 mm Hg in pts with TAV, 58 ± 36 mm Hg in pts with BAV, 58 ± 22 mm Hg in control group). Office diastolic BP was increased in pts with TAV as compared with control group (82 ± 11 versus 75 ± 11, p<0.01). Pulse wave velocity was lower, but augmentation index were higher in BAV pts than in the control and TAV group. There was increased period of blood ejection out in pts with BAV, that, probably, due to hemodynamic and morphologic characteristics of the valve.

Conclusions: Patients with BAV have changes in arterial vawe reflection, which could not be explained by young age only and likely due to properties of aortic wall. This features can play role in ascending aortic aneurysm formation in this subjects.

PP.08.34 BENEFICIAL EFFECT OF STENTING AND MULTIFACTORIAL DRUG THERAPY ON ARTERIAL STIFFNES IN ATHEROSCLEROTIC RENOVASCULAR HYPERTENSION

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Objective: Patients with atherosclerotic renovascular hypertension (aRVH) have higher arterial stiffness (AS) than patients with other cardiovascular related diseases. It is still unresolved whether therapeutic strategies that are effective in reducing brachial blood pressure (BP) in patients with aRVH independently affects AS and central BP thereby influencing outcome. Our aim was to determine effect of stenting in addition to multifactorial drug therapy on markers of AS and clinical course in aRVH.

Design and method: In this longitudinal study we have enrolled 37 patients with unilateral aRVH. BP and indices of AS were determining at baseline, after 6 and 36 months. Average follow up period was 39 (21-46) months. Markers of AS were determined using Arteriograph, SpaceLabs was used for ABPM and Omron device for office BP measurements. After revascularization all patients received telmisartan 80 mg in addition to other antihypertensive drugs and statin.

Results: Baseline pulse wave velocity (PWV) was higher in aRVH patients (12.7m/s) compared to other high risk hypertensive patients. Three patients who deceased had the highest PWV (15.03m/s). At the end of follow up 31/34 improved BP valuesm, none was cured. Kidney function was unchanged in 23/34 patients, and deterioration was observed in 6 patients. After 6 months brachial BP was significantly lower and remained the same till the end of follow up period. Aortic augmentation index (AIx) significantly improved after 6 months (35.91(14.47) vs.32.18(10.42);p=0.03) and was unchanged after 3 years (39.65(10.54);p=0.55). PWV did not change after 6 months (12.7 (2.6) vs.13.7(3.1);p=0.13) but was significantly lower at the end of follow up (11.18(2.35);p=0.027).

Conclusions: Therapy based on stenting and multifactorial drug therapy reduces AS in patients with aRVH. AIx improved after 6 months what could be attributed to the usage of renin-angiotensin blockers. We failed to detect decrease of PWV after 6 months. Progressive reduction in PWV over time have been observed with no further fall in brachial BP and AIx what is in line with other studies .Combination therapy has beneficial effect on AS in patients with aRVH.Larger studies are needed to confirm predictive ability over and above brachial BP.

PP.08.35 REFERENCE VALUES FOR PULSE WAVE VELOCITY MEASURED BY AN OSCILLOMETRIC METHOD IN A POPULATIONAL SURVEY. DATA FROM SEPHAR II STUDY

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Objective: Our objective was to find out the reference values for pulse wave velocity (PWV) measured by a simplified and time-saving oscillometric method on a populational level during SEPHAR II study, the second national representative survey on hypertension prevalence in Romania.

Design and method: Following a selection based on the multi-stratified proportional sampling procedure, a number of 1975 subjects, who gave informed consent, were evaluated by means of a questionnaire, anthropometric, blood pressure (BP), 12 lead ECGs recordings, blood and urine analysis. PWV was measured with Arteriograph (TensioMed Ltd., Budapest, Hungary) in only 1104 of cases. After exclusion of subjects with diabetes, treated hypertension or dyslipidemia and overt cardiovascular disease the linear regression analysis (stepwise method) was applied to examine the influence of cardiovascular risk factors on PWV for 731 subjects (mean age 40.18±12.66 years, 51.8% females).

Results: PWV proved to be independent of gender, smoking and untreated lipid disorders, after adjustement for age and mean BP. Consequently, the reference values for PWV were established according to age and BP, the main determi-

nants of arterial stiffness (Table 1). This results were found similar (p>0.05) to those reported by The Reference Values for Arterial Stiffness' Collaboration based on stated methods, confirming previously good correlations between assessement of PWV with the Arteriograph and the values obtained using the SphygmoCor and the Complior devices.

Table 1: Pulsed wave velocity distribution by age and BP values

Age group (years)	Normal BP	High normal BP	Grade I HT	Grade II/III HT
< 30	7.18 ± 1.45	7.21 ± 1.14	8.13 ± 2.01	8.65 ± 2.04
30-39	7.39 ± 1.37	7.76 ± 1.13	8.12 ± 1.35	8.91 ± 2.25
40-49	8.32 ± 1.79	8.88 ± 1.65	9.39 ± 1.89	9.17 ± 1.45
50-59	9.19 ± 2.60	9.46 ± 2.45	9.93 ± 1.61	10.74 ± 1.78
60-69	9.12 ± 2.34	10.43 ± 2.65	10.86 ± 2.98	10.69 ± 2.42
≥70	9.80 ± 0.01	10.43 ± 0.92	10.55 ± 2.69	10.06 ± 1.82

BP: blood pressure; HT: arterial hypertension

Conclusions: In order to integrate arterial stiffness evaluation in clinical practice methodological standardization and reference values deduced form the general population evaluation are very much needed. Our data are answering to one of this goals for an emerging oscillometric method of PWV measurement.

PP.08.36 BLOOD PRESSURE AND ARTERIAL STIFFNESS IN RELATION TO SODIUM METABOLISM IN PATIENTS WITH DIASTOLIC LEFT VENTRICULAR DYSFUNCTION AND HIGH SODIUM INTAKE

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Objective: Sodium load ranks among key mechanisms of the development of hypertension and its complications.

Design and method: In a population with high sodium consumption, we assessed relation between brachial and central blood pressures, elastic properties of large arteries, echocardiographic left ventricular diastolic function (LVDF) and sodium reabsorption in proximal (FELi) and distal (FDRNa) renal tubules assessed using the endogenous lithium clearance.

Results: We found a significant interaction between LVDF and FELi with respect to the values of brachial blood pressure: systolic (SBP), diastolic (DBP) and mean blood pressure (MBP) (all PINT<0.03). In patients with FELi, below the median value and impaired LVDF, the values of SBP (149.3 vs. 132.5 mmHg; P=0.005), DBP (85.1 vs. 76.1 mmHg; P=0.001), MBP (106.5 vs. 94.9 mmHg; P=0.001), central SBP (137.4 vs. 122.0 mmHg; P=0.01), central DBP (84.8 vs. 76.0 mmHg; P=0.003), central MBP (106.9 vs. 95.9 mmHg; P=0.007), central aortic pulse wave augmentation (AG) (18.0 vs. 13.5 mmHg; P=0.03), central aortic pulse wave augmentation index (AIxC) (155.7 vs. 140.9 %; P=0.01) and pulse wave velocity (PWV) (14.6 vs. 12.5 m/s; P=0.02) were significantly higher than in patients with normal LVDF. Such relationships were not observed in patients with FELi above the median value.

Conclusions: We conclude that in the hypertensive population with high sodium intake, increased sodium reabsorption in proximal tubules may affect blood pressures and arterial wall damage, thus contributing to the development of LVDF impairment.

PP.08.37 PATIENTS WITH TYPE 2 DIABETES MELLITUS HAVE GREATER PROPENSITY FOR A HYPERTENSIVE RESPONSE TO MODERATE INTENSITY EXERCISE: RELATION WITH LOCAL AND SYSTEMIC HAEMODYNAMICS

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Objective: A hypertensive response to moderate intensity exercise (HRE) is associated with increased cardiovascular mortality risk. Patients with type 2 diabetes mellitus (T2DM) have vascular irregularities which may predispose to an HRE at moderate intensity but this has not been examined previously. The aim of this study was to determine if patients with T2DM have propensity towards an HRE at moderate intensity exercise and also to examine the haemodynamic correlates of exercise blood pressure (BP).
Design and method: Sixty-eight patients with T2DM and 68 controls (56±9 vs 62±8 years, 57% male both) were examined at rest and during moderate cycle exercise (30 watts and 50 rpm). Haemodynamics recorded included; brachial and central BP and aortic stiffness (aPWV) by applanation tonometry; heart rate, stroke volume, cardiac output and systemic vascular resistance (SVR) by impedance cardiography. Moderate exercise HRE was defined as >160mmHg for females and >170mmHg for males.

Results: Patients with T2DM had significantly higher exercise brachial and central systolic BP (153±18 vs 137±16 mmHg, p<0.001 and 132±15 vs 117±12 mmHg, p<0.001), as well as a greater change from baseline (25±15 vs 17±23 mmHg, p=0.019). Nineteen patients with T2DM had an HRE compared to 4 controls (28% vs 6%; p=0.001). The strongest independent correlates of exercise brachial systolic BP in patients with T2DM were stroke volume and SVR (β=1.09, adjusted R^2=0.189, p=0.004 and β=-0.041, adjusted R^2=0.099, p=0.037 respectively) after adjusting for age, sex and body mass index. These variables were not associated with exercise brachial systolic BP in controls (β=0.421, adjusted R^2=0.052, p=0.120 and β=0.006, adjusted R^2=0.018, p=0.278 respectively).

Conclusions: Patients with T2DM have elevated BP responses to moderate intensity exercise and have greater prevalence of an HRE compared to controls. Abnormalities in central and peripheral haemodynamics may help explain exaggerated BP responses to exercise in patients with T2DM.

PP.08.38 EVALUATION OF CAROTID AND FEMORAL DIAMETER AFTER AN IRONMAN COMPETITION

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Objective: The assessment of vascular functional properties in extreme exercise conditions could enhance the characterization of vessel properties, elucidating both dynamic behavior and modifications due to training. The aim of this study was to evaluate the acute effects of participation in Ironman triathlon competition on carotid and femoral properties, in relation to hemodynamic load.

Design and method: 28 male triathletes (41±8 years), participating at the Ironman competition (swimming 3.8 km, cycling 180 km, running 42,2 km; 13 athletes performed half-race), underwent cardiac, carotid and femoral ultrasound examinations at rest and within 20' from the arrival. For both arteries, mean arterial diameter (Dcar and Dfem) and distension were estimated by an automatic system applied to ultrasound B-mode image sequences, and pulse pressure (PPcar and PPfem) by tonometry; carotid and femoral cross-sectional compliance coefficients (CCcar and CCfem) were calculated.

Results: The mean duration of the competition was 12:48±1:14 h (6:14 ± 0:37 hrs for the half-race). At the end of the competition the athletes showed increased heart rate (from 60.2±13.1 to 82.8±15.6 bpm, p<0.0001), unchanged mean blood pressure (from 93±14 to 91±10 mmHg, p=ns), carotid PP (from 42 to 42 mmHg, p=ns), femoral PP (from 50±15 to 46±7 mmHg, p=ns), and stroke volume (from 64±14 to 59±16 ml, p=ns), in the presence of negligible dehydration (total body water from 48.0±4.0 to 46.5±3.9 kg, p=ns). Cardiac output increased (from 5.5±1.2 to 6.7±2.4 l/min, p<0.05), and total peripheral resistances were reduced (from 17.6±3.9 to 14.8±4.6, p=0.01). Dcar increased (from 7.19±0.65 to 7.61 ± 0.76 mm, p<0.05), while Dfem was unchanged at the end of the competition (10.41±0.83 and 10.49±0.82, mm p=ns). CCcar and CCfem were not modified (1.12±0.58 vs 1.22±0.54 and 0.99±0.40 vs 0.92±0.36 mm^2/KPa, p=ns).

Conclusions: In an Ironman competition, strenuous exercise induced a marked carotid dilation, but did not lead to vascular changes in the femoral artery, in the presence of unchanged blood pressure and hydration status. These data suggest a different acute functional adaptation in central arteries with respect to peripheral leg vessels.

PP.08.39 AORTIC TO BRACHIAL PULSE PRESSURE AMPLIFICATION AS FUNCTIONAL MARKER AND PREDICTOR OF RENAL FUNCTION LOSS IN CHRONIC KIDNEY DISEASE

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Objective: Parameters associated with arterial stiffness and structural vascular remodeling, have been associated to renal function. Pulse pressure amplification (PPA) is a new parameter of arterial stiffness reflecting large artery function. Its contribution in chronic kidney disease (CKD) remains uncertain. We assessed the role of PPA in CKD and CKD progression in patients with CKD stage 2-4.

Design and method: CKD and CKD progression in patients with CKD stage 2-4. We studied a cohort of 128 (40% female) patients with CKD stages 2/3/4 (N=36/55/37), and 89 (49% female) controls. Each patient underwent a work-up including medical interview, clinical examination, blood sampling and determination of PPA.

Results: In cross-sectional analysis PPA was reduced in CKD patients as compared to control subjects. In CKD patients reduced PPA was associated with a decline in renal function. Prospective follow-up was 42 months. Sixteen renal endpoints defined by 50% loss of renal function or start of renal replacement therapy were detected during this period. In Cox regression analysis PPA, eGFR and proteinuria predicted renal endpoints. There was an interaction between CKD and PPA present. Stratification according to CKD severity and median of PPA revealed that CKD stage 4 and low PPA had the highest risk to develop renal endpoints unadjusted 8.1 (2.4 – 27.7) and adjusted for age and proteinuria 5.6 (1.5 – 21.9). This was confirmed by Kaplan-Meier analysis (log-rank P<0.001).

Conclusions: Taken together, PPA is reduced in CKD, associated with declining renal function and low PPA predicts renal endpoints in severe CKD.

PP.08.40 AORTIC ANEURYSM AND DISSECTION IN HYPERTENSIVE PATIENTS: A RARE COMPLICATION BUT BEING ABLE TO BURN IN NORTH AFRICA

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Objective: An aortic aneurysm is a localized dilatation of the aorta greater than 50% the normal diameter and it should include the three layers of the wall. One of the main causes includes hypertension. Echocardiography is a very useful diagnostic tool for aortic aneurysm assessment. Transthoracic echocardiography TTE is the first- choice diagnostic tool for this indication and trans-oesophageal echocardiography (TOE) is used if additional information is required. The aim or our study is to analyze the profile of our hypertensive patients (pts)who develop an aortic aneurysm.

Design and method: We performed a prospective study starting from October 2010 to 2013, on 60 consecutive hypertensive patients mean age 63±14 years, 52 male 8 female . They underwent clinical, ECG, TTE and TOE examination for assessment of aortic aneurysm. If dissection is present, the De Bakey classification is used: type I if it involves the entire aorta; type II dissection if it involves the ascending aorta and type III if it involves the descending aorta.

Results: 24 pts (40%) have association of hypertension, diabetes mellitus tobacco smoking; 30pts have the combination of hypertension-dyslipidaemia and tobacco smoking. 6pts(10%) presents an abdominal aneurysm; 24pts (40%) aneurysm of the ascending aorta; type III dissection in 16pts(26%); dissection type II in 7pts (11%)who underwent Bentall procedure and in 8 (13%)pts the entire aorta is involved , type I dissection from the De Bakey classification. All the patients didn't reach the Blood pressure goal.

Conclusions: Patient participation and reduction of physician inertia are fundamental components against uncontrolled hypertension, diabetes, tobacco smoking and obesity.

PP.08.41 CAROTID ARTERY ECHOGENICITY AND CENTRAL ARTERY HAEMODYNAMICS IN HEALTHY MIDDLE-AGED AND OLDER INDIVIDUALS

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Objective: Grey scale median of the common carotid artery intima-media complex (IM-GSM) is a recently introduced ultrasound-based assessment to characterize the composition of arterial wall. Echogenic carotid artery plaque has been shown to be associated with increased aortic stiffness. It is unknown if a similar association exists between IM-GSM and aortic stiffness as well as between IM-GSM and other central artery haemodynamic indices. This study examined the relationship between IM-GSM, aortic stiffness and central artery haemodynamics in healthy middle-aged and older individuals.

Design and method: Data from 86 individuals (63.5±8.6yrs, 43F) who had no overt cardiovascular disease and were not on any medications were analyzed in this study. Common carotid artery diameter, far-wall intima-media thickness (IMT) and blood velocity data were obtained using ultrasound. IMT and IM-GSM were analyzed using semi-automated edge-detection software. Aortic stiffness assessed by carotid-femoral PWV (cfPWV) and aortic blood pressure estimated from radial artery tonometry and generalized transfer function were obtained using a commercially available apparatus (SphygmoCor®). Carotid artery wall shear rate (WSR) was estimated using peak, mean and diastolic blood velocity data.

Results: IM-GSM was inversely associated with IMT (r=-0.50), aortic SBP (r=-0.39), aortic pulse pressure (PP; r=-0.40), MAP (r=-0.26) and cfPWV (r=-0.43, all p<0.05). IM-GSM was also inversely associated with body mass index (r=-0.25) and blood glucose concentration (r=-0.25, both p<0.05). None of the estimated WSR indices were associated with IM-GSM. In a stepwise multivariate regression analysis, IMT, body mass index and aortic PP were each independent determinants of IM-GSM (total R^2=0.40). This association was unaffected by the addition of brachial PP into the model.

Conclusions: These results suggest an unfavourable influence of increased IMT, aortic PP and body mass index on carotid artery wall composition.

PP.08.42 CAROTID ARTERY ECHOGENICITY AND CENTRAL ARTERY STIFFNESS IN TYPE 2 DIABETES: CO-EXISTENCE OF HYPERTENSION AND CARDIOVASCULAR DISEASE

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Objective: Type 2 diabetes (DM) is known to increase aortic stiffness, an independent predictor of future cardiovascular disease (CVD). Co-existence of DM and hypertension (HT) has also been shown to further increase stiffness. Grey scale median of the common carotid artery intima-media complex (IM-GSM) is thought to reflect the composition of arterial wall (atherosclerotic changes). However, it is unclear whether the co-existence of DM with HT or with HT and CVD alters IM-GSM, similarly to aortic stiffness. This study examined IM-GSM and aortic stiffness in middle-aged and older DM individuals with and without the co-existence of HT and with HT and CVD.

Design and method: Data from 325 individuals were included and divided into 4 groups: 86 healthy control (CT; 63.5±8.6yrs, 43F), 64 DM only (DO; 63.8±8.5yrs, 23F), 85 DM and HT (DH; 66.4±8.4yrs, 32F), and 90 DM, HT and CVD (DHC; 67.9±8.7yrs, 17F). Common carotid artery far-wall intima-media thickness (IMT) image was obtained using ultrasound. IMT and IM-GSM were analyzed using semi-automated edge-detection software. Aortic stiffness was assessed by carotid-femoral PWV (cfPWV) using applanation tonometry.

Results: DHC group was older than CT and DO groups (p<0.05). IM-GSM was unfavourably altered in DO (104.7±2.9au), DH (105.1±2.5au) and DHC (101.7±2.5au) compared to CT (122.5±2.5au, p<0.05) after adjustment for age and sex. Adjustment for IMT did not change this finding. Accumulation of risk factors stiffened the aorta, indicated by increased cfPWV (CT, 9.1±0.2m/s; DO, 10.2±0.3m/s; DH, 10.4±0.3m/s; DHC, 10.7±0.3m/s; p<0.05) after adjustment for age and sex. Multivariate regression analysis showed that the presence of DM was independently associated with IM-GSM in addition to IMT and body mass index in the full pooled data set (total R^2=0.28).

Conclusions: These results demonstrate that the presence of DM itself unfavourably alters IM-GSM without further influence from the co-existence of HT or CVD, while aortic stiffness does not show such a clear-cut difference in our population. These findings suggest that alterations in IM-GSM may be an early marker of atherosclerotic vascular changes associated with DM.

PP.08.43 IMPLICATIONS OF REACTIVE OXYGEN SPECIES (ROS) FOR AORTIC CALCIFICATION IN CHRONIC KIDNEY DISEASE

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Objective: Vascular calcification is a consequence of finely regulated processes in patients suffering from chronic kidney disease (CKD). Many factors are able to induce the transdifferentiation of vascular smooth muscle cells (VSMC) towards an osteoblast-like phenotype, including oxidative stress and reactive oxygen species (ROS). There are important links between cytokine activation, ROS generation and CKD. While inflammation may play a role in atherosclerotic (intimal) vascular calcification, inflammation and ROS are generally not considered to play a dominant role in medial vascular calcification. Here, we used an animal model of medial vascular calcification in CKD to assess the importance of inflammatory cytokines, ROS generators and downstream signaling events during vascular calcification.

Design and method: Wistar rats were rendered uremic by a 5/6 nephrectomy procedure. Vascular calcification was induced by a high calcium (Ca) and phosphorus (P) diet supplemented with vitamin D3 diet (CKD+Ca/P/VitD). Between experimental weeks 3 and 6, hemodynamic parameters and pulse wave velocity were assessed. At the end of experimental week 6, blood and thoracic aortas were collected for analysis, which included tissue immunofluorescence studies along with RNA and protein expression assays.

Results: CKD+Ca/P/VitD rats showed increased pulse pressure, pulse wave velocity and marked calcification of the aortic media. Animals with vascular calcification demonstrated the presence of macrophages near the sites of calcification.The expression of the inflammatory cytokines TNF, IL-1β and IL-6 were all increased in aortas from treated animals. Additionally, while the expression of main antioxidant enzymes were diminished in aortas from treated animals, the expression of essential subunits of an important ROS generator, NADPH oxidase, were increased. Finally, specific signaling pathways, known to be targets of increased ROS, were activated in aortas from treated animals.

Conclusions: Our study indicates that in an animal model of chronic kidney disease, proinflammatory cytokines and ROS generation participate in signaling pathways involved in vascular calcification. This work shows that a close relationship exists between oxidative stress, inflammatory responses and arterial medial calcification during CKD.

POSTERS' SESSION

POSTERS' SESSION PS09
MOLECULAR BIOLOGY - NEURAL AND MEMBRANE MECHANISMS

PP.09.01 ROLE OF MEMBRANE POTASSIUM CONDUCTANCE IN THE MECHANISMS OF HYDROGEN SULFIDE VASORELAXING ACTION

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Objective: Hydrogen sulfide (H2S) plays an important role in the regulation of the blood vessels smooth muscles tone. It leads to a strong relaxation of the vascular wall principally due to the activation of smooth muscle cells (SMC) membrane potassium channels.

Design and method: The study was performed by the method of mehanography on endothelium-denuded aortic smooth muscle segments of the Wistar rats. SMC contractions were induced with highpotassium solution (30mM KCl) and α1-adrenomimetic phenylephrine (PE, 10μM). The amplitude of contractions was calculated as a percentage of the control contraction induced with 30KCl or PE. We used sodium hydrogen sulfide (NaHS) as a donor of H2S. Potassium channels activity was modulated by relevant potassium channels blockers.

Results: In SMC precontracted with 30KCl addition of 5-50μM NaHS increased mechanical tension of SMC, and addition of 100-1000μM NaHS decreased it in dose-dependent manner. We tested the effect of 500μM NaHS (EC50), relaxing action of which was 35.1±7.5% (n=6, $p<0.05$) of the amplitude of the control highpotassium contraction. Blocker of calcium-activated and voltage-dependent potassium channels tetraethylammonium (TEA, 10mM) significantly reduced NaHS relaxing effect, which was 13.9±3.2% (n=6; $p<0.05$). Voltage-dependent potassium channels blocker 4-aminopyridine (4AP, 1mM) had no effect on NaHS-induced relaxation. Blockers of large conductance calcium-activated potassium channels and ATP-sensitive potassium channels charybdotoxyn (HT, 0.1μM) and glibenclamide (GB, 10μM), respectively, both increased relaxing effect of NaHS.
In SMC precontracted with PE addition of 5-1000μM NaHS decreased mechanical tension of SMC with EC50=100μM and the value of relaxation 55.8±7.2% (n=6, $p<0.05$) of the control PE-induced contraction. TEA (10mM) and 4AP (1mM) both significantly reduced relaxing effect of 100μM NaHS to 13.8±5.2% (n=9, $p<0.05$) and 16.2±2.7% (n=7, $p<0.05$) respectively. GB (10μM) completely abolished the relaxing effect of 100μM NaHS. HT (0.1mM) had no significant effect on H2S- induced relaxation.

Conclusions: In contraction induced by depolarization of SMC membrane with highpotassium solution, relaxing effect of H2S is mediated by opening of calcium-activated potassium channels of small and intermediate conductance, and in SMC contraction induced by activation of α1-adrenergic receptors – by activation of ATP-sensitive potassium channels.

PP.09.02 INFLUENCE HYDROGEN PEROXIDE ON PULMONARY ARTERY OF GUINEA PIGS

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Objective: Hydrogen peroxide - the representative of reactive oxygen species, can perform in the body's cells as a function of the signal, and is a metabolite of damaging surrounding tissue. The concentration of hydrogen peroxide may vary considerably, affecting the mechanical stress in vascular smooth muscle. Of particular importance, this fact may have in various diseases, such as hypertension, diabetes mellitus. Hence the need for the present study.

Design and method: The study was performed by mechanographics metod smooth muscle isolated ring segments of pulmonary artery of guinea pigs . Precontracture was caused by high potassium Krebs solution (40 mM KCl).

Results: Hydrogen peroxide at concentrations ranging from 0.001 pM to 1000 pM constrictor has a direct dose-dependent effect on precontracted pulmonary artery smooth muscle. Growth strain amounted to 45 % of the high potassium contraction of the segments remote from the endothelium, and 59 % - stored for segments with endothelium.

Conclusions: Hydrogen peroxide has a constrictor action on precontracted smooth muscle of guinea pig pulmonary vessels, which may have pathogenetic importance in diseases such as pulmonary hypertension and other.

PP.09.03 GENETIC PREDISPOSITION TO CARDIOVASCULAR DISEASES IN THE OFFSPRING OF POPULATION EXPOSED TO RADIATION IN RESULT OF NUCLEAR TESTS

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Objective: This study of genetic predisposition to developing of cardiovascular diseases (CVD) in the offspring of population exposed to radiation.

Design and method: Analysis of frequency of Met235Thr and Thr174Met polymorphisms gene AGT, Leu 28 Pro gene APOE, C786T gene NOS3, Glin192Arg gene PON1 and Lys198Asn gene EDN1. Total 218 people were examined. Selection was based on the family principle including 27 persons of age group 60 > (I generation of persons exposed to direct radiation), 141 their children (II generation) and 50 grandchildren (III generation).

Results: It was found high frequency of heterozygous type inheritance for Thr174Met polymorphisms gene AGT (46.15 %; 48.9 %, and 52.0 % respectively in I, II, and III generations); for people of I, and III generations heterozygous type prevailed over homozygous. For Met235Thr frequency of heterozygous type in the offspring of exposed people was higher compared with I generation (48.15; 51.2 %, and 54.0 % respectively in I, II, and III generations ($p<0.05$; 0.05)).
Heterozygous type inheritance for APOE Leu28Pro was dominant in the II and III generations (51.64 % and 50.0 % respectively; 19.23 % in I generation ($p<0.05$; 0.05). Homozygous mutant type inheritance in the offspring of III generation (age <30) was 8.33 % versus 1.64 % in II generation ($p<0.01$; 0.01).
It was found unexpected high frequency of monozygotic pathological mutations for NOS3 C786T genotype in the people of I and III generation (26.1 % and 20.83 % respectively). Frequency of heterozygous type inheritance for genotype EDN1 Lys198Asn was 36.0 %, 38.62 %, and 39.58 % respectively.

Conclusions: Results of study indicate the possible inheritance of pathological mutations of genes responsible for developing of disorders of lipid metabolism, endothelial dysfunction and hypertension in the offspring of exposed to radiation people.

PP.09.04 THE ROLE OF NITRIC OXIDE IN THE MECHANISM OF ACTION OF CARBON MONOXIDE ON THE CONTRACTILE ACTIVITY OF SMOOTH MUSCLE CELLS FROM THE RAT AORTA

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Objective: To study the mechanism of carbon monoxide action on the contractile responses of vascular smooth muscle cells.

Design and method: Contractile responses of rat aorta strips triggered by depolarization and activation of α1-adrenergic receptors with high K+-medium and phenylephrine, respectively, were measured as increments of isometric tension. Tricarbonyldichlororuthenium(II)-dimer (CORM-2) was used as a donor of carbon monoxide. ODQ (1μM), L-NAME hydrochloride (100 μM) of used to inhibit NO-synthase and soluble guanylate cyclase. To elucidate the contribution of changes in membrane conductance potassium blockers used: Tetraethylammonium chloride (10mM) and 4-Aminopyridine (1mM).

Results: It is shown that the donor of carbon monoxide - CORM-2, in experiments with of high potassium contraction in concentrations of 10-1000 μM, and in cases phenilefrine-induced contractions (10 μM) of smooth muscle cells, of 1 μM and above, caused a dose-dependent relaxation of vascular segments. Inhibition of NO-synthase and soluble guanylate cyclase (GC) weakened CO - induced relaxation of the segments. With blocking potassium channels tetraethylammonium chloride and 4-aminopyridine relaxing effect CORM-2 on vascular segments virtually eliminated.

Conclusions: These results may be the evidence of cooperation in the implementation of gazotransmitters gasotransmitters relaxating effect of carbon monoxide on the level of soluble guanylate cyclase and potassium channels plasmalemma of smooth muscle cells.

PP.09.05 PERSISTENT SIGNIFICANT ELEVATION OF CK WITH UNKNOWN ETIOLOGY

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Objective: Case report about idiopathic hyperCKemia.

Design and method: 52yo male with history of dyslipidemia, smoking, and alcohol abuse, with no hypertension, no DM, presented on 9/1/09 with acute MI with occluded RCA. He underwent a drug-eluting stent to RCA with excellent angiographic result. The hospital course was unremarkable. At presentation, total CK (Creatine Kinase) was 352 U/L which peaked at 700, CKMB 4.2 U/L and TROP T < 0.01 U/L. Patient discharged on aspirin, clopidogril, metoprolol, and atorvastatin 80mg. 16/10/09, presented with mild muscle aches after exercising for 2 hours. CK > 20,000, CKMB 49.23, TROP T 0.02. His liver test, renal function and CBC are normal, and myoglobin 2.15. Patient was treated with IV fluid, continued on aspirin and clopidogril; statin was held. Repeat CK gradually dropped to 2,230. Patient was asymptomatic throughout the hospital course, and on 29-12-2009 the ck 1529, normal renal, pt still off statin. Repeat investigations over the period of 2 years continued to show persistent elevation in CK in the 1300 range. In Feb 2012 add rovastatin. August ldl 1.9 ck 1052.

Results: Muscle biopsy shows slight variation in fiber diameter, non-specific, slight increase lipid storage in some fibers not sufficient to diagnose of lipid storage myopathy. Aldolase serum 9.5, ANA negative Electrophoresis of ck; 99.1 mmck, 0.9 mbck, 0.0 bbck, thyroid function normal.

Conclusions: This middle-aged male presented with acute MI. Lab investigations showed elevated CK in the 300 range. Later it dropped as expected then back up to 20,000 after vigorous exercise and continued to be elevated in the 1,200 range for several years.
The work up was unrevealing, the possible contributing factors such as statin and alcohol were removed. Autoimmune diseases also ruled out. This elevation of CK was triggered by muscle trauma (vigorous exercise) but persisted for a long time without any further injury. Patient has no muscle pain or weakness. There is probably a lack of filtering out the CK from the body rather than increased production from muscle destruction. In this case we couldn't find a definite explanation and call it idiopathic hyperCKemia.

PP.09.06 EPIGENETIC REGULATION OF HUMAN KIBRA EXPRESSION

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Objective: KIBRA has been described as a key factor of the Hippo signaling pathway, which controls organ size and cell growth, cell contact inhibition as well as tumorigenesis and cystogenesis. Dysregulation of Hippo pathway components including KIBRA have been described in human cancer development. In the current work, we analyzed the epigenetic regulation of human KIBRA expression based on a detailed analysis of the KIBRA 5'-regulatory region. We determined specific KIBRA methylation patterns in different renal cell carcinoma subtypes and the impact of methylation on KIBRA expression.

Design and method: We analysed the functional impact of KIBRA CpG islands methylation in reporter gene assays using the CpG-free pCpGL-basic vector system. Promoter deletion constructs were methylated in vitro using methyltransferases SssI or HpaI and transfected into human neuroblastoma (SH-SY5Y) and kidney epithelial (IHKE) cells. Genomic DNA was isolated from kidney tissues of patients with different carcinoma subtypes (e.g. clear cell, papillary, chromophobe), bisulfite converted, subcloned and sequenced. De novo KIBRA demethylation was analyzed in all cell lines treated with 5-azacytedine and trichostatine A.

Results: We identified two separate methylation-sensitive CpG islands located within the KIBRA core promoter (CpG1) and an alternative promoter (CpG2). Methylation of all CpG sites by SssI resulted in a total abrogation of the promoter activity in vitro, while partial methylation by HpaII only repressed the CpG1 promoter activity in IHKE cells. Bisulfite sequencing of subcloned patients' DNA revealed significant differences in methylation patterns of CpG1 and CpG2. Promoter demethylation in vivo by 5-azacytedine and trichostatine resulted in an activation of KIBRA expression in SH-SY5Y cells.

Conclusions: KIBRA expression depends on specific methylation patterns of at least two functional CpG islands. The impact of partial promoter methylation on KIBRA expression was cell-type specific, which underlines our previous results demonstrating differential KIBRA regulation in renal and neuronal cells. Based on our data, we suggest an association of KIBRA methylation status with different renal carcinoma subtypes.

PP.09.07 EFFECT OF HIGH GLUCOSE AND ANGIOTENSIN II IN ATRIAL FIBROBLASTS OF FAILING HUMAN HEARTS

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Objective: Cardiac fibroblasts significantly contribute in inducing structural and functional changes in the heart. Despite several evidences about ventricular fibroblasts, a small number of studies have been made on atrial fibroblasts. In atrial myocardium, activation of local renin-angiotensin system and mitogen-activated protein kinase pathways plays essential role in atrial structure remodeling. In particular, the effect of angiotensin (ang) II is due to the activation of Janus kinase signal transducers and activators of transcription (JAK-STAT) pathway. The objective of the present study was to describe the effects of Ang II stimulation on JAK2/STAT3 Tyr-phosphorylation in human failing atrial fibroblasts.

Design and method: Fibroblasts were isolated from right atrial appendages of failing human hearts (n=3) and passaged three times to yield almost pure cultures (>99% purity). Cells were changed to serum free medium for 24 h, exposed to media containing glucose 5nM (NG) or 25 mM (HG) for 2h, and stimulated with ang II (100 nM) for 5, 10, 15, 30 and 60 minutes, respectively. JAK2 (Tyr-1009) and STAT3 (Tyr-705) phosphorylation were then investigated by Western blot analysis using specific antibodies.

Results: Our results show that Ang II stimulation fails to induce phosphorylation both of JAK2 and STAT3 proteins in NG condition. Furthermore, HG condition, that we previously observed to induce both JAK2 and STAT3 tyrosine phosphorylation in ventricular fibroblasts, is not able to activate JAK2 and STAT3.
Conclusions: Present findings indicate that neither ang II stimulation and HG can induce JAK2 and STAT3 tyrosine phosphorylation in human failing atrial fibroblasts (at least at the considered times). Our previous results showed that ang II and HG alone induced both JAK2 and STAT3 tyrosine phosphorylation leading to increased collagen I deposition in ventricular fibroblasts. Ongoing studies are aimed to investigate the causes of the different effects of HG and ang II stimulation in atrial and ventricular fibroblasts.

PP.09.08 MISO THE TRADITIONAL JAPANESE FERMENTED FOOD, AND EFFECT ON THE BAROREFLEX SENSITIVITY OF THE HEART AND ARTERY

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Objective: Several kinds of the Japanese conventional style foods have been thought to be one of the most important food habit in the candidates to prevent the hypertension. In order to determine the effect of the Miso, which was the conventional and historical Japanese style natural fermented food, the newly developed quantitative baroreflex evaluating device (Jpn Pt.4789203) has been used in this study.

Design and method: 12 healthy adult volunteers had been used in the experiments after the ethical commitee allowance. Coffee and alcohol intake was prohibited before the experiments. Type A behavior pattern, hostility score, and beck depression scale were calculated from the Questionnaire before the measurements. Finger chip pulse wave, blood pressure and ECG were recorded in the data recorder at the sitting position and various kinds of audiovisual contents were added to the subjects. Quantitative analysis, Power spectral analysis of the time series data was carried out, and cross correlation function, transfer function and gain were calculated from the each power spectral data. HRV and fluctuations were calculated from power spectrum, and baroreflex function was calculated from the slope of the regression line between the blood pressure change and HR. And baroreflex function of the artery was calculated from the regression line between pulse tranmission time (PTT) and blood pressure changes with time lag calculated from the cross correlation function.

Results: As the results, significant correlation was observed between the some Questionnaire data and Miso intake habit and hemodynamic spectral data. For example, type A behavior pattern scale and the hostility scores of the subjects had the significant correlation with the miso intake habits. Rho max suggesting the linearity of the spectral data showed the significant difference in pulse wave transmission time and blood pressures.

Conclusions: Our results had suggested that eating habit had the effect on the autonomic nervous system baroreflex sensitivity. Traditional japanese foods might have the merit in hypertension control. Further consideration will be needed for the eating habits and Miso intake, because it have the economical advantage compared with the drug administration.

PP.09.09 CAPSAICIN MEDIATED AFFERENT RENAL DENERVATION: PHARMACOLOGICAL CONFIRMATION AND IMPLICATIONS FOR THE PATHOPHYSIOLOGY OF HYPERTENSION

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Objective: It has been reported that capsaicin evokes selective denervation of the renal afferent nerves. We assessed the efficacy of capsaicin-mediated denervation in preventing the physiological responses to activation of the renal afferent and efferent nerves and in the development of dietary salt-evoked hypertension in the Dahl salt-sensitive rat.

Design and method: Conscious Sprague-Dawley (SD) rats implanted with an ICV cannula, having undergone sham (S) or bilateral renal afferent nerve denervation (ADNX) (capsaicin 33mM), received IV and IR infusions of bradykinin (BK) (5-40 µg/kg/min) and adenosine (A) (2-12 µg/min). All animals then received ICV guanabenz (50µg) (N=5/gp). HR, MAP and urinary sodium excretion (UNaV) were continuously monitored. Dahl salt-sensitive (DSS) rats underwent sham, ADNX or bilateral RNDX surgery (N=5/group) – all animals were maintained on an 8% NaCl diet for 21-days and MAP was continuously monitored by radiotelemetry.

Results: IR, but not IV, BK dose-dependently increased MAP and HR in sham, but not ADNX rats (BK 40 µg/kg/min; peak change HR [bpm] S +61±8 vs ADNX -5±3, P<0.05; peak change MAP [mmHg] S +19±3 vs ADNX +0.6±2, P<0.0.5). IR, but not IV, adenosine evoked a dose-dependent increase in natriuresis in sham animals, a response abolished by ADNX (A 12 µg/min; peak change UNaV [µeq/min] S +18.7±3 vs ADNX +2±0.4, P<0.05). In both sham and ADNX rats, ICV guanabenz evoked profound natriuresis (guanabenz 50 µg; peak change UNaV [µeq/min] S +13.4±1 vs ADNX +12.8±1). In DSS rats a high salt diet evoked hypertension in sham rats, hypertension was attenuated in RDNX rats but exacerbated in ADNX rats (DSS High-salt diet day 21 peak change MAP [mmHg]; S +30±3, RDNX +20±2*, ADNX +45±6*, P<0.05).

Conclusions: Capsaicin mediated afferent renal denervation prevents the physiological responses to intrarenal administration of activators of the renal afferent nerves without affecting the function of the renal efferent nerves - indicated by the natriuresis to central α2-adrenoceptor stimulation. Afferent renal denervation exacerbated DSS hypertension – suggesting a critical role of the renal afferent nerves as a CNS negative feedback mechanism to evoke efferent renal nerve (and global) sympathoinhibition and the attenuation of hypertension.

PP.09.10 CARDIOVASCULAR REACTIVITY DURING DRIVE TEST SIMULATION: COMPARISON BETWEEN HYPERTENSIVE PATIENTS ON THERAPY WITH ATENOLOL AND NORMOTENSIVE SUBJECTS

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Objective: In previous studies, we were able to demonstrate the ability of the drive test simulation to stimulate a cardiovascular response in normotensive patients with a mixed pattern characterized by a dominant vascular component. This reactivity was particularly evident in the female population and there was a gender-dependant difference during high speed street driving and manoeuvres, characterized by females cardiovascular reactivity to be more stimulated by manoeuvres and males by high speed. The aim of this study was to evaluate the influence of a drive test simulation on the cardiovascular reactivity of hypertensive patients on b-blockers therapy and to compare it with normotensive patients.

Design and method: 67 patients (52 normotensive and 15 hypertensive on atenolol 100 mg/day therapy, 31 males and 36 females, mean age 40±8 years old) underwent a drive test with a car simulator. We continuously monitored in a non invasive way systolic and diastolic blood pressure, heart rate, stroke volume, cardiac output and total peripheral resistances. Following operator directions, patients underwent a standardized route consisting of high speed street driving and manoeuvres in narrow and crowded places.

Results: The reactivity of the hypertensive population on atenolol and the normotensive one resulted statistically different during drive test, as shown in Table. No statistically significant differences in reactivity between gender in the hypertensive population was found (all p=ns).

	Δ (speed – baseline) Atenolol	Δ (speed – baseline) Controls	P
SYS [mmHg]	9,23 (± 2,59)	24,2 (± 18,05)	0,002
DIA [mmHg]	8,51 (± 5,12)	21,0 (± 13,21)	0,001
HR [bpm]	6,6 (± 2,48)	8,2 (± 9,37)	0,510
SV [ml]	0,39 (± 5,3)	-7,68 (± 15,7)	0,055
CO [lpm]	0,56 (± 0,38)	-0,15 (± 1,21)	0,027
TPR [mmHg/mlps]	-0,3 (± 0,1)	0,27 (± 0,33)	0,001
	Δ (manoeuvres – baseline) Atenolol	Δ (manoeuvres – baseline) Controls	P
SYS [mmHg]	15,89 (± 2,12)	30,36 (± 17,39)	0,002
DIA [mmHg]	15,07 (± 1,83)	25,31 (± 13,28)	0,004
HR [bpm]	9,02 (± 1,84)	9,81 (± 11,4)	0,790
SV [ml]	0,29 (± 7,17)	-8 (± 16,46)	0,060
CO [lpm]	0,76 (± 0,5)	-0,16 (± 1,38)	0,013
TPR [mmHg/mlps]	0,02 (± 0,16)	0,36 (± 0,4)	0,002

Conclusions: When comparing normotensive and hypertensive on atenolol, the results have shown the effect of b-blockers on reducing cardiovascular reactivity during a stressor test. The fact that there were no differences between genders in the hypertensive population emphasizes the role of atenolol in reducing gender-dependant differences in the cardiovascular reactivity that was demonstrated in the normotensive population.

PP.09.11 HYPNOTIC FOCUSED ANALGESIA AND HYPNOTIC GENERAL ANAESTHESIA PREVENT THE CARDIOVASCULAR EFFECTS OF PAIN. PILOT STUDY

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Objective: To establish whether Hypnotic focused analgesia (HFA) corresponding to local anaesthesia and hypnotic general anaesthesia (HGA) corresponding to spontaneous-breathing general anaesthesia are able to prevent the central and peripheral resistance rise induced by painful stimuli on the median nerve (PSMN).

Design and method: Hypnotic induction was obtained in 5 normal volunteers. Hand HFA was suggested as described in Casiglia et al, Hypnosis prevents the cardiovascular response to cold pressor test, Am J Clin Hypn 2007:49:255-66. HGA was obtained in the same subjects suggesting total-body analgesia, narcosis, muscular immobility and amnesia like. PSMN was produced through a device giving direct current (DC) electric discharges (2 stimuli/second). HGA differed from HFA in that, analgesia was extended to total body, hypnotic sleep reproducing surgical narcosis was induced, paralysis was suggested but for respiratory muscles and subjects did not know where the painful stimuli would be administered. Subjective pain (SP) was recorded with a 0-10 visual scale. Maximum tolerable DC intensity indicated objective pain tolerance (OPT). Blood pressure, forearm flow and cardiac output were monitored, and central and peripheral resistance were calculated in normal consciousness, in HFA and in HGA in order to measure the adrenergic response triggered by pain stimuli (ARPS).

Results: SP: in comparison to pre-hypnotic conditions, maximum subjective pain decreased in average by 84% in HFA and 111% in HGA. OPT: at the maximum PSMN, pain tolerance increased by 30% in HFA and by 64% in HGA. Haemodynamics: in basal conditions, the PSMN inducing maximum tolerable pain produced 46% increase of central resistance and 46% increase of peripheral resistance, while during HFA and during HGA no increase of resistance was observed.

Conclusions: HFA significantly reduces subjective pain perception, an effect that is mirrored by objective pain tolerance. HGA is even more efficient than HFA in this respect. What is more important, both HFA and HGA significantly reduce the ARPS, so living organ protection against pain. Consequently, both HFA and HGA are not simple subjective consequences of dissociation, but really reduce pain transmission and reflex arc.

PP.09.12 RENAL SYMPATHETIC DENERVATION IMPROVES GLUCOSE METABOLISM THROUGH AN ACTIVATION OF SODIUM DEPENDENT GLUCOSE TRANSPORTER 2 IN TYPE 2 DIABETIC RATS

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Objective: Recent studies have shown that renal sympathetic denervation (RDX) improves glucose metabolism in patients with resistant hypertension.

However, the mechanisms underlying the beneficial effects of RDX are poorly understood. Here, we examined the effects of RDX at diabetic stage on glucose metabolism in type 2 diabetic rats.

Design and method: Otsuka Long Evans Tokushima Fatty (OLETF) rats were underwent uninephrectomy and RDX at 5 and 25 weeks of age, respectively. Blood pressure was measured by telemetry system.

Results: At 45 weeks of age, RDX animals had almost undetectable renal cortical tissues norepinephrine (NE) levels. RDX-OLETF rats showed lower levels of blood glucose, plasma insulin and their area under the curve in response to oral glucose loading during the oral glucose tolerance test, as compared to non denervated rats. Furthermore, the whole body insulin sensitivity was assessed by the hyperinsulinemic-euglycemic clamp study at 45 week of age, and RDX-OLETF rats showed an improved glucose infusion rate, as compared to non denervated rats. RDX suppressed plasma and renal tissues NE levels, lowered urine NE excretion, and improved in vivo glucose uptake by adipose tissues, soleus muscle and liver tissues in OLEFT rats. Furthermore, RDX markedly increased urinary excretion rate of glucose which was associated with a decrease in sodium dependent glucose transporter 2 (SGLT2) expression in proximal tubular brush border membrane.

Conclusions: These data suggest that renal sympathetic denervation improves glucose metabolism by increasing glucose uptake at peripheral tissues and urinary glucose excretion.

PP.09.13 INADEQUATE BLOOD PRESSURE CONTROL IN HYPERTENSIVE PATIENTS RECEIVING ANTIHYPERTENSIVE THERAPY IS ASSOCIATED WITH AUTONOMIC DYSFUNCTION

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Objective: Inadequate blood pressure (BP) control, which may influence the difficulty selection of antihypertensive therapy (AHT) can be associated with impaired neurogenic control of blood circulation.
Aim. To study features of autonomic control circulation in patients with arterial hypertension (AH), which had different variants disorders BP profile despite AHT.

Design and method: Study included 106 patients with arterial hypertension (AH) treated with combination AHT, mean age 54,8±6,1 years. 72 patients had associated cardiovascular disease (CHD, stroke and diabetes).
All patients were performed ambulatory BP monitoring (BPLab, Russia) and study of autonomic regulation: tilt-test (TT), Valsalva maneuver, assessment dynamics forearm blood flow (DFBF) during lower body negative pressure (LBNP) -10 mmHg, arterial baroreflex (BRS), heart rate variability (HRV), blood pressure variability (VAD) and cross-spectrum. Hemodynamic parameters recorded using beat-to-beat BP monitor (Finometer-PRO, Nederland), occlusion plethysmography and ECG.

Results: During ambulatory monitoring revealed that 51 patients not been achieved adequate control blood pressure profile. It caused an increase BP during the day in 17, at night - 31 patients; increase diurnal blood pressure variability (DVAD) in 33, inadequate blood pressure reduction at night in 24 patients. DBF during LBNP was lower in patients with high daily systolic BP (SBP) (–0,11±0,10vs. 0,30±0,20 RU; p<0,05) and at night (–0,06±0,15vs.0,33±0,24 RU; p<0,01). BRS correlated with daily SBP (r=–0,28; p<0,05), DFBF during LBNP correlated with daily SBP (r=–0,47; p<0,01) and at night (r=–0,63; p<0,001). Diurnally diastolic BP (DBP) associated with HRV, BPV and cross-spectrum, notably in low frequency range (r=0,38; p<0,01, r=0,29; p<0,01, r=0,40; p<0,005, respectively). Patients with high DBP more significantly decreased SBP in orthostasis (-12,5±12,5 vs. -0,3±11,2 mm Hg; p <0,01). In patients with elevated DVAD were observed decrease the Valsalva index (1,49±0,21 and 1,73±0,24; p<0,01) and orthostatic hypertension (x2=4,4; p <0,05). Patients with inadequate night decrease SAD or DBP had less BRS (6,1±3,0 vs. 9,5±5.3 ms/mmHg; p<0,05) and DFBF during LBNP (0,01±0,18 vs. 0,36±0,25 RU; p<0,05).

Conclusions: In patients with resistance to AHT and various disorders of blood pressure profile observed different types autonomic dysfunction, which can lead to difficulties in selection adequate treatment.

PP.09.14 CAROTID CHEMO- AND BARORECEPTORS IN OBESITY HYPERTENSION

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Objective: Carotid bodies (CB) influence sympathetic activity, and the peripheral chemoreflex is enhanced in both human and experimental hypertension (HT). We hypothesized that activation of carotid chemoreceptors contributes to sympathetically-mediated obesity-induced HT. In dogs with obesity HT (n=4), antihypertensive responses to CB denervation were compared to responses during chronic electrical activation of the carotid baroreflex (BA), which has sustained effects to suppresses central sympathetic outflow.

Design and method: After baseline hemodynamics were recorded at normal body weight, the diet was supplemented with beef fat, whereas Na intake was held constant. After 5 weeks on the high-fat diet (obese), when body weight had increased ~40%, fat intake was reduced to a level that maintained this body weight. Responses to 1 week of BA (week 6) were recorded followed by 1 week of recovery (week 7). The carotid sinuses were then denervated (CSD), and 2 weeks of hemodynamic data were recorded.

Results: Weight gain resulted in increased mean arterial pressure (MAP) and substantial increases in heart rate (HR). MAP decreased within 5 days of CSD and continued to fall until the severity of HT was attenuated ~ 40% (week 9). During this time, there were no significant changes in HR. In contrast, BA completely abolished the HT within 24 hours of electrical stimulation of the carotid sinus and greatly diminished the tachycardia by improving vagosympathetic balance. CSD abolished ventilatory responses to IV injection of NaCN and led to a sustained increase in arterial PCO2 (39±1 to 53±1 mmHg), indicating successful CB denervation.

Condition	MAP (mmHg)	HR (bpm)
Lean	103±2*	82±3*
Obese (week 5)	123±4	115±2
BA (week 6)	103±2*	97±4*
Recovery (week 7)	125±2	117±3
CSD (week 9)	116±3*	112±5

P< 0.05 vs Obese (week 5)

Conclusions: These findings suggest that CB are active in obesity and contribute to the sympathetically-mediated HT, but that their influence on MAP can be counteracted by BA. Because intermittent hypoxia increases the chemosensory response of the CB and because obstructive sleep apnea is prevalent in obesity, this neurogenic mechanism may be especially important in mediating human obesity HT. HL-51971.

PP.09.15 FAILURE IN PARASYMPATHETIC MODULATION AND VASCULAR REMODELING: AN ASSOCIATION INDEPENDENT OF BLOOD PRESSURE AND AGING IN HYPERTENSIVE PATIENTS

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Objective: Diverse factors have been associated with vascular remodeling (VR), primarily aging and hypertension. Abnormal autonomic regulation, which is involved in different pathophysiological pathways of cardiovascular disease, could impact on VR beyond the above factors.
To assess: a) the associations between autonomic profile and VR. b) Whether autonomic variables are independent predictors of VR.

Design and method: 300 consecutive patients were evaluated (March/2012–October/2013). After exclusion criteria (cardio/renal-diseases, anemia, β-blocker-therapy, antidepressants, antiarrhythmics, bronchodilators), 171 patients remained: 89 treated-hypertensives (52.0±11.1 years, 141.1±11.6/89.1±9.70 mm Hg, 87.6% males) and 82 normotensives (47.0±9.53 years, 119.0±10.0/76.5±8.31 mm Hg, 70.1% males). Anthropometry, resting BP (OMROM HEM781), carotid-femoral atherosclerosis and common-carotid intima-media thickness (CIMT; Esaote My Lab 40) were evaluated. Autonomic balance was measured through heart rate variability at rest (5 min). Parasympathetic modulation in time-domain (RMSSD) and sympathetic tone in frequency-domain (Low-High frequency (Lf/Hf), by autoregressive method) were determined. VR was defined as maximum CIMT>0.90 mm and/or plaque. In hypertensive and normotensive patients, univariate correlations were performed between logarithmically normalized RMSSD and Lf/Hf and maximum CIMT (Pearson). Mean-difference analyses of RMSSD and Lf-Hf according to presence/absence of atherosclerotic plaque (T Test) were done. Logistic regression was performed with VR as dependent variable.

Results: In hypertensives, RMSSD and Lf/Hf correlated inversely and directly, respectively, with maximum CIMT (r= -0.41, p<0.001 and r=0.24, p=0.02). Plaque presence was associated with lower parasympathetic (RMSSD: 18.4ms vs. 27.4ms, p<0.002) and higher sympathetic (Lf/Hf: 2.51 vs 1.70, p = 0.04) modulations. In normotensives no significant associations between autonomic profile and maximum CIMT or plaque presence were found (p>0.05 in all cases). In logistic regression, age and RMSSD were independent predictors of VR (adjusted for sex, smoking, SBP, diabetes and BMI; p=0.002 and p=0.04, respectively).

Variable	Coefficient	Std. Error	P
Age	0,1353	0,04376	0,0020
Male sex	-1,5775	1,0555	0,1350
Smoker	0,2160	0,9153	0,8134
BMI	-0,01165	0,07301	0,8732
SBP	-0,003782	0,02159	0,8610
Diabetes	-0,8555	1,3282	0,5195
RMSSD	-1,9010	0,9271	0,0403
LfHfar	0,1502	0,2132	0,4809
Constant	2,3578		

Conclusions: In hypertensive, but not in normotensive patients, a lower parasympathetic modulation was associated with VR beyond age and BP values. Sympathetic tone showed no independent association with VR in this study. Thus, future investigations will be needed to evaluate if an impaired vagal modulation, through specific mechanisms (i.e: inhibition of vagal anti-inflammatory reflex), could be linked to VR in essential hypertension.

PP.09.16 BARORECEPTOR STIMULATION ENHANCED NO-DEPENDENT VASCULAR DILATION, A NEW TREATMENT FOR ARTERIAL HYPERTENSION AND METABOLIC SYNDROME

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Objective: Increasing evidence suggests nitric oxide (NO) deficit and baroreflex dysfunction to be characteristic for cardiovascular conditions even in preclinical stages of the disease. Sodium nitroprusside (SNP), a spontaneous NO-donor, vasodilatory effect was studied in conjunction with sinocarotid baroreceptor magnetic stimulation and potential implementation in cardiovascular conditions with autonomic dysfunction and NO deficit.

Design and method: Mean femoral artery blood pressure (MAP), heart rate (HR) and ear lobe skin microcirculatory blood flow, measured by microphotoelectric plethysmogram (MPPG) were simultaneously recorded in conscious rabbits before and after 40-min local exposure of sinocarotid baroreceptors to 350 mT intensity static magnetic field (SMF), generated by Nd-Fe-B alloy magnets (n = 14) or sham magnets (n = 10, controls). Arterial baroreflex sensitivity (BRS) was measured by the changes in HR and MAP after intravenous (i.v.) bolus injections of SNP and phenylephrine.

Results: SMF significantly decreased systemic MAP (-6.2%), phenylephrine-induced abrupt elevation in MAP (-21.9%) and increased microcirculatory blood flow (+23.0%), and BRS (+68.8). An increase in BRS significantly correlated with decrease in phenylephrine MAP ramps ($r = -0.47$, $p < 0.016$) and increase in microcirculatory blood flow ($r = 0.66$, $p = 0.009$), indicating improvement of the baroreflex-mediated makro- and microcirculatory control. The microvascular vasodilatory response due to same dose i.v. bolus of nitroprusside significantly increased after SMF exposure (+163.2%) and significantly correlated with increase in BRS ($r = 0.56$, $p = 0.021$).

Conclusions: A larger vasodilatory effect of a sodium nitroprusside (NO-donor) on the background of increased BRS suggests augmentation of the baroreflex capacity support NO-dependent vasodilation to be a new physiological mechanism of blood pressure buffering and microcirculatory control. Baroreceptor magnetic stimulation, improving microvessels sensitivity to NO, could augment insulin-mediated skeletal muscle vasodilation (which is NO-dependent), nutritive blood flow and glucose uptake, ameliorating insulin resistance and the metabolic syndrome. Baroreceptor stimulation seems to be a new complex systemic approach how to stabilize enhanced blood pressure variability, moderate autonomic, vascular and endothelial dysfunction with potential implementation in an array of cardiovascular and metabolic diseases where NO deficit and autonomic dysfunction increases the risk of morbidity and mortality substantially.

PP.09.17 SYMPTOMS RECURRENCE IN PATIENTS WITH POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME

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Objective: Postural orthostatic tachycardia syndrome (POTS) is defined as the development of orthostatic symptoms with a heart rate increment >= 30. POTS's clinical presentation and its pathophysiology are complex. The prognosis of this condition remains uncertain and limited data is available regarding long-term symptoms recurrence.

Design and method: We retrospectively analyzed clinical records of pts with POTS diagnosed, from January 2000 to December 2010. Demographic data, comorbidities and symptoms were analyzed. A follow-up (FUP) survey was conducted in December 2012. Pts without FUP data were excluded.

Results: A total of 19 pts were included, all women, mean age 27.4 ± 8.9 years. Mean FUP time was 92±41 months. Overall, on FUP, five pts (31.3%) were asymptomatic, 9 (56.3%) improved significantly their quality of life but two pts (12,5%) remained highly symptomatic. Patients were divided according to their symptomatic status on FUP into 2 groups: highly symptomatic patients versus assymptomatic or midly symptomatic patients.
There were inter-group differences referring to age, symptom pattern (syncope, dizziness, visual symptoms, diaphoresis, palpitations, pallor, headache, nausea, asthenia, chest pain, dyspnea, tremor, heat intolerance, diarrhea) , as well as the postural context (orthostatic symptoms only vs sitting position symptoms also vs supine symptoms also). Higher frequency of dyspnea and headache during the episodes and occurrence of supine symptoms were associated with a higher probability of symptoms recurrence on FUP ($p<0,05$ for all analysis).

Conclusions: Simple clinical data (symptoms and their context) may be of value in symptoms recurrence preview, an important determinant of quality of life in pts with POTS.

PP.09.18 VASCULAR ULTRASOUND DETERMINANTS OF BRAIN INFARCTION IN HYPERTENSIVE DIABETIC PATIENTS

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Objective: It has been demonstrated that the ultrasound findings of carotid arteries are associated with ischemia on cerebral imaging. In an effort to better determine the impact of the atherosclerotic load on brain parenchyma, a study was performed aiming to establish the association of carotid and femoral ultrasound findings with ischemia on brain computerised tomography (CT).

Design and method: Analysis involved imaging by duplex of carotid and femoral arteries of 74 hypertensive diabetic patients (46 male and 28 female, mean age: 64.29 years) in longitudinal fashion, to detect the presence of plaque and to assess the intima-media thickness (IMT). Each artery was assigned a score (presence of plaque= 1, absence of plaque=0, IMT>0.8 mm=l, IMT<0.8 mm=0) and the total score of the four vessels (two carotids and two femorals) was calculated per patient (atherosclerotic ultrasonic score-ATHUS). Subsequently, brain CT scans were performed in all patients and the presence or absence of ischemia was noted.

Results: Group A (ATHUS=0-2, 26 patients) was associated with a 19.2% (5/26) prevalence of brain CT ischemia. The corresponding values for group B (ATHUS=3-5, 24 patients) and group C (ATHUS=6-8, 24 patients) were: 45.8% (11/24) and 58.3 %(14/24) respectively ($p<0.05$).

Conclusions: Our results suggested that the degree of atherosclerosis was directly related to brain CT ischemic findings. This position might be clarified in larger studies of patients, aiming to establish the role of atherosclerosis detected on ultrasound in the development of brain CT ischemic findings.

PP.09.19 THE ROLE OF ACETYLCHOLINE INHIBITORS, THYROID FUNCTION AND ATHEROSCLEROSIS IN ELDERLY HYPERTENSIVE PATIENTS WITH VASCULAR DEMENTIA

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Objective: Atherosclerosis is commonly implied after the findings of carotid ultrasound and lower limp Doppler studies and has also been associated with dementia. Recent studies have shown that patients with vascular dementia (VD) exhibit a cholinergic deficit and they have a good response to treatment with ace-

tylcholinesterase inhibitors (Achl). There is evidence in thyroid mouse models in in vitro studies that achetylocholine stimulates iodine organification without concomitant T4 release. The aim of this study was to assess thyroid function after Achl treatment in VD patients and to investigate its therapeutic impact in patients with VD and impaired atherosclerotic markers.

Design and method: 68 patients who were admitted with diagnosis of stroke and VD were included. As controls there were 50 healthy individuals. The patient group completed a 12 months therapy with Achl (rivastigmine), while the control group received placebo. We investigated changes in thyroid parameters before and after the administration of Achl. Atherosclerotic markers included imaging by duplex of carotid and femoral arteries, has been done before the beginning of Achl treatment and at the completion of the study after 12 months, in order to detect the presence of atherosclerotic plaque and to assess the intima-media thickness IMT),as a calculated marker of subclinical atherosclerosis and subsequently a potential VD. Each artery was assigned a score (presence of plaque=1, absence of plaque=0, IMT>0.8mm-1, IMT<0.8mm-0) and the total score of the 4 vessels (2 carotid and 2 common femoral) was calculated per each patient (atherosclerotic ultrasonic score - ATHUS). Subsequently, the MMSE of every patient was reevaluated.

Results: 12 months after treatment MMSE score was unchanged in 45/50 control individuals and improved in 60/68 patients ($p<0.001$). It seems that Achl benefit patients with VD at least 12 months but not controls. Patients group (ATHUS=3-6, 55 patients) was associated with median MMSE of 27. The corresponding value of the control group (ATHUS= 0-2, 40 persons) was 30 ($p<0.05$)

Conclusions: Our results suggest that Achl treatment has the potential to offer clinical benefit after 12 months of treatment to VD patients who also have evidence of atherosclerotic vascular disease.

PP.09.20 ASSOCIATION OF SERUM LEVELS OF VASCULAR ENDOTHELIAL GROWTH FACTOR-A WITH VASCULAR ULTRASOUND DETERMINANTS OF DEMENTIA IN HYPERTENSIVE PATIENTS WITH TYPE 2 DIABETIC NEPHROPATHY

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Objective: Vascular endothelial growth factor-A (VEGF-A) might play an important role in vessels' remodeling. It remains controversial the mechanism by which VEGF works in the kidney, as well as in the vessels at least in the early stages of diabetic nephropathy (DN) and CKD. Whether VEGF-A is detrimental in early stages of DN or other renal conditions has not yet been clearly answered. Recent evidence supports that combined findings of carotid ultrasound and lower limp Doppler studies denoting atherosclerosis are associated with dementia. VEGF-A may play a role in the pathophysiology of Vascular Dementia (VD). VEGF-A is elevated in postmortem brain tissue of VD patients. VEGF-A has been found in neurons, microglia, vascular endothelial cells and leukocytes. The aim of the present study was to determine the serum levels of VEGF-A and to investigate their potential correlation with the atherosclerotic markers and albuminuria and VD in hypertensive patients with early stages of type 2 DN.

Design and method: CKD patients of stages 1 and 2 with type II DN (n=30) were included. As controls, there were two groups, patients with diabetes type II without CKD (n=15) and healthy individuals (n=15). VEGF-A levels were measured by an ELISA method. Intima media thickness of carotid and femoral arteries and atheromatic plaque were evaluated by a high resolution ultrasonography. Analysis of atherosclerosis markers involved imaging by duplex of carotid and femoral arteries in all patients in longitudinal fashion, to detect the presence of plaque and to assess the intima-media thickness (IMT). Subsequently, the mini-mental score examination (MMSE) of every patient was evaluated.

Results: There was a notable difference between VEGF-A levels in each of the groups.There was a statistically significant correlation between levels of VEGF-A and albuminuria ($p<0.0001$). Further, VEGF-A levels were independently correlated with IMT and atheromatic plaque ($p<0.0001$) and MMSE score in DN patients.

Conclusions: Our study suggests that serum levels of VEGF-A might present independent risk factors of atherosclerosis, albuminuria and vascular dementia in hypertensive patients with early stages of type II diabetic nephropathy to the progression of CKD.

PP.09.21 SELECTIVE CARDIOVASCULAR ADAPTATION TO CHRONIC STRESS IN MICE

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Objective: Exaggerated responses to acute stress and increasing circulating angiotensin II (AngII) contribute to the development of hypertension. While there is habituation with chronic stress leading to less cardiovascular effects, responses to novel stress may be similar or possibly enhanced. In a mouse model of chronic stress, we aimed to investigate cardiovascular responses to repeated and novel stressors and in response to low dose infusion of AngII.

Design and method: Male C57Bl6 mice were implanted with telemetry probes and recordings of mean arterial pressure (MAP) and heart rate (HR) were made in chronically stressed (n=10, 2 hours stress per day for 3 weeks) and in non-stressed (n=4) control mice. Daily stress included a random combination of 60mins of restraint and 2 x 30mins of dirty cage switch and 5mins of shaker stress was chosen as the novel stress. A separate group of non-stressed and chronically stressed mice (n=4 per group) were administered AngII (280µg/kg/day) via minipump and following a final restraint stress, brains were analyzed using immunohistochemistry.

Results: Chronic stress had no effect on basal levels of MAP or HR but attenuated the pressor (14.0 v 21.2mmHg; $P<0.01$) and tachycardic responses (95 v 219bpm; $P<0.001$) to dirty cage switch. Novel shaker stress increased MAP by +7.1mmHg ($P<0.01$) and HR by +70bpm ($P=0.05$) compared with non-stressed mice. No differences were observed in the cardiovascular response to restraint stress. However in AngII infused mice, BP was markedly less in non-stressed mice which was reversed by chronic stress (22.0 v 33.0mmHg; $P<0.05$) and associated with greater Fos labeling in the paraventricular (+11) and dorsomedial (+12) nuclei in the hypothalamus and central (+3) and medial amygdala (+4; all $P<0.05$).

Conclusions: The findings indicate that cardiovascular responses to chronic stressors do not always lead to habituation. Responses to novel stressors can be enhanced and suggests that adaptation to long term stressful situations is non-uniform and may depend on the type of stress involved. Furthermore, the non-uniform adaptation suggests that the modulation likely involves higher brain regions (hypothalamus and amygdala) rather than lower pre-sympathetic pathways.

PP.09.22 ELECTRICAL BAROREFLEX ACTIVATION THERAPY DOES NOT CO-STIMULATE CAROTID BODY CHEMORECEPTORS

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Objective: Carotid baroreflex activation therapy (BAT) by the Rheos® system produces a sustained fall in blood pressure in patients with resistant hypertension. Since the activation electrodes are implanted at the level of the carotid sinus, it is conceivable that the nearby located carotid body chemoreceptors are stimulated as well. Physiological stimulation of carotid chemoreceptors not only raises respiration, but it also increases sympathetic activity which may in part counteract the effects of BAT. The aim of the present study is to investigate whether there is evidence for concomitant carotid chemoreflex activation during BAT.

Design and method: Thirteen participants with the Rheos® system implanted were included in this single-center study. At arrival at the clinic, the device was switched off for 2 hours while patients were at rest. Subsequently, the device was switched on at 6 electrical settings of high and low frequencies and amplitudes. Arterial CO2, end-tidal CO2, breath duration, breathing frequency and blood pressure were measured during all device activation settings. Multilevel statistical models were adjusted for age, gender, blood pressure reduction, antihypertensive medication, sleep apnea, cardiac and lung disease.

Results: Baseline and maximal response end-tidal CO2, PaCO2, breath duration and breathing frequency are presented in Table 1.

TABLE 1: Respiratory and blood pressure measurements during baseline (device off) and the maximum tolerable electrical activation

Device Settings	$PaCO_2$	$ETCO_2$	BD	BF	MAP
Device off	5.75±0.41	4.70±0.54	3.56±0.62	17.91±2.76	103±17
Max activation	5.77±0.43	4.63±0.52	3.61±0.51	17.62±2.37	95±22 *

*Values are in mean ± SD. Max activation = maximum tolerable electrical activation, $PaCO_2$ = arterial CO_2 (kPa), ET CO_2 = end-tidal CO_2 (kPa), BD = breath duration (seconds), BF = breathing frequency (breaths/minute), MAP = mean arterial pressure (mmHg). * $P < 0.05$ vs baseline.*

These values did not change significantly during any of the electrical settings. Nevertheless, mean arterial pressure showed a highly significant decrease during electrical activation (P<0.001).

Conclusions: Carotid BAT using the Rheos® system did not result in raised respiratory activity at maximally tolerated settings, which suggests that co-activation of carotid body chemoreceptors does not occur during BAT.

PP.09.23 CAROTID SINUS MASSAGE: A POTENTIAL TOOL FOR SELECTING SIDE FOR DELIVERING BAROREFLEX ACTIVATION THERAPY IN PATIENTS WITH RESISTANT HYPERTENSION

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Objective: Carotid baroreflex activation therapy (BAT) is a renewed therapy to treat resistant hypertension. Currently, the activation electrodes are implanted only unilateral, preferably at the right carotid sinus. The aim of this study is to assess the side dominance of carotid baroreflexes in hypertensive patients and to evaluate the use of carotid sinus massage (CSM) to predict the best carotid sinus side to deliver BAT before surgical implantation.

Design and method: To this aim we studied 18 patients that were already implanted bilaterally and, currently receiving BAT. CSM was performed twice at each sinus in a random order. The greatest reflex side was determined when the difference between left and right blood pressure and heart rate drop was >5 mmHg and >=3 beats per minute, respectively. The strongest reflex during CSM was retrospectively compared to the strongest baroreflex side during routine testing with the BAT-system.

Results: Mean decrease in systolic blood pressure was 30 ± 13 and 22 ± 11 mmHg after right and left CSM, respectively (p=0.015), whereas heart rate dropped by 21 ± 10 and 12 ± 8 bpm, respectively (p=0.001). 89% of patients had a larger effect of CSM at the right side. The same trend was observed during BAT and the proportions of left/right dominance were equal between CSM and BAT.

Conclusions: Carotid baroreflexes in hypertensive patients show side-dominance towards the right sinus. Nevertheless, a minority of patients had a greater left-sided baroreflex. Therefore, it may be worthwile to consider performing CSM in candidate patients before implanting BAT unilaterally.

PP.09.24 NITRIC OXIDE SYSTEM INHIBITION MODIFIES CARDIAC AQP1 LOCALIZATION DURING HYPOVOLEMIC STATE IN GROWING RATS

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Objective: We previously showed that cardiac AQP1 is altered during hypovolemic state according to the stage of postnatal growth studied. Considering that it has been reported that AQP1 facilitates nitric oxide (NO) transport across the plasma membrane, the objective of the present work was to study if NO system inhibition regulates AQP1 in vivo during water restriction in cardiac tissue of 25-day-old pups.

Design and method: Male Sprague-Dawley rats aged 25 days were randomly assigned as follows (n = 7 each group): R: water restriction during 3 days; C: water ad libitum for 3 days; RL: infusion of L-NAME (4mg/kg.day) via ALZET osmotic mini pumps + water restriction during 3 days; CL: infusion of L-NAME (4mg/kg.day) + water ad libitum for 3 days. At the end of each experimental period, we determined cardiac weight and water content (according to Ding et al.), cardiomyocyte mean diameter and AQP1 localization by immunohistochemistry and protein levels by Western Blot.

Results:

	C	CL	R	RL
Body Weight (g)	85 ± 10	90 ± 7	56 ± 6*	57 ± 6*
Hematocrit (%)	42 ± 2	43 ± 2	55 ± 3*	54 ± 2*
Heart weight (g)	0,47 ± 0,08	0,46 ± 0,05	0,35 ± 0,06*	0,33 ± 0,04*
Cardiomyocyte diameter (μm)	15,0 ± 1,7	15,4 ± 1,9	13,0 ± 1,4*	15,1 ± 1,6#
Cardiac water content (%)	91,7 ± 0,4	92,9 ± 1,6	87,6 ± 0,4*	95,2 ± 1,2#

*p<0.05 vs. C group; #p<0.05 vs. R group

In order to verify NO system inhibition, NOS activity was measured in cardiac tissue of all groups of animals. CL and RL groups presented decreased NOS activity by 50% after L-NAME treatment, in comparison to C group. AQP1 immmunostaining showed the presence of this water channel in the endothelium and endocardium in all groups of animals, being this pattern unchanged by water restriction. However, in animals of RL group, it was observed that AQP1 was present in cardiomyocyte plasma membrane. Cardiac AQP1 protein levels did not change after water restriction or L-NAME treatment in the experimental groups studied.

Conclusions: Water restriction induced a decrease in cardiomyocyte mean diameter and water content, associated to unchanged AQP1 protein levels or localization. L-NAME treatment during hypovolemic state induced the appearance of AQP1 in the plasma membrane, associated to a larger mean cardiomyocyte diameter and cardiac water content, similar to control group. Therefore, NO system inhibition modifies cardiac AQP1 localization and improves cardiac water balance during hypovolemic state in early stages of postnatal life.

PP.09.25 SODIUM-DEPENDENT ION-EXCHANGE SYSTEM IN ITS ROLE AS THE PRIMARY TARGET GASOTRANSMITTERS IN CONTRACTILE REACTIONS OF SMOOTH MUSCLE CELLS

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Objective: It becomes increasingly evident that the traditional alarm systems of smooth muscle cells (calcium ions, cyclic nucleotides, the decay products of phosphoinositides and proteinkinase C), you must attach gas transmitters (NO, H2S, CO). Confirms the legitimacy of such an approach involving them in processes of intra-and intercellular communication, as well as participation in the development of pathogenesis of a large number of cell dysfunctions. However, the different steps of gas transmitters can be explained not only by their influence on these processes, and/or involvement in the operation of various intracellular effector systems.

Design and method: Using the double sucrose bridge was studied the influence of the gas transmitters electrical and contractile activity of smooth muscle cells of the ureter Guinea pig caused by an electrical stimulus. Participation in the studied processes Na/H- exchanger and Na,K,2Cl-cotrasporter avoiding the use of inhibitors ethylisopropilamiloride (1 μM) and bumetanide (100 μM microns), respectively.

Results: It is shown that application of inhibitors of Na/H exchanger / Na,K,2Cl-cotrasporter and free-Na solutions reduces the severity of contractile reactions NO, H2S, CO, at a concentration of 100 μM.

Conclusions: Thus, miogenic action gasotransmitters on smooth muscles due to preferential activation Na/H exchanger and Na,K,2Cl- cotrasporter.

PP.09.26 AGE RELATED AQUAPORIN-1 CHANGES ARE ASSOCIATED TO CARDIAC WATER HOMEOSTASIS DURING DEHIDRATION

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Objective: Water channel aquaporin-1 (AQP1) is involved in the maintenance of cellular osmotic environment. Even though this protein has been linked to cardiovascular homeostasis, its physiological role still remains to be explored, particularly in the postnatal period. The aim of the present study was to evaluate cardiac AQP1 in rats subjected to hypovolemic state following water restriction during the growth stage.

Design and method: Male Sprague-Dowley rats aged 25 and 50 days were divided in the following groups: R: water restriction during 3 days; C: water ad libitum for 3 days. At the end of each experiment, we determined: cardiac weight and water content (according to Ding et al.), cardiomyocyte mean diameter, cardiac fibrosis (Trichrome staining) and AQP1 protein levels (Western Blot) and localization (Immunohistochemistry).

Results:

	C25	R25	C50	R50
Body weight (g)	83 ± 10	52 ± 6*	240 ± 12†	179 ± 10*
Heart weight (g)	0,46 ± 0,07	0,34 ± 0,08*	0,83 ± 0,13†	0,73 ± 0,09
Heart weight (g/100g)	0,49 ± 0,04	0,48 ± 0,06	0,35 ± 0,04†	0,38 ± 0,05
Cardiac water content (%)	91,7 ± 0,4	87,6 ± 0,4*	91,5 ± 0,7	91,2 ± 0,6
Cardiomyocyte mean diameter (μm)	15,4 ± 0,3	12,1 ± 0,2*	17,2 ± 0,4†	16,3 ± 0,3

*p<0.05 vs. respective C; †p<0.05 vs. 25-day-old rats

Cardiac tissue stained with Masson's trichrome did not show increased fibrosis in neither of the experimental groups. AQP1 immunohistochemical staining of the heart revealed its presence in vascular endothelium and endocardium in control animals of both age groups. No changes in AQP1 localization or protein levels were observed in the 25-day-old group submitted to water restriction.

In the oldest group, AQP1 staining appeared in the plasma membrane and its protein levels were increased in response to water restriction.

Conclusions: Water restriction protocol induced a decrease in heart weight, cardiac water content and cardiomyocyte mean diameter without fibrosis development in the 25-day-old rats; such results may be compatible with microcardia. Increased AQP1 protein levels and membrane localization in the 50-day-old group may prevent such alterations, probably indicating that AQP1 participates in maintaining cardiac water homeostasis during hypovolemic state in mature rats.

PP.09.27 CYSTEIN-RICH ANGIOGENIC PROTEIN 61 PROMOTES VASCULAR SMOOTH MUSCLE CELL CALCIFICATION VIA METALLOPROTEINASE ACTIVATION

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Objective: Cystein-rich angiogenic protein 61 (CYR61, CCN1) was reported to be regulated by angiotensin II in vascular smooth muscle cells (SMCs) of atheromatous plaque. Because CYR61 was reported to induce osteoblastic differentiation of mesenchymal stem cells, we hypothesized that the CYR61 may play a role in vascular calcification.

Design and method: We performed experiments using vascular smooth muscle cells harvested from mouse thoracic aorta. We screened global gene expression after CYR61 adenoviral transfection. We evaluated vascular smooth muscle calcification by the expression of osteoblast master transcription factor, Runx2, alkaline phosphatase activity assay and Von Kossa stain.

Results: CYR61 expression was induced by 20.3 folds in SMCs harvested from thoracic aortas of male C57BL6 mouse after 16 hours of adenoviral vector (Ad-CYR61, 50 MOI) transfection, which significantly induced SMC calcification by 209.5±54.8% evaluated by Von Kossa staining after 14 days. In order to evaluate the full range of effects of CYR61 on SMC calcification, we performed microarray analysis. Several metalloproteinases such as MMP-13, -3, -10, and -8 were induced by 55.3, 49.9, 6.4 and 5.2 folds, whereas tissue inhibitor of metalloproteinases such as TIMP-3 and -2 were reduced by 52% and 31% after 16 hours of Ad-CYR61 transfection, respectively (all $p<0.05$). Remarkably, we found overall suppression of procollagen gene expression. Real time PCR confirmed MMP-13 gene induction by 33±13 folds compared with control adenovirus transfected SMCs ($p<0.05$). Although mRNA or protein expressions of MMP-9 were not found increased, gelatin zymography showed an increased enzymatic activity of MMP-9 (92kDa) by 20241% by Ad-CYR61, which was completely reversed by MMP-13 siRNA. Inhibition of MMP activity by the global MMP inhibitor, doxycycline completely blocked Ad-CYR61-induced calcification to the 87.0±30.8% of the control adenovirus transfected SMCs. Also, Ad-CYR61 failed to induce calcification in VSMCs harvested from MMP-9 knock out mouse (100.9±7.6% of the control adenovirus transfected SMCs, $p=0.90$).

Conclusions: These findings demonstrate that CYR61 induces SMC calcification through MMP-13 - MMP-9 cascade. Therapies targeting this signaling pathway may regulate vascular calcification.

POSTERS' SESSION

POSTERS' SESSION PS10
EPIDEMIOLOGY

PP.10.01 PREVALENCE OF HIGH BLOOD PRESSURE IN ADULT POPULATION OF THE REPUBLIC OF ARMENIA

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Objective: Effective control of arterial blood pressure (BP) is a key strategy aimed at mitigating the burden of cardiovascular complications.
The goal of the study was to estimate the prevalence of high blood pressure (HBP) 15 years and older Armenian population.

Design and method: The study was carried out within the framework of the Health System Performance Assessment. Data of a representational survey and examinations were analyzed. The survey was based on stratified cluster self-weighted sampling method and 1600 respondents were involved (34% in capital city Yerevan, 31,8% in urban settings and 34,2% in rural ones). To assess BP oscillometric method was used for measurements. According to international recommendations the BP was measured twice on each arm with 3-5 minutes intervals. Criteria of HBP included systolic level equal or exceeding 140mmHg and/or diastolic equal or exceeding 90 mmHg.

Results: The prevalence of HBP among the studied population was 34%. The rate increases with the age. In 30-39 age group HBP was revealed in 23% of population, in 40-49 age group – 33%, in 50-59 age group – 56%, in 60-69 and older age group – over 70% of population. The prevalence of HBP is 1,4 times higher in males (40% vs. 28,7%). The study evidences that the prevalence of HBP is correlated to the wellbeing and education levels. The highest HBP rate was detected in the poor and lowest educational attainment groups (43% and 38% correspondingly), as well as among those with secondary education (55%). The study of the urban-versus-rural rates of prevalence of HBP suggests that the latter is slightly higher among residents of urban localities (35% vs. 31%). Latent HBP was detected in 16% of respondents (those who did not know about having HBP). To normalize and control BP 14,9% of patients were receiving antihypertensive therapy, but 74% of them had BP more then 140/90mmHg.

Conclusions: The prevalence of HBP is linked to non-modifiable (age, gender) factors and determinants like educational level, wealth and residence. The high prevalence of HBP (34%) stems from unhealthy lifestyle and low utilization of medical care by the population.

PP.10.02 PREVALENCE OF HYPOVITAMINOSIS D AND HYPERTENSION IN PATIENTS INFECTED WITH HUMAN IMMUNODEFICIENCY VIRUS (HIV): ROLE OF INFLAMMATION AND IMMUNE STATE

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Objective: Describe the prevalence of hypertension (HTN) and vitamin D (VitD) deficiency in an HIV-infected population, determine the association between VitD levels and blood pressure (BP) values, and analyze if the immune function and inflammation are related to high levels of BP.

Design and method: Preliminary results of observational, cross-sectional cohort study, which included 250 randomized patients from local HIV program in the province of Córdoba, Argentina. Routine clinical examination was performed including oscillometric blood pressure measured in office. Lipid profile, creatinine, high- sensitive C-reactive protein (hsCRP) and 25 (OH)-VitD was measured. VitD lower than 20 ng/dl was considered as deficiency. CD4 + T lymphocytes cells (TLCD4+) levels and viral load of HIV were determined. 24-h creatinine clearance (CrCl) and 24-natriuria was measured. All patients underwent 24-h ambulatory blood pressure monitoring (ABPM) using Spacelabs device.

Results: 31 patients, 18 (58 %) male, age 46.1 (27-63) years. 45.1 % was hypertensive in office, and 51.6 % through the ABPM; 65.2 % (n = 23) had VitD deficiency, being more common in hypertensive patients (85 % vs. 45 %, P = 0.05). VitD correlated inversely with 24-h SBP (r = -0.45, p< 0.05). Higher systolic and diastolic BP during day and night was observed in patients with lower plasma levels of VitD (p < 0.05) (Table). The simple regression analysis shows VitD as a predictor of 24-h SBP (β = -0.7 ± 0.3, p < 0.03), however in the multiple linear regression analysis only persist as 24-h SBP predictors TLCD4 + (β -0.02 ± 0.009 , P < 0.04) and plasma levels of hsCRP (β 0.88 ± 0.35, p<0.03) (R^2 0.78, p < 0.05).

Conclusions: High prevalence of hypertension and VitD deficiency was detected in HIV patients, showing an inverse association between VitD levels and BP. Low VitD would condition a greater viral activity (decreased TLCD4+) , promoting low-grade vascular inflammation and resulting hypertension.

Clinical and biochemical features of HIV-patients across plasmaVitD tertils

	Total	Vit D 1st Tertil n=7	Vit D 2nd Tertil n=8	Vit D 3th Tertil n=8	p
Age (y)	46.1±10.9	48.6±11.1	49±11.9	41.4±10.7	0.34
BMI	26±5.3	23.8±5.4	28.2±5.8	24,6±4.3	0.23
SBP office	136.8±17.9	147.1±21.1	143.7±14.8	123.2±11.6	0.02
DBP office	84.8±11.7	87.3±14.4	90.5±6.9	79±9.6	0.1
SBP day	128.6±12	133.9±9.2	129.2±7.4	121.5±11.2	0.05
DBP day	81.1±9.2	82.9±6.7	83.5±5.2	75.5±7.2	0.04
SBP night	119.5±13.9	126.9±10	122.7±16.1	108.9±6.3	0,02
DBP night	71.1±10	76.6±6.1	74.1±10.4	61.6±4.2	<0.01
TLCD4+	470.7±238	491.1±184	420.1±301	528.7±230	0.7
hsCRP (ng/dl)	4.4±4.1	6.8±3	2.6±3	4.1±5.2	0.14
VitD (ng/dl)	18±6.8	11.3±0.7	16.5±2	25.3±5.7	<0.01
ClCr (ml/min)	102.8±1.5	102.3±0.5	102.8±1.4	103.1±2.3	0.67
NaU (meq)	177.1±81.2	176.3±91	199.7±102	146.1±66	0.58
IP (n,%)	4 (13%)	1 (14%)	1 (12%)	1 (12%)	0.99

PP.10.03 THE INVESTIGATION OF SEXUAL FUNCTION IN MALE AND FEMALE PATIENTS WITH HYPERTENSION

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Objective: The available evidence suggests that hypertension is one of the risk factors for male sexual dysfunction. The prevalence of erectile dysfunction(ED) in male hypertensive patients is higher than that of nomotensive males. Hypertension may be associated with female sexual dysfunction (FSD) as well.

Design and method: This study included 140 man and 160 women with mild to moderate hypertension according the 2010 Chinese Hypertension Guideline. The International Index of Erectile Function (IIEF) and female sexual function index (FSFI) scale were used to evaluate the sexual function separately. Serum sex hormone binding globulin (SHBG), testosterone and estradiol were detected using a radio-immunity assay in both gender groups.

Results: Compared with nomotensive subjects, male hypertensive subjects showed lower score of erection function (20.94±6.28 to 23.48±3.89, P = 0.001). Score of sexual desire, ability to achieve orgasm, sexual satisfaction and overall satisfaction did not differ significantly. The prevalence of erectile dysfunction was 29.3% in the hypertensive patients, 10.1% in the control group. The between-group difference was statistically significant (P=0.001). In female hypertensive subjects, score of sexual desire (2.92±1.01 to

3.58±0.74), arouse (3.51±0.96 to 4.47±0.67, P<0.001), lubrication (4.38±1.02 to 5.29±0.59,P<0.001), pain (4.86±1.10 to 5.50±0.61,P<0.001) and total score (23.83±4.50 to 27.56±3.28,P<0.001) were lower than those of nomotensive women. Score of orgasm and satisfaction did not differ significantly. Female sexual dysfunction existed in 60.4% of hypertensive suspects, and 26.0% of nomotensive women. The between-group difference was statistically significant (P=0.000). There were no significant difference in the levels of SHBG, testosterone and estradiol in there groups.Increasing systolic blood pressure [men (P=0.006), women (P=0.045)] and aging [men (P=0.037), women (P=0.001)] are risk factors for ED or FSD in hypertensives.

Conclusions: The results of this study suggest that hypertension have negative influence to sexual dysfunction of both male and female patients.

PP.10.04 PREVALENCE AND CARDIO-METABOLIC CHARACTERISTICS OF PRIMARY ALDOSTERONISM

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Objective: To investigated the prevalence of primary aldosteronism (PA) and cardio-metabolic pattern of PA in general hypertensive patients in Xinjiang of China.

Design and method: Consecutive hypertensive patients referred to Hypertension Center of Xinjiang from January 2009 to January 2011 underwent a diagnostic protocol composed of measurement of K+ and Na+ in serum and 24-h urine, sitting plasma renin activity, and aldosterone at baseline and after saline loading test. The polysomnography, glucose, lipid profile, smoking and alcoholism and the clinical profiles were compared between PA and non-PA group. The related factors of PA were discussed by multivariate logistic regression.

Results: (1) 474(28.03%) out of 1677 hypertensive patients were diagnosed to have PA. The mean hypertension duration of PA was longer than that in non-PA groups (5.54 years vs. 4.24 years, P<0.001). (2) The detection rate of PA was around 30% in OSAS, obese, age<45-years-old and hyperglycemia population, respectively. (3) The patients of PA showed worse blood control, lower serum K+(3.72±0.38mmol/L), higher urine K+ excretion (42.68±16.62mmol/L) compared to non-PA. More patients with PA were reported to have the family history of hypertension than non-PA patients (66.6% vs. 75.1%, P=0.001). 197 (43.2%) cases in PA group and 416 (35.6%) cases in non-PA group were evaluated as obese, but the fasting glucose, TC and LDL-C showed higher levels in non-PA patients. 43.2% PA patients and 35.6% hypertensive patients were diagnosed of OSAS by an AHI>5 during sleep. (4) Multivariate logistic regression analysis showed that abnormal presence of adrenal CT, hypokalemia history, family history of hypertension and severity of obstructive sleep apnea syndrome would increase the risk of PA.

Conclusions: A markedly prevalence of PA(28.03%) was detected in Chinese general hypertensive population, the greater detection rate of PA in males and severe OSAS leading to a concept that PA identification should extend to such individuals.

PP.10.05 GENDER AND AGE DIFFERENCES IN ARTERIAL HYPERTENSION IN POPULATION WITHOUT HISTORY OF CARDIOVASCULAR DISEASE

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Objective: Cardiovascular mortality in Ukraine is one of the highest in Europe. Study was performed to assess prevalence and correlation of arterial hypertension (AH) and other cardiovascular risk factors among urban and rural population without history of coronary artery diseases and strokes.

Design and method: Representative sample of 810 people without history of cardiovascular disease (40,1% men), mean age 48,7 ± 10,1 years with no gender difference was selected in 2013 from 114786 of urban and 120456 of rural population in Volyn region, Ukraine. The interviewer-based questionnaire, blood pressure (BP), anthropometric measurements and laboratory tests were performed.

Results: High prevalence of risk factors was found. Prevalence of AH was 44,9%, obesity – 50,7%, abdominal obesity – 51,5%, diabetes mellitus – 5,1%, hypercholesterolemia – 85,7%, smoking – 12,7%, hypodynamia – 9,4%. AH was more prevalent in women (W) – 55,2% vs men (M) 42,1% (p<0,001). Mean systolic BP (SBP) in people with AH was 150,3 ± 21,8 mmHg, diastolic BP (DBP) – 94,0 ± 11,5 mmHg. W had lower mean BP vs M (SBP - 148,4 ± 22,6 vs 152,8 ± 20,3 mmHg, p=0,02; DBP – 92,7 ± 11,4 vs 95,7 ± 11,4 mmHg, p=0,004). Significant gender difference in AH awareness was revealed - 36,1% of M and 10,8% of W were unaware of their AH at the time of measurement (p<0,001). Among people with AH 44,8% properly use all prescribed AH medications, but only 21,4% of them had BP below 140/90 mmHg (24,0% W vs 16,1% M, p=0,001). So 23,4% of AH pts who were compliant to treatment didn't reach AH control without gender difference. At the same time most of compliant pts who didn't reach BP goal were in 61-70 years group – 36,3% (p<0,001). Most of AH control pts were found in 30-40 age group – 37,0% (p=0,004).

Conclusions: The most prevalent risk factors in healthy cardiovascular population are AH, hypercholesterolemia and obesity. Despite the fact that AH was more prevalent in women awareness and AH control was much worse in men.

PP.10.06 PRELIMINARY ASSESSMENT OF THE EFFECT AND SAFETY OF ENRICHED POTASSIUM SALT ON BLOOD PRESSURE IN MEN LIVING IN NURSING HOUSES IN NORTHERN PART OF CHINA

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Objective: To assess the effects of enriched potasium salt (50% sodium chloride ,50% potasium chloride) on blood pressure and safety in male population living in nursing houses in northern part of China.

Design and method: Participants were from 20 nursing houses. The nursing houses were randomly divided into 2 groups using either normal salt (control group) or potassium enriched salt (intervention group) for cooking. After baseline screening the study, salt was provided (10g /person day) to each nursing house every 3 months. The results of a12-month follow-up were analyzed. In a subgroup, the 24-hour urine was collected at baseline and at the12months follow-up.

Results: The data of 569 participants (365 in the intervention group and 204 in the control group) were d 83.0±13.0 mmHg for intervention and control group respectively (T-test SBP P=0.869, DBPanalyzed. The baseline means of SBP and DBP were 155.4±26.6 and 85.1±12.4, 154.3±23.8 an P=0.053 between two groups). After one year intervention, the paired t-test showed that mean of BP was significantly decreased by 6.9 mmHg and 5.2 mmHg (all P<0.001) for SBP and DBP respectively in the intervention group; the mean of BP was not significantly changed in control group. 24 hour sodium excretion was similar in both groups at baseline and 1 year intervention, but the 24 hour potassium excretion in the intervention group was substantially increased compared to the control group (64.8±48.6 vs. 26.0±12.7 mmol/24h , P<0.001), the ratio of sodium to potassium excretion was significantly reduced in the intervention group compared to the control group (baseline:10.9 vs. 9.4,P=0.003,total N=121; after intervention: 3.0 vs. 7.1 P=0.00,total N=130). The mean serum creatinine level was the same (71.9umol/L) in both groups, and the serum potassium concentration remained in the normal range in both groups.

Conclusions: The results showed that using enriched potassium salt for cooking significantly reduced blood pressure without compromising safety. Potassium substitution may provide a cost-effective approach to prevention and control of hypertension.

PP.10.07 EPIDEMIOLOGY OF HYPERTENSION IN ELDERLY AND VERY ELDERLY. RESULTS OF A REPRESENTATIVE SURVEY: POLSENIOR

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Objective: The epidemiological surveys on hypertension (HT) often limit age of examined subjects to maximal 79 years. Very few national representative data show the epidemiology of HT above 80 years of age. The aim of our survey was to present examine prevalence, awareness, treatment and control of HT through the wide spectrum of old age including very elderly.

Design and method: The cross-sectional, national representative survey PolSenior was performed on random sample of subjects in years 2007-2010. Out of eligible 12.260 subjects aged 65 years and more (65 to 104 years) - 4950 subjects participated in examinations performed in subjects' homes: standardized interview with respondents and/or their caregiver (history of HT and its treatment), blood pressure (BP) and heart rate readings during two separate visits (A&D UA787), and anthropometric measurements. Hypertension was defined when BP (mean of two measurements during each visit) was >=140 and/or 90 mmHg and/or antihypertensive treatment. To compare data in five-year age groups, the uniform criterion of controlled HT was applied: BP < 140/90 mmHg.

Results: Weighted mean age (±SD) of the study group was 74±7 years (crude mean age: 79±9 years); 2544 subjects 65 to 79 years old, 1651 subjects aged 80-89 years and 755 subjects aged 90 years and more. There were 2556 women and 2394 men. The main results are presented in the Table.

Hypertension	65-69yrs	70-74yrs	75-79yrs	80-84yrs	85-89yrs	90yrs +
Prevalence (%)						
Men	74.9	77.8	71.6	69.9	64.9	60.1
Women	76.6	83.2	83.1	80.2	78.4	66.7
Awareness (%)						
Men	67.1	70.2	65.7	68.6	60.9	60.8
Women	79.1	81.6	82.6	75.3	73.1	72.3
Treatment (%)						
Men	60.1	61.8	57.0	62.6	53.9	54.3
Women	71.5	75.8	76.7	71.8	67.4	63.5
Control (%)						
BP <140/90 mmHg						
Men	28.4	32.3	26.8	37.0	38.4	38.1
Women	28.5	33.8	30.4	30.5	31.4	34.2
Control (%)						
BP <150/90 mmHg						
Men	39.6	44.1	42.5	51.9	56.1	56.8
Women	42.1	47.4	45.5	42.9	43.0	46.8

Conclusions: The presented results show a gentle but clearly reversed trends in prevalence and control of HT in people over 80 years of age compared with the younger elderly. Although this phenomenon can be probably explained by lower burden of chronic diseases, the further studies involving people over 85 years of age are needed. Due to observed decreasing of awareness and treatment of HT with advanced age, it seems to be reasonable to extend a screening programs and antihypertensive initiatives for very elderly people, as important component of preventive gerontology.

PP.10.08 A SURVEY ON RISK FACTORS OF CARDIOVASCULAR DISEASES IN MALE POPULATION IN NURSING HOUSES IN NORTHERN PART OF CHINA

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Objective: To explore the epidemic and clustering status of risk factors of cardiovascular diseases (CVD) in male population in nursing houses in northern part of China, and provide the evidence for preventing CVD in nursing houses.

Design and method: Totally 1849 men were investigated from December 2010 to June 2012 in the northern 31 nursing houses. Survey items included questionnaire, physical examinations and laboratory tests. Definition of diabetes (DM) was based on fasting glucose level >=7.0mmol/L or self report histry of DM. Definition of dyslipidemia was that a person had at least one of the following four factors: total cholesterol >=5.72, LDL-C >=3.64, TG >=1.7, HDL-C <=0.91mmol/L.

Results: There was 90.2% population with one or more risk factors of CVD In male population in nursing houses in northern part of China. The prevalence of hypertension, DM and dyslipidemia was 67.3%, 7.6% and 28.3% respectively. The proportion of smoker and overweight or obesity was 41.8% and 40.6%. The older men with age greater 60Yr had higher prevalence.

Conclusions: The results suggested that the prevalence of hypertension was high, most of them had multiple risk factors of CVD. It indicates that the prevention of CVD should be at basis on prevention and control hypertension, control blood glucose and lipids and other risk factors, in order to promote health level of older people.

PP.10.09 THE QUESTIONNAIRE SURVEY OF THE STATUS OF CONTROL OR TREATMENT FOR ELDER HYPERTENSIVE PATIENTS IN 56 MEDICAL INSTITUTIONS IN SICHUAN PROVINCE

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Objective: To investigate the status of control and treatment for elder hypertensive patients in medical institutions in Sichuan province.

Design and method: The questionnaire survey for hypertensive outpatients aged above 60 years from 56 medical clinics in 13 cities (counties) in Sichuan province were conducted from February 2010 to August 2011.

Results: Of all 1687 subjects, 919 were male (54.5%) and 768 were female (45.5%). The rate of blood pressure control below 140/90mmHg was 50.4%. The main complications were coronary heart disease (41.1%), diabetes (35.4%) and stroke (22.2%). 80.3% received combined treatment, 52.5% used calcium channel blocker plus angiotensin receptor blocker for combination for anti-hypertensive treatment, while only 7.2% used diuretics as the one of the combination agents. Most patients kept on blood pressure monitor (94.1%) and treatment (84.2%). The concern of the drug's side effect (44.8%) was the most important reason for aged hypertensive patients of discontinuing anti-hypertensive treatment.

Conclusions: Though the control rate for aged hypertensive patients was raised,it still need improve. Relatively more complications, lower diuretics usage rate, inadequate self-management and understanding for antihypertensive treatment could be the major problems for the control and treatment in aged hypertensive patients.

PP.10.10 MORE THAN 40% OF HOSPITALIZED PATIENTS IN HYPERTENSION CENTER COULD BE DETECTED SECONDARY CAUSE OF HYPERTENSION

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Objective: It is important to recognize patients who might have secondary hypertension (SH). The prevalence of SH has increased with improvements in its diagnosis and recognition, but there is little recent information regarding the prevalence of SH. The aim of our study were to detect the prevalence of secondary hypertension in our hypertension center.

Design and method: Patients who were hospitalized in our Hypertension Center with the complaint of high blood pressure from January 2010 to December 2010 were included. We determined the secondary cause of hypertension in these patients using an established screening scheme and observed the prevalence of SH.

Results: Of 3,003 patients who presented with hypertension (1,598 males and 1,405 females aged 12 to 89 years), 1,673 (55.71%) patients had EH, and 1,330 (44.29%) patients had SH; their systolic blood pressure at the first visit was 141.69±21.52 (mmHg), and their diastolic blood pressure was 91.08±14.79 (mmHg). Among secondary etiologies, obstructive sleep apnea (24.71%) was the most common, followed by primary aldosteronism (PA; 10.69%), anxiety disorders (4.66%), renal parenchymal disease (1.8%) and hypothyroidism (1.03%). A total of 147 patients with PA had other causes of hypertension, and 5 patients with obstructive sleep apnea had hypothyroidism. The prevalence of SH was much higher than originally suspected, and almost half of the patients with high blood pressure in our center had secondary causes of hypertension.

Conclusions: We believe that physicians should carefully investigate the etiology of hypertensive patients at the first visit to the clinic. Some types of SH can only be identified through observing signs and symptoms and performing basic laboratory tests.

PP.10.11 IMPACT OF AGE AND GENDER ON THE PREVALENCE OF THE METABOLIC SYNDROME AND ITS COMPONENTS AND RISK OF CARDIOVASCULAR MORBIDITY AND MORTALITY IN EUROPEANS. THE MORGAM PROJECT

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Objective: To investigate the influence of age and gender on the prevalence and cardiovascular disease (CVD) risk in Europeans presenting with the Metabolic Syndrome (MetS).

Design and method: Using 36 cohorts in 10 European countries from the MORGAM-Project with baseline between 1982-1997, 69094 men and women aged 19-78 years, without known cardiovascular disease were included. Hazard ratios (HRs) for CVD mortality, fatal and nonfatal (total) coronary heart disease (CHD), and total stroke were analyzed using Cox regressions adjusting for age, cholesterol level, smoking- and fasting status. During 12.2 years of follow-up, 3.7%/2.1% of men/women died due to CVD. The corresponding percentages for total CHD and stroke were 8.3/3.8 and 3.1/2.5, respectively.

Results: The prevalence of MetS, according to modified definitions of the International Diabetes Federation (IDF) and the revised National Cholesterol Education Program - Adult Treatment Panel (NCEP-ATP III), increased significantly across age groups for both genders (P<0.0001); with almost a 5-fold increase in women from ages 19-39 years to 60-78 years (7.4%/7.6% to 35.4%/37.6%, for IDF/NCEP-ATP III, respectively) and a 2-fold increase in men (5.3%/10.5% to 11.5%/21.8%). Irrespective of the definition used, the associations between MetS and all three CVD events were significant (all P<0.0001). For IDF/NCEP-ATP III in men and women, HR for total CHD was 1.60/1.62 and 1.93/2.03, for CVD mortality 1.73/1.65 and 1.77/2.06, and for total stroke 1.51/1.53 and 1.58/1.77. Whereas in men the HRs for a CVD event were independent of age, in women the HRs for total CHD declined with age (from HRs 3.23 / 3.98 to 1.55 / 1.56) while the HRs for total stroke tended to increase (from HRs 1.31/1.25 to 1.55/1.83).

Conclusions: In Europeans, both age and gender influenced the prevalence of MetS and its prognostic significance. Future research investigating the utility of MetS in cardiovascular disease prediction should take into account differences in these two important risk factors.

PP.10.12 WHITE-COAT HYPERTENSION IN PATIENTS WITH CHRONIC KIDNEY DISEASE IS ASSOCIATED WITH LOW SERUM 25-OH-D3 LEVEL

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Objective: The role of white-coat hypertension (WCH) in the general population has been validated, but little is known about WCH as an associated risk factor in chronic kidney disease (CKD) patients.

Design and method: We retrospectively investigated the prevalence of WCH in CKD patients stages 1 to 4. We evaluated the association of WCH with constitutive parameteres, etiology and CKD stage, CKD complications and related therapy, proteinuria, lipid status, 25 hydroxyvitamin D3 (25-OH-D3) concentration, current antihypertensive medication, and target organ damage.

Results: We investigated 108 patients (average age 56.8, 53 women, 55 men) and WCH was found in 41 of them (37.9%). The prevalence of WCH was not influenced by constitutive parameters, etiology and stage of CKD, presence of CKD complications or medications used to treat them, urinary protein/creatinine ratio, eGFR, and serum cholesterol. The two groups did not differ in any class of antihypertensive medication, the frequency of their daily dosing or cardiovascular (CV) complications, Patients with WCH had significantly lower levels of 25-OH-D3 (46.5 ± 26.0 nmol/l) compared to patients without WCH (63.4 ±28.7 nmol/l; p=0.01). Further evaluation revealed an association of low 25-OH-D3 concentration with higher urinary protein/creatinine ratio (p=0.03), higher frequency of daily dosing of antihypertensive drugs (p=0.04) and higher rate of CV complications (p=0.04). Statistically significant positive correlation was noted between active forms of vitamin D supplementation and peripheral occlusive artery disease (PAOD)(p=0.02; R=0.218) without correlation with ischemic heart disease or CV disease. Supplementation with cholecalcipherol was not associated with any CV complication.

Conclusions: WCH was prevalent in CKD patients and was accompanied with lower serum 25-OH-D3 level, which had a negative impact on proteinuria and CV complications, possibly due to the lack of renin-angiotensin system suppression. Vitamin D deficiency is known to have an influence on the mental status and it might have the impact on the appearance of WCH. Cholecalcipherol supplementation had no negative effects on target organ disease; however, the active form of vitamin D had negative impact on PAOD. Further prospective studies are warranted to elucidate the importance of WCH in patients with CKD.

PP.10.13 RELATIONSHIP BETWEEN BLOOD PRESSURE AND METABOLIC PARAMETERS IN OBESE PATIENTS WITHOUT KNOWN HISTORY OF HYPERTENSION

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Objective: Obesity has been shown to be an independent risk factor for coronary heart disease, while insulin resistance associated with obesity contributes to the development of other cardiovascular risk factors, including dyslipidemia, hypertension and type 2 diabetes. The purpose of this study is to examine the relationship between blood pressure levels and metabolic parameters such as insulin resistance, HBA1c and lipid profile in obese patients without known history of hypertension.

Design and method: Study participants were obese (BMI>30) adults without history of cardiovascular disease, who underwent clinical evaluation as part of a weight management program. Collected data included demographics (age, gender), somatometric (height, weight, waist and hip circumference), medical history and clinical information. Systolic and diastolic blood pressure (SBP & DBP) were determined in both heads and the greater average of three consecutive measurements was used as final value. Laboratory variables included insulin resistance (IR-HOMA method), fasting glucose, HBA1c and lipid profile.

Results: Study population consisted of 121 obese patients (mean BMI = 36.20 ±3.94 Kg/m2, mean age 44.12 ±7.38 years, 70 males) with mean SBP 119.19 ±10.29 and DBP 73.11 ±5.05 mmHg. Significant correlations were detected between SBP and Waist to hip ratio-WHR (r=0.204, p=0.025), IR-HOMA (r=0.325, p<0.001), fasting glucose (r=0.319, p<0.001), HBA1c (r=0.289, p=0.001), Total Cholesterol-TC (r=0.247, p=0.006), LDL (r=0.248, p=0.006) and Triglycerides-TG (r=0.332, p<0.001). Stepwise multivariate regression analysis revealed that DBP (b=0.996; 95% CI 0.764 – 1.228; p<0.001), gender (b=-8.423; 95% CI -10.780 – -6.066; p<0.001), HBA1c (b=2.822; 95% CI 1.466 – 4.177; p<0.001), TC (b=0.055; 95% CI 0.026 – 0.084; p<0.001) and WHR (b=1.842; 95% CI 0.359 – 3.324; p=0.015) were independent predictors of SBP (R2=0.634).

Conclusions: SBP significantly correlates with metabolic parameters in obese patients without known history of cardiovascular disease.

PP.10.14 RELATIONSHIPS OF METABOLIC SYNDROME AND DIABETES MELLITUS WITH INCIDENT AND PERSISTENT RESISTANT HYPERTENSION IN ESSENTIAL HYPERTENSIVE SUBJECTS

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Objective: We sought to identify the relationship of metabolic syndrome (MS) and diabetes mellitus (DM) with resistant hypertension (RH) development and persistence in essential hypertensives.

Design and method: We followed up for a median period of 40 months (IQR 28-60 months) 2176 essential hypertensives free of cardiovascular disease (mean age 57.6 years, office BP=143.4/89.2 mmHg). All subjects had at least one annual visit and at baseline underwent left ventricular mass index (LVMI)

estimation and blood sampling for assessment of metabolic profile. MS was defined according to the updated NCEP III criteria. Four groups were identified depending on presence or absence of RH (office-based uncontrolled hypertension under >or=3 drugs including a diuretic or controlled hypertension under >or=4 drugs) at baseline and follow-up: 1464 patients (67.2%) never having RH, 174 (8%) with resolved RH, 202 (9.3%) with incident RH and 336 (15.5%) with persistent RH.

Results: MS was present at baseline in 819 hypertensives (37.6%) and DM in 305 (14%). Patients with MS compared to those without MS or DM exhibited greater office systolic BP (by 2.8 mmHg, p=0.002), waist circumference (by 9.9 cm, p<0.001), body mass index (by 3.1 kg/m², p<0.001) and LVMI (by 2.7 g/m², p=0.029) while did not differ regarding age and gender. Patients with DM compared to those without DM or MS were older (by 4 years, p<0.001) and exhibited greater office pulse pressure (by 4.2 mmHg, p<0.001), waist circumference (by 8.5 cm, p<0.001), body mass index (by 2.8 kg/m², p<0.001) and LVMI (by 4.4 g/m², p=0.006). At follow up hypertensives with DM compared to those without MS or DM exhibited increased prevalence of incident (14.8% vs. 8.4%, p=0.001) and persistent RH (24.3% vs. 10.6%, p<0.001). Likewise, prevalence of incident (14.8% vs. 8.4%, p=0.002) and persistent RH (24.3% vs. 18.4%, p=0.030) was increased in hypertensives with DM rather than MS. Hypertensives with MS compared to those with MS exhibited increased prevalence of persistent RH (18.4% vs. 10.6%, p<0.001).

Conclusions: Diabetes mellitus is more closely related compared to MS with incident and persistent RH in essential hypertensive subjects.

PP.10.15 RISK PROFILE OF HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION AND THE LINK WITH LEFT VENTRICULAR HYPERTROPHY

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Objective: Numerous epidemiological studies have shown that the presence of arterial hypertension increases the risk of coronary heart disease especially in at risk populations. Left ventricular hypertrophy (LVH) is initially a useful compensatory process that represents an adaptation to increased ventricular wall stress; however, it also accelerates atherosclerosis within the coronary vessels leading to a higher incidence of myocardial infarction. Aim of the study was to find the presence of risk factors among the hypertensive patients with acute myocardial infarction (AMI) and the link with LVH.

Design and method: A number of 98 hypertensive patients (56 males and 42 females), aged 41- 85 years, admitted with ST-segment elevation AMI were evaluated during the first week of hospitalization before discharge by: clinical and laboratory examination, 12 lead standard ECG: LVH was diagnosed by the Sokolow-Lyon index, echocardiographic measurement of left ventricle mass index (LVMi) according to ASE recommendations: left ventricular mass (LVM) measurements using Devereaux formula: LVM=0,8[1,04(LVEDD+IVS+LVPW)3-LVEDD3]+ 0,6g; (LVEDD=left ventricular end-diastolic diameter, IVS=interventricular septum in diastola, LVPW=left ventricular posterior wall in diastola) this was indexed for body size using du Bois formula; cut off values for LVH were LVMi>115g/m2 in males and>95g/m2 in females.

Results: 1. In lot of study 57,14% were males (75,43% with LVH) and 42,86% females (60,73% with LVH). 2.Most of patients were aged 60-69 years: 34 patients (64,7% with LVH). 3.Looking for age and sex distribution of patients, in all groups male sex was dominant: highest incidence between 50-59 years group: 71,42%, followed by 69-69 years group age: 55,88%. 4.Most of patients: 56,12% were stage 3 of hypertension (80,35% with LVH) 5.68,36% of patients were diabetics (71,64% with LVH) 6.Obesity was found in 68,36% of hypertensive patients with AMI. (50,74% % with LVH) 7.Smoke was present in 53,06% of patients. (84,8% with LVH when patients associated supplementary this risk factor).

Conclusions: 1. Risk factors as: male sex, age, obesity, the level of blood pressure, diabetes, and smoking, were all positively associated with the incidence of AMI in hypertensive patients. 2.In hypertensive patients with AMI we found a correlation between and risk factors presence and LVH.

PP.10.16 HYPERTENSION AND SELF-MEASUREMENT OF BLOOD PRESSURE: EXPERIENCE FROM THE FRENCH IPC COHORT

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Objective: To analyze the use of self-measurement of blood Pressure (hBP) in hypertensives (HTN) by comparison with normotensive subjects from a French large primary care cohort.

Design and method: 21.357 subjects (12.282 men and 9075 women) answered the self-administered questionnaire about the personal use of hBP (yes/no) during a standardized health check-up at the IPC center (Paris and suburb) during 2012. Hypertension was defined as systolic blood pressure (SBP) >=140 mmHg or diastolic blood pressure (DBP) >=90 mmHg and/or treatment. Chi-square test and multivariate ANOVA were performed (SAS software).

Results: From the 2270 (10.6%) subjects declaring using an hBP device (1247 men and 1023 women, aged 58.2±14.5 vs 45.9±14.9 years (p<0.0001)), 1422 (63%) were HTN (SBP=149±17/DBP=84±10 mmHg). In HTN, 20.4 % declared using hBP by comparison with 7.4% among normotensives. The use of hBP device increased with age: 9.0% before 50 years, 20.2% from 50 to 65, and 32.5% after 65 years. The hBP users were controlled with treatment for 25.4%, not treated at the time of examination for 37%, and not controlled while treated for 37.5%, versus respectively: 11%, 75% and 14% in non-users HTN. The percentage of hBP-users controlled with treatment remained stable with age: 26.8% before 50 years, 25.3% from 50 to 65, and 25% after 65 years versus respectively: 6.3%, 12.6%, and 14.6 % in non-users. Except for cholesterol, the other cardio-vascular risk factors increased in HTN using hBP by comparison with non-users, particularly diabetes: 10.1 % vs 6.2%.

Conclusions: The use of hBP in this population is lower than in the other French study (FLAHS: 36%), limited in number, although having a national representation. As expected, the use of hBP is higher among HTN than in normotensives and appears linked to a better control, with less untreated patients. The utilization of hBP, higher in elderly than in youngest people, must be strongly recommended, particularly in young where control is 4 times better among users compared to elderly where control is only 2 times better.

PP.10.17 POSITIVE ASSOCIATION BETWEEN DENTAL STATUS AND BLOOD PRESSURE AND RISK OF HYPERTENSION

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Objective: Periodontal inflammation and lost tooth are linked to cardiovascular prognosis. The aim of the study was to evaluate the impact of oral health on blood pressure (BP) status, particularly hypertension, in a French non selected population.

Design and method: 109.293 subjects (68.339 men and 40.954 women), explored at the IPC center (Paris), benefited from oral and dental examination by experienced dental practitioners between 2002 and 2010. Three automated resting BP were recorded in supine position then averaged. Hypertension was defined as systolic BP (SBP) >=140 mmHg or diastolic BP (DBP) >=90 mmHg and/or treatment. Dental status was evaluated according to: i) plaques, gingival bleeding, gingivitis, ii) number of teeth decayed, missing and fixed partial denture or removable dentures, iii) masticatory efficiency, considered sufficient if functional tooth units (defined as presence of opposite teeth) are >=5. Statistical analyses were adjusted on age and gender, leukocyte count (available biological inflammation criterion), heart rate, BMI, tobacco, glycemia, gamma GT (alcohol evaluation), socio-economic deprivation (EPICES score), with ANOVA and multivariate logistic regression (SAS software).

Results: Presence of dental plaque or gingivitis is associated with BP increase of 2.5 mmHg (p<0.0001). Risk of hypertension increased with presence of dental plaque or gingivitis respectively by 44% [28%-61% (IC 95%)] and 60% [36%-88%]. Lack of >= 10 teeth is associated with SBP increase of 3.3 mmHg (p<0.0001), with no change in DBP. After adjustment, the risk of hypertension in absence of more than 10 teeth did not increase. Insufficient masticatory efficiency is associated with higher SBP and DBP: 1.5 mmHg (p<0.0001). Risk of hypertension associated with insufficient masticatory efficiency increased by 13% [5%-22%].

Conclusions: Dental plaques, gingivitis and low masticatory efficiency are associated with high BP. Periodontal inflammation increases by 20%, and insufficient masticatory efficiency increases by 13%, the risk of hypertension. Biological inflammation seems to not explain this relationship. A low number of teeth are associated with high SBP. Other studies are needed, particularly to explore

the link with prognosis in hypertension. Furthermore, a specialized follow-up by dentists is clearly required before and during hypertension.

PP.10.18 HYPERTENSION IN MENOPAUSAL WOMEN

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Objective: To assess hypertension in menopausal women in a Primary Care Zone: prevalence, degree of control, treatment and comorbidities

Design and method: A descriptive, cross sectional, retrospective, observational study with no control group; that is, prevalence in the Primary Care area of Tarancón on menopausal women with amenorrhea more 12 consecutive months. 400 postmenopausal women diagnosed with Metabolic Syndrome by NCEP ATP III participated in the study, from January 2010 until the first quarter of 2011.

Results: The mean age was 66.93 ± 10.49 years; mean age at menopause onset was 48.76 ± 5.08 years. The average age of women in the study was 18.11 ± 11.27 years. it appeared in a regular manner on 86% of women. Anthropometric data in menopausal women with hypertension was obtained.
The prevalence of MS in the menopausal female population more 45 years of Tarancón reached 61.73 % .
The prevalence of each of the components of MS were : hypertension 96%, abdominal obesity 91%, low HDL cholesterol 70 % , hypertriglyceridemia 57 % and hyperglycemia 54%.
48% of the sample met three of the five diagnostic criteria for SM, 36 % met four, and 16 % met the five ATP-III criteria. It was observed that the number of met criteria increases according with age.
95.8 % of the sample had blood pressure >= 130/85 mmHg or were already receiving antihypertensive therapy. 82.3 % of women had SBP minor 130 mmHg and 36.8 % had DBP >= 85 mmHg. 36% had SBP / DBP minor 130/85 mmHg. 13% used to smoke, from which: more10 cigarettes per day 26.9 %; 10-19 cigarettes per day 34.5%; and more 20 cigarettes per day 38.4 %.

Conclusions: We found a higher prevalence of systolic hypertension than diastolic. The proper tension control was only reached by 36% . We are surprised that a high percentage of women, and especially younger women 75%, of all age groups keep their tension controlled without drug treatment oriented towards overdiagnosis of hypertension, which fortunately decreases with age.

PP.10.19 THE COMBINATION OF HYPERTENSION WITH DIABETES AMONG WOMEN OF WORKING AGE

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Objective: Arterial hypertension (AH) is found in almost 80% of patients with diabetes mellitus (DM) type 2.It is known that the combination of hypertension with diabetes the risk of coronary heart disease is increased by 2-4 times.
Purpose:To investigate the mean values of AH in the presence and absence of DM among the female population of working age.

Design and method: The study involved 952 women who were divided into four age groups: 20-29, 30-39, 40-49 and 50-59. Participants were asked questions on the questionnaire recommended by WHO to identify the presence of coronary artery disease and susceptibility to the presence of carbohydrate metabolism disorders.Study conducted ECG,measurement of blood pressure on the right hand, and determined the level of glucose in capillary blood glucose meter.Diagnosis was established hypertension if the systolic blood pressure (SBP) was more than 140 mm.Hg and diastolic blood pressure (DBP) was more than 90 mm.Hg.,and diabetes, when fasting levels in the range from 5.5 mmol /l to 6.1 mmol /l.

Results: Our study showed that the mean SBP and DBP were significantly higher in patients with type 2 diabetes compared with those with whom he was absent (144,1±4,1mm Hg and 126.9±0,9 mm Hg,p<0.001;DBP -85,3±1,9 mm Hg and 78,6±0,4 mm Hg,p<0.001).In individuals without type 2 diabetes average value of SBP and DBP was significantly increased from a minimum of 20-29 years to a maximum of 50-59 years (112,5±0,98 mmHg and 148,3±1,98 mmHg,p<0.05;DBP-72,0±0,7 mm Hg and 85,1±0,9 mmHg,p<0.01),and the maximum growth rate accounted for the age range from 40-49 years to 50-59 years. In the presence of type 2 diabetes in individuals 30-39 years had relatively low values of the garden with a further statistically significant increase in his age category 50-59 years (115,2 ±4,8 mm Hg and 157,9±5,7mmHg,p<0.05),and maximum rate of increase was registered in the age range from 40-49 to 30-39 years.

Conclusions: 1. SBP and DBP were significantly higher in patients with type 2 diabetes compared with those with whom he was absent.
2.Maximum growth rate of AH in persons with diabetes observed 10 years earlier than in those without diabetes.

PP.10.20 DISTRIBUTION OF REPRODUCTIVE FACTORS IN HYPERTENSIVE WOMEN

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Objective: To study distribution of reproductive factors (number of pregnancies, deliveries, and abortions) in hypertensive women.

Design and method: 322 women aged 21-59 y were examined. 56 healthy normotensive volunteers constituted control group (CG). 63 patients with high normal BP (HNBP) and 203 patients with essential hypertension (EH) (EH groups I-III) with EH duration 12.8±9.7 ywere enrolled. A survey included data of gynecological history office BP was measured. Gradation (in per cent) and average group values of reproductive factors were estimated. Chi-square criterion ($\chi 2$) was used for assessment of significant differences in distribution of factors between groups, and t criterion – between variational series.

Results: Significantly major share of women having pregnancies, and abortions, was found in EH III group (98.7% vs 80.4%, p<0.001; 96.1% vs 75%, p<0.01; 84.2% vs 55.4%, p<0.001, correspondingly, comparing with CG).
Significant differences in factors incidence according to $\chi 2$ were found between the following groups: deliveries - CG - HNBP (p<0.05), EH I - EH III (p<0.02); abortions - CG - HNBP (p<0.01), CG - EH I (p<0.05), CG - EH II (-<0.01).
Significantly the major share of women having 2 and more pregnancies (89.5% vs 64.3%; p<0.001), 2 and more deliveries (96.1% vs 75%; p<0.05), 2 and more abortions (67.1% vs 35.7%; p<0.001) was found in the EH III group comparing with CG.
Among all the examined women significantly higher average values of pregnancies, deliveries, and abortions number was found in the EH III group (5.6±4.1 vs 3.3±3.0, p<0.001; 1.8±0.8 vs 1.2±0.9, p<0.001 and 3.4±3.7 vs 1.8±2.4, p<0.01, respectively) comparing with CG. Significant differences were also found between the following groups of patients: number of pregnancies – CG - EH II (p<0.01), EH - EH III (p<0.05), number of deliveries – CG - HNBP (p<0.02), CG - EH I (p<0.05); number of abortions – CG - EH II (p<0.05).

Conclusions: Among 21 - 59 y women high values of BP are associated with significantly higher incidence of pregnancies, deliveries, and abortions (p<0.05 according to χ 2 criterion) and more high average values of their number (p<0.05 according to t criterion).

PP.10.21 TRENDS OF HYPERTENSION, OBESITY AND WEIGHT PERCEPTION OF SAHRAOUI ETHNIC GROUP IN SOUTH OF MOROCCO (2001-2011)

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Objective: To examine trends in hypertension prevalence, obesity prevalence and weight perception among Sahraoui women.

Design and method: Data were collected from regional surveys conducted in 2001 and 2011 in South Morocco. The sample was randomly selected among adult healthy urban women aged 15 years and older, non pregnant.

Results: The prevalence of hypertension, obesity and overweight increased from 2001 to 2011. The overall prevalence of obesity increased from 49% to 51,7%, abdominal obesity from 76% to 90.5% and overweight from 30,1% to 31,8%. The similar trend was observed for hypertension that is more prevalent among obese and overweight women compared to normal weight women.
Hypertension and obesity were negatively associated with time spent in walking and positively associated with time spent in some sedentary activities.
Body image perception and physical inactivity were key factors in this elevated prevalence. During the past 10 years, there was a significant increase of percentage of women who want to lose body weight (4,9% to 33,7%) but the desire to gain weight remains very high even among normal weight women (69,7%).
Also eating disorders seem to be an increased problem among Moroccan Sahraoui women. In fact 22,9% of studied women reported having an eating disorder. It's more common among overweight (21,9%) and obese (29,8%) compared to normal weight women (3%).

Conclusions: High prevalence of hypertension and obesity trends are for a raise, suggesting apparent needs for immediate attention in terms of prevention and health education among the studied population.

PP.10.22 HEALTH CONDITION OF THE POPULATION ATTACHED TO POLYCLINICS OF TOMSK CITY (RUSSIA): FEATURES AND DYNAMICS

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Objective: The aim was to study epidemiology and dynamics of risk factors (RF) of cardiovascular diseases (CVD) among population attached to Tomsk polyclinics.

Design and method: Screening of population attached to Tomsk polyclinics (914 people) was performed. Arterial hypertension (AH) was an inclusion criterion. Frequency of cardiovascular mortality, nonfatal myocardial infarction (MI) was analyzed.

Results: The average age of population was 52,2±8,2 years. Smoking prevalence in general population was 31.1%. Men smoke more than women (58% and 13.8%, respectively, p=0.001). Patients smoked 13.7±7.1 cigarettes per day. Tobacco use was significantly higher among men than among women (15.0±7.1 vs 10.1±5.6 cigarettes per day, p=0.001). Men started smoking earlier and refused from smoking later than female patients. Average age of onset of smoking among men was 18.8±3.8 years, women – 21.3±6.2 years, quitting age – 40.8±11.1 and 31.2±11.1 respectively (p=0.001). Total cholesterol was 5.0±1.0 mmol/l, no sex differences were detected. Awareness of AH was significantly higher in female patients (74.1% vs. 65.1%, p=0.007). Both male and female patients with documented AH received antihypertensive therapy, the vast majority had reached the first degree of hypertension (40.0% and 42.6%, respectively). Effective control of blood pressure (BP) (SBP less than 140 mm Hg) was achieved in 29.7% of women and 18% of men. Regularly 82.8% of respondents received antihypertensive therapy. 57% of smoking patients had a combination of AH and overweight. The correlation between overweight and obesity and high normal BP in population was revealed (71.4% patients, p=0.001). Target organ damage like left ventricular hypertrophy (LVH) occurred in 56.7% patients. At the time of the survey 21.5% of respondents had documented CVD. According to register of acute MI for a period of 3 years acute MI developed in 4.3% cases. Frequency of nonfatal MI was 2.3%, cardiovascular death - 2.3%. Average frequency of hospitalization for acute CVD was 12.4 % per year.

Conclusions: Significant prevalence of major RF for CVD was revealed among patients. Effective control of BP was achieved in 25% of patients. Target organ damage like LVH was detected in 56.7% of patients with AH.

PP.10.23 ESTIMATION OF 24-HOUR SODIUM, POTASSIUM AND ALBUMIN EXCRETION FROM SPOT URINE SAMPLES IN A NATIONAL REPRESENTATIVE SURVEY OF HYPERTENSION (PHYSA)

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Objective: The 24-hour urine collection is the standard method for sodium (UNa24h) and albumin (UAE24h) excretion but is difficult to be performed in practice.

Design and method: Within a large national representative hypertension survey (n=3720) we evaluate the accuracy of predicting UNa24h, UK+24h and UAE24h from a spot urine sample in which we calculate the urine Na/creatinine, K/ creatinine and albumine/creatinine ratios and then corrected for 24-hour creatinine excretion. Comparisons were made with real 24-h urinary samples validated by urinary creatinine (n=2538).

Results: Predicted UNa24h from spot (average 268±65 mEq/24h) correlated (r=0.232, p<0.01) with real UNa24h (average 182±64 mEq/24h) but overestimated it by 47.3%. (by 151.1%, 77.5% 12.1% for UNa24h <100, 100-200 and >200 mEq/24h, respectively). The spot sample identified persons with UNa excretion <100 mEq/d or <150 mEq/d with sensitivities of 5 and 2 % and specificities of 78 and 97% respectively. Predicted UK+24h (average 98±34 mEq/24h) correlated (r=0.121, p<0.01) with real UK+24h (average 75±26 mEq/24h) and overestimated it by 32.9%. UAE24h predicted from spot (23.8±146.3 mg/24h). correlated (r=0.890, p<0.001) with real UAE24h (16.1±50.7 mg/24h). This spot sample identified persons with microalbuminuria (UAE24h >=30 mg/24h) with a sensitivity of 44.4 % and specificity of 96.4%.

Conclusions: Accuracy of spot urine samples is acceptable to assess 24-h microalbuminuria but not reliable to predict 24-h sodium and potassium excretion and for assessing sodium and potassium intake. 24h urinary collection remains the best and probably a dificult to replace method for evaluating daily sodium intake.

PP.10.24 CHANGES IN PREVALENCE AND CONTROL OF HYPERTENSION FROM THE FIRST TO A SECOND VISIT 2 WEEKS AFTER IN A NATIONAL HYPERTENSION SURVEY

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Objective: Most of the population surveys for evaluation of hypertension (HT) prevalence and control have been based on 2-3 measurements of blood pressure (BP) in a single day although recommendations advise the need for BP evaluation at least during 2 different occasions. We compare prevalence and control of HT in a representative sample of the 18-90 years old population yielding 3139 subjects (54.1% women) evaluated at a first Visit (V1) and a second one 10-15 days after (V2 - visit2) under similar conditions.

Design and method: In a national survey – PHYSA, we compare prevalence and control of HT in a representative sample of the 18-90 years old population yielding 3139 subjects (54.1% women) evaluated at a first Visit (V1) and a second one 10-15 days after (V2 - visit2) under similar conditions. HT was defined as a systolic BP >= 140 mm Hg or diastolic BP >= 90 mm Hg (average of 2-3 BP measurements, reported knowledge or treatment with anti-hypertensive drugs at the both visits.

Results: Mean age was 49±18 yrs, BMI 27.3±4.9 Kg/m2. From V1 to V2, BP changed from 128/75 ±18/11 to 124/73 ±16/10 mm Hg (delta 4/2 ±11/7 mm Hg) (all P<0.0001) and heart rate from 73±11to 72±1 and a clear regression to the mean was suggested; prevalence of HT changed from 44.0 to 30.9% i.e. -3.1% (-3.4 women, -2.8 men) and HT control from 42.3 to 57.1 %, i.e. +14.8 % (+27.8 women, 12.3 men), all p<0.02. In treated patients (n=1038) net increase in HT control rate was +15.2% from V1 to V2. In untreated subjects (n= 2106) the adjusted prevalence of HT decreased by 4.9% from V1 to V2.

Conclusions: We conclude that in population surveys of HT a single day of BP evaluation clearly overestimates the HT prevalence and underestimates the HT control. We suggest that a second visit may be important for correction of data and of the regression-dilution bias.

PP.10.25 RELATIONSHIP BETWEEN THE BLOOD PRESSURE PATTERNS AND THE PULSE PRESSURE IN THE PORTUGUESE POPULATION

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Objective: The purpose of this study was to identify the relationship between the Blood Pressure Patterns and the pulse pressure in a Portuguese group of patients.

Design and method: We made a descriptive study, with group of patients whose had done Ambulatory Blood Pressure Monitoring and that we follow at Hypertension unit.
We used oscillometric SpaceLabs 90207 monitors (SpaceLabsInc) to obtain blood pressure readings at 15 minute intervals at daytime and every 30 minutes at nighttime in the first 24 hours and we collected demographic characteristics. The patterns were: Dipping:10% or more systolic blood pressure fall during nighttime from baseline) and Non dipping was defined as a fall in average nighttime systolic blood pressure lower than 10% from baseline.
The normal level of pulse pressure was defined in base of the Madhaven and Glynn studies´s conclusions: Lower of 63mmHg.

Results: Among the 304 participants 53.9% were female; mean age: 59.56 years; the pattern´s distribution was: dipping 47%, non-dipping 45.1%; the patients with non-dipping patterns 24% had high pulse pressure and 4.37% had resistant hypertension.

Conclusions: Our study didn´t show any relationship between this measurement and the non-dipping patterns, so we can conclude that the pulse pressure is an independent item that can be used to assess de cardiovascular risk, this affirmation matches with another author´s publications.

PP.10.26 GENDER DIFFERENCES IN PREVALENCE OF PREHYPERTENSION AND HYPERTENSION IN ASSOCIATION WITH CARDIOVASCULAR RISK FACTORS AMONG BELARUSIAN URBAN POPULATION

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Objective: To study gender differences in the prevalence of prehypertension (preHT) and hypertension (HT) in association with cardiovascular risk factors.

Design and method: A cross-sectional analysis of 3399 individuals (1884 men and 1515 women) living in some Vitebsk areas was conducted in 2007-2008. PreHT is defined according to the JNC-7 (2003) and HT is defined according to the WHO/ISH (1999). The following methods were involved: standard cardiologic questionnaires, blood pressure measurements, electrocardiography, biochemical analyses of blood and urine.

Results: Men and women were the same age. During our study the following data are received: preHT frequency was 34.3% (39.9% in men vs. 29.8% in women, p<0.001), HT was 40.3% (42.2% in men vs. 38.7% in women, p>0.05). It was found out that in men adjusted for age preHT prevalence was associated with body mass index (p<0.001) and alcohol abuse (p<0.1). And in women it was associated with body mass index (p<0.001), family history of premature cardiovascular disease (p<0.001) and heart rate (p<0.001). HT prevalence in men adjusted for age was associated with body mass index (p<0.001), family history of premature cardiovascular disease (p<0.001), heart rate (p<0.001), alcohol abuse (p<0.001), C-reactive protein (p<0.01), low physical activity (p<0.05). And in women it was associated with body mass index (p<0.001), family history of premature cardiovascular disease (p<0.001), heart rate (p<0.001), alcohol abuse (p<0.001), C-reactive protein (p<0.01), low physical activity (p<0.05), total cholesterol (p<0.05), smoking in the past and present (p<0.05), university education (p<0.1).

Conclusions: Prevalence of preHT and HT in association with cardiovascular risk factors has gender differences in a Belarusian urban population.

PP.10.27 CENTRAL BLOOD PRESSURE, CLINIC BLOOD PRESSURE AND 24-HOUR AMBULATORY BLOOD PRESSURE AS CORRELATES OF ARTERIAL STIFFNESS

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Objective: Pulse wave velocity is a measure of arterial aging and is associated with increased risk for a first cardiovascular event. The relationship between increased blood pressure (BP) and arterial stiffness is by now established. In clinical practice and research there are a various measures of BP namely: clinic BP, central aortic BP and 24-hour BP. We aimed to investigate which of the measures of BP better correlates with PWV.

Design and method: 51 drug naïve (female, n=35), newly diagnosed hypertensive patients were recruited. PWV was measured by Sphygmocor (Atcor Medical). Central systolic aortic BP (CSBP), Central diastolic BP (CDBP) was assessed by applanation tonometry, 24-hour SBP and 24-hour DBP were also measured (Spacelabs 90216), and clinic SBP and DBP were measured according to international guidelines. Partial correlation (Pearson's test) was used to correlate PWV with BP parameters. Age and body mass index were used as a controlling covariates.

Results: Mean age of the population was 54.5±13.7 years. PWV was significantly correlated with 24-hour SBP (r=0.29 p=0.049), daytime SBP (r=0.332, p=0.024), clinic PP (r=0.342, p=0.02), 24-hour PP (r=0.469, p<0.001), daytime PP (0.497, p<0.001), and nighttime SBP (r=0.298, p=0.045).

Conclusions: PWV better correlated with indices of 24-hour BP measurement. SBP and PP were the most prominent determinants of PWV. This study demonstrates the superiority of 24-hour BP measurement parameters in influencing arterial stiffness.

PP.10.28 RELATION OF INSULIN SENSITIVITY/RESISTANCE AND ARTERIAL STIFFNESS IN HEALTHY INDIVIDUALS

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Objective: Central aortic blood pressure (BP) has been postulated to correlate more closely with cardiovascular disease risk than brachial cuff BP. The aim of the present study was to explore the cross-sectional associations between arterial stiffness, central aortic BP and insulin resistance/sensitivity indices in a group of healthy individuals.

Design and method: 34 healthy, drug naïve subjects were included in the analysis (mean age±sd = 17 male). Central aortic systolic and diastolic blood pressure (CSBP and CDBP), augmentation index (Aix), and pulse wave velocity were measured by applanation tonometry(Sphygmocor,Atcor Medical). Patients also underwent an oral glucose tolerance test. The insulin resistance indice HOMA-IR, and the insulin sensitivity indices QUICKI, Matsuda, Cederholm, Gutt were calculated. AUC of insulin and glucose were also calculated. All subjects underwent an oral glucose tolerance test.

Results: Mean age of the population was 40±11.2 years. Fasting glucose significantly correlated with CSBP (r=0.41, p=0.034) and CDBP (r=0.585, p=0.001), AUCglucose also correlated with CSBP (r=0.386, p=0.049) and AUCinsulin correlated with CDBP (r=0.348,p=0.048). Insulin sensitivity indices QUICKI, Matsuda and Gutt significantly inversely correlated with CDBP (r=-0.429, p=0.025, r=-0.508, p=0.008, and r=-0.412, p=0.036 respectively). Measures of arterial stiffness did not correlate significantly with measures of insulin sensitivity/resistance.

Conclusions: Central aortic blood pressure was found to significantly correlate with insulin resistance/sensitivity indices. This relationship delineates the close relationship of BP with glucose metabolism.

PP.10.29 HYPERTENSION PREVALENCE IN SEVENTH DAY ADVENTIST COMMUNITIES IN SOUTHWESTERN, BRAZIL

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Objective: To compare the prevalence of hypertension in Seventh Day Adventist communities with a non-Adventist community.

Design and method: The study was developed in the Southwestern of Brazil, with 304 Adventists and 243 non-Adventists. The casual blood pressure measurement and Home Blood Pressure measurement (HBPM) were performed with automatic validated devices. Significance was set at p<0.

Results: Hypertension prevalence was lower among Adventists (p<0.05, 25.6% vs. 35.4%).
There were differences between Adventist hypertensive and non-Adventist hypertensive patients, respectively, with regard to: education level (high school-36.8% vs. 15.5%); self-employed and housewives (30.8% - 30.8% vs. 15.1% - 19.8%); vegetarian/ovo-lacto vegetarian diet (19.2% vs. 0%); physical exercise (49.4% vs. 18.8%); smoking (0% vs. 15.1%); alcohol consumption (0% vs. 39.2%), referred hypertension (74.4% vs. 84.3%); antihypertensive medication use (58.3% vs. 66.2%); believes that hypertension is "curable" (57.7% vs. 32.6%), does not cause renal problems (71.4% vs. 51.3%) and that there is no hereditary influence (84.9% vs. 66.7%); no diabetes (91% vs. 77.9%); use other hypertension treatments (51.8% vs. 27.3%); and stop taking medication on his/her own account (50% vs. 29%). There was no difference in the blood pressure control between Adventist hypertensive patients (44.8%) and non-Adventist hypertensive patients (58.9%) with casual blood pressure measurement, but Adventist patients showed higher levels of control according to HBPM in comparison with casual measures (77.1% vs. 44.8%).

Conclusions: Hypertension prevalence levels were lower among Adventists, which can be related to the somewhat healthier habits and lifestyles this religion defends, although the rates found are quite close to data in many brazilian studies.

PP.10.30 PREVALENCE OF UNCONTROLLED HYPERTENSION WITH WIDE PULSE PRESSURE IN PHYSICIAN OFFICES IN JAPAN

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Objective: Hypertension (HTN) is a modifiable cause of vascular damage; wide pulse pressure (WPP) is a predictor of cardiovascular disease in hypertensive patients. Many studies have quantified HTN prevalence in Japan, few reporting WPP data. The study aimed to estimate the prevalence of uncontrolled HTN with WPP among patients with HTN attending to physician offices in Japan.

Design and method: A cross-sectional chart-review was conducted in 15 sites distributed all over Japan. Patients consecutively attending to physician offices, aged >=20 years, with primary HTN, with their clinical chart available in the centre, and giving informed consent were included. The study was approved by an IRB.
Age, gender, type of HTN, and the last two blood pressure readings available were retrieved from the clinical chart. A patient was classified as having WPP if PP was >=60 mmHg and considered uncontrolled if readings showed HTN irrespective of treatment. All data was analysed descriptively.

Results: Three hundred thirty patients with HTN were included, 170 (51.5%) were females and 200 (60.6%) were >65 years old. At inclusion, 43.0% had grade I HTN, 24.2% grade II, 8.8% grade III, and 23.9% isolated systolic hypertension (ISH).
Prevalence of WPP was 17.6% (95%CI: 7.8%-27.4%), with a higher prevalence among females (22.4%) than males (12.5%)(p=0.0188), as well as in >65 (22.0%) than <65 (10.8%)(p=0.0088). At inclusion, 12.1% of WPP patients had grade I HTN, 36.2% grade II, 19.9% grade III, and 38.8% ISH.
Patients without WPP had the following mean (SD) values: systolic blood pressure (SBP) 128.0 (8.6) mmHg, diastolic blood pressure (DBP) 75.5 (8.4) mmHg, heart rate 74.2 (10.0) bpm, and pulse pressure (PP) 52.5 (7.2).
Patients with WPP had the following mean (SD) values: SBP 152.0 (12.0) mmHg (p<0.0001 vs without WPP), DBP 78.6 (10.3) mmHg (p=0.0155), heart rate 72.8 (10.0) bpm (p=0.5183), PP 73.5 (10.4)(p<0.0001).

Conclusions: The prevalence of uncontrolled WPP among hypertensive patients in Japan is 17.6%. Patients with WPP had a trend to more severe hypertension, showing higher levels of SBP, DBP and PP than patients without WPP.

PP.10.31 BLOOD PRESSURE SIGNIFICANTLY INCREASED DURING THE PERIMENOPAUSAL TRANSITION IN KOREAN HEALTHY WOMEN

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Objective: It is well known that postmenopausal women have higher prevalence of hypertension than premenopausal women. However, there has been limited available information on blood pressure (BP) change during menopausal transition. Therefore, we aimed to evaluate the BP change during the menopausal transition and examine the factors associated with BP.

Design and method: A cross-sectional study was performed on 2,201 women aged 44 to 56 years (809 in premenopause, 317 in early perimenopause, 414 in late perimenopause, and 661 in postmenopause) at health check-up centers from November 2012 to March 2013. To determine the risk factors related to the BP change and the prevalence of hypertension according to menopause stage, we used multiple linear regression and logistic regression analyses with variable selection using backward elimination, respectively.

Results: Both systolic and diastolic blood pressures changed significantly across menopausal status and showed the highest increase from early to late perimenopause. The prevalence of hypertension also significantly increased from early to late perimenopause (7.9% to 13.7%). During the menopausal transition, the late perimenopause versus early perimenopause was independently significant for evaluated SBP(β=1.986, p=0.045) and DBP(β=2.086, p=0.001) after adjustment with variables related hypertension. The prevalence of hypertension in late perimenopausal period was significantly higher than that in early perimenopausal period (OR=1.760, 95% CI=1.041-2.974) after adjustment. Waist circumference (OR=1.036), LDL-cholesterol (OR=0.992), glucose (OR=1.014), HOMA (OR=1.189) and uric acid (OR=1.265) were also significantly associated with the prevalence of hypertension.

Table1. Blood pressure potential covariates according to menopausal status

Variables	Menopausal Status				P-value
	Premenopause	Early perimenopause	Late perimenopause	Postmenopause	
Age, year	46.8±2.5	47.46±2.4	49.57±2.8	53.15±3.1	<.001
BMI, kg/m2	22.92±3.1	22.76±3	22.96±3.1	23.39±3.1	0.006
Waist, cm	78.34±7.8	78.17±7.2	78.89±8	80.07±8	<.001
Smoke, n(%)	24(4.2)	6(2.7)	10(3.5)	19(4.3)	0.734
SBP, mmHg	104.00±13.5	104.14±12.7	108.01±15.1	107.91±14.5	<.001
DBP, mmHg	67.81±10.6	67.54±9.9	71.00±12.0	70.56±11.5	<.001
Hypertension, n(%)					
Normal	683(84.6)	261(82.3)	305(74.4)	490(74.5)	<.001
Prehypertension	71(8.8)	31(9.8)	49(12.0)	73(11.1)	
Hypertension	53(6.6)	25(7.9)	56(13.7)	95(14.4)	
Menopause symptoms, score(0~6)					
Vasomotor	0.47±0.9	0.66±1.0	1.14±1.4	1.55±1.6	<.001
Psychosocial	1.13±1.1	1.43±1.2	1.6±1.3	1.84±1.4	<.001
Physical	1.47±1	1.75±1.1	1.85±1.2	1.95±1.2	<.001
Sexual	1.11±1.3	1.47±1.5	1.79±1.7	2.51±1.9	<.001
Glucose, mg/dL	95.13±13.6	94.15±15.7	96.48±16.9	96.75±15.1	0.032
T-cholesterol, mg/dL	194.71±31.2	196.69±32.3	207.92±36.7	210.13±35.9	<.001
HDL-cholesterol, mg/dL	63.07±14.7	63.81±14.8	64.54±15.7	62.26±15.7	0.100
LDL-cholesterol, mg/dL	117.29±28.3	118.05±29	128.24±33.3	131.88±32.1	<.001
Triglyceride, mg/dL	90.18±53.9	92.99±56.1	97.53±58.9	102.25±54.6	<.001
HOMA	1.46±1.1	1.4±0.9	1.32±1	1.47±1.1	0.121
G-GTP, U/L	19.05±24.7	17.95±14.6	20.92±22.3	25.08±30.1	<.001
Free T3, pg/mL	2.82±0.4	2.85±0.3	2.88±0.4	2.98±0.4	<.001
Uric acid, mg/dL	4.05±0.8	4.04±0.8	4.32±0.9	4.41±0.9	<.001

Data represent mean±SD and n(%) for continuous variables and categorical variables, respectively.
SBP: systolic blood pressure, DBP: diastolic blood pressure
Take the hypertension medicine: SBP>=15, DBP>=10

Conclusions: Our results showed that the perimenopausal transition independently affects BP change among women in Korea. To identify the factors that influence the BP change during perimenopausal transition, further prospective studies including these covariates are warranted.

PP.10.32 MASKED HYPERTENSION AND ATHEROGENESIS: THE IMPACT ON APELIN AND RELAXIN PLASMA LEVELS

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Objective: Recent evidence demonstrate that masked hypertension (MH) is a significant predictor of cardiovascular disease, while hypoapelinemia and hyporelaxinemia may contribute to vascular damage accelerating atherogenesis.

Design and method: Aim of our study was to examine apelin and relaxin plasma levels in patients with MH and compare the findings to those of healthy normotensives matched for age, sex, body mass index and the rest of risk factors. One hundred-thirty (60 M, 70 F) healthy subjects mean age 45±12 yrs who had clinic blood pressure <140/90 mmHg were studied. The whole study population underwent 24 hour ambulatory blood pressure monitoring (ABPM). According to the ABPM recordings, 24 individuals (8M, 16 F) had MH (daytime systolic blood pressure 135 mmHg or daytime diastolic blood pressure 85 mmHg - group A) while the rest 106 subjects (52 M, 54 F) had normal ABPM recordings, group B. Apelin and relaxin plasma levels were determined in both groups (ELISA method).

Results: Our findings and the comparisons between the two groups are shown in the table below:

	Group A (n=24)	Group B (n=106)	p
Apelin (pg/ml)	220±121	315±147	<0.001
Relaxin (pg/ml)	35,2±6,7	56.8±13.6	<0.001

Conclusions: Our findings suggest tha subjects with masked hypertension have significantly lower apelin and relaxin plasma levels compared to healthy individuals. This observation may have prognostic significance for future cardiovascular events in subjects with masked hypertension and needs further investigations.

PP.10.33 APELIN AND RELAXIN PLASMA LEVELS IN HEALTHY OFFSPRING OF HYPERTENSIVE PATIENTS

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Objective: Epidemiologic studies have shown that healthy offspring of hypertensive patients exhibit many features of the metabolic syndrome, such as hyperinsulinemia, insulin resistance, and lipid disorders, while hypoapelinemia and hyporelaxinemia may contribute to vascular damage accelerating atherogenesis.

Aim of our study was to determine apelin and relaxin plasma levels in healthy offspring of hypertensives (HOH) and to compare the findings to those of healthy offspring of healthy parents (HOHP), matched for age, sex and BMI.

Design and method: Forty six (24M, 22F) HOH mean age 18 3 yrs and BMI 22,4 1,4 Kg/m2 (Group A) and 50 (28M, 22F) HOHP mean age 18 3,2 yrs and BMI 22,6 1,7 Kg/m2 (Group B) were studied. Apelin and relaxin plasma levels (ELISA method) were determined in the study population. The two groups are matched for age, gender, BMI.

Results: Apelin plasma levels were significantly lower (6 3 vs. 10 5 pg/ml, $p<0.001$) and relaxin plasma levels were significantly lower (20 7vs.29 8 pg/ml, $p<0.001$) also in-group A compared to group B respectively.

Conclusions: Our findings suggest that offspring of hypertensives have significantly lower plasma apelin and relaxin levels. This group of individuals needs a closer follow-up and further examination.

PP.10.34 JOB STRESS AND 16-TH YEARS RISK OF AN ARTERIAL HYPERTENSION IN FEMALE POPULATION AGED 25-64 YEARS IN RUSSIA (BASED ON WHO EPIDEMIOLOGICAL PROGRAM MONICA-PSYCHOSOCIAL)

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Objective: To study the influence of job stress on relative risk of an arterial hypertension (AH) in female population aged of 25-64 years in Russia over 16 years of follow-up.

Design and method: Under the third screening of the WHO MONICA-psychosocial program (MOPSY) random representative sample of women aged 25-64 years (n=870) were surveyed in Novosibirsk. Questionnaire "Awareness and attitude towards the health" proposed by MOPSY protocol was used to estimate levels of job stress. From 1995 to 2010 women were followed for the incidence of AH. Cox regression model was used for relative risk assessment (HR) of AH.

Results: The prevalence of high job stress level in women aged 25-64 years was 31.6%.
HR of AH over 16 years of follow-up in women with high job stress was 1.39-fold higher (95.0%CI:1.08-1.78, $p=0.01$) compared to those with lower levels of job stress. There were tendencies of increasing AH in married women experienced stress at work compared to unmarried, divorced and widowed with the same stress level. AH significantly higher developed in women with university ($x2=8.23$ df=1 $p<0.01$), college ($x2=3.98$ df=1 $p<0.05$) and high school education ($x2=5.29$ df=1 $p<0.05$) having job stress compared to those with elementary school education and stress at work. With regard to occupational class higher AH rates was found for physical workers with job stress compared to pensioners without it ($x2=5.47$ df=1 $p<0.05$) and AH rates were tend to be higher in managers experienced stress at work ($x2=3.24$ df=1 $p=0.07$).

Conclusions: There is high prevalence of stress at work in female population aged 25-64 years and high job stress level is 31.6% in Russia. Women with high job stress have significantly higher relative risk of AH over 16-th years of follow-up. Rates of AH development were more likely in married women with middle and high educational level and high job stress in professional class managers and physical workers.

PP.10.35 HYPERTENSION PREVALENCE, AWARENESS, TREATMENT AND CONTROL: THE IMPACT OF AMBULATORY BLOOD PRESSURE MONITORING

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Objective: Accurate measurement of blood pressure (BP) is essential for diagnosis and management of hypertension. Usually measurements are performed in a clinical setting. Ambulatory blood pressure monitoring (ABPM) provides information over a prolonged period and is superior for the prediction of clinical events. The aim of this paper is to examine the prevalence, awareness, treatment and control rates of hypertension in a population based sample and to examine how 24 hour ABPM impacts on these rates.

Design and method: The Mitchelstown Cohort was established to examine cardiovascular health in a middle-aged Irish adult population based sample. All participants had their BP measured. The average of the second and third BP readings was defined as the study blood pressure. All participants were invited to undergo 24 hour ABPM. Hypertension was defined using accepted thresholds or by current anti-hypertensive medication use. Participants were defined as aware of their hypertension if they self-reported a doctor diagnosis of hypertension, and as treated if they self-reported anti-hypertensive medication use. Control of hypertension was defined as being on anti-hypertensive medication with a blood pressure value below the normal threshold.

Results: Of 2047 participants, 1207 (response rate 59%), under-went 24 hour ABPM. We excluded 128 from the ABPM analysis because of incomplete data. The mean study BP was 130/80 mmHg. The mean daytime BP was 131/77 mmHg and the mean night-time BP was 111/62 mmHg. Based on the study BP, the prevalence of hypertension was 46% with an awareness rate of 57%, 58% were treated and 48% controlled. For those who underwent ABPM, the prevalence was 63%. The awareness rate was 52%, 54% were treated and 42% controlled. The classification of hypertension by study and ABPM measurements was discordant in 27% of cases. ABPM reclassified 16% from normotensive to hypertensive and 11% from hypertensive to normotensive.

Conclusions: Awareness, treatment and control rates of hypertension remain suboptimal. Using ABPM reclassified hypertension status in 27% of participants in this study. The routine use of ABPM in the diagnosis and management of hypertension will result in better decision making with respect to treatment initiation and titration.

PP.10.36 PREVALENCE OF SEXUAL DYSFUNCTION, ANXIETY AND DEPRESSION IN ELDERLY HYPERTENSIVE PATIENTS WITH CONCOMITANT TYPE 2 DIABETES MELLITUS

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Objective: Hypertension and diabetes mellitus are considered independent risk factors for several quality-of-life diminishing complications. However, their cumulative effect on patient's physical, like sexual performance, and psychological functions remains unclarified. We aimed at investigating the prevalence of sexual dysfunction, anxiety and depression in patients suffering concurrently from hypertension and type 2 diabetes mellitus.

Design and method: The study population consisted of hypertensive patients suffering from type 2 diabetes mellitus who attended the Hypertensive Outpatient Clinic of the 2nd Propedeutic Department, Aristotle University, Thessaloniki, Greece. The International Index of Erectile Function (IIEF) and the Female Sexual Dysfunction Index (FSFI) questionnaires were used to detect Sexual Dysfunction in male and female patients, respectively. The Hamilton anxiety scale questionnaire was used to evaluate anxiety, while depression was detected using the Zung self-rating depression scale.

Results: A total of 281 patients, 170 females and 111 males, 67±10 years old (systolic blood pressure: 151±20mmHg, diastolic blood pressure: 81±11mmHg), were studied. Sexual dysfunction was detected in 88.6% of our sample while anxiety and depression affected 37.7% and 12.5%, respectively. Sexual dysfunction was detected in 81.1% of male and 93.5% of female patients ($p=0.002$). Anxiety affected 24.3% of men and 46.5% of women ($p<0.001$), whereas 9% of men and 14.7% of women suffered from depression ($p=0.161$).

Conclusions: Physicians should be aware of the tremendous impact hypertension and diabetes mellitus have on patients' physical and mental health in order to search for underlying sexual dysfunction and alleviate their patient's health related quality of life.

PP.10.37 ANALYSIS OF THE TOTAL CARDIOVASCULAR RISK OF HYPERTENSIVE PATIENTS BASED ON THE LARGE HUNGARIAN HYPERTENSIVE STUDIES

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Objective: It is absolutely essential to know the total cardiovascular risk in hypertensive patients. We performed two large postmarketing studies of hypertension in Hungary (COMPLETE-D: 10935 patients, valsartan based therapy, PEARL: 10335 patients, perindopril-amlodipin fix combination) approximately in the mean time. Our aim was to examine whether the epidemiologic data of studies, performed without randomization in the common practice, are comparable or not.

Design and method: Age: COMPLETE-D: 57.7 ±12.22 years, and PEARL: 61.02 ±12.43 years. COMPLETE-D/PEARL: mean duration of hypertension: 9.6/9.53 years; risk factors: smoking 3669/3231, dyslipidemia 5408/5263, obe-

sity 5788/5086, family history of hypertension 5553/4119; target organ damages: left ventricular hypertrophy 3210/2833, elevation of serum creatinine 521/444, microalbuminuria 1121/614, signs of atherosclerosis 1098/3036; complicatons: stroke 778/1256, coronary heart disease 1985/2946, nephropathy 472/430, peripheral artery disease 1052/1107; diabetes: 3119/2134. Baseline blood pressure where: COMPLETE-D: 162.5/94.6 ±13.8/9.1 mmHg, and PEARL: 158.3/92.6 ±14.1/9.1 mmHg. Statistics: Chi-square.

Results: The patient population of COMPLETE-D was younger by an average of 3.32 years ($p<0.001$) while their blood pressure was higher by 4.2/2 mmHg ($p<0.001/0.001$); there was more smoking, obesity, family history of hypertension, left ventricular hypertrophy, microalbuminuria, diabetes (each case $p<0.001$), dyslipidemia ($p=0.032$). There was more stroke ($p<0.001$), coronary heart disease ($p<0.001$), peripheral artery disease ($p=0.0085$) in the study of PEARL. There wasn't any significant difference in the other factors.

Conclusions: The two medical studies performed in the common medical practice was resulted in valuable information regarding the efficacy and the safety. Both of the studies ensured the high Hungarian cardiovascular risk, but the epidemiological data should be evaluated with reservations and they are not comparable to each other because of their solid heterogeneousness of factors (age, blood pressure of elected patients, unequal territorial distribution). Our results also show that in case of metaanalytic studies one should be very cautious in merging data from different trials the number of patients might be impressive, however, the original data could not be fairly comparable.

PP.10.38 HIGH SALT INTAKE FAIL TO ENHANCE PLASMA ADIPONECTIN IN NORMOTENSIVE SALT SENSITIVE SUBJECTS

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Objective: Evidences show that salt could modulate adiponectin and inflammation level in normal individuals. Therefore, we hypothesized that abnormalities of adiponectin and inflammation may be the potential mechanism of salt sensitivity. Aims of the study were to investigate whether different alteration of adiponectin and inflammation level in response of high salt were exhibited between normotensive salt sensitive and salt resistant subjects.

Design and method: 30 normotensive subjects (aged 25 to 50 years) were selected from a rural community of Northern China. All of the people were sequentially maintained on 3 days baseline investigate, a low-salt diet for 7 days (3 g/day, NaCl), then a high-salt diet for 7 days (18 g/day). Salt-sensitivity was diagnosed in 10 subjects who exhibited a response of the increase in mean BP by >=10% from low-salt period to high-salt period.

Results: Plasma adiponectin was higher significantly in high salt intake than in low salt diet(6.1±1.3vs7.1±1.7μg/ml, P=0.047) in normotensive salt resistant subjects but not in normotensive salt sensitive subjects (6.4±2vs5.9±2.1μg/ml, P=0.481). High salt intake increased markedly plasma TNF-α(P <0.0001) and MCP-1(P<0.0001) in normotensive salt sensitive subjects as well as normotensive salt resistant subjects. No change of plasma hs-CRP was observed.

Conclusions: The disturbance of adiponectin exists in normotensive salt sensitive subjects during high salt diet, which may be a novel underlying mechanism of salt sensitivity.

PP.10.39 THE ROVIGO STUDY (RISK OF VASCULAR COMPLICATIONS: IMPACT OF GENETICS IN OLD PEOPLE): PROTOCOL, STUDY DESIGN, AND PRELIMINARY RESULTS OF THE INITIAL SURVEY

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Objective: The epidemiology of cardiovascular (CV) risk in the elderly is far from being defined and the reasons why some subjects retain a healthy body, while others are affected by different diseases or die prematurely are still unknown. The aims of thhis study was to compare the CV risk pattern in two elderly populations living in the same area.

Design and method: The Risk Of Vascular complications: Impact of Genetics in Old people (ROVIGO) study is a cross-sectional, population-based study performed in 580 elderly subjects representative of general population living in Rovigo a town of Veneto region in the North-Eastern of Italy. The ROVIGO was compared with a standard control population (SCP) of subjects matched for age and gender with the one-to-one method, living in the towns of Castelfranco and Chioggia, pertaining to the CArdiovascular STudy in the ELderly.
In the statistical analysis values of continuous variables are expressed as mean and standard deviation; analysis of variance with the Bonferroni's post-hoc correction was used to compare grouped continuous variables, and Pearson's X2 test to compare prevalence of categorical variables. The null hypothesis was rejected when p was <0.05.

Results: Blood pressure values, historical coronary artery and cerebrovascular diseases and chronic heart failure were lower in the ROVIGO than in the SCP (Table 1). Only diabetes mellitus was more prevalent in the ROVIGO than in the SCP.

Conclusions: Rovigo population seems to be at lower CV risk than the SCP. Whether this depends on favourable genetic profile, lifestyle, or both, needs to be clarified by further analyses.

Abstract PP.10.41

	ROVIGO Study cohort			SCP of the CASTEL study		
	All (n= 580)	Men (n =272)	Women (n =308)	All (n=580)	Men (n =272)	Women (n =308)
SBP (mmHg)	143.4±19.5	143.2±18.3	143.5±20.6	155.3±23.1	153.2±22.2	157.2±23.7*†
DBP(mmHg)	79.7±11.6	80.6±11.6	78.9±11.5	86.4±9.8	86.2±9.7	86.6±9.8*
Pulse pressure (mmHg)	63.7±14.2	62.8±13.2	64.6±15.0	69.8±18.3	67.9±17.7	71.8±18.6*†
Heart rate (bpm)	71.8±9.7	70.6±9.8	73.0±9.4*	75.8±12.1	73.8±11.1	77.6±12.5*
Hypertension (%)	82.4	83.4	81.5	86.2	87.9	84.1
ISH (%)	38.3	36.0	40.2	32.1	32.3	31.2
BP control (<140/90, %)	29.5†	28.2†	30.6†	12.1	9.4	15.6
Serum glucose (mg/dL)	102.1±25.0	105.5±27.4*	99.3±22.3	113.8±35.9	110.7±28.8	116.7±42.1*
Diabetes (%)	18.8	22.8*†	15.2	8.4	10.0	7.1
Total cholesterol (mg/dL)	207.2±70.1	199.7±91.1	213.9 ±42.3*†	209.0±42.8	201±40.6	218±43.4*
LDL-cholesterol (mg/dL)	120.6±33.7	115.2±31.0	125.4±35.3*†	138.1±38.2	132.7±36.4	142.8±39.2*
HDL-cholesterol (mg/dL)	61.3+16.0	56.2+13.2	65.9+17.0*	42.2+13.1	47.0+13.1	51.3+12.8*
Tryglicerides (mg/dL)	114.5+63.6	116.5+73.7	112.6+52.9	108.5+55.6	107.0+57.5	110.0+54.0
LVH_ECG (%)	44.9	52.5*	38.3	43.2	51.4*	37.2
Atrial fibrillation (%)	7.1	6.6	7.5	4.3	4.9	3.6
History of CAD (%)	13.3	16.9*†	8.1	32.4	36.3*†	28.0†
History of CHF (%)	3.8	3.6	3.8	20.6	21.1†	19.4†
History of CVS (%)	5.4	6.6*	3.9	6.8	5.0	8.2*†
COPD (%)	16.1	19.8*	12.6	31.9†	37.5*†	27.0†

BP: blood pressure; SBP: systolic blood pressure. DBP: diastolic blood pressure. BMI: Body mass index. HDL: high density lipoproteins; LDL: low density lipoproteins; LVH: left ventricular hypertrophy; ECG: electrocardiogram; CAD: coronary artery disease. CHF: chronic heart failure; CVS: cerebrovascular disease; COPD: chronic obstructive pulmonary disease; * p<0.001 between gender in the same cohort. †p<0.05 versus same gender in the study cohorts.

PP.10.40 THE INCIDENCE OF HYPERTENSION IN ANTIPSYCHOTIC THERAPY

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Objective: The antipsychotics of new generation, unlike conventional therapy, are the first line in treatment of psychosis. Although, this class of drugs is also related to the development of metabolic syndrome, which includes hypertension. The aim of this study was determining the incidence of arterial hypertension in patients treated by new generation of antipsychotic medication related to patients on conventional antipsychotics.

Design and method: The study included 116 patients, divided into two main groups:
- A research-based group of patients with the diagnosis of chronic psychosis who had been receiving new generation of antipsychotic medications,
- A control group with the diagnosis of the chronic psychosis treated with conventional antipsychotics

In both groups, the values of blood pressure were monitored during initial 24 months of the patients' therapy with the new generation or with the classic antipsychotic drugs.

Results: Patients in test group (on therapy of new generation of antipsychotic medications) had a higher incidence of hypertension in relation to control group patients (on therapy of conventional antipsychotics). A percentage of hypertension incidence in patients treated by new generation of antipsychotic drugs were 66,7 %, and those treated by conventional antipsychotics were 21,1 %. Based on values of the Pearson's Chi-Square test and its significance (-0,428 p=0,00), it was confirmed that there is a statistically significant difference in presence of hypertension between these groups.

Conclusions: It was concluded, based on results, that the hypertension more often occures in patients who had been receiving the therapy with new generation of antipsychotics compared to the conventional therapy.
The percentage of patients with hypertension in the treatment of new-generation antipsychotics was 66.7%, and in patients with classical therapy 21.1%. Also, the correlation coefficient ($r = -0.428$), $p = 0.000$) presents correlation of hypertension of therapy.

POSTERS' SESSION

POSTERS' SESSION PS11
SLEEP APNOEA

PP.11.01 CORRELATION BETWEEN NOCTURNAL HYPOXEMIA AND MICROALBUMINURIA IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME AND ARTERIAL HYPERTENSION

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Objective: The aim of the study was to investigate the relationship between nocturnal hypoxemia and microalbuminuria (MAU) in patients with obstructive sleep apnea syndrome (OSAS) and arterial hypertension (AH).

Design and method: The study involved 20 patients with OSAS and AH (gr.I) and 20 patients with only OSAS (gr.II). OSAS was diagnosed as apnea-hypopnea index (AHI)>5episode/hour. Microalbuminuria (MAU) was detected in the morning urine samples ranging between 20-199 mg/l. Nocturnal hypoxemia was estimated by indexes of oxygen desaturation index (ODI) and oxygen desaturation time (ODT), which were investigated in quartiles for statistical analysis using Pearson x2 and Fisher exact test.

Results: Statistical analysis of obtained results showed a significant correlation between MAU and AH in ODI quartiles, which was detected in ODI fourth quartile group (ODI>77,98 episode/hour) for the gr.I patients. In addition, similar correlation was detected in second quartile group (ODI=14,85-60,25 episod/hour). Relationship between MAU and AH was also revealed in ODT fourth quartile group (ODT>209,30 min.), in gr.I of patients.

Conclusions: The influence of both – oxygen desaturation index and time on the correlation of AH and MAU was revealed only in the fourth quartile groups.

PP.11.02 HYPERTENSION IS FREQUENT BUT NOT AN INDEPENDENT RISK FACTOR FOR ENDOTHELIAL DYSFUNCTION IN OBSTRUCTIVE SLEEP APNEA

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Objective: The aim of the study was to evaluate whether hypertension is an independent risk factor for endothelial dysfunction in newly diagnosed obstructive sleep apnea (OSA) with normal ejection fraction.

Design and method: According to the study eligible criteria 125 consecutive patients among overall number of 792 patients were prospectively enrolled in the study. Control group consisted of 78 asymptomatic age matched healthy subjects who did not have any cardiovascular and respiratory disease, volunteer to participate. All patients had undergone overnight polysomnography and complete standard transthoracic and advanced tissue Doppler imaging echocardiogram, as well as the evaluation of the endothelial dysfunction according to the standard procedure. hypertension was defined as systolic values more than 140 mmHg and diastolic values more than 90 mmHg, within three measurements during control visits.

Results: Endothelial dysfunction was present in more than a half of the newly diagnosed patienets with OSA (60.3 %). Only 64.3 % of them had hypertension. Hypertension was present also in 44.6% with newly diagnosed OSA, without endothelial dysfunction. There was no significance between hypertension and endothelial dysfunction (X2 =1.036, p= 0.309). No significant differences were detected in systolic and dystolic blood pressure values in patients with newly diagnosed OSA with and without endothelial dysfunction (t=1.49) p=0.139 for systolic blood pressure and t= 0.730, p=0.467, for diastolic blood pressure).

Conclusions: Although hypertension endothelial dysfunction are frequent in patients with newly diagnosed OSA, hypertension is not an independent risk factor for endothelial dysfunction in newly diagnosed OSA.

PP.11.03 IMPACT OF SHORT-TERM CONTINUOUS POSITIVE AIRWAY PRESSURE TREATMENT ON VASCULAR PROPERTIES IN OBSTRUCTIVE SLEEP APNEA PATIENTS

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Objective: One of the reasons for the increased cardiovascular morbidity in obstructive sleep apnea (OSA) is abnormal vascular function. Long-term treatment of OSA is associated with modest blood pressure fall with subsequent improvement in vascular performance. We aimed to verify the hypothesis whether effective short-term continuous positive airway pressure (CPAP) therapy influences vascular changes which may have the potential of reversing cardiovascular risk in those patients.

Design and method: We enrolled 63 patients (15 females; age 57.8 ±10.3 years old; BMI=36.2 ±5 kg/m2) with newly-detected moderate-to-severe OSA who were subjected to CPAP treatment. Patients underwent cf-PWV assessment (SphygmoCor,AtCor Medical), common carotid artery distensibility assesment with ArtLab system (Esaote), and ambulatory blood pressure measurements (SpaceLabs 90207) on two occasions – before, and after effective CPAP treatment (8 ±2 days). CPAP efficacy was assessed by device recorded logs (AHI, average usage time).

Results: 14 patients were excluded from analysis due to poor CPAP treatment adherence. Ambulatory blood pressure was comparable before and after CPAP (131.5 ±14 vs. 133.7 ±14 mm Hg, P=0.12; and 77.3 ±8.9 vs. 77.9 ±9.8, P=0.48; for systolic and diastolic BP, respectively). CPAP therapy resulted in decreased PWV (10.95 ±2.42 vs. 10.65 ±2.47 m/s) and increased common carotid artery distensibility (466 ±129 μm vs. 483 ±132; P=0.049). No significant correlations between delta ambulatory BP vs. delta cf-PWV, and carotid distensibility were present. However, changes in PWV correlated fairly with sleep apnea markers (for mean oxygen saturation: R=-0.42; P=0.007; and for Oxygen Desaturation Index: R=0.35; P=0.03).

Conclusions: Short-term CPAP therapy in OSA-patients improves vascular function indicies without evident BP fall.

PP.11.04 THE IMPACT OF RENAL DENERVATION ON OFFICE AND AMBULATORY BLOOD PRESSURE LEVELS IN PATIENTS WITH TRUE RESISTANT HYPERTENSION AND OBSTRUCTIVE SLEEP APNEA. THE INTERIM ANALYSIS

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Objective: The aim of our ongoing study (NCT01366625) is to investigate the clinical utility of renal denervation (RDN) for the treatment of resistant hypertension (RHTN) coexisting with obstructive sleep apnea (OSA). Here we report an interim analysis of the primary end point - blood pressure (BP) reduction at 3 months.

Design and method: 31 patients (24M, 7F, mean age 55,7±8,1, range:32 – 69ys) with true RHTN (office blood pressure (OBP)>=140/90mmHg and daytime systolic BP average >=135 mmHg on >=3 antihypertensive drugs including a diuretic) coexisting with moderate-to-severe OSA (apnea/hypopnea index>=15) were allocated to two groups: in 18 patients (13M, 5F, mean age 54,6±10,1, range: 32 – 69ys) RDN was performed (Symplicity® Catheter System) and 13 patients (11M, 2F, mean age 55,7±8,1, range:50 – 65ys) were assigned to control

group. At baseline and at three months follow-up all patients underwent evaluation of OBP an ambulatory blood pressure levels (ABP) by ABPM.

Results: The treatment and control groups were well matched in regard to baseline characteristics. At 3 months OBP levels in the RDN group reduced by 25/17 mm Hg (p <0,001/p<0,001), whereas they did not differ from baseline in the control group (change of +1/-6 mmHg, p=0,781/p=0,109). Between-group differences in OBP change were significant at p<0,01 and p=0,011 for systolic and diastolic OBP respectively. Systolic OBP <140mmHg was achieved in 13 patients in the RDN group and in none of patients in the control group (71,4% vs 0%, p<0,001). In ABPM 24h, daytime and nighttime ABP levels were reduced by -10/-8 mmHg (p<0,01/p<0,01), -14/-10 mmHg (p<0,01/p<0,01) and -10/-8 mmHg (p<0,01/p<0,01) in RDN group. In the control group no significant changes in 24h, daytime and nighttime ABP levels were observed. Between-group differences in ABP were significant for daytime systolic and diastolic ABP levels (p=0,025 and p=0,041, respectively) but not for 24h nor nighttime ABP levels.

Conclusions: The interim analysis of the on-going study designed to evaluate the clinical utility of renal denervation in true resistant hypertension coexisting with moderate-to-severe OSA showed improvements in office and ambulatory blood pressure levels 3 months after the procedure.

PP.11.05 GENETIC VARIATIONS OF STAMP2 GENE POLYMORPHISM AND RELATED INFLAMMATORY FACTORS IN OBSTRUCTIVE SLEEP APNEA SYNDROME

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Objective: Increasingly studies have reported an independent association of obstructive OSAS with the different components of the metabolic syndrome, particularly hypertension, insulin resistance and abnormal lipid metabolism. Six-transmembrane protein of prostate 2 (STAMP2) was an important factor that links inflammatory and systemic metabolism, associated with obesity. OSAS and obesity share common mechanisms such as inflammatory activation, oxidative stress and increased sympathetic activity. Susceptibility genes of OSAS had been confounded by obesity. STAMP2 gene represents a strong biological and positional candidate for a susceptibility factor for OSAS. The association between the human STAMP2 gene and OSAS is unclear in populations. The aim of this study was designed to investigate whether the STAMP2 gene conferred susceptibility and related inflammatory factors to OSAS independent of obesity.

Design and method: The representative variations of STAMP2 were selected based on the function (missense mutation) and linkage disequilibrxium (r2>0.8) and genotyped with TaqMan-PCR method in general populations (614 OSAS and 399 non-OSAS controls). The subjects were selected from the cross-sectional study of hypertension patients diagnosed at Xinjiang people's hospital were selected randomly from December 2009 to January 2011 among general Chinese population.

Results: Four common single nucleotide polymorphisms (SNPs) of the STAMP2 gene (rs8122, rs1981529, rs34741656, and rs7810472) were detected in patients with OSAS (n = 614) and control subjects (n =399). rs8122 and rs1981529 satisfied HEW balance(P>0.05). SNPs rs8122 were significantly associated with OSAS phenotype [add.P = 0.022 and dom.P = 0.010; adjusted for male 1.999(1.478-2.688), BMI>=28 3.686 (2.725-4.985), additive P = 0.015 and dominant P = 0.037 respectively]. OSAS patients in AA (4.7%)genetype was less than GA genetype(30.9) or GG(64.3). The level of AHI in SNPrs8122 AA genetype carrier is lower than GG, But the level of TNF-α,IL-6 and MCP-1 are no difference between case-control groups.

Conclusions: The present study shows an association of the common variation rs8122 in the STAMP2 gene with OSAS independent of obesity. Suggesting that obesity and OSAS interacted respectively, STAMP2 gene SNP rs8122 is one of the genetic variance may be involved in the pathogenesis of OSAS non-shareable with obesity.

PP.11.06 SLEEP APNEA SYNDROME IN ADULT ROMANIAN POPULATION

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Objective: To estimate the prevalence of sleep apnea syndrom in adult Romanian population.

Design and method: The study has been conducted on the subjects enrolled in SEPHAR II survey (1975 subjects, 52.6% females, 69,06% response rate). The blood pressure (BP) values were defined by the arithmetic mean of 2nd and 3rd measurements from each of the two study visits.
Arterial hypertension and blood pressure control were defined according to the 2013 ESH-ESC Guidelines.
The probability of Sleep Apnea Syndrome (SAS) was realised through the Berlin questionnaire.
Treatment resistant hypertension was defined as BP values > 140/90mmHg in treated hypertensive subjects with at least three antihypertensive drugs including a diueretic.

Results: A high probability of SAS was recorded in 392 subjects (12.3%), the majority of them being hypertensive subjects (308, 78,6%).
The majority of hypertensives with high probability of SAS were known hypertensives (231 subjects, 25.8%), receiving antihypertensive treatment (194 subjects, 41,1%) and having moderate-severe BP values (161subjects; 52,27%).
Treatment-resistant HT was recorded in 98 cases, representing 12,28% of all hypertensive popuation, and 20,76% of treated hypertensiv population.
One out fo five hipertensive adults with treatment-resistant HT (38 subjects, 38,77%) has a high probability of SAS.

Conclusions: In Romania, SAS represent a real health problem, about 1 in 5 adults having an increased probability of SAS, being both an etiological and an aggravating fator of HT in adult Romanian population.
The results of this study were the basis of SAS-SEPHAR project, whose primary objective is the prevalence of SAS in the adult population of Romania.

PP.11.07 HYPERTENSIVE PATIENTS HAVE A HIGH PREVALENCE OF OBSTRUCTIVE SLEEP APNOEA DESPITE LACK OF SYMPTOMS

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Objective: Obstructive sleep apnoea (OSA) is characterized by repetitive upper airway obstructions during sleep, intermittent hypoxia, subsequent arousal, and sympathetic activation. OSA contributes to hypertension and increases cardiovascular risk. The prevalence of OSA in patients with different levels of hypertension is insufficiently studied and may range between 37 and 83%. We aimed to determine the prevalence of OSA in hypertensive patients, and to establish whether the most commonly used questionnaire (Epworth Sleepiness Scale; ESS) or a more extensive questionnaire (Karolinska Exhaustion Disorder Scale; KEDS) can be used to estimate risk for OSA in a reliable way.

Design and method: Consecutive patients referred to a cardiovascular risk assessment clinic (ESH Hypertension Excellence Centre) for a 24-h ambulatory blood pressure measurement (ABPM) were offered to undergo a simultaneous sleep recording, using a validated screening device (SomnocheckMicro; Weinmann). Symptoms were assessed by means of the ESS and KEDS questionnaires.

Results: 121 of 173 patients had complete sleep and blood pressure recordings, of whom 105 had hypertension, defined as either ongoing antihypertensive drug treatment or >=130 mmHg systolic and/or >=80 mmHg diastolic blood pressure by ABPM. Median age was 57 years, BMI 27.2 kg/m2, and 68% were male. Median 24-h averaged blood pressure was 135/83 mmHg. The prevalence of OSA (apnoea-hypopnoea index [AHI] >=5/h) was 71%, but only 25% of these had significant daytime symptoms (ESS score >=10 or KEDS >=19). Furthermore, 32% had an AHI >=15/h, which is usually considered an indication for treatment. We found no correlation between ESS score or KEDS and severity of OSA, defined as AHI (r2=0.006, p=0.46, and r2=0.034, p=0.064, respectively). We found no difference in ESS score or KEDS between the groups without OSA (AHI<5/h), mild OSA (5 to <15/h), moderate (15 to <30/h) or severe OSA (AHI >=30/h) (ANOVA, p=0.47 and 0.23, respectively).

Conclusions: OSA is common in hypertensive patients at a referral centre and one third fulfils conventional indications for treatment of the breathing disorder. These patients frequently lack typical symptoms of hypersomnolence. Symptom-related questionnaires do not appear to be useful to exclude OSA.

PP.11.08 PREVALENCE OF MASKED HYPERTENSION CORRELATES WITH ACEI/ARB AND CCB TREATMENT IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

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Objective: Obstructive sleep apnea (OSA) is a common disorder with important clinical consequences. It is one of the most important causes of a secondary and masked hypertension which are prevalent conditions among these patients. How treatment of arterial hypertension influences prevalence of masked hypertension in patients with OSA is unknown. The aim of this study was to analyze pharmacotherapy and compensation of arterial hypertension in patients with OSA and assess how it is influencing prevalence of masked hypertension.

Design and method: 85 hypertensive patients (75 men) with metabolic syndrome, average age 53.6±9.3 years were evaluated using polysomnography or polygraphy with diagnosis of OSA, average apnea-hypopnea index (AHI) 56.3±23. Patients underwent 24 hour ambulatory blood pressure monitoring (ABPM) and current pharmacotherapy data was taken. Appropriate combinations of antihypertensive drugs were derived from ESH/ESC 2013 guidelines.

Results: Arterial hypertension was well compensated in only 11.8 % of patients. Masked hypertension was present in 60% of patients and nocturnal hypertension in 84.7% of patients. Fisher's exact test has found a significantly higher prevalence of masked hypertension in patients taking angiotensin converting enzyme inhibitors/angiotensin receptor blockers (ACEi/ARB) (p=0.007) and in patients taking calcium channel blockers (CCB) (p=0.014). Fisher's exact test with analysis of adjusted residues has found that in group of patients with subcompensation of arterial hypertension was significantly more often used triple combination of drugs (51.4 vs 10%).

Conclusions: In this group of patients, the prevalence of masked hypertension was significantly higher in patients taking ACEi/ARB or CCB. Exact pathophysiological mechanism of this phenomenon is not known. Arterial hypertension was well compensated in only 11.8% of patients and only 24.7% of patients were treated according to current ESH/ESC guidelines. From these results is evident that optimalization of antihypertensive treatment can be in patients with OSA much better.

PP.11.09 OBSTRUCTIVE SLEEP APNEA AND PULSE WAVE VELOCITY AMONG THE ELDERLY RESPONDENTS OF POLSENIOR PROJECT

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Objective: Obstructive sleep apnea is thought to be a consequence of some cardiovascular factors, e.g. arteriosclerosis and hypertension.
The aim of the study was to assess the relationship between the presence of obstructive sleep apnea and pulse wave velocity as a measure of arterial stiffness in elderly subjects.

Design and method: Pulse wave velocity was determined as a part of geriatric assessment of respondents recruited into nationwide PolSenior Project. Carotid-femoral pulse wave velocity (cf-PWV) was measured using an automatic computerized recorder and analyzed by the Complior program. Assessment for obstructive sleep apnea (OSA) was performed with the use a screening tool, such as Sleep Strip device. OSA was suspected when more than 14 episodes of hypopnea or apnea per 1 hour of night sleep was recorded.

Results: Sleep Strip test was performed in 74 respondents aged 55–95 years old. In 18 of them it was impossible to interpret the test because of some technical issues; in 56 it was of acceptable quality. Examined group consisted of 51.8% of men. Mean age of respondents was 70.9±10.3 years. Obstructive sleep apnea was suspected in 75% of examined respondents (SBP/DBP=149.8/88.0mmHg; 78.6% diagnosed for HT); in 23% of them mild OSA (SBP/DBP=138.9/85.2mmHg; 76.9% with HT), in 28.6% moderate (SBP/DBP=155.3/92.2mmHg; 87.5% diagnosed for HT) and in 23% severe OSA (SBP/DBP=153.8/85.8mmHg; 69.2% with HT) was presumed. Cf-PWV higher than 10m/s was recorded among 69.1% of respondents with suspicion OSA, whereas in only 50% of those without that suspicion (SBP=146.2/84.3mmHg; 71.4% of HT). Mean cf-PWV among respondents with OSA was 10.8±4m/s, in comparison to 9.8±2.6m/s in those without OSA.

Conclusions: Obstructive sleep apnea as well their more advanced stages more often was suspected in hypertensive subjects. Cf-PWV higher than 10m/s, as well as, higher absolute values of cf-PVW were recorded more often among respondents in whom, on the basis of Sleep Strip test, suspicion of OSA was made. It may indicate some contribution of vascular factors to OSA occurrence, as well as reversibly, OSA incidents to worsening co-morbidities.

PP.11.10 DIABETES MELLITUS ABOLISHED FALL IN EVENING BLOOD PRESSURE PROVOKED BY POSITIVE AIRWAY PRESSURE THERAPY IN HYPERTENSIVE SLEEP APNEA ESPECIALLY OF HAVING LOW OXYGEN SATURATION

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Objective: Sleep apnea (SAS) elevates blood pressure (BP). Diabetes mellitus (DM) and hypertension are often associated. Although positive airway pressure (CPAP) lowers BP in SAS, the impact of DM on CPAP induced BP lowering in hypertensive SAS is still obscure. This study examines whether DM adversely affects hypotensive effect of CPAP.

Design and method: Nineteen hypertensive SAS having DM (17 males, age 53.2±9.6, BMI 29.4±5.2) and 28 hypertensive SAS without DM (23 males, age 50.7±13.4, BMI 27.6±4.6) treated by CPAP were included. Morning and evening BP were measured before and after CPAP. Duration of CPAP in DM and non-DM was 40.8±19.1 and 40.3±36.3 days, respectively. Hypertension was defined as systolic BP (SBP) >140 and/or diastolic BP (DBP) >90 mmHg. DM was defined as HbA1c >6.5% and/or under treatment. All patients had not taken antihypertensive drugs.

Results: Before CPAP, no difference of apnea-hypoxia index (AHI) was observed between DM and non-DM (59.2±23.3 vs. 52.1±22.7). Though, average oxygen saturation (SpO2) was lower in DM than in non-DM (94.2±2.7 vs. 95.9±1.5%, p<0.05). After CPAP, AHI decreased and SpO2 increased to the same level. Morning SBP decreased in both DM (144.1±10.4 to 134.7±15.0 mmHg, p<0.01) and non-DM (145.4±12.7 to 133.4±12.6 mmHg, p<0.001). Also, evening SBP lowered in non-DM (141.8±14.9 to 134.8±16.3 mmHg, p<0.05), however, evening SBP did not fall in DM (136.2±12.5 to 134.4±15.0 mmHg). Notably, among 7 DM with SpO2 below 94% before CPAP, only 2 patients showed an evening SBP decrease. DBP decreased in morning (p<0.01), while no change in evening in both groups. Accordingly, after CPAP, 13 in 28 non-DM, but only 3 of 19 DM, attained to optimal BP level (<140/85 mmHg) (p<0.05).

Conclusions: Evening SBP reduction by CPAP was abolished in SAS with DM. Especially, over 70% of DM with lower SpO2 did not show evening SBP lowering after CPAP. Subsequently, only 16% of diabetic hypertensive SAS achieved to optimal BP level, while nearly 50% of non-diabetic did by CPAP. Introducing antihypertensive medications along with CPAP is strongly recommended in hypertensive SAS if having DM, especially with low SpO2.

PP.11.11 ELEVATION OF EVENING SYSTOLIC BLOOD PRESSURE ASSOCIATES WITH OCCURRENCE OF ARRHYTHMIA IN SLEEP APNEA WITHOUT HEART DISEASE ALONG WITH THE EFFICACY OF POSITIVE PRESSURE THERAPY

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Objective: Sleep apnea (SAS) elicits arrhythmia and blood pressure (BP) elevation. However, the influence of BP elevation on occurrence of arrhythmia in SAS without heart disease (w/o HD) is obscure. This study examines the hypothesis that, in SAS w/o HD, evening BP elevation links to arrhythmia, and positive pressure therapy (CPAP) suppresses both evening BP elevation and arrhythmia.

Design and method: Thirty-six SAS w/o HD treated by CPAP were included. All patients were undertaken polysomnography including electrocardiographic monitoring before and after CPAP. Morning and evening BP, and, the occurrence of arrhythmia were investigated. Having arrhythmia was defined as >3 beats/hour of premature beats. CPAP was applied in patients with apnea-hypoxia index (AHI) >20. Duration of CPAP application was 50.7±78.1 days. Central SAS shared 1.1% in these patients.

Results: Arrhythmia was detected in 10 patients (Group 1: 5 patients with atrial, 5 with ventricular and 1 with both arrhythmias) and remaining 26 patients showed no arrhythmia (Group 2). Sex, age, BMI, AHI and lowest SpO2 revealed no difference between two groups (Group 1 vs. 2; male/female 10/0 vs. 22/4, age 53.7±5.0

vs. 53.4±2.9, BMI 27.7±6.7 vs. 27.6±5.7, AHI 55.4±21.6 vs. 48.4±21.6, lowest SpO2 69.9±17.4 vs. 74.9±11.1). However, evening systolic BP (SBP) was higher in Group 1 than in Group 2 (145.6±17.7 vs. 128.6±12.2 mmHg, p<0.01), while morning SBP did not differ (135.6±20.3 vs. 131.0±13.9 mmHg). Notably, elevation of SBP from morning to evening was observed in Group 1, but not in Group 2 (10±15.1 vs. -2.96±15.1, p<0.05). Diastolic BP demonstrated no difference among 2 groups. After applying CPAP, arrhythmia diminished in all Group 1 patients except one with ventricular arrhythmia along with the decrease of evening SBP to the same level in Group 2 (132.3±19.8 vs. 127.7±12.2 mmHg).

Conclusions: In SAS w/o HD, occurrence of arrhythmias was associated with higher evening SBP, especially with elevation of SBP from morning to evening. Further, CPAP suppressed arrhythmia as well as evening BP elevation. In SAS w/o HD, more widespread application of CPAP is encouraged especially for having arrhythmia and high BP on evening.

PP.11.12 IMPACT OF OBSTRUCTIVE SLEEP APNOEA ON CARDIAC ORGAN DAMAGE IN PATIENTS WITH ACUTE ISCHEMIC STROKE

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Objective: Obstructive sleep apnea (OSA) is indicated as an independent risk factor for hypertension and other cardiovascular disease frequently associated with stroke, but its relation with the presence of target organ damage at cardiac level in acute stroke patients is still poorly explored.

Design and method: A total of 130 consecutive patients with acute ischemic stroke were enrolled.
Patients underwent full multi-channel 24h polysomnography for evaluation of OSA, echocardiography to evaluate left ventricle (LV) mass index (LV mass/BSA, LV mass/height), thickness of interventricular septum (IVS) and posterior wall (LVPW), LV ejection fraction, left atrium (LA) enlargement.

Results: 61.9% (67) of patients, mostly males (67.1%) with acute stroke had OSA (ODI>10). Patients with acute stroke and OSA showed a significant increase (p<0.05) of LV mass index (LV mass/BSA, LV mass/height), IVS and LVPW thickness and a significant LA enlargement as compared to patients without OSA. LV ejection fraction was not significantly different in patients with stroke with and without OSA and was within normal limits.

Conclusions: Acute stroke patients with OSA had higher LV mass and LV mass index and showed LA enlargement as compared to patients without OSA. The present study confirms the high prevalence of OSA in stroke patients, supporting the pathogenetic link between these conditions. The new finding of our work is the demonstration of structural LV abnormalities in acute stroke patients with OSA, supporting the role of OSA as a risk factor for both cerebrovascular and cardiac damage. These data are in line with the suggestion that OSA may contribute to a less favorable outcome in stroke patients.

PP.11.13 ACETAZOLAMIDE PREVENTS PERIODIC BREATHING IN HYPOXIC CONDITIONS AT HIGH ALTITUDE BY INTERACTING WITH GENDER-RELATED DIFFERENCES IN CHEMOREFLEX SENSING

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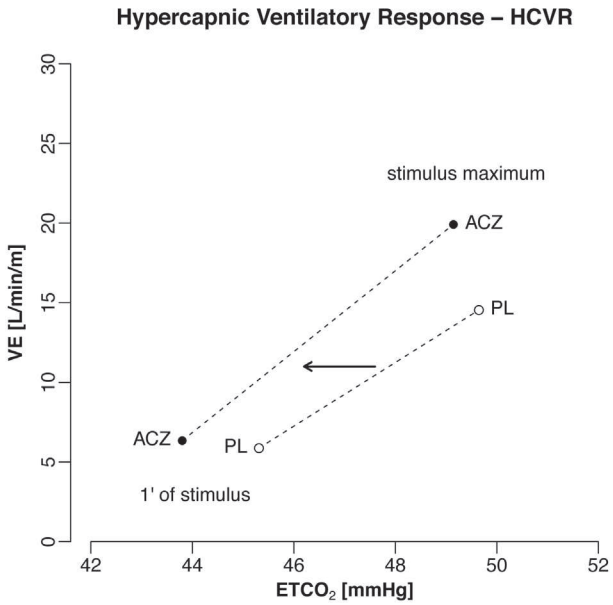
Objective: Acute high-altitude exposure induces in healthy subjects a blood pressure (BP) rise, particularly evident at night. Periodic breathing during sleep (PBS) is a common finding during acute exposure to high-altitude, and its occurrence may affect autonomic cardiovascular control and BP through cyclic deoxygenations and re-oxygenations. At high-altitude PBS is more frequent in males, although the mechanisms accounting for this gender-related difference are not completely understood. Acetazolamide has proved useful in preventing PBS as well as to counteract blood pressure (BP) rise at high-altitude.

We aimed at investigating PBS pathophysiology at high-altitude, focusing on gender-related differences in chemosensitivity (that may account for the different gender prevalence of PBS) and by assessing the modifications of chemoreflex control induced by acetazolamide, that may have a role in counteracting BP rise at high-altitude.

Design and method: 44 healthy lowlanders(21females), randomized to acetazolamide/placebo, underwent polysomnography at sea-level and at 4559m a.s.l.. Hypoxic and hypercapnic chemoreflex sensitivities were assessed at sea-level.

Results: Males exhibited increased hypoxic chemosensitivity even after ventilation was normalized for body height (0.10±0.02 vs 0.08±0.02 L/min/%SpO2/m, p<0.001), and displayed PBS at altitude more frequently than females (40.9±27.8 vs 7.3±4.0 events/hour, p=0.008).
Ventilation increased from sea-level to high-altitude (+4.6±2.1 L/min, p<0.001), irrespectively of gender and treatment.
Acetazolamide leftward-shifted the CO2 set-point without gender-related differences(figure) and, at altitude, it improved oxygen saturation(p<0.001) during daytime (85.2±3.8 vs 77.1±6.6%) and nighttime (78.2±2.6 vs 71.4±4.3%) compared to placebo. The reduction(p<0.001) of end-tidal CO2 pressure from sea-level to high-altitude was more marked on acetazolamide than placebo (24.9±2.7 vs 29.9±3.0 mmHg, p=0.041). Acetazolamide at high-altitude resulted in less PBS in males (3.8±3.8 events/hour, p=0.002) and in females (2.9±3.5 events/hour, p=0.069), abolishing between-gender differences.



Conclusions: The greater severity of PBS displayed by males at high-altitude could be attributed to their higher chemosensitivity to hypoxia, promoter of ventilatory instability in context of hyperventilation-induced hypocapnia. Acetazolamide may attenuate BP-increase associated to altitude exposure by influencing the two sides of chemoreflex loop (modifying apneic threshold and improving oxygenation) and thus counteracting the occurrence of PBS in both genders.

PP.11.14 INFLUENCE OF CPAP THERAPY ON PARAMETERS OF VASCULAR STIFFNESS IN PATIENTS WITH TYPE 2 DIABETES

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Objective: To assess the impact of long-term CPAP therapy on the indicators of vascular stiffness in patients with type 2 diabetes mellitus (DM) suffering from moderate-to-severe obstructive sleep apnea syndrome (OSAS).

Design and method: 38 people with DM and moderate-to-severe OSAS were examined. All subjects suffered from arterial hypertension (AH) 1-2 degrees. All patients included in the study were randomly divided into two groups. Group 1 (CPAP) included 20 patients, who in addition to antihypertensive therapy (AHT) received 12-week treatment of CPAP device «Somnobalance e» (Weinmann, Germany). The average age in this group was 58,3±7,3 years, body mass index (BMI) - 41,8±15,2 kg/m2; systolic blood pressure (SBP) - 156,3±6,0 mmHg, di-

astolic blood pressure (DBP) - 95,0±5,6 mmHg. Group 2 (control - C) included 18 diabetic patients who were on drug therapy without additional CPAP treatment. Mean age was 56,0±8,4 years, BMI - 38,4±4,1 kg/m2, SBP - 155,6±8,9 mmHg, DBP - 96,9±4,7 mmHg. The subjects were matched for age, sex, height, office BP. OSA was detected by the cardio respiratory monitoring (CRM) SOMNOcheck2 (Weinmann, Germany). Arterial stiffness was assessed by volume sphygmography device VaSera-1000 («Fukuda Denshi», Japan) with the definition of pulse wave velocity (PWV) in the aorta (PWVao), predominantly elastic type of arteries on the right and left (R/L-PWV), muscle type (B-PWV). The survey was conducted at baseline and after 12 weeks of observation.

Results: According to the volumetric sphygmography in CPAP group the initial values of R-/L-PWV were 15,6±2,8 m/s, B-PWV - 6,5±1,5 m/s, PWVao - 10,4±5,1 m/s. After 12-week CPAP therapy was a decrease of R-/L-PWV to 14,5±2,2 (7,1%, p<0,05). B-PWV and PWV after the treatment were 6,0±1,8 m/s and 8,1 ± 3,5 m/s, respectively (NS). In patients of control group the R-/L-PWV initially was 15,0±2,8 m/s, B-PWV – 7,2 (6,3; 8) m/s, PWVao – 8,1 (6,4; 11,4) m/s. R-/L-PWV declining to 14,1±3,9 m/s (6%, p<0,01). Values of B-PWV and PWVao did not change significantly (8,0±2,6 m/s and 6,8±2,1 m/s, respectively).

Conclusions: Using of CPAP therapy in patients with DM in combination with hypertension and OSA helped to improve the parameters of arterial stiffness.

PP.11.15 ASSOCIATION OF THE POLYMORPHISM OF C1Q TUMOR NECROSIS FACTOR-RELATED PROTEIN WITH DYSLIPIDEMIA IN SLEEP APNEA-RELATED HYPERTENSION

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Objective: (1) To investigate the relationship between the polymorphism of C1q tumor necrosis factor-related protein (CTRP1) and sleep apnea-related hypertension. (2) To investigate the relationship between the polymorphism of CTRP1 and dyslipidemia in sleep apnea-related hypertension.

Design and method: 838 subjects who had clinical symptoms of (Obstructive sleep apnea syndrom)OSAS were recruited from People's hospital of Xinjiang Uygur Autonomous Region from Jan 1th 2010 to Dec 31th(male: 615 , average age is 45.68 9.55,female: 221, average age is 49.63 9.78).Variable sites of CTRP1's gene function were sequenced. Through Taqman-PCR, represented sites were genotyped.

Results: (1) We found eight variable sites from the CTRP1's gene function. Through Taqman-PCR, we successfully genotyped three sites: rs4789922,rs11 077409,rs76683473. (2) Between OSAS group and non-OSAS group, the frequency distribution of genotypes have no significant difference.(3) Between dyslipidemia group and non- dyslipidemia group(P=0.003), low LDL-C group and non- dyslipidemia group(P=0.001), high TG group and non- dyslipidemia group(P=0.001), the frequency distribution of genotypes in rs76683473 have significant difference respectively. (4)Logistic regression: adjusting the influence factors including body mass index (BMI) and fasting blood glucose (FBG), rs76683473 was a risk factor of low LDL-C(GG vs GT+TT OR=1.52 95%CI: 1.01~2.29) and high TG(GG vs GT+TT OR=1.83 95%CI: 1.19~2.80)in sleep apnea-related hypertension.

Conclusions: The polymorphism of CTRP1 has relationship with dyslipidemia in sleep apnea-related hypertension, excluding influence factors of obesity and blood glucose.

PP.11.16 NOCTURNAL DIETARY NITRATE FOR OBSTRUCTIVE SLEEP APNOEA: A PILOT, RANDOMIZED, CROSSOVER 2 WEEK TRIAL

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Objective: Obstructive sleep apnoea syndrome (OSAS) is associated with high blood-pressure (BP), absence of nocturnal BP dipping and decreased cerebral blood-flow leading to an increased risk for cardiovascular and neurocognitive morbidities. The bioavailability of nitric oxide (NO), a vasodilator, is indicated by serum nitrate/nitrite, which are typically decreased in OSAS. Dietary nitrate may increase serum nitrate/nitrite, lower BP, and increase cerebral blood-flow.

Design and method: 3 CPAP naïve males (mean age 53.3y; mean BMI 38.1kg/m2) with severe OSAS (mean AHI 34) were recruited. At baseline, each subject completed the Fatigue Severity Scale (FSS), Epworth Sleepiness Scale (ESS), Beck Depression Inventory (BDI), a neuropsychological assessment (trail making) and wore an ambulatory BP monitor for 24-h. Subjects were randomized to either 140ml beetroot juice (BRJ) (14mmol nitrate) nightly or 140ml water (<0.5mmol nitrate) nightly for 2 weeks followed by the crossover condition. Assessments were repeated at after 2 and 4 weeks.

Results: No adverse effects of dietary nitrate were reported. We observed a trend towards increased mood and neuropsychological function as well as decreased fatigue, sleepiness, and blood pressure.

Table 1: Differences between water and BRJ

	Baseline	BRJ	Water	P-value
FSS (0-60)	45	28	54	0.08
ESS (0-24)	13	5	14	0.1
BDI (0-63)	13	3	14	0.1
Trail making A (seconds)	30	27	32	0.004
Trail making B (seconds)	51	35	60	0.1
Nocturnal SBP (mmHg)	118	106	122	0.08
Nocturnal DBP (mmHg)	71	67	74	0.06
% dipping SBP	-1.3	7.5	-0.3	0.02

Conclusions: Nocturnal dietary nitrate may improve NO bioavailability in OSAS, resulting in direct benefits to BP profiles, in particular improving the nocturnal dip. Further work is required to evaluate this therapeutic concept.

PP.11.17 OBSTRUCTIVE SLEEP APNEA PATIENTS WITH NON-DIPPER AND RISER PATTERNS RECEIVE MORE BLOOD PRESSURE LOWERING EFFECTS FROM CONTINUOUS POSITIVE AIRWAY PRESSURE TREATMENT

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Objective: Patients with obstructive sleep apnea (OSA) frequently present non-dipper type of nocturnal blood pressure which has been reported to be a risk of cerebrovascular events. A few meta-analyses revealed continuous positive airway pressure treatment (CPAP) can reduce blood pressure in OSA patients but the efficacy is limited. The aim of this study was to examine the hypothesis that there are differences in blood pressure lowering effects by CPAP among nocturnal types of OSA patients.

Design and method: We registered 110 consecutive patients who were diagnosed with OSA for the first time by polysomnography and satisfied the inclusion criteria of left ventricular ejection fraction>40%, %VC>80%, FEV1.0%>70%, Hugh-Jones class I, and central apnea index<5 per hour. Of the patients, 50 successfully underwent CPAP and were prospectively examined with ambulatory blood pressure monitoring (ABPM) just before and 6-month after the treatment. Patietns were divided into Normal/Dipper and Non-dipper/Riser groups according to the nocturnal blood pressure types. Patients were excluded if daily CPAP usage<4 hours or %CPAP usage<60%.

Results: Because 7 of 22 patients in Normal/Dipper and 9 of 28 patients in Non-dipper/Riser were excluded due to poor compliance, 15 and 19 were finally analysed, respectively. The severity of OSA, acute effects of CPAP, and the compliance of 6-month CPAP were similar between the two groups. While day and night systolic/diastolic blood pressure did not change between before and after the 6-month CPAP (day: before 132±13/87±11, after 135±15/87±10, night: before 113±12/76±8, after 118±15/78±9 mm Hg) in Normal/Dipper group, night systolic/diastolic blood pressure significantly decreased (day: before 139±14/88±10, after 134±13/86±12, night: before 134±17/86±10, after 121±15/80±11 mm Hg, p<0.01) and significant differences between day and night blood pressure appeared which did not exist before the 6-month CPAP (systole: p<0.001, diastole: p<0.01) in Non-dipper/Riser group.

Conclusions: The present study demonstrated that the patients with nocturnal blood pressure of non-dipper or riser approached a normal pattern in those firstly diagnosed with OSA and induced CPAP. Such patients may obtain more beneficial effects from CPAP compared to those with normal or dipper blood pressure pattern.

PP.11.18 BLOOD PRESSURE PROFILE IN SNORING HYPERTENSIVE PATIENTS WITHOUT APNEA

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Objective: The association between obstructive sleep apnea (OSA) and hypertension was established.
In spite of the fact that snoring is the main manifestation of OSA, an important number of the snoring population fails to present apnea. Apnea and hypoxemia were proposed as the link between OSA and hypertension.
The aim of our study was to observe the blood pressure (BP) profile and the prevalence of underestimated high blood pressure (UHBP) in snoring hypertensive patient (HP) without apnea.

Design and method: Ninety two male HP (age 55 +/- 15 BMI 30 +/- 5) with systolic and diastolic office BP 168 +/- 23 and 105 +/- 9, respectively were prospectively included.
Hypertension diagnosis was performed by office and ambulatory BP.
Snoring severity was evaluated by Berlin questionnaires in all HP.
Exclusion criteria: apnea hipopnea index > 5 events /hour; respiratory pathologies, antihypertensive or anxiolitic therapy, smokers and alcohol abuse.
Ambulatory BP measurements (ABPM, spacelabs 90207) and Polisomnographia Study (PSG ATI Praxis 18) were performed in all patients.
Statistics analysis was performed by Spearman correlation, Kruskall Wallis and chi cuadrado distribution. P<0.05 was considered statistically significant.

Results: A significant correlation was found between snoring severity and nocturnal systolic and diastolic BP (p.0.01), as well as 24 hour systolic BP (P.0.03). This relationship remains unalterated even after being adjusted by age and BMI.
In our study, office BP had no correlation with snoring severity. ABPM showed that 44 HP (47.8%) were non-dipper and 21 HP (22.8%) disclosed and inverse dipper pattern.
Twenty six HP (28.2%) presented more severe BP when ABPM was performed (UHBP).

Conclusions: In our snoring hypertensive population without OSA, a significative relationship between snore severity and ambulatory BP was found, with high incidence of loss in circadian rythm.
ABPM analysis showed a high incidence of non-dipper pattern and underestimated high blood pressure and would be the proper tool for the study of these patients.
The relationship between snoring severity and BP needs further investigation.

PP.11.19 A TENDENCY TOWARD A SHIFT IN A COUNT OF CIRCULATING ENDOTHELIAL PROGENITOR CELLS IN PATIENTS WITH ARTERIAL HYPERTENSION, OBESITY AND SEVERE OBSTRUCTIVE SLEEP APNEA SYNDROME

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Objective: Preliminary results of the ongoing study investigating peculiarities of inflammatory response and endothelial function in patients with arterial hypertension (AH), obesity and obstructive sleep apnea syndrome (OSAS) and the effects of CPAP and antihypertensive therapy.
Background: OSAS is frequently associated with obesity and AH. All of the co-morbidities have impact on endothelial function. Circulating endothelial progenitor cells (EPCs) are known for their potential in the process of endothelial damage and repair. Though results in this field are inconsistent.

Design and method: To evaluate the number of circulating EPCs in patients with AH, obesity and severe OSAS in comparison with control group.
Materials and methods: In the analysis we included 18 male pts with AH 155.38± 8.6/ 94.9±14,2mmHg, severe OSAS (AHI 55.1±24,5) and obesity (BMI 36.8±4,9) and 8 male pts with AH 153.11±11,5/ 95,0±12,4 mmHg, obesity (BMI 36.2±4,4), but without OSAS (AHI 3.6±1,5). Both groups were matched by age, cardiovascular risk factors and were otherwise healthy (in terms of chronic heart disease, diabetes mellitus, chronic kidney disease, manifested autoimmune or inflammatory disease) . EPCs - CD34+CD133+CD309(VEGF-2/KDR+) were isolated and quantified from peripheral blood samples, obtained in the fasting condition, following sleep studies and initial diagnostics - by flow cytometry (Cytomics FC500, Beckman Coulter, USA).

Results:

	OSA+AH + Obesity	AH + Obesity	*p*
Age	42.6 ± 8,0	40.5 ± 10,0	0.6272
BMI	36.8 ± 4,9	36.2 ± 4,4	0.7113
AHI	55.1 ± 24,5	3.6 ± 1,5	0.0001
SBP, mmHg	155.3 ± 8.6	153.1 ± 11,5	0.7983
DBP, mmHg	94.9 ± 14,2	95,0 ± 12,4	0.8650
HR	80.2 ± 15.7	63.1 ± 4.7	0.0069
Absolute leucocytes count	6.5 ± 1,8	6.6 ± 1,6	0.9024
% CD34	1.181 ± 0.9883	1.026 ± 0.4999	0.9025
% EPC	0.4519 ± 0.4354	0.6000 ± 0.5253	0.3269
Absolute count EPC/10ml	420.11 ± 663.49	194.10 ± 380.02	0.3995

Conclusions: In the preliminary data of the study, patients with OSAS, obesity and AH showed a tendency to the increase of the number of circulating EPC in comparison to the matched group of obese AH patients without OSAS, but without statistical significance.
It is planned to continue recruitment of the patients for further evaluation of obtained data and assessment the impact of CPAP and antihypertensive therapy.

PP.11.20 INCREASED ARTERIAL STIFFNESS IN HYPERTENSIVE PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA: EFFECTS OF GENDER

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Objective: Obstructive Sleep Apnoea (OSA) is associated with increased arterial stiffness in males. However, the association between OSA, hypertension and arterial stiffness is not clear in females. The main aim of this study is to explore whether the impact of OSA on arterial stiffness is modulated by gender.

Design and method: We recruited consecutive patients with established diagnosis of hypertension under a standardized antihypertensive treatment (hydrochlorothiazide plus enalapril or losartan). All patients were submitted to antropometric measurements, full polysomnography, office blood pressure (BP), ambulatory blood pressure measurements (ABPM) and carotid-femoral pulse wave velocity (PWV), a marker of arterial stiffness. OSA was defined by an apnoea-hypopnoea index >=15 events/hour of sleep). We performed distinct analysis by gender (male and females).

Results: Eight-nine patients were studied (37males/52 females). The main results are shown in the Table:

	Males			Females		
	No OSA N = 12	OSA N = 25	P	No OSA N = 29	OSA N = 23	P
Age (years)	56.6±8.1	57.2±10	0.83	52±9.8	58.7±8.1	<0.05
Body Mass Index (Kg/m²)	29.7±2.7	30.3±3.9	0.56	28.7±5.5	33±5	<0.05
Apnea-hypopnoea index(events/hour)	8.9±4.3	35.5±18.8	<0.05	5.9±4.7	31.1±16.4	<0.05
Daytime Systolic ABPM (mmHg)	138.6±16.9	139.6±18	0.86	130.7±17.7	133.6±15	0.53
Daytime Diastolic ABPM (mmHg)	87.1±10.6	87.5±13.4	0.92	82.5±12.1	80.8±11.4	0.61
Nightime Systolic ABPM (mmHg)	119±15.7	125.8±19.1	0.25	117.9±19.7	121.6±15.8	0.49
Nightime Diastolic ABPM (mmHg)	71.4±12.9	75.1±12.6	0.42	70.2±13	69.8±12.8	0.92
Non-dipping (%)	25	48	0.28	41.4	65.2	0.1
PWV (m/s)	11.2±2.2	12.8±2.4	0.05	11.8±2.3	13.1±2.2	0.05

Conclusions: In patients with hypertension, the presence of OSA is associated with increased arterial stiffness not only in males but also in females. Since arterial stiffness is a marker of increased cardiovascular risk, these results suggest that females are also exposed to the cardiovascular consequences of OSA.

PP.11.21 OBSTRUCTIVE SLEEP APNEA. THE MOST FREQUENT CAUSE OF RESISTANT HYPERTENSION IN YOUNG PEOPLE

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Objective: Secondary hypertension refers to arterial hypertension due to an identifiable cause and affects ~5-10% of the general hypertensive population. Recognition and treatment of secondary causes of hypertension may help to control blood pressure and reduce cardiovascular risk. There is increasing evidence that obstructive sleep apnea (OSA) is an independent risk factor for arterial hypertension. This study aimed to describe the profile of resistant hypertension in young patients, and to elucidate the relationships between OSA and hypertension.

Design and method: 98 consecutive patients, aged 18 to 60 years with resistant hypertension were investigated for known causes of hypertension. A group of 36 patients in whom antihypertensive medication was kept unchanged was followed for 6 months during continuous positive airway pressure (CPAP) therapy.

Results: Among 98 patients (age: 49±1,3 years, 46% males, systolic and diastolic blood pressure: 178±34 and 106±21 mm Hg, respectively), obstructive sleep apnea (apnea-hypopnea index: >15 events per hour) was the most common condition associated with resistant hypertension (62.2%), followed by primary aldosteronism (3,8%), renal parenchymal disease (2,04%), renal artery stenosis (2.04%), oral contraceptives (1.02%), and thyroid disorders (1,02%). In 27,8%, no secondary cause of hypertension was identified. Two concomitant secondary causes of hypertension were found in 1,02% of patients. Half of the patients 55.1% presented obesity (mean BI 32,6±1,3). Age >50 years ($p<0.01$), obesity ($p<0.05$), neck circumference >=41 cm for women and >=43 cm for men ($p<0.05$), and snoring ($p<0.05$) were predictors of obstructive sleep apnea. The mean AHI was 23.2 +/- 22.0 events/h before OSA therapy. During the follow-up period with effective CPAP therapy, the mean daytime systolic BP decreased with 11±1,5 mmHg ($p=0.051$), diastolic BP with 8±1,3 mm Hg($p= 0.001$), and HR from 67.7 +/- 6.8 to 75.7 +/- 8.1 beats/min ($p = 0.001$).

Conclusions: Obstructive sleep apnea seems to be the most common condition associated with resistant hypertension. Obesity, age >50 years, large neck circumference and snoring are good predictors of obstructive sleep apnea. In patients with reversible causes of hypertension, early detection and treatment are important to prevent irreversible changes in the vasculature and target organs.

PP.11.22 PREVALENCE OF BLOOD PRESSURE CONTROL AT CARDIOLOGIST' CONSULTATION IN A OBSTRUCTIVE SLEEP APNEA SYNDROME POPULATION

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Objective: Obstructive sleep apnea (OSA) is the most frequent factor influencing the bad control of blood pressure. OSA syndrom is a daily concern of cardiologists. We aim to assess the prevalence of blood pressure control in a population of patients followed by cardiologists.

Design and method: Seven cardiologists have prospectively collected the data of 69 patients followed at their consultation from Mars 2012 until December 2012. Patients must be observant of their positive airway ventilation and free of cardiovascular or pneumologic event for more than 6 months. The population was divised in two groups regarding 24 hours ambulatory blood pressure monitoring. The blood pressure control was defined as a 24-hours blood pressure <130/80 mmHg.

Results: We used non parametric tests for the statistical analysis. There were not differences between groups regarding clinical and epidemiological data. 44 patients (63% of the population) didn't reach blood pressure target. The seniority of the OSA ($p=0.01$) and a higher systolic blood pressure at consultation ($p=0.004$) were the most clinical factor associated with a poor control. The treatment score and the prescription of the different therapeutic class were not different between groups, all patients were hypertensive. We noted a higher left ventricular mass ($p=0.02$) and a higher root aortic size ($p=0.04$) in case of poor blood pressure control. The main results are summarized in the table.

Population characteristics'	Blood pressure target n=25	Uncontrolled Group n=44	p
Age (years)	56.4+/-8.7	58.8+/-8.9	0.2
Gender (male/female)	18/7	37/7	0.2
BMI (Kg/m²)	33.4+/-6.2	33.4+/-7.4	0.9
Seniority of ventilation (years)	3.6+/-3.27	6.3+/-5.06	**0.01**
Ventilation time per night (hours)	6.7+/-1.4	6.8+/-1.6	0.8
Root ascending aortic size (mm)	31+/-3.7	34+/-4.6	**0.04**
Left ventricular mass (g/m²)	83+/-13	92+/-16	**0.02**
24-h SBP (mmHg)	119 ± 7	143 ± 14	0.0001
24-h DBP (mmHg)	72 ± 5	83 ± 10	0.0001
SBP day-time (mmHg)	124 ± 8	147 ± 16	0.0001
DBP day-time (mmHg)	76 ± 7	86 ± 12	0.0004
SBP night-time (mmHg)	108 ± 7	132 ± 15	0.0001
DBP night-time (mmHg)	64 ± 5	75 ± 10	0.0001

Legend : Group 1 : 24-h Blood pressure <130/80 mmHg, groupe 2: 24-h Blood pressure upper or equal to 130 mmHg for the systolic or 24-h Blood pressure upper or equal to 80 mmHg for the diastolic. BMI: Body Mass Index, SBP: systolic Blood Pressure, DBP: diastolic blood pressure

Conclusions: The poor blood pressure control is high in this population. This phenomen seems to be associated with a higher target organ damage. 24-h ambulatory blood pressure monitoring should be used regularly in this high risk population.

PP.11.23 HYPERTENSION PREVALENCE AND CARDIOVASCULAR RISKS ASSOCIATED WITH OBSTRUCTIVE SLEEP APNEA IN GUADELOUPE (FRENCH WEST INDIES)

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Objective: In Guadeloupe, arterial hypertension, dyslipidemia and type 2 diabetes are the most important cardiovascular risk factors and prevalence of obstructive sleep apnea (OSA) is unknown. Data on the relationships between hypertension and OSA are also unavailable. The aim of this study was:
i) to assess the prevalence of arterial hypertension and nondipper pattern evaluated by 48 hour-ambulatory blood pressure monitoring (ABPM) in an adult population identified obstructive sleep apnea (OSA)/ non-OSA during cardiorespitory monitoring.
ii) to determine the risk factors associated with OSA.

Design and method: A preliminary cross- sectional study was realized at Pointe-a- Pitre University Hospital. Patients were referred for suspected OSA to sleep specialist and performed a polysomnography or cardiorespitory polygraphy. OSA was present if the apnea- hypopnea index was > or = 5. We obtained two groups: OSA/ non-OSA. Before obtaining cardiorespitory monitoring results, all patients underwent 48 hour- ABPM. We determined fasten level of cardiovascular risk markers (hs-CRP, homa-IR index) and identified cardiovascular risk factors.

Results: A total of 139 patients were included. The mean age ± SD at diagnosis was 53 ± 11 years, 65% were women. OSA was present in 68% with a higher frequency in men than in women (82% vs 60%; P= 0.009). Difference was not significant between the two groups OSA/ non-OSA for hypertension frequency (78% vs 82%; P= 0.54) and nondipper pattern (71% vs 78%; P= 0.42). Difference was significant for mean waist circonference, body max index and homa-IR index and for frequencies of snoring (81% vs 56%; P= 0.002), obesity (48% vs 29%; P= 0.03), dyslipidemia (51% vs 22%; P= 0.001) and type 2 diabetes (22% vs 7%; P= 0.02).

Conclusions: Our preliminary data highlight raised frequency of cardiovascular risk markers and cardiovascular risk factors in patients with OSA and confirm their high cardiovascular risk. Number of subjects included in the study limit the statistical power and probably affects the results. A prospective follow-up will allow to compare incidence of cardiovascular events in the two groups OSA/non-OSA.

PP.11.24 RELATIONSHIP BETWEEN SNORING AND PREHYPERTENSION IN ADOLESCENTS

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Objective: To determine the association between snoring and prehypertension (PH) in adolescents.

Design and method: This study included 96 adolescents, 43 males and 53 females. Demographic (age, gender), anthropometric parameters [weight, height, waist circumference (WC)] and casual blood pressure (BP) were recorded. Also, parents of adolescents completed the 22-item Sleep-Related Breathing Disorder (SRBD) scale of the Pediatric Sleep Questionnaire, and it was analyze the subscales for snoring (Items A2, A3, A4 and A5) as the mean values of the responses [(yes=1, no=0), SMV]. The PH was defined as average of casual blood pressure (BP) greater than or equal to the 90 percentile but less than the 95 percentile, or BP greater than or equal to 120/80 mmHg. Spearman Correlation was applied to determine the association between PH and snoring; the logistic regression analysis was used to estimate the risk value of snoring on PH condition.

Results: The PH prevalence was 10.4 % in all adolescents, 16.3% in males and 5.7% in females (p: NS). Adolescents with PH showed higher values than normotensives in SMV (0.57 vs. 0.22; p=0.004), body mass index (27.4 vs. 22.3, p=0.004), WC (86.6 vs. 72.3, p=0.0001). It was showed a statistically significant correlation among PH with: WC (R=0.316, p=0.002), SMV (R=0.250, p=0.01) and male gender (R=0.228, p=0.03). The logistic regression analysis showed the following risk factors for PH: SMV [Odds Ratio (OR) = 6.181; 95% Confidence Intervals (CIs)= 1.120-31.114; p=0.03] and WC [OR= 1.068; 95% CIs= 1.016-1.123; p=0.01].

Conclusions: Snorers adolescents have a very high risk for prehypertension. Therefore, the investigation of sleep quality in this population is recommended to detect early cardiovascular risk.

PP.11.25 PREVALENCE OF CORONARY HEART DISEASE IN PATIENTS WITH ARTERIAL HYPERTENSION BASED TO THE DESATURATION INDEXES

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Objective: Sleep-related breathing disorders are highly prevalent in patients with established cardiovascular diseases and are present in a large proportion of patients with arterial hypertension.
To assess prevalence of coronary heart diseases in patients with arterial hypertension according to the various desaturation indexes.

Design and method: Every fifth patient (pt) admitted to the Complex was enrolled in the study (excluding emergency and surgical departments) over a period of 6 months. Overnight pulseoximetry was performed with The PulseOx 7500™. We used 4% oxygen desaturation index (ODI).
The analyzed sample consisted of 205 pts. Mean age was 60,0±12,2 years. The patients were divided into four groups (gr) by the desaturation index (ODI). We analyzed the prevalence of coronary heart disease (CHD), myocardial infarction (MI), percutaneous transluminal coronary angioplasty (PTCA), coronary artery bypass graft (CABG) according to the oxygen desaturation index.

Results: Prevalence of coronary heart disease, including myocardial infarction, percutaneous transluminal coronary angioplasty, coronary artery bypass graft in patients with arterial hypertension was not depending on the oxygen desaturation index.

	Gr.1 ODI ≤ 5 (N=46)	Gr.2 5 < ODI ≤ 15 (N=64)	Gr.3 15 < ODI ≤ 30 (N=46)	Gr.4 30 < ODI (N=49)	*p*
CHD, N (%)	22 (47,8%)	26 (40,6%)	19 (41,3%)	19 (38,7%)	ns
MI, N (%)	12 (26,1%)	16 (25,0%)	11 (23,9%)	11 (22,4%)	ns
PTCA , N (%)	13 (28,3%)	17 (26,6%)	8 (17,4%)	10 (20,4%)	ns
CABG N (%)	2 (4,3%)	4 (6,2%)	2 (4,3%)	3 (6,1%)	ns

Conclusions: For more subtle analysis it is important to take into consideration the degree of arterial hypertension, polysomnography analysis of the sleep breathing.

POSTERS' SESSION

POSTERS' SESSION PS12
KIDNEY

PP.12.01 REGULATION OF RENALASE EXPRESSION BY D5 DOPAMINE RECEPTORS IN RAT RENAL PROXIMAL TUBULE CELLS

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Objective: The dopaminergic and sympathetic systems interact to regulate blood pressure. Our previous studies showed that a regulation of 1-adrenergic receptor function by D1-like dopamine receptors in vascular smooth muscle cells. Because renalase could regulate circulating epinephrine levels and dopamine production in renal proximal tubules (RPTs), we tested the hypothesis that D1-like receptors regulate renalase expression in kidney.

Design and method: The effect of D1-like receptor stimulation on renalase expression and function was measured in immortalized RPT cells from Wistar-Kyoto (WKY) and spontaneously hypertensive rats (SHRs).

Results: We found that the D1-like receptor agonist, fenoldopam (10-7-10-5 mol/L), increased renalase protein expression and function in WKY RPT cells but decreased them in SHR cells. Fenoldopam also increased renalase mRNA levels in WKY but not in SHR cells. In contrast, fenoldopam increased the degradation of renalase protein in SHR cells but not in WKY cells. The regulation of renalase by the D1-like receptor was mainly via the D5 receptor because silencing of the D5 but not D1 receptor by antisense oligonucleotides blocked the stimulatory effect of the D1-like receptor on renalase expression in WKY cells. Moreover, inhibition of PKC, by the PKC inhibitor 19-31, blocked the stimulatory effect of fenoldopam on renalase expression while stimulation of PKC, by a PKC agonist (PMA), increased renalase expression, indicating that PKC is involved in the process.

Conclusions: Our studies suggest that the D5 receptor positively regulates renalase expression in WKY but not SHR RPT cells; aberrant regulation of renalase by the D5 receptor may be involved in the pathogenesis of hypertension.

PP.12.02 AMBULATORY ARTERIAL STIFFNESS INDEX, PULSE PRESSURE AND RENAL FUNCTION IN PRIMARY HYPERTENSION

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Objective: Ambulatory arterial stiffness index (AASI) has been introduced as a novel marker of arterial stiffness which independently predicts stroke and cardiovascular mortality. However, clinical usefulness and accuracy were questioned and it is unanswered whether AASI may add to better stratification and prediction of overall risk. Our aim was to assess the relationship between AASI and renal function in a group of newly diagnosed, untreated hypertensive patients and compare this surrogate index with pulse pressure (PP), an old, reliable and simple measure.

Design and method: A total of 103 subjects (mean age 37±9.1yr; men 58%), with eGFR > 60 ml/min/1.73m2 were enrolled. ABPM was measured using Spacelab's device, and office BP with mercury sphygmomanometer. The AASI was defined as 1 - the regression slope of diastolic over systolic BP readings obtained from 24-h recordings. Albuminuria was determined from 24 h urine sample and separately during day and night. Glomerular filtration rate was estimated using abbreviated MDRD formula.

Results: The average office BP values were significantly higher than 24h ABPM values (153.7/102.1 (15/8.5) vs. 135.5/84.8 (12.9/10.5) mmHg ($p< 0.001$). Significant difference was found between average office PP and 24h ABPM PP (51.7(12) vs. 50. 6(8.7); $p<0.01$). Average AASI was 0.373± 0.05. AASI and 24h PP were strongly associated ($r=0.8269$, $p<0.00001$). Significant correlation between ABPM PP values and albuminuria measured either during day-time, night-time or 24h was observed ($r=0.405$; $r=420$; $r=0.414$; respectively, $p=0.002$) as well as with eGFR ($p<0.05$). In contrast, we failed to find correlation between AASI and office PP neither with albuminuria nor with eGFR ($p>0.05$).

Conclusions: In the present cross-sectional study AASI was not independently associated with signs of renal damage. AMBP PP outperformed AASI but also office PP. Our results strengthen the usefulness of ABPM in clinical work but failed to prove advantage of AASI over pulse pressure.

PP.12.03 EFFECT OF MINERALOCORTICOID AND AMILORIDE ON BLOOD PRESSURE IN ONE-RENIN GENE LIDDLE MUTATION MICE

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Objective: Variants in epithelial sodium channel (ENaC) genes play an important role in the development of salt-sensitive hypertension. We have previously reported that, under high salt diet, two-renin gene Liddle mutation mice developed high blood pressure (BP) accompanied with low plasma aldosterone level and high activity of ENaC. However, number of renin gene has an impact on BP. It is unknown whether the Liddle mouse's BP responses to mineralocorticoid and to amiloride (ENaC blocker)? The aim of the study was to investigate the impact of deoxycorticosterone-acetate (DOCA) and amiloride on BP in one-renin gene Liddle mutation mice under normal salt diet.

Design and method: Male adult Liddle and control one-renin gene mice were applied in the study. PA-C10 telemetry transmitter was implanted for continuous monitoring carotid arterial BP in a freely moving mouse. After one-week BP monitored as baseline, a DOCA implant was subcutaneously implanted in the mouse for one week. Then, withdrawn the DOCA implant and monitored BP for another week. Afterwards, the mouse subcutaneously received an Alzet osmotic minipump filled with amiloride.

Results: Even under normal salt diet, telemetric BP in one-renin gene Liddle mutation mice was significant higher than the control. Administration of DOCA elevated BP compared to baseline in Liddle mice. Withdraw DOCA, the Liddle mice's BP declined to baseline. No change in BP was found in amiloride treated Liddle mice under normal salt diet.

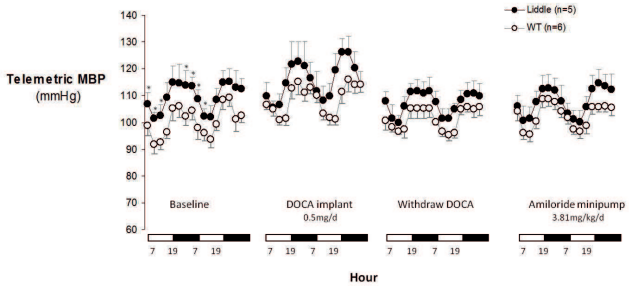

Figure: Telemetric mean blood pressure (MBP) in Liddle and control mice treated with DOCA and amiloride under normal salt diet. Each dot represents MBP with 3-hour moving average. Day or sleeping MBP was shown from 7h to 19h (blank cuboid on X-axis); Night or active MBP, from 19h to 7h (dark cuboid on X-axis).

Conclusions: One-renin gene Liddle mutation mice develop high BP under normal salt diet. Mineralocorticoid may activate ENaC for increasing BP in Liddle mice. This provides potential clinical implication for treatment on low renin hypertensive patient with ENaC mutation by aldosterone antagonist. It is of interest to further study the effect of aldosterone antagonist and low salt diet on BP in Liddle mutation mice.

PP.12.04 THROMBIN CLEAVED OSTEOPONTIN PLAYS AN IMPORTANT ROLE IN ACUTE KIDNEY INJURY

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Objective: Acute kidney injury (AKI) affects both quality of life and health care costs and is a common condition with a high risk of death. Ischemia-reperfusion (I/R) induced acute kidney injury (IR-AKI) is widely used as a model of AKI in mice. In AKI, renal tubular necrosis and apoptosis, interstitial congestion and bleeding are seen in renal tissues. Plasma osteopontin (OPN) was reported to be a novel biomarker for overall survival and renal outcome in patients with acute kidney injury. OPN is cleaved by thrombin and released as thrombin cleaved OPN (trOPN). Therefore we hypothesized that OPN is cleaved by thrombin in AKI tissues. In the present paper, we studied roles of OPN and trOPN on AKI caused by ischemia-reperfusion injury (I/R) in mice.

Design and method: OPN knock out (KO) and wild type (WT) mice were used in this study. Mice were anesthetized, right renal pedicle were ligated with 5-0 silk suture and right kidney removed. After 14days, mice were anesthetized, left renal pedicle were clamped with atraumatic clamps for 20 minutes followed by reperfusion for 48 hours. We obtained blood samples from inferior vena cava and removed left kidney.

Results: Serum creatinine and blood urea nitrogen significantly higher in WT-I/R mice than that of OPN KO-I/R mice. Outer medulla tubular necrosis was more severe in WT-I/R mice than that of OPN KO-I/R mice. Western blotting detected a substantial increase of total OPN with trOPN in WT-I/R mouse renal tissues. Immunostaining of renal specimens revealed OPN and TrOPN were expressed mainly in tubule at outer medulla. TUNEL positive cells were detected in WT-I/R mice more than in OPN KO-I/R mice.

Conclusions: These results suggested that induction of OPN and trOPN plays an important role in renal tissue injury through the induction of tubular apoptosis by I/R mouse model.

PP.12.05 RENAL PROGNOSIS IN PATIENTS WITH ESSENTIAL HYPERTENSION: ROLE OF SERUM PHOSPHORUS CHANGES DURING FOLLOW-UP

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Objective: Our aim was to analyze whether changes in plasma phosphorus (P) were associated with renal prognosis in a cohort of patients with essential hypertension.

Design and method: 1361 patients with essential hypertension, 50.2% male, age 60.5±12.3 years, usually followed at our center, were analyzed. All were followed for a minimun of three years. We classified the patients in two groups, defined by the presence of renal event (development of albuminuria >=30 mg/g or progression of albuminuria during follow-up) or absence of renal event (maintenance of albuminuria <30 mg/g during the follow-up). Changes in plasma phosphorus (Δ P) were assessed absolutely (final P - initial P) and relatively ((final P – initial P)/(initial P) x100).

Results: At baseline the mean serum creatinine was 1.0±0.4 mg/dl, estimated glomerular filtration rate (eGFR) using the formula CKD-Epi was 78.4±25.1 ml/min/1.73m2, and mean plasma phosphorus was 3.3±0.5 mg/dl .
Patients with renal event (n=363, 26.7%) were older (64.2±11.5 vs 59.2±12.3 years), higher systolic blood pressure (144±20 vs 136±18 mmHg), higher requirements of antihypertensives drugs (2.7±1.2 vs 2.1±1.2), higher serum creatinine (1.18±0.51 vs 0.93±0.27 mg/dl) and lower eGFR (71.1±32.7 vs 81.1±21.1 ml/min/1.73m2) (p<0.001 for all comparisons). Serum phosphorus showed no significant difference (3.29±0.56 vs 3.28±0.52 mg/dl).
Mean absolute Δ P was 0.11±0.55 mg/dl in patients with renal event and 0.06±0.50 mg/dl in patients without renal event (p=0.083). Mean relative Δ P was 4.9 % among patients with renal event and 2.9% among patients without event (p=0.048). The logistic regression analysis showed that independent factors for the occurrence of renal event were age (odds ratio [OR] 1.029, confidence interval 95% [CI95] 1.017-1.042, p=0.000), female sex (OR 0.575, CI95 0.432-0.765, p=0.000), baseline serum creatinine (OR 4.308 , CI95 2.841-6.533, p=0.000), diabetes (OR 2.153, CI95 1.652-2.805, p=0.000) and relative Δ P (OR 1.009, CI95 1.001-1.017, p=0.021).

Conclusions: In conclusion, in a cohort of essential hypertensive patients regularly followed in our center, changes in plasma phosphorus during follow-up are an independent risk factor for the development or progression of renal disease.

PP.12.06 CIRCADIAN RHYTHM AND DAY TO DAY VARIABILITY OF SERUM POTASSIUM CONCENTRATION

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Objective: Hyperkalemia is a common and life-threatening complication frequently seen in patients with acute kidney injury, end-stage renal disease and chronic heart failure. Most of them also suffer from arterial hypertension. Cardiac arrest and ventricular fibrillation are possible consequences of hyperkalemia. Biosensors are currently being developed to measure serum potassium under ambulatory conditions and trigger an alarm if the potassium concentration exceeds normal limits. Only few studies exist on the circadian rhythm of potassium; and its dependence on age and kidney function is less clear.

Design and method: Our observational monocentric exploratory study included 30 subjects of which 15 had impaired renal function (RF) (GFR < 60 ml/min/1,73m²). Subjects were further categorized into three age groups: 18-39 years (N normal RF= 5, N impaired RF = 4), 40-59 years (N normal RF = 5, N impaired RF = 6), 61-80 years (N normal RF = 5, N impaired RF = 5). Serum potassium levels were measured every 2 hours during a 24 hour period and repeated once after 2, 4, or 6 days.

Results: In the 15 subjects with normal RF, the lowest mean potassium level (3.96 ± 0.14 mmol/l) was observed at 9 p.m and the highest mean potassium level (4.23 ± 0.23 mmol/l) at 1 p.m. In patients with impaired RF, the lowest mean potassium level (4.20 ± 0.32) was observed at 9 p.m. and the highest mean potassium level (4.57 ± 0.46) was observed at 3 p.m. The range between all minima and maxima was greater in patients with impaired RF (0.71 ± 0.45 mmol/l) than in subjects with normal RF (0.53 ± 0.14 mmol/l) [p=0.015]. No difference in the circadian rhythm was found between the first and second examination and between the age groups.

Conclusions: Our results indicate that patients with normal and impaired RF have comparable circadian patterns of serum potassium concentrations, but higher fluctuations in patients with impaired RF. These results have clinical relevance for developing an automatic biosensor to measure the potassium concentration in blood under ambulatory conditions in patients at high risk for potassium fluctuations.

PP.12.07 RENAL TRANSPLANTATION REDUCES PULSE WAVE VELOCITY IN PEDIATRIC PATIENTS

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Objective: Children with chronic kidney disease (CKD) carry an increased cardiovascular risk.
Cardiovascular death is the second leading cause of death in children after renal transplantation. The 4C-T (Cardiovascular Comorbidity in Children with CKD and Transplantation) study evaluates cardiovascular target organ damage longitudinally in children prior to and after renal transplantation.

Design and method: The multicenter, prospective, observational 4C study enrolled 736 children aged 6 to 17 years with estimated GFR <40 ml/min/1.73 m2 at 55 Pediatric Nephrology centres from 12 European countries.
Of these, 161 have started renal replacement therapy (RRT) and entered the 4C-T study. At annual study visits, the morphology and function of the heart and large arteries were monitored by noninvasive methods.

Results: 119 of the 161 patients with RRT had a visit 12 months after RRT start and were included in this analysis. 56 patients had started dialysis and 73 received a transplant. Half of the patients (52 %) were transplanted preemptively. Overall patients carried a higher cardiovascular risk compared to the age-matched general population as documented by elevated age-adjusted aortic pulse wave velocity (PWV) and carotid intima-media thickness (IMT). After renal transplantation PWV-SDS decreased from 0.31±1.48 to -0.20±1.21 (p=.007, paired t-test), whereas PWV remained unchanged after initiation of

dialysis (0.53±1.75 to 0.43±1.24 (p=.66). No differences were seen for IMT and left ventricular mass index.

Conclusions: Our preliminary analyses suggest an improvement of the arteriosclerotic profile in patients undergoing transplantation compared to patients starting dialysis. PWV has been the most sensitive measure for those changes. With more and more patients becoming eligible, the 4C-T study will be one of the largest studies investigating the course of cardiovascular comorbidity in pediatric renal transplant recipients.

PP.12.08 LEFT VENTRICULAR MASS AFTER RENAL TRANSPLANTATION, A META-ANALYSIS

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Objective: Left ventricular hypertrophy is of prognostic importance in patients after renal transplantation. Several small studies have examined left ventricular mass index (LVMI) in renal transplant recipients with unequivocal results. We therefore performed a metaanalysis of the available evidence to assess the effect of renal transplantation on (LVMI).

Design and method: We identified manuscripts from Medline and Scopus using the search term "left ventricular mass" and "(renal OR kidney) AND transplantation". For the final analysis we identified X manuscripts comparing LVMI in kidney transplanted patients cross-sectional with healthy controls, Y manuscripts comparing LVMI in kidney transplanted patients cross-sectional with patients on dialysis, 5 manuscripts examining LVMI longitudinally before and at least 12 months after renal transplantation and 2 studies examining LVMI longitudinally for at least 12 months using a control cohort. Standardized means were computed and a random effect model was used for analysis. All probability values were 2 tailed and P = .05 was considered statistically significant. The extent of heterogeneity between trials was examined with I2 test for heterogeneity and the Cochran Q test; publication bias was evaluated by using funnel-plot graphs to check symmetrical distribution and convergence toward the pooled effect. Analysis was performed using "Comprehensive Metanalysis V2.0, Biostat, Enlewood, USA".

Results: Compared to healthy controls LVMI was higher in renal transplant recipients (standardized mean difference=0.708±0.324, p= 0.029; I2= 89; Q=67.7, p<0.001), but compared to patients on dialysis LVMI was lower (standardized mean difference=0.431±0.116, p<0.001; I2= 18; Q= 6.1, p=0.297). In the studies with longitudinal observation LVMI was decreased after at least 12 months of follow-up (standardized mean difference=0.574±0.228, p<0.001, I2= 49, Q=7.8, p=0.096).

Conclusions: Despite some discrepancies looking at the single studies the overall effect shows that after renal transplantation LVMI decreases compared to dialysis patients. This development might at least in part explain the better survival of patients with end stage renal disease after transplantation compared to dialysis.

PP.12.09 DONOR AND RECIPIENT GENDER INFLUENCE THE IMPORTANCE OF URINARY ANGIOTENSINOGEN LEVELS ON RENAL GRAFT SURVIVAL

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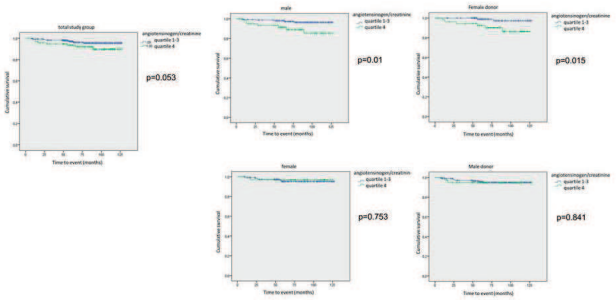
Objective: Intrarenal activity of the renin angiotensin aldosterone system (RAAS) is an important pathophysiological factor for the progression of renal disease. Urinary angiotensinogen (uAGT) levels have been shown to be a measure of intrarenal RAAS activity. We hypothesized that uAGT levels three months after renal transplantation (rTx) may predict long term graft survival.

Design and method: We assessed uAGT/Ucreatinine ratio in 392 patients participating in our rTx protocol biopsy program using a commercially available assay (IBL, Japan). All samples had been stored at -80°C for at least five years to assure long term follow up of patients. Primary endpoint of our analysis was death censored graft survival. Quartiles of uAGT/creatinine ratio were built, Kaplan-Meier curves and log-rank test were used for analysis. All analyses were performed using SPSS 21.0.

Results: 5-year graft survival was 89% in renal transplant recipients in the highest quartile of UAGT/Ucreatinine ratio as compared to 96% in the lower quartiles. This difference was of borderline significance (p=0.053, log-rank test). Further analyses revealed that in male recipients and in kidnys from female donors this effect was pronounced (p=0.01 and p=0.015, respectively), whereas in female recipients and kidneys from male donors this effect was not existent.



Conclusions: In conclusion higher uAGT levels reflecting intrarenal RAAS activity are associated with worse graft survival in males and in recipients of organs from female donors. This reflects a potential pathophysiological role in graft failure e.g. due to profibrotic effects of angiotensin II and aldosterone. Therapeutic strategies to reduce intrarenal RAAS activity e.g. high dose RAAS blockade might be useful to improve long-term graft survival. The gender dependencies of the effect need to be confirmed in further studies.

PP.12.10 LIPID LOWERING DRUGS AND MICROALBUMINURIA: RESULTS OF A GENERAL POPULATION SURVEY IN SPAIN

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Objective: Statins are widely prescribed to reduce cardiovascular risk and to slow down progression of kidney disease. But statins may also generate tubular microalbuminaria. The current observational study evaluated the impact of statin use in general population on the interpretation of microlbuminuria as a marker of cardiovascular and renal disease.

Design and method: We used cross-sectional data of the HERMEX survey, an observational, cross sectional, population based study. 3,402 subjects were randomly selected from the Health Care System of Extremadura. The final sample included 2,813 subjects (mean age 51.2 years, 53.5% female). Urinary albumin excretion (UAE) rate in first morning urine sample was analyzed. Microalbuminuria was diagnosed when UAE rate was > 22 in men or > 31 mg/g in women.

Results: The prevalence of microalbuminuria was 4.1% (95%CI 0.03-0.05) for those patients who were not taking statins vs. 7.2% (95%CI 0.05-0.10) for those who were treated with statins (p = 0.004; X2 test). Comparative odds ratio (OR) from patients taking statins vs. those who were not taking statins was 1.81 (95%CI 1.21-2.71); for subjects without statins, OR 0.62 (95%CI 0.46-0.84); and for patients taking statins, OR: 1.13 (95%CI 1.02-1.25). This result was statistically significant (p = 0.005, Mantel-Haenszel test). The mean UAE ratio was lower (12.6±95.2 mg/g) in patients without statin treatment than in those patients treated with statins (14.1±66.2; p < 0.001, Wilcoxon Test). Subjects using statins had more cardiovascular risk factors, pointing to bias by indication. Nevertheless, multivariate regression analysis showed an independent relationship between statin treatment and microalbuminuria.

Conclusions: Use of statins is independently associated with microalbuminuria, even after adjusting for bias by indication to receive a statin. This microalbuminuria can result in incorrect labeling of subjects as having a higher cardiovascular or renal risk.

PP.12.11 RENAL PROFILE IN A COHORT OF PATIENTS WITH HIGH CARDIOVASCULAR RISK

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Objective: The prevalence of chronic kidney disease (CKD) is mostly attributed to an increase of noncontagious and also non-intrinsic renal disorders, such as hypertension, diabetes or aging. We evaluated risk of CKD by estimated glomerular filtration rate (eGFR) and albuminuria categories in patients undergoing primary prevention program in a specialised center of cardiology and angiology.

Design and method: Study included a cohort of 3,939 white adults, aged 40-64 years with Systematic Coronary Risk Evaluation (SCORE) >=11%, systolic blood pressure (SBP) >= 180 mmHg and/or diastolic blood pressure (DBP) >= 110 mmHg or SBP> 160 mmHg with low DBP, metabolic syndrome (according

to the NCEP ATP III criteria), diabetes mellitus found or present, atherosclerosis in other arteries, early family history of coronary (ischaemic) heart disease or severe dyslipidaemia. GFR was estimated by Modification of Diet in Renal Disease (MDRD) Study Equation, and albuminuria defined as moderately to severely increased when albumin to creatinine ratio (ACR) is >=2.5 in men and >= 3.5 in female.

Results: The cohort consisted of male 37.3%, and female 62.7% with average age 53.98±6.14 yr. The characteristics of cardiovascular risk factors were as follow: waist circumference 103.0±12.3cm, body mass index 30.66±6.62 kg/m2, SBP 154.98 ± 12.03 mmHg, heart rate 67.92±12.03 bpm, fasting glucose 107.6±21.8 mg/dl, cholesterol 269.5± 68.8 mg/dl, triacylglycerides 194.9±196.6 mg/dl, LDL cholesterol 185.6±46.0 mg/dl. Distribution of GFR categories (n=3,939) was: 1 – 36.96%, 2 – 58.62%, 3a – 4.09%, 3b – 2.79%, 4 – 0,25%, 5 – 0.25%. Albuminuria (n=623) was found: normal to mildly increased 92.6%, moderately increased 6.9%, severely increased 0.5%. Stratifying by the renal risk profile, 85.1% of this cohort was diagnosed as a low risk, 13.3% moderately increased risk, 1.4% high risk, and 0.2% very high risk.

Conclusions: In our study, 14.9% of patients had moderately increased to very high risk of CKD. Patients with high cardiovascular risk must be regulary screened for renal profile according to the risk category in order to establish the prevalance of CKD and slower its complications.

PP.12.12 UREMIC CARDIOPATHY IN PATIENTS COMMENCING DIALYSIS- BENEFICIAL EFFECT OF RAAS AND SYMPATHETIC BLOCKADE

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Objective: Congestive cardiac failure with normal ejection fraction is commonly seen in patients with renal failure commencing hemodialysis. The etiology of diastolic dysfunction in chronic kidney disease (CKD) is multifactorial. Activation of RAAS and sympathetic system are major contributors. The aim of the present study is to see whether the treatment aimed at RAAS and sympathetic blockade is beneficial for diastolic heart failure in renal failure.

Design and method: 118 patients with Stage 5 CKD who commenced hemodialysis because of congestive symptoms during the period August 2008 to September 2013 were studied. Consecutive patients were assigned Group A or Group B. Group A (n=59)patients were given a combination of ramiipril 2.5 -5mg, losartan 50-100mg, aldactone 25-50mg and carvedilol 3.125 or nebivolol 2.5 for control of blood pressure. Group A patients were given HD 2 or 3 sessons per week with potassium free dialysate depending on the congestive symptoms. Group B patients (n=59) were on usual antihypertensives which included clonidine, calcium channel blocker (nifidipine or amlodipine), prazosine or minoxidil. Group B patients were given hemodialysis varying from 2-5 sessions per week depending up on the congestive symptoms. ECHO cardiography was done at the end of one week and at six months after initiation of hemodialysis . Blood pressure, congestive symptoms, requirement of hemodialysis and ECHO cardiographic results were compared.

Results: Both groups were comparable for age sex and body mass index (BMI). All patients had comparable symptoms, blood pressure and Echocardiographic findings at the beginning. At the end of 6 months Group A patients had better control of Blood pressure less congestive symptoms and requirement of dialysis was less compared to Group B patients. Echocardiography after 6 months showed significant improvement in LV mass index, posterior wall thickness, septal thicknes and E/A ratio in Group A patients compared to Group B patients.

Conclusions: This study shows that a combination of ACEI, ARB, Aldosterone antagonist and beta blocker improve cardiac function in patients with uremic cardiopathy and is beneficial in the management of CKD patients with congestive symptoms commencing hemodialysis.

PP.12.13 BLOOD PRESSURE DIFFERENCES BETWEEN HAEMODIALYSIS PATIENTS AND RENAL TRANSPLANT RECIPIENTS

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Objective: There is a high prevalence of hypertension in end stage renal disease with estimates from 25 to 80%. Also, 70–90% of renal transplant recipients have either arterial hypertension or requires antihypertensive therapy. The aim of this study was to show the differences in blood pressure between haemodialysis (HD) patients and renal transplant recipients (Tx) in University Hospital Center Split, Croatia.

Design and method: In this study 211 patients (aged 64.79±13.62 years) were included (115 males, 96 females), 134 HD patients and 77 Tx. For Tx systolic (SBP) and diastolic blood pressure (DBP) (mmHg) were obtained during ambulatory visits. For the maintenance HD patients SBP and DBP before middle week HD session were measured. Also, for all study participants mean blood arterial pressure (MAP) and pulse pressure (PP) were determined.

Results: The results demonstrated that 32 patients (out of 211) did not receive antihypertensive drugs. There were 54 (25.6%) unregulated hypertensive subjects (SBP >140 mmHg and/or DBP >90 mmHg); 30 HD patients and 24 Tx. No differences in unregulated hypertension incidence between HD patients and Tx (x2 =1.980; p=0.107) were found. Therefore, the significant differences between these two groups of patients were found in SBP, DBP, MAP and PP value (Table 1).

Table 1. The differences between maintenance HD patients (N=134) and Tx (N=77) (Student's t-test for independent subjects, one tailed).

	HD		TX		
	X±SD		X±SD		P
SBP (mmHg)	128.02±	24.08	137.99±	15.78	0.001*
DBP (mmHg)	66.23±	12.21	81.49±	7.99	<0.001*
MAP (mmHg)	86.83±	14.74	100.32±	9.30	<0.001*
PP (mmHg)	61.79±	18.40	56.49±	13.26	0.014*

Legend: *p*, significance; *$p < 0.05$, *SD*, standard deviation

Conclusions: Unregulated arterial hypertension is highly prevalent in HD and Tx population, with no statistically significant difference between two groups of patients. The Tx have statistically significant higher SBP, DBP, MAP and PP. Possible explanations for this differences is use of immunosuppressive drugs in Tx. Purine synthesis inhibitors, namely azathioprine and mycophenolate salts, and mTOR inhibitors do not interfere with blood pressure, while there is evidence that both calcineurin inhibitors and glucocorticoides can exert hypertensive effects.

PP.12.14 THE EFFECT OF ANTIHYPERTENSIVE DRUGS ON ESTIMATED GLOMERULAR FILTRATION RATE OF HYPERTENSIVE PATIENTS. A RETROSPECTIVE STUDY

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Objective: The aim of the present study was to investigate longitudinally the effect of antihypertensive drugs on estimated glomerular filtration rate (eGFR) in a hypertensive population.

Design and method: This retrospective study consisted of 779 hypertensive adult patients (240 males) of an outpatient hypertension clinic that were followed up for three to twenty years (mean = 7.96±4.16years). Age, body mass index (BMI), mean arterial blood pressure (MAP) and drugs used were recorded for each patient at each visit. Other laboratory tests, including hematocrit, glucose, uric acid and lipid profile, were also measured and included as covariates in the model. Patients with diabetes were excluded from the study. Estimated GFR values were calculated using the simplified Modification of Diet in Renal Disease formula (MDRD). Repeated measures analysis using a mixed effects model was applied in order to investigate the continuous effect of drugs on eGFR within and between patients. A secondary analysis was performed using multiple imputation to estimate missing biochemistry data.

Results: The rate of decline in eGFR (eGFR slope in ml/min/1.73 m2/year) was the primary outcome measure of the study and was evaluated after adjustment for MAP, age, BMI, laboratory tests and dose of each drug used. Complete case analysis revealed that six drugs were significant independent predictors of eGFR. These were verapamil (β coefficient=-1.88, 95% CI -2.85 to -0.91), amlodipine (β=1.37, 95% CI 0.21 to 2.53), benazepril (β=1.93, 95% CI 0.25 to 3.62), lercanidipine (β=7.66, 95% CI 0.89 to 14.43), chlorthalidone (β=0.90, 95% CI 0.07 to 1.73) and enalapril (β=-1.61, 95% CI -3.17 to -0.05). In multiple imputation analysis ten drugs resulted in a significant change in eGFR.

Conclusions: From a pool of 55 antihypertensive substances a diuretic, two angiotensin converting enzyme inhibitors, two dihydropiridine and one non-dihydropiridine calcium channel blockers, were found to have a significant effect on renal function in hypertensive patients in a complete case analysis. The effect of these drugs was beyond blood pressure control.

PP.12.15 BLOOD PRESSURE AND PRIOR HYPERTENSION IN PATIENTS WITH PRIMARY GLOMERULOPATHIES

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Objective: Hypertension (HT) is well established risk factor for renal disease. Blood pressure (BP) values measured at the time when kidney biopsy is performed significantly determine clinical course of patients with primary glomerulopathies (PGN). However, data on the role of BP values before PGN was diagnosed on clinical course are scarce. Our aim was to analyse prevalence of prior HT and to assess whether it influences clinical course in PGN.

Design and method: Data of 745 adult patients (64.5% men; median 40 age (IQR: 28-55) yr.) collected from our registry were analysed. Prior HT was diagnosed as BP > 140/90 mmHg and/or taking antihypertensive drugs before signs of renal impairment (RI) were evident. RI was defined as serum creatinine > 115 umol/l or presence of either proteinuria or erithrocyturia. BP was measured following ESH/ESC guidelines. Age adjusted HT prevalence was calculated. Outcome was defined as complete (proteinuria<0.25 g/dU) and partial remission (proteinuria 0.25-3 g/dU) or therapeutic failure (proteinuria>3.0 g/dU) and ESRD.

Results: In the whole group prevalence of age-sex adjusted prior HT was 59.7%. There was no difference in duration of prior HT between men and women (20 (8-60) vs. 24 (12-84); p>0.05) as well as among PGN subtypes. At the time when kidney biopsy was performed patients with prior HT had higher BP, and proteinuria, lower eGFR. Prior HT was not related to poorer outcome (OR 1.003 [0.998, 1.008],p=0.19). However, systolic and diastolic BP, as well pulse pressure values at the time of biopsy were significantly associated with therapeutic failure (OR 0.982 [0.970, 0.993], p=0.002; OR 0.977 [0.959, 0.995], p=0.013; OR 0.979 [0.962, 0.997], p=0.019, respectively).

Conclusions: In patients with PGN prevalence of prior HT is higher than in general population. It is related to more severe clinical presentation at the time of kidney biopsy but not independently to the clinical outcome. BP values at the time when PGN was diagnosed have more important prognostic value.

PP.12.16 PREVALENCE OF HYPERTENSION IN PRIMARY GLOMERULOPATHIES

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Objective: It was reported that patients with primary glomerulopathies (PGN) had higher prevalence of hypertension (HT). Our aim was to determine prevalence of HT prior renal impairment and at the time of biopsy in patients with different PGN subtypes and to analyse whether differences in clinical course exists among those subgroups.

Design and method: Data of 745 adult patients (64.5% men; median 40 age (IQR: 28-55) yrs.) collected from our registry were analysed. Prior HT was diagnosed as BP > 140/90 mmHg and/or taking antihypertensive drugs before signs of renal impairment (RI) were evident. RI was defined as serum creatinine > 115 umol/l or presence of either proteinuria or erithrocyturia. HT at the time of kidney biopsy was defined as previously if proteinuria was non-nephrotic (1), or as BP > 130/85 mmHg if proteinuria was in nephrotic range (2). BP was measured following ESH/ESC guidelines. Age adjusted HT prevalence was calculated.

Results: Prevalence of HT prior kidney biopsy and at the time of biopsy was higher in all PGN subtypes than in general population (Table). Prevalence remained higher even after adjustment for RI. Prevalence of prior HT was the lowest in mesangioproliferative (MSGN) and the highest in membranoproliferative (MPGN) and focal segmental glomerulosclerosis (FSGS) ($x2 = 80.0$; $p<0.0001$). There was no difference in duration of prior HT among various PGN subtypes. Significant increase of prevalence was observed at the moment of kidney biopsy. At that time prevalence was the highest in membranous (MGN) and crescent (CGN) ($x2 = 15.9$; $p=0.01$) which had also the highest pulse pressure values.

Conclusions: Prevalence of AH is higher in patients with PGN than in general population. Differences in prevalence of HT both prior RI and at the time of biopsy were observed among different PGN subtypes. As we shown previously, prior HT has impact on clinical presentation while BP values at the time of biopsy determine clinical course.

Table 1. Prevalence of HT in PGN (%)

	N	Prior HT	At the time of biopsy[1]	At the time of biopsy[2]
Whole group	745	59.7	82.1	88.1
MGN	190	79.4	90.0	94.7
MSGN	136	37.5	80.8	82.3
IgAN	151	82.3	82.7	84.1
FSGS	141	57.4	68.8	88.6
MPGN	54	75.9	88.8	92.5
CGN	73	59	82.2	86.3

PP.12.17 HYPERTENSIVE URGENCY AND ACUTE DECOMPENSATION OF HEART FAILURE ARE THE MAIN CAUSES OF WORSENING OF RENAL FUNCTION IN THERAPEUTIC IN-PATIENTS

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Objective: The aim of the study was to assess the prevalence and predictors of acute worsening of renal function (WRF) in patients admitted to therapeutic departments of city clinical hospital.

Design and method: 565 consecutive hospital patients (female 60%, 64±18 years (M±SD), arterial hypertension (HTN) 71%, myocardial infarction (MI) 16%, chronic heart failure (CHF) 59%, atrial fibrillation 21%, diabetes mellitus (DM) 16%, chronic kidney disease 17%, serum creatinine (SCr) 95±46 μmol/l) were included in the study. Acute WRF was diagnosed by SCr change more than 30% during hospitalization. Late WRF was diagnosed by SCr increase during hospitalization. Acute kidney injury (AKI) was assessed according 2012 KDIGO Guidelines. Mann-Witney test and multivariate analysis were performed. P<0.05 was considered significant.

Results: Acute WRF was revealed in 19.4% of patients, 67.6% of them had late WRF. Patients with late WRF compared with patients without WRF had higher rate of HTN (91 vs 69%), MI (40 vs 13%), CHF (79 vs 56%), DM (37 vs 13%), first hospital prescription of ACE inhibitors (45 vs 30%), beta-blockers (70 vs 36%) and loop diuretics (43 vs 20%) (p<0.01). Hypertensive urgency with decrease of systolic blood pressure >60 mmHg for 24 hours (37%) and acute decompensation of HF (33%) were the leading causes of late WRF. 57,5% of patients with late WRF met AKI criteria, 42.5% had 30-50% increase of SCr. The following predictors of WRF were determined: HTN (odds ratio (OR) 4.3, 95% confidential interval (CI) 1.92-9.59), MI (OR 4.2, 95% CI 2.49-7.34), DM (OR 3.9, 95% CI 2.28-6.85), CHF (OR 3.0, 95% CI 1.67-5.51), first prescription of beta-blockers (OR 3.8, 95% CI 2.26-6.53), loop diuretics (OR 2.9, 95% CI 1.72-4.84), ACE inhibitors (OR 1.97, 95% CI 1.19-3.25).

Conclusions: Late WRF was diagnosed in 12.4% of admitted patients, 57.5% of them met AKI criteria. Hypertensive urgency with decrease of systolic blood pressure >60 mmHg for 24 hours and acute decompensation of HF were the main causes of late WRF. First prescription in hospital of beta-blockers, ACE inhibitors and loop diuretics was associated with late WRF.

PP.12.18 FACTORS ASSOCIATED WITH UNCONTROLLED HYPERTENSION AMONG RENAL TRANSPLANT PATIENTS IN NAIROBI, KENYA

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Objective: Literature, including local data, show poor blood pressure control (BP) in renal transplant recipients (RTR). This is associated with poor cardiovascular outcomes and graft survival. Kenya has a nascent renal transplant program. We sought to determine clinical and sociodemographic factors associated with the poor BP control.

Design and method: A cross sectional study in all eligible RTRs at the Kenyatta national hospital. Clinical evaluation including sociodemographic data, BP and anthropometric measurements were done as per standard procedure. Pre transplant BP and antihypertensive drugs pre and post transplant were extracted from the file. The Morisky medication adherence scale (MMAS-8) was self administered. Serum creatinine and urinary albumin:creatinine ratio (UACR) were assayed. BP control was correlated with recipient and donor age, sex, adherence, BMI, serum creatinine, UACR, acute rejection and health insurance status. Categorical data were analyzed by the Chi-square test or Fisher's exact test

and continuous variables by the student's t test. Factors significant on univariate analysis were subjected to multivariate analysis by logistic regression. All tests were at 5% level of significance.

Results: 85 of 100 patients were evaluated; mean age 42.4 years, male: female ratio 1.9:1. 58. (68.2%) had uncontrolled hypertension (BP equal to or more than 130/80 mmHg). 32.9% were adherent. Mean BP reduced significantly post transplant (SBP 144.5 vs. 131.8; DBP 103.6 vs. 83.5 in mmHg, p<0.001), despite a reduction in hypertensive drugs; 3.6± 1.6 to 2.1 ± 0.9 (p< 0.001). Male sex (OR 3.9, CI 1.5-10.3, p=0.004), increasing proteinuria, p=0.029 for trend and non adherence (OR 10, 95% CI 3.1-32.1, p<0.001) showed correlation on univariate analysis. Only male sex (OR 3.8, 95% CI 1.1-13.4, p=0.04) and non adherence (OR 16.6, 95% CI 4.9-56.3, p<0.001) remained significant on multivariate analysis.

Conclusions: Despite a reduction in BP post transplant a significant number of RTRs remain uncontrolled. Non adherence and male sex showed independent correlation. Adherence counselling should therefore be a major component of the management. Research to elucidate reasons for non adherence is imperative. Because of our small number of RTRs, the study lacked statistical power to establish some of the correlations.

PP.12.19 LOCATION AND MRNA EXPRESSION OF HYPOXIA-INDUCIBLE FACTOR-1 ALPHA IN KIDNEYS OF FEMALE SPRAGUE-DAWLEY RATS ONE YEAR AFTER UNILATERAL NEPHRECTOMY

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Objective: Hypoxia inducible factor-1 alpha (HIF-1α) is a transcription factor which regulates cell response to hypoxia, leading to transcription of many genes involved in energy metabolism, angiogenesis, and apoptosis. In patients undergoing unilateral or bilateral nephrectomy due to renal or urothelial cell carcinoma, or renal abscess, lower expression of HIF-1α is related to higher kidney fibrosis and lower estimated glomerular filtration of remnant kidney. After nephrectomy, remnant kidney enlarges for 25%, but if there is any role of HIF-1α in enlargement is unknown. Interestingly, HIF-1α is upregulated in hypertrophic cardiomyopathy. The objective of this study is to explore the HIF-1α mRNA expression and localization in remnant kidney of unilaterally nephrectomized, otherwise healthy female Sprague–Dawley rats.

Design and method: In this study 15 female Sprague-Dawley rats (4 months of age) were randomly divided into three groups: unilaterally nephrectomised, sham operated and naïve rats. One year after the nephrectomy, all rats were sacrificed and remained kidneys were weighted and further analyzed. HIF-1α mRNA expression was performed by real-time PCR; mRNA expression of HIF-1α was normalized to HPRT housekeeping gene and analyzed by REST 2009. HIF-1α protein expression and distribution in kidneys was assessed by immunohistochemistry.

Results: There is a significant downregulation of HIF-1α gene in remnant kidneys of nephrectomized rats compared to naïve rats. There was no difference of HIF-1α mRNA expression in sham operated rats compared to other groups. In nephrectomised rats, immunohistochemistry showed that HIF-1α is expressed in proximal tubules, distal tubules and glomeruli, but highest expression was in proximal tubules. In medulla, HIF-1α is expressed in collecting tubules and with lower expression in loop of Henle of nephrectomised rat kidneys, compared to other parts of kidney. Destruction of parenchyma is present in kidney medulla of nephrectomised rats only. Hypertrophy of remnant kidney was present in nephrectomised rats with significantly higher kidney weight compared to sham operated and naïve rats.

Conclusions: Our results show lower mRNA expression of HIF-1α which may be related to destruction of parenchyma present in medulla of unilaterally nephrectomized rats, but hypertrophy is not linked to HIF-1α expression.

PP.12.20 IRON, HYPERTENSION, AND RENAL INJURY IN A RAT MODEL OF CHRONIC KIDNEY DISEASE

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Objective: Iron accumulation is associated with the pathogenesis of cardiovascular disease and chronic kidney disease (CKD). However, little is known about the effects of iron restriction against these diseases. Here, we investigated the effects of dietary iron restriction on hypertension and renal injury in a rat model of CKD.

Design and method: CKD was induced by 5/6 nephrectomy in Sprague-Dawley rats. After operation, 5/6 nephrectomized rats were given iron-restricted diet from 1 day to 16 week for prevention protocol or from 8 week to 16 week for rescue protocol. Other CKD rats were given a normal diet. Sham-operative rats given a normal diet served as a control.

Results: CKD rats developed hypertension, proteinuria, glomerulosclerosis, podocyte injury, and tubular dilatation. In contrast, dietary iron restriction prevented the development of hypertension and kidney injury after 16 weeks diet. Iron restriction suppressed vascular hypertrophy, fibrosis, and inflammation in CKD rats. The phosphorylation of ERK was increased in the aorta of CKD rats, whereas this change was ameliorated by iron-restricted diet. In preexisting renal injury and hypertension in CKD, 8 weeks iron-restricted diet did not attenuate hypertension and vascular remodeling, while renal injury was ameliorated by iron restriction. Of interest, dietary iron restriction immediately led to increased urinary sodium excretion in CKD rats. Increased expression of nuclear mineralocorticoid receptor (MR) and Rac1 activity in the CKD kidney were significantly suppressed by iron restriction.

Conclusions: In conclusion, iron restriction prevents the development of hypertension and renal injury, and rescues preexisting renal injury. These beneficial effects of iron restriction on renal injury seem to be associated with the inhibition of renal MR signaling.

PP.12.21 IRON IN THE DEVELOPMENT OF HYPERTENSIVE NEPHROPATHY

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Objective: Although iron is reported to be associated with the pathogenesis of chronic kidney disease, it is unknown whether iron participates in the pathophysiology of nephrosclerosis. Here, we investigate whether iron is involved in the development of hypertensive nephropathy and the effects of iron restriction on nephrosclerosis in salt-loaded stroke-prone spontaneously hypertensive rats (SHRSP).

Design and method: SHRSP were given either a normal or high-salt diet for 8 weeks. A further subset of SHRSP was fed a high-salt with iron-restricted diet.

Results: SHRSP given a high-salt diet exhibited severe hypertension and nephrosclerosis. As a result, the survival rate was decreased after 8 weeks diet. Importantly, massive iron accumulation and increased iron content were observed in the kidneys of salt-loaded SHRSP, along with increased urinary 8-Hydroxy-2'-deoxyguanosine and iron excretions; however, these changes were attenuated by iron restriction. Of interest, expression of cellular iron transport proteins, transferrin receptor 1 and divalent metal transporter 1, was increased in the tubules of salt-loaded SHRSP. Moreover, iron restriction attenuated the development of severe hypertension and nephrosclerosis, thereby improving survival rate in salt-loaded SHRSP.

Conclusions: These results suggest a novel mechanism by which iron plays a role in the development of hypertensive nephropathy.

PP.12.22 CARDIORENAL SYNDROME IN HEMODIALYSIS PATIENTS

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Objective: Cardio and renal disfunction commonly coexist with increasing risk for morbitity and mortality.The aim of the study is to evaluate the presence of cardiorenal syndrome among hemodialysis patients; identifying different risk factors (such as HTA, glucose intolerance, metabolic syndrome and anemia) and their relationship with cardiorenal syndrome.

Design and method: 123 patients with end-stage renal disease on hemodialysis were included in the study. Dialysis regimen was the same. The results had

shown as percentages and mean± SD. SPSS- 15 version software was used for the statistical analysis. The results were appraised by using Chi-square test. P < 0.05 was considered statistically significant.

Results: The prevalence of CRS was 82.1% (101 patients). The most frequent type was type 4 SCR 78 patients (63.4%), type 3 SCR 19 patients (15.4%), type 5 SCR 3 patients (2.4%) and; type 2 SCR 1 patient (0.8%). Male patients 60 (48.8%) versus (vs) female patients 41 (33.3%), p<0.71. The mean age was 44.06 ± 15.21 years, comparing with patients who were not with CRS 54.97 ±11.2 years, p<0.01.Time on hemodialysis was 4.67 ± 2.47 years ≤ 0.09. Metabolic syndrome was founded in 59 patients (48%) p<0.001, the advanced age (44.6% vs 54.99 p<0.01), the presence of HTA (43.1% vs 37.4%), p<0.001,Diabetes (17.1% vs 0.8%) p<0.019,anemia (65% vs 17.9%) p<0.02

Conclusions: Cardiorenal Syndrome was found to be very common among hemodialysis patients in our study. There were no significant data on gender and time on hemodialysis, otherwise tradicional risk factors such as age, hypertension, anemia, metabolic syndrome and diabetes was found to be very significant with a strong relation among cardiorenal patients. These are all modifiable risk factor expect age, so the effective treatment could improved patients outcomes with cardiorenal syndrome.

PP.12.23 THE COMPARISON OF TWO METHODS TO DETERMINE METABOLIC SYNDROME IN HEMODIALYSIS PATIENTS

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Objective: Hemodialysis patients have an increased risk for cardiovascular disease. The metabolic syndrome (MS) itself is also a common risk factor for cardiovascular disease. The aim of the study is to evaluate the prevalence of MS comparing two different methods in hemodialysis population.

Design and method: One hundred twenty three hemodialysis patients of University Hospital Center were enrolled in the study: 74 patients were males (60.2 %) and 49 patients were females (38.9%). The mean age was 52.63 ± 12.8 years, and the time of beginning hemodialysis 3.7 ± 2.3 years. The MS was defined according International Diabetes Federation (IDF) and National Cholesterol Education Program Adults Treatment Panel III (NCEP-ATP III).

Results: The prevalence of MS according to IDF definition was 48% (59 patients): 40 were males (32.5%) vs. 19 females' patients (15.4%) (≤ 0.097). The mean age was 56.98 ± 10.7 years comparing to patients without MS 48.07 ± 13.443 years (p<0.001). In accordance with the time of begging hemodialysis MS patients 3.58 ± 2.119 years and no MS patients 3.8 ± 2.63 years (p<0.593). The prevalence of MS according to NCEP-ATP III was 18.7% (23 patients): 13 % were males (16) vs. 5.7 % females' patients (7) (≤ 0.307). The mean age was 57.43 ± 10.632 years comparing to patients without MS 51.67 ± 13.150, (p<0.128). The time of beginning hemodialysis for MS patients was 3.22 ± 2.044 years and for patients without MS was 3.81 ± 2.465 years (p<0.288). Comparing data as regard the evaluation of MS with two methods, the prevalence according to IDF definition was 48% vs. 18.7% according to NCEP-ATP III (p < 0.0001).

Conclusions: The prevalence of MS is high in our hemodialysis population. As regard the definition for MS, our study found a greater sensitivity according to IDF than NCEP-ATP III definition. Advanced age is found as a significant factor by IDF definition, while gender and time on hemodialysis havo no significance in our study.

PP.12.24 HYPERTENSION AS A RISK FACTOR TO DEVELOP CONTRAST INDUCED NEPHROPATHY IN A COHORT OF PATIENTS WHO UNDERWENT URGENT PERCUTANEOUS CORONARY INTERVENTION

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Objective: Contrast – induced nephropathy (CIN) is one of the most frequent causes of hospital acquired acute renal failure or underlying renal disease impairment. Risk factors to develop CIN are well known, but we hypothesize that hypertension before PCI could be recognized as an independent risk factor. Our aims were to determine the incidence of CIN after urgent percutaneous coronary intervention (PCI); to identify frequency of main risk factors of CIN; to evaluate significance of hypertension as a risk factor to develop CIN after PCI.

Design and method: A retrospective case – control study was performed at Vilnius University Hospital Santariskiu Klinikos. We analyzed data of 1304 patients, who underwent urgent PCI because of acute ischemic coronary event in yr. 2009. CIN group consisted of 52 patients with absolute (>=0,5mg/dl) or relative (>=25%) increase in serum creatinine at 24 – 120 h after exposure to a contrast agent, 263 patients without CIN served as control group.

Results: The analysis enrolled 315 patients, 98(31.1%) female and 217(68.9%) male, mean age 68.8±10.4 years. Of 315 patients, we diagnosed 52 cases of CIN, 17 (32.7%) pts. in CIN group had an underlying renal disease. CIN group had a higher number of risk factors: hypotension 6(11.5%) vs. 18(6.8%), Intra-aortic balloon pump (IABP) 10(19,2%) vs. 18(6.5%), congestive heart failure or lung edema 26(50%) vs. 89(33,8%), age >75y 19(36.5%) vs. 81(30.8%), anemia 25(48.1%) vs. 88(33.5%), diabetes mellitus (DM) 15(28.8%) vs. 51(19.4%), eGFG<60 36(69.3%) vs. 149(56.7%). Mean predictive risk score was higher in CIN group: 12.4±6.8 vs. 8.5±5.3, P<0.0001. Prevalence of hypertension before PCI was similar in both groups. We found a tendency to develop CIN after PCI in patients, who had poor controlled hypertension, who were on 3 or more antihypertensive drugs or had a refractory hypertension. We found a significant incidence of CIN (16.4%) after urgent PCI.

Conclusions: The main risk factors of CIN are hypotension, IABP and DM. Hypertensive patients with poor control, refractory hypertension or with underlying nephropathy are on higher risk to develop CIN.

PP.12.25 PREVALENCE OF CHRONIC KIDNEY DISEASE IN HYPERTENSIVE AND/OR DIABETIC PATIENTS IN PRIMARY CARE (MADRID, SPAIN)

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Objective: The prevalence and incidence of chronic kidney disease (CKD) are increasing. The detection and identification of these patients could reduce cardiovascular mobility and mortality and prevent renal disease progression to end stage of renal disease. Patients with hypertension and/or diabetes mellitus (DM) were studied for chronic kidney disease (CKD).
The aim is to detect the prevalence and stage of chronic kidney disease in patients with hypertension and/or d Diabetes Mellitus in Primary Care in Madrid. Spain.

Design and method: 263 Health Center in Primary Care in Madrid were evaluated (349.620 patients) from April 2012 through March 2013. Blood pressure, blood glucose level, serum creatinine, hemoglobin level, serum creatinine level, microalbuminuria, body mass index, lipids and estimated glomerular filtration rat (EGFR) were evaluated.
Renal association (2013) stages of CKD were used. There are five stages, kidney function is normal in stage 1 and minimally reduced in stage 2 (≤ 60 ml/min). Statistics analyses (SPPS).

Results: 55% were women. Patients with HT and DM were classified on five stages. HTwithout DM (239.114): CKD<60ml: 22%; Stage 3A :16,35%; Stage 3B: 4,7%; Stage 4: 1%; Stage 5: 0,27%. DM without HT(35.386): CKD<60ml: 12,30%; Stage 3A: 9,29%; Stage 3B: 2,33%; Stage 4: 0,48%; Stage 5: 0,21%. HT and DM(75.120): CKD<60ml: 27,59%; Stage 3A:17,75%; Stage 3B:7,95%; Stage 4:1,92%; Stage 5: 0,47%.

Conclusions: There is a high prevalence of CKD in HT and DM patients. Screening of CKD in patients with cardiovascular disease or several cardiovascular risk factors, like hypertensive and diabetic patients could reduce and prevent renal disease progression to end stage renal disease.

PP.12.26 ANALYSIS OF THE ALTERATION OF BONE MINERAL METABOLISM AND VASCULAR CALCIFICATION IN HEMODIALYSIS PATIENTS

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Objective: To analyze whether there is association between atherosclerotic development and alteration of bone metabolism in patients with chronic renal failure undergoing hemodialysis program.

Design and method: This is a prospective, descriptive study. Randomly to 44 of 130 hemodialysis patients in clinical hemodialysis the Palmar (Murcia) were

selected. All patients were determined by the ankle-brachial index, Adragao index (measures the degree of vascular calcification), Charlson index (mortality associated with long-term patient comorbidity), clinical, demographic and laboratory data. They were also performs an echocardiogram, bone densitometry and biochemical determinations (calcium, phosphorus, intact PTH and hemodialysis time).

Results: The mean age of patients studied was 71.8 ± 8.9 years. 24 were male (54.5%) and 20 women (45.5 %). The mean values of the variables analyzed are: Bone mineral density -2.09 ± 1.17 mg / cm ², ankle brachial index 1.35 ± 0.45, 4.48 ± Adragao index 1.87 points , intact PTH 275 , 4 ± 165.9 ng / L, calcium 8.96 ± 0.44 mg / dL , phosphorus 4.36 ± 0.98 mg / dL , Charlson index 6.11 ± 1.54 points, mean time on hemodialysis 5.64 ± 4.77 years. They presented criteria of left ventricular hypertrophy 39 patients (88.6 %). Adragao index was significantly correlated with bone mineral density (p 0.041), ankle brachial index (p 0.015) and Charlson index (p 0.009). A greater ICVS, decreased bone mineral density, increased ankle brachial index and higher Charlson index . With the rest of quantitative variables (iPTH, Ca, P and hemodialysis time) correlation is not significant. The correlation between the Adragao índex and left ventricular hypertrophy showed no statistical significance.

Conclusions: In patients undergoing hemodialysis a higher Adragao index (higher vascular calcification), lower bone mineral density, increased ankle brachial index and higher Charlson index (high comorbidity).

PP.12.27 A CROSS-SECTIONAL STUDY OF OXIDATIVE STRESS AND GLOMERULAR FILTRATION RATE IN UNTREATED HYPERTENSIVE PATIENTS WITHOUT CHRONIC KIDNEY DISEASE

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Objective: The relationship between oxidative stress and kidney function in middle-aged patients with uncomplicated hypertension is not well studied. Accordingly the aim of the study was to investigate the association between estimated glomerular filtration rate (eGFR) and urinary F2-isoprostane in middle-aged patients with untreated arterial hypertension.

Design and method: A cross-sectional study included 44 non-diabetic patients (age 53,5±6,2 years, 20 males) with untreated arterial hypertension without target organ damage on routine examination with estimated glomerular filtration rate by CKD-EPI formula (eGFR) >60 ml/min/1,73m² and albumin/creatinine ratio<30mg/g in a morning urinary spot. F2-isoprostan was measured in a morning urinary spot. Linear regression analyses were used to assess the cross-sectional associations between F2-isoprostanes (independent variable) and eGFR (dependent variable). A two-sided p-value of < 0.05 was regarded as significant

Results: Mean values of urinary F2-isoprostanes was 383,2±239,1 ng/l (Me 317,0 [min 139,0, max 1312 ng/l]). Urinary F2-isoprostanes values for assessed by eGFR quartiles: I > 94 ml/min/1,73m2 , II 91-94 ml/min/1,73m2, III 79-91 ml/min/1,73m2 , IV 61-79 ml/min/1,73m2. There was a progressive increase of urinary F2-isoprostanes from I to IV quartile: 289,6 [139,0-317,2 ng/l], 300,1 [207,8-392,3 ng/l], 428,1 [352,4-517 ng/l], 503,5 [412,7-1312 ng/l] (p<0,05 for trend]. Multivariable analysis revealed significant independent correlation between eGFR and urinary F2-isoprostanes (β= -3,1, p<0,001).

Conclusions: The result obtained suggest strong negative association between oxidative stress assessed by urinary F2-isoprostanes and eGFR in middle-aged untreated non-diabetic hypertensive subjects without chronic kidney disease and may reflect the role of oxidative stress for future subclinical kidney function impairment in this patient population.

PP.12.28 THE PREVALENCE OF CHRONIC KIDNEY DISEASE AND THE PREDICTORS OF DECREASED KIDNEY FUNCTION IN HYPERTENSIVE PATIENTS IN WESTERN SEASIDE OF KOREA

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Objective: Hypertension (HT) is one of treatment targets for the progression of chronic kidney disease. HT has been known to play an important role in progression of chronic kidney disease (CKD). However, limited data are available in HT patients enjoying very salty food. We evaluated the prevalence of CKD and the predictors of decreased kidney function (DKF) in HT patients in living in seaside of Korea.

Design and method: We retrospectively analyzed the medical records of outpatients with HT in Inha University hospital in located in seaport of western part of Korea. DKF was defined as annual loss of estimated glomerular filtration rate (eGFR) more than 10% of baseline eGFR.

Results: The prevalence of CKD was 51% in 981 total participants. In HT patients without CKD (NCKD-HT), the incidence of DKF was 46.2%. The incidence of DKF in HT patients with CKD (CKD-HT) was 40.8%. Age was only baseline risk factor of DKF in NCKD-HT group. In multifactorial analysis, history of diabetes mellitus (odds ratio [OR], 2.99; 95% Confidence Interval [CI], 1.88±4.78), hemoglobin levels (OR, 0.86; 95% CI, 0.76±0.98), proteinuria (OR, 1.86; 95% CI, 1.16±2.98), and hematuria (OR, 1.62; 95% CI, 1.02±2.58) were related to DKF in CKD-HT group.

Conclusions: We suggest that the prevalence of CKD in HT patients is high and DKF is frequent in both NCKD-HT and CKD-HT groups living in the western seaside area of Korea . The pattern of the predictors of DKF shows the difference between the two groups. Especially diabetes, abnormal urinalysis, and anemia are strongly associated with DKF in CKD-HT group.

PP.12.29 SYSTOLIC BLOOD PRESSURE CHANGE BETWEEN BEFORE AND 2 HOURS AFTER DIALYSIS MAY PREDICT INTRADIALYTIC HYPOTENSION IN DIABETIC ESRD PATIENTS

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Objective: Intradialytic hypotension (IDH) is the most frequent complication of hemodialysis (HD). However, its development is unpredictable. We investigated whether the degree of systolic blood pressure (SBP) reduction during first 2 hours predict IDH in hypotension-prone HD patients.

Design and method: We included 5 IDH-prone patients. IDH defined as the occurrence of SBP < 100 mmHg during HD.or SBP drop > 100 mmHg (compared to o hr)
Patients with infection, liver cirrhosis and congestive heart failure, Inadequate BP data during HD session, HD sessions with taking alpha agonist (Midron) or of < 3 hrs were excluded. About 1 years of HD records were reviewed and divided into IDH and non-IDH sessions. As control, 719 HD records of 5 patients without IDH were also reviewed.

Results: All were female diabetics with ages of 61+6 years and HD durations of 4.5+1.9 years. Total 719 sessions of HD (143.8 sessions/patient) were included in this study. Among them, 104 sessions were IDH. SBPs were significantly lower in IDH than in non-IDH sessions throughout HD (180+28 vs. 180+22 mmHg at 0 hr; 150+25 vs. 163+23 mmHg at 1 hr ; 137+26 vs. 163+24 mmHg at 2 hr ; 118+23 vs. 158+25 mmHg at 3 hr ; and 109+26 vs. 154+27 mmHg at 4 hr). The changes of SBP between 0 and 1 hr (29.9+26.5 vs. 16.2+22.1 mmHg), between 0 and 2 hr (42.8+32.8 vs. 16.6+28.7 mmHg) were significantly higher in IDH than in non-IDH sessions. Independent predictors of IDH were the changes of body weight (dBW), followed by the changes of SBP between 0 and 2 hrs (dSBP02), and pre-HD SBP. dSBP02 were significantly correlated with dBW (r=0.255, p=0.001) in IDH-prone 5 patients. Receiver operating curve analysis showed that dSBP02 was 0.67. However, dSBP02 were not correlated with dBW in control HD patients (r=-0.06, p=0.085).

Conclusions: SBP reduction for first 2 hours of HD appears roughly to predict IDH. The amount of ultrafiltration during first hour was the strongest variable. The cutoff value was 0.74 liter/hour. This data can help to manage IDH in hypotensin-prone diabetic HD patients.

PP.12.30 THE ANTIHYPERTENSIVE EFFECT OF LINAGLIPTIN IN RATS WITH ADRIAMYCIN-INDUCED NEPHROPATHY

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Objective: In contrast with glucagon-like peptide-1 receptor agonists, it is not clear whether dipeptidyl peptidase-4 (DPP4) inhibitors may have blood pressure (BP) lowering effects in hypertensive animals. Renal parenchymal disease is an important cause of secondary hypertension, and we tested if the DPP4 inhibitor may exert beneficial effects in adriamycin-induced nephropathy.

Design and method: Male Sragues-Dawley rats were uninephrectomized and randomly divided into vehicle-treated controls (VC, n=4), adriamycin-treated controls (AC, n=4), and adriamycin- and linagliptin-treated rats (AL, n=5). Ariamycin was intravenously given into the femoral vein as a single bolus (5 mg/kg BW), and linagliptin (3 mg/kg/d) was daily administered to AL by oral gavage for 6 weeks. BP, proteinuria, and serum creatinine were determined at 4 and 6 weeks.

Results: Body weight gain was smaller in adriamycin-treated rats but not altered by linagliptin administration: at 6 weeks, 473 ± 9, 354 ± 16, and 338 ± 12g in VC, AC, and AL, respectively. At 4 weeks, systolic BP was elevated in AC (180 ± 5 mmHg, P<0.01) compared with VC (137 ± 2 mmHg). Notably, it was significantly reduced in AL (155 ± 4 mmHg, P<0.05) compared with AC. This pattern of differences continued at 6 weeks; Compared with VC (137 ± 4 mmHg), systolic BP increased in AC (166 ± 3 mmHg, P<0.01) but significantly relieved in AL (149 ± 6 mmHg, P<0.05). Although heavy proteinuria showed a decreasing tendency in AL (496 ± 93 mg/d) compared with AC (725 ± 83 mg/d), the difference did not reach the statistical significance (P=0.083). Serum creatinine at 6 weeks showed subtle changes but had no significant differences between the groups: 0.44 ± 0.02, 0.63 ± 0.07, and 0.53 ± 0.07 mg/dL in VC, AC, and AL, respectively.

Conclusions: Hypertension was relieved by linagliptin in rats with adriamycin-induced nephropathy. DPP4 inhibitors may have a BP lowering effect in proteinuric kidney disease, probably via non-renal mechanisms. Renoprotective effects of DPP4 inhibitors remain to be investigated.

PP.12.31 DETERIORATION OF KIDNEY FUNCTION OVER TIME AND DETERMINANTS IN THE SOUTH AFRICAN CAPE TOWN BELLVILLE SOUTH COHORT

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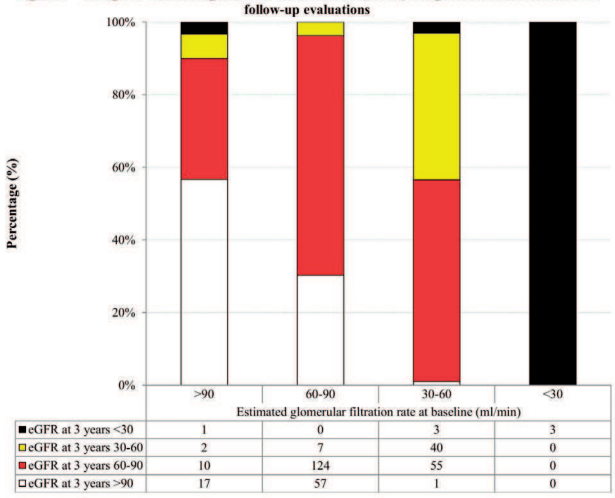
Objective: We assessed the trajectories of kidney functions and investigate the determinants of worsening or improvement during a 3-year follow-up of a community-based cohort of mixed-ancestry South Africans.

Figure 1 – Changes in estimated glomerular filtration rate (eGFR) categories between baseline and follow-up evaluations



	>90	60-90	30-60	<30
eGFR at 3 years <30	1	0	3	3
eGFR at 3 years 30-60	2	7	40	0
eGFR at 3 years 60-90	10	124	55	0
eGFR at 3 years >90	17	57	1	0

Design and method: A total of 320 participants (78.1% being women) aged 56.2 years, from the Bellville-South community (Cape Town) were examined twice between 2008 and 2011. Estimated glomerular filtration rate (eGFR) was based on the Modification of Diet in Renal Disease (MDRD) equation; and staging of kidney function based on the National Kidney Foundation Disease Outcomes Quality Initiative classification. Multinomial logistic regressions models were used to relate baseline characteristics with change in kidney function categories during follow-up, with adjustment for baseline age and sex in basic analyses, and further mutual adjustment for significant predictors in basic models. Trajectories of eGFR and continuous risk markers during follow-up were investigated through repeated general linear models, with adjustment for multiple comparisons through Bonferroni methods. A probability threshold of p<0.05 was used to characterize statistically significant results.

Results: Mean eGFR (ml/min) was 68.6 at baseline and distribution across eGFR categories was: >90 (9.4%), 60-90 (58.7%), 30-60 (28.1%) and <30 (0.9%). eGFR increased by 8ml/min (p<0.0001) during follow-up, reflecting variable trajectories by baseline eGFR categories, gender, status for hypertension and glucose tolerance (all p-interaction<0.012). Movements across eGFR categories during follow-up favoured improvement in 113 participants (cumulative incidence 35.3%), and worsening in 23 (7.2%), Figure 1. In multivariable adjusted multinomial logistic regression and using 'stable category' as reference group, men had a 72% (43-86%) lower chance of improvement while each mmHg higher baseline systolic blood pressure (BP) conferred a 7% (3-11%) risk of deterioration. Equivalent for each 1% higher HbA1c was 30% (8-56%). Compared with diabetics, participants with IGT or IFG had 102% (3-297%) higher chances of improvement.

Conclusions: Variable trajectories of kidney function were observed within three years in this cohort, with close to one-tenth experiencing a significant deterioration, mostly from the effects of modifiable risk factors such as non-optimal BP levels and dysglycemia.

PP.12.32 EVALUATION OF CENTRAL AORTIC PRESSURE IN INTRA- AND INTERDIALYTIC PERIODS IN END-STAGE RENAL DISEASE PATIENTS ON HEMODIALYSIS

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Objective: Ambulatory brachial blood pressure (BP) monitoring (ABPM) during the 44-hour interdialytic period is considered the gold-standard method for BP assessment in hemodialysis patients. Accumulated evidence suggests superiority of office aortic over brachial BP in predicting all-cause and cardiovascular mortality in these individuals. Non-invasive aortic ABPM represents a new technological achievement with anticipated benefits in hypertension management. This study evaluated time ambulatory aortic BP during the intra- and interdialytic periods in hemodialysis patients.

Design and method: A total of 92 patients receiving maintenance hemodialysis for at least 3 months were included in this pilot study. All patients underwent aortic and brachial ABPM during the 4-hour intradialytic period and during the subsequent 44-hour interdialytic interval with a novel validated brachial cuff-based automatic oscillometric device (Mobil-o-Graph, IEM, Stolberg, Germany), which records brachial BP and pulse waveforms and calculates central BP through mathematical transformation.

Results: During the hemodialysis-on day (Day 1), intradialytic aortic systolic BP (SBP) did not differ significantly from out-of-dialysis aortic SBP (120.3±17.8 vs 119.4±15.7 mmHg, P=0.527). In contrast, ambulatory aortic diastolic BP (DBP) was significantly higher and aortic pulse pressure (PP) significantly lower in the intradialytic than the out-of dialysis period (82.7±12.1 vs 79.1±10.8 mmHg, P<0.001 for aortic DBP and 37.5±5.7 vs 40.3±5.4 mmHg, P<0.001 for aortic PP, respectively). Mean aortic SBP, DBP and PP during the out-of-dialysis period of the hemodialysis-on day were significantly lower than during the 24-hour period of the hemodialysis-off day (Day 2) (119.4±15.7 vs 123.1±15.1 mmHg, P<0.001, 79.1±10.8 vs 80.5±10.8 mmHg, and 40.3±5.4 vs 42.6±5.1 mmHg, P<0.001, respectively). Similar trends in the changes of ambulatory SBP, DBP and PP during the intra- and interdialytic periods were evident for recordings at the brachial artery level.

Conclusions: This is the first study to evaluate ambulatory aortic BP in hemodialysis patients, showing increase in SBP, DBP and PP during Day 2 in comparison to the out-of-dialysis period of Day 1. Future studies are warranted to investigate the value of central ambulatory BP for cardiovascular risk prediction.

PP.12.33 HISTOPATHOLOGICAL DIAGNOSES IN PATIENTS PRESENTING WITH HYPERTENSIVE KIDNEY DISEASE

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Objective: Hypertension is a recognized cause of acute and chronic kidney disease (CKD). It is also a common complication of CKD from any aetiology. The underlying histopathological diagnoses have not been well described in patients who present with a clinical diagnosis of hypertensive kidney disease.

Design and method: We have conducted an observational study of consecutive renal biopsies performed over a 5-year period, in patients with a clinical diagnosis of hypertensive nephropathy (HN). Clinical diagnosis of HN was determined

from case notes and was agreed independently by two nephrologists. Outcomes were the histological presence of HN, glomerulonephritis (GN) or other kidney disease, and potential clinical predictors of HN.

Results: 53 native renal biopsies were performed in patients with a clinical diagnosis of hypertensive kidney disease. Mean age was 49 years; 41 were male, and mean estimated Glomerular Filtration Rate (eGFR) was 23 mls/min/1.73m². • 18/53 (34%) had a documented urinary protein-creatinine ratio (uPCR) >300mg/mmol. This cohort were equally as likely to those with uPCR <300mg/mmol to have a non-hypertensive histological diagnosis (p=0.512). • 37/53 (70%) had documented haematuria > 1+ on dipstick. 16/37 (43%) of this cohort had a non-hypertensive histopathological diagnosis, compared to only 1/11 (9%) of those with 1+ or less haematuria on dipstick, suggesting that the presence of haematuria may make a non-HN diagnosis more likely (p=0.0697). • 11/53 (21%) presented with accelerated hypertension. On biopsy 6/11 (55%) had confirmed HN and 5/11 (45%) had GN (2 IgA nephropathy, 3 FSGS). • 5/53 (9%) patients had minor bleeds, and 1/53 (2%) had a major bleed requiring renal arterial embolisation. 2 of the complications (1 major, 1 minor) were in patients with accelerated hypertension.

Probable Underlying Diagnosis Based on Histological Findings		Cases
Hypertensive nephropathy		29
Glomerulonephritis		16
	IgA nephropathy	*10*
	FSGS	*6*
Diabetic nephropathy		1
Microangiopathic process / HUS		1
Inadequate tissue		2
Chronic damage, no specific etiological features		4

Conclusions: Native renal biopsies performed in patients with a clinical diagnosis of hypertensive kidney disease showed histological evidence of HN as the primary diagnosis in only 55% of cases. Similar results were seen in the small sub-group who presented with accelerated hypertension, in whom the procedural complication appeared to be higher. Urinalysis and proteinuria quantification did not predict histological diagnosis. Kidney biopsy should be considered in individuals who present with hypertension and kidney damage.

PP.12.34 URINARY SODIUM AND POTASSIUM EXCRETION AND RISK OF CHRONIC KIDNEY DISEASE PROGRESSION AND DEATH

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Objective: Chronic kidney disease is a major risk factor for end-stage renal disease, cardiovascular disease, and premature death. Evidence of the effects of dietary sodium and potassium intake on the progression of chronic kidney disease is sparse and inconsistent. We investigated the prospective association of urinary sodium and potassium excretion with the risk of chronic kidney disease progression and all-cause mortality among patients with chronic kidney disease.

Design and method: The Chronic Renal Insufficiency Cohort Study is a prospective, longitudinal cohort study of 3,939 patients with chronic kidney disease recruited from 7 clinical centers in the US. Urinary excretion of sodium and potassium was measured using three 24-hour urine specimens and calibrated to gender-specific mean creatinine excretion. Estimated glomerular filtration rate was obtained annually. Chronic kidney disease progression was defined as a composite endpoint of incident end-stage renal disease or halving of estimated glomerular filtration rate from baseline. Other outcomes were death from all causes alone or combined with chronic kidney disease progression.

Results: A total of 905 chronic kidney disease progression events and 540 deaths from all-causes were identified during follow-up. Overall, a 100-mmol higher 24-hour urinary sodium excretion was associated with an increased hazard ratio of 1.28 (95% confidence interval 1.17, 1.41; p<.001) for chronic kidney disease progression, 1.35 (1.21, 1.50; p<.001) for all-cause mortality, and 1.30 (1.21, 1.41; p<.001) for the composite outcome. Similarly, a 50-mmol higher potassium excretion was associated with an increased hazard ratio of 1.56 (1.36, 1.78; p<.001) for chronic kidney disease progression, 1.36 (1.15, 1.62; p<.001) for all-cause mortality, and 1.51 (1.35, 1.69; p<.001) for the composite outcome after adjustment for important covariables, including baseline kidney function and use of diuretics and other antihypertensive medications.

Conclusions: Both high dietary sodium and potassium intake are associated with increased risk of chronic kidney disease progression and all-cause mortality in patients with chronic kidney disease. These results suggest that a moderate reduction in dietary sodium and potassium intake might slow the progression of chronic kidney disease and reduce all-cause mortality in patients with chronic kidney disease.

PP.12.35 RENAL OUTCOME OF MALIGNANT HYPERTENSION

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Objective: Malignant hypertension with renal impairment is generally associated with a grave prognosis. The aim of this study is to describe clinical aspects of malignant hypertension and evaluate the renal impact on patient survival.

Design and method: We conduct a retrospective analysis of patients admitted with malignant hypertension (MHT) in the department of Nephrology of Charles Nicolle Hospital, between January 1990 and December 2013. We studied the clinical features, renal function and survival of patients.

Results: 36 cases of MHT were diagnosed with a sex ratio H/F at 2,5. 24 patients had already chronic hypertension (68%). The average disease duration of hypertension before the malignant stage was 11 years [2, 30]. The delay between the clinical presentation and admission of patients equals an average of 5 days [1, 15]. 28% were admitted the same day. On admission, the mean blood pressure was 150,47mm Hg [14, 20]. Headaches, asthenia and visual disorders were the 3 main symptoms of MHT, as classically described. All patients had grade III to IV retinopathy according to the Keith and Wagener classification. 42% of the patients presented with clinical signs of left heart failure and with severe cerebral damage in 8% of cases. 99% of the patients had renal failure (25% of acute origin). Initial mean creatinine was estimated at 847 µmol/l [84, 2087]. End-stage renal failure was retained in 80% of cases. Hypertension was associated with various renal diseases in 26% of cases and was essential in 74% of cases. Among the 36 patients, 12 died by cardiovascular causes. The survival rate, calculated on a 5-year basis was estimated to 66% of cases. 6 patients received a kidney transplant with a good clinical outcome.

Conclusions: Progressive renal function decline leading to end-stage renal disease remains a major threat to patients with MHT. BP control during follow-up was an important modifiable predictor not only of renal outcome but of survival rate also. Careful monitoring of renal functioning and effective treatment of the blood pressure is mandatory in patients with MHT.

PP.12.36 COMPARATIVE SHR KIDNEY TRANSCRIPTOME ANALYSIS: INDAPAMIDE MORE POTENT THAN HYDROCHLOROTHIAZIDE AS A DIURETIC AND IN LOWERING BLOOD PRESSURE

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Objective: Indapamide (INDA) and hydrochlorothiazide (HCT) are 2 antihypertensive drugs promoting diuresis and natriuresis. While both act on kidney and lower blood pressure (BP), it has been shown that they are differentially effective, indicating partially distinct mechanisms of action. We have shown that, while INDA lowered systolic BP more than HCT, platelet extracts from HCT-treated patient caused higher proliferation of smooth muscle cells compared to extracts from INDA-treated patients (Am Heart J 122:1198-1203;1991). The goal was to explore the kidney transcriptome of SHR treated with INDA or HCT in order to unveil pathways explaining the observed associated differences in BP lowering efficacy and growth promoting/inhibiting activity.

Design and method: Male SHR aged 10 weeks were divided into 3 groups: controls, INDA (0,24 mg/Kg/d) and HCT (1,5 mg/Kg/d). They were sacrificed after 3 weeks of treatment. Total kidney transcriptome analysis was performed using the Affymetrix Rat Exon 1.0 ST microarray.

Results: 1238 kidney genes were significantly modulated in the HCT and INDA rats, compared to the CTLs. Among these, 218 were modulated by both drugs, with 2 displaying a quantitative differential expression between HCT and INDA: Klks3 (members of the kallikrein family) 1,66 fold higher and Capn6 (calpain 6), 1,3 fold lower in the INDA group. Pathway analysis showed that Klks3 could be involved in direct lowering of BP through stimulation of renal kallikrein/kinin system, increased renal calcium reabsorption and direct inhibition of Na, Cl cotransporter (NCC) and epithelial Na Chan-

nel (ENaC). Capn6 is involved in proliferation and inhibition of apoptosis. Capn6 was less down-regulated by HCT. Several other genes modulated by HCT were found to be associated with pathways related to cancer, growth and proliferation.

Conclusions: We propose that a possible difference between the 2 drugs reside in 1) a more potent inhibition of NCC and ENaC by INDA and, 2) an increased capacity for INDA to stimulate the kidney kallikrein/kinin system resulting in a higher diuresis and natriuresis and normalization of calciuria in salt-sensitive hypertensive, and 3) a lower growth inhibitory capacity for HCT resulting in higher proliferation.

PP.12.37 PULSE WAVE VELOCITY WITH POPMETRE® INDEPENDENTLY CORRELATES WITH GLOMERULAR FILTRATION RATE IN RENAL TRANSPLANT RECIPIENTS

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Objective: To evaluate the relationship between glomerular filtration rate and arterial stiffness using Pulse Wave Velocity (PWV) as an independent cardiovascular risk factor in renal transplanted patients.

Design and method: We studied transplanted patients followed in our outpatient clinic. After a medical examination, we measured systolic (SBP) and diastolic (DPB) blood pressure (Comfort Cuff– Skil-Care, USA), PWV (pOpmètre® - Axelife sas - France) after 10 min supine resting. pOpmetre® measures the finger to toe transit time, and according to a height chart, calculates the PWV. Three measurements were performed to study the repeatability. Estimated glomerular filtration rate (eGFR) was calculated using MDRD equation.

Results: Forty-four (30 men, 14 women) renal transplant recipients were included. No significant difference between men and women were found in age (M±SEM: 53.2±2.2), SBP (138±2 mmHg), DBP (81±2 mmHg), eGFR (45.9±2.4 ml/min/1.73 m2) and PWV (10.4±1 m/s) [range: 6.0-15.7]. Repeatability expressed as the SD/mean of 3 measurements was very good: 5.4%.
PWV correlated positively with age (r^2=0.16, p<0.009) and negatively with eGFR (r^2=0.15, p<.009). Using a stepwise regression model (including gender, age, SBP, DBP, height, weight), only age and pOpmetre PWV remained significantly associated with eGFR.

Conclusions: Glomerular filtration rate independently correlates with pulse wave velocity in renal transplant patients, supporting the hypothesis that kidney function plays a predominant role in arterial stiffness.

PP.12.38 MILD ANEMIA IS ASSOCIATED WITH FUTURE RENAL FUNCTION DETERIORATION IN HYPERTENSIVE PATIENTS

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Objective: Anemia and iron deficiency is known as a poor prognostic factor in many cardiovascular diseases such as CHF and ischemic heart disease. Also anemia is a result of chronic inflammation. But the importance of anemia in hypertensive patients is not well understood.

Design and method: Hypertensive patients with normal renal function were enrolled in this study. The patients were divided into two groups of normal Hb level(>=13mg/dL) or anemic(<12mg/dL). Two groups were followed over a year. The blood pressure was controlled conventionally. Serum creatinine levels and eGRF were evaluated during the follow-up period.

Results: Of 1482 consecutive hypertensive patients, 117 were excluded as having CRF. 878 patients had normal Hb levels(14.57±1.19) and 487 were anemic(11.66±1.28). Initial serum creatinine levels were 0.94±0.20 in normal and 0.92±0.28 in anemic group(p=0.12).
During the follow-up(368.8±211.3 days) period, creatinine levels were not changed significantly(0.94±0.23 in normal and 0.92±0.28 in anemic group, p=0.32 and 0.17 each). But 38 patients developed renal dysfunction in normal group(4.33%) and 28 in anemic group(6.31%, HR 1.33-1.57, p<0.01).

Conclusions: In hypertensive patients, mild anemia is associated with the risk of development of kidney dysfunction in short term period.

PP.12.39 PATTERNS OF CHANGE IN CENTRAL AORTIC PULSE WAVEFORM PROFILE DURING A MID-WEEK DIALYSIS SESSION

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Objective: Prospective cohort studies have demonstrated that arterial wave reflections are independent predictors of mortality in hemodialysis patients. This study aimed to investigate potential differences in the pattern of intradialytic change of central arterial pressure waveform parameters across hemodialysis patients and to identify demographic, biochemical and dialysis-related factors potentially affecting the type of intradialytic response.

Design and method: A total of 70 patients receiving maintenance hemodialysis were evaluated before and after the mid-week dialysis session. Radial artery applanation tonometry was performed with the use of the Sphygmocor device in order to determine central aortic pressures and heart rate-adjusted augmentation index (AIx(75)), as measure of wave reflections.

Results: Three different patterns of intradialytic change in central arterial pressure waveform profile were evident: a) AIx(75) was positive pre-dialysis and increased afterward in 13/70 patients (Group A); b) AIx(75) was positive pre-dialysis and decreased afterward, but remained positive post-dialysis in 49/70 patients (Group B); c) AIx(75) was positive pre-dialysis and became negative post-dialysis in 8/70 patients (Group C). Patients with intradialytic rise in AIx(75) (Group A) tended to be older, had higher dialysis vintage and received higher number of antihypertensive agents than patients who restored a normalized central arterial pressure waveform post-dialysis (Group C). Further, patients in Group A experienced increase instead of decrease in central aortic systolic BP during dialysis (4.0±0.6 vs -21.4±11.3 mmHg, P<0.001) and had lower intradialytic weight loss (-1.4±1.2 vs -2.1±1.2, P<0.05) than those who achieved a negative AIx(75) post-dialysis (Group C).

Conclusions: This study shows the presence of diverse patterns of change in central arterial pressure waveform profile during a mid-week dialysis session. Future prospective studies are required in order to clarify whether intradialytic rise in AIx(75) levels is associated with heightened risk of mortality.

PP.12.40 AZELNIDIPINE CAN RESTORE THE HEART RATE VARIABILITY IN CKD PATIENTS WITH PRECEDING TREATMENT WITH ARB

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Objective: Sympathetic nervous system can be activated not only in end-stage renal disease but also even in the early stage of chronic kidney disease (CKD). Therefore, heart rate variability (HRV) can be fluctuated in patients with CKD. Decreases in both traditional (SDNN, RMSSD, VLF, LF/HF), and novel indices [fractal scaling exponents α1, and deceleration capacity (DC5)], can be provided as the risk for mortality in various clinical settings. Recently, we have proposed that the non-Gaussianity index (λ25) can be served as a powerful predictor of mortality in cardiovascular diseases. Angiotensin receptor blockers (ARBs) and Azelnidipine can assuage the sympathetic activity in experimental models. Therefore, we investigate whether add-on administration of azelnidipine to the preceding ARB treatment can alter the HRVs.

Design and method: Major inclusion criteria were: (1) CKD according to K/DOQI criteria; (2) undergoing treatment with olmesartan prior to enrollment at least for two months; (3) office BP >130/80 mmHg (or 125/75 mmHg if proteinuria >1 g/day). Forty-five consecutive patients with CKD (32 men and 13 women; 59±15 years) were enrolled after providing informed consent. After the baseline examinations, the participants received single daily doses of a CCB, azelnidipine (16 mg/day), in the morning to attain the daytime BP goal <130/80

mmHg (or 125/75 mmHg if proteinuria was greater than 1 g/day). Subjects underwent a 24-h hECG with a portable ECG recorder (DMC-3253, Nihon Koden, Tokyo, Japan) at baseline and after 8-wk add-on treatment with azelnidipine to the ARB.

Results: Add on Azelnidipine to preceding ARB treatment did not alter the SDNN (p=0.6), RMSSD (p=0.1), fractal scaling exponents α1 (p=0.6), VLF (p=0.9), LF/HF (p=0.2), increased DC5 (6.16±1.88 to 6.46±19.0, p=0.04), and decreased λ25 (0.56±0.15 to 0.50±0.11, p=0.0004).

Conclusions: Add-on administration of azelnidipine to the preceding ARB treatment can alter the HRVs. Further studies are needed to evaluate whether increase in DC5 or decrease in λ25 can indicate the reduced risk of cardiac mortality in CKD patients.

POSTERS' SESSION

POSTERS' SESSION PS13
MICROCIRCULATION

PP.13.01 ARTERIAL STIFFNESS IS NOT ASSOCIATED WITH SKIN MICROVASCULAR DYSFUNCTION, AS DETERMINED BY CAPILLAROSCOPY AND FLOWMOTION. THE MAASTRICHT STUDY

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Objective: It has been suggested that increased arterial stiffness is a cause of microvascular dysfunction. Studies which evaluated the direct association between arterial stiffness and microvascular function are, however, scarce, and population-based studies on this topic non-existent. The aim of the present study therefore was to evaluate in a large population-based cohort the association between arterial stiffness on the one hand and skin microvascular dysfunction, as determined by nailfold capillaroscopy and microvascular flowmotion, on the other.

Design and method: We used cross-sectional data of The Maastricht Study (for the present analysis: n=737; age 59.7 years; 45.2% women; 28.8% type 2 diabetes (by design)). The Maastricht Study is a population-based cohort study that focuses on the pathophysiology of type 2 diabetes and other chronic diseases. Arterial stiffness was determined via carotid-femoral pulse wave velocity (cfPWV, tonometry) and distensibility coefficients of the carotid and femoral arteries (ultrasonography). In addition, nailfold capillaroscopy was used to determine capillary density at baseline and during hyperaemic response and venous congestion. Laser Doppler flowmetry was used to assess skin microvascular flowmotion at rest.

Results: After adjustment for age, sex, mean arterial pressure and heart rate, neither cfPWV, nor the carotid and femoral distensibility coefficients were associated with baseline capillary density, hyperaemic capillary recruitment or capillary density during venous congestion (Table, models 1). In addition, none of the arterial stiffness indices were associated with skin microvascular flowmotion (models 1). Further adjustment for glucose metabolism status (models 2) and additionally for other potential confounders (models 3) did not materially change these results. There was no interaction with age, glucose metabolism status, hypertension or prior cardiovascular disease (P for interaction all >.13).

Conclusions: In the present population-based cohort study, arterial stiffness was not associated with skin microvascular dysfunction. Despite the fact that skin microvascular dysfunction has been hypothesized to represent a generalized phenomenon, these results do not exclude the possibility that arterial stiffness is associated with microvascular dysfunction of target end-organs like the brain, eye and kidney. The present results thereby warrant further study.

Table. Association between arterial stiffness and measures of skin microvascular function

		Capillary density (capillaries / mm²)			Flowmotion
		Baseline	Hyperaemic recruitment (delta)[A]	Venous congestion (delta)[A]	Total flowmotion energy[B]
		Regression coefficient (95% confidence interval)			
cfPWV (per +1 SD)	1	-0.24 (-1.93; 1.45)	-0.12 (-1.53; 1.30)	0.10 (-1.38; 1.58)	-0.02 (-0.08; 0.04)
	2	-0.75 (-2.44; 0.94)	0.47 (-0.94; 1.88)	0.67 (-0.81; 2.14)	-0.03 (-0.09; 0.04)
	3	-0.64 (-2.34; 1.07)	0.46 (-0.97; 1.88)	0.68 (-0.80; 2.17)	-0.02 (-0.09; 0.04)
Carotid DC (per -1 SD)	1	-0.42 (-2.09; 1.25)	0.30 (-1.09; 1.69)	0.54 (-0.91; 1.99)	0.03 (-0.03; 0.10)
	2	-0.42 (-2.09; 1.25)	0.30 (-1.09; 1.69)	0.54 (-0.91; 1.99)	0.03 (-0.03; 0.10)
	3	-0.53 (-2.20; 1.13)	0.45 (-0.92; 1.83)	0.74 (-0.70; 2.18)	0.05 (-0.01; 0.11)
Femoral DC (per -1 SD)	1	-0.83 (-2.19; 0.53)	-0.26 (-1.40; 0.87)	-0.38 (-1.57; 0.80)	0.02 (-0.03; 0.07)
	2	-0.83 (-2.19; 0.53)	-0.26 (-1.40; 0.87)	-0.38 (-1.57; 0.80)	0.02 (-0.03; 0.07)
	3	-0.88 (-2.24; 0.48)	-0.24 (-1.37; 0.90)	-0.33 (-1.51; 0.85)	0.02 (-0.03; 0.07)

Model 1: adjusted for age, sex, mean arterial pressure and heart rate; Model 2: additionally adjusted for glucose metabolism status; Model 3: additionally adjusted for prior cardiovascular disease, body mass index, smoking habits, total / HDL cholesterol ratio, triglycerides, use of lipid-lowering and(or) anti-hypertensive medication.
[A] Results were qualitatively similar when percentage recruitment was used instead of absolute differences in number of capillaries (delta).
[B] Analyses with flowmotion energy as the outcome were additionally adjusted for skin temperature in all models.
Abbreviations: SD: standard deviation, DC: distensibility coefficient.

PP.13.02 PARALLEL DETERIORATION OF ALBUMINURIA AND OXYGEN SATURATION IN ESSENTIAL HYPERTENSION: INTEGRATING VASCULAR DYSFUNCTION

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Objective: Hypertension is associated with the development of microvascular complications while pulmonary alveolar-capillary network represents the largest microvascular structure in the body. The aim of the study was to estimate whether impaired pulmonary function, assessed by oxygen saturation (SaO2), was accompanied by augmented albuminuria in essential hypertension.

Design and method: Our population consisted of 49 newly diagnosed untreated nondiabetic patients with stage I–II essential hypertension [46% males, aged 51 years, office blood pressure (BP) = 144/ 92 mm Hg]. All subjects underwent blood sampling for assessment of metabolic profile, albumin-to-creatinine ratio (ACR) values were determined as the mean of 2 nonconsecutive morning spot urine samples, and pulmonary function was evaluated on the basis of SaO2. Moreover, weight and height were measured by standard techniques and waist circumference was estimated at the midpoint between the low rib margin and the iliac crest.

Results: Based on the mean value of SaO2 (97.6%), hypertensives were classified into those with high and low SaO2. Hypertensives with low SaO2 values compared to those with high values exhibited greater waist circumference (105.9±12.4 vs 95.6±11.4 cm, $p < 0.05$), higher levels of TChol (233.3±49.5 vs 195.9±46.1 mg/dl, $p < 0.05$), higher levels of BMI (30.0±4.2 vs 25.8±3.9, $p < 0.01$), and greater ACR (26.8±42.2 vs 7.5±1.8 mg/g, $p < 0.05$). In the total population, SaO2 was negatively related to ACR ($r = -0.554$, $p = 0.005$) and logBMI ($r = -0.367$, $p < 0.05$), while it was positively associated with HDL ($r = 0.371$, $p < 0.05$). Multiple regression analysis revealed that only ACR was independent associated with SaO2 ($R2 = 0.468$, $p < 0.01$).

Conclusions: In this preclinical setting, impaired pulmonary function is accompanied by augmented albuminuria in essential hypertensive subjects. Furthermore, the observed interrelationship between ACR and SaO2 suggest parallel changes in pulmonary and renal microcirculation.

PP.13.03 PENILE MICROVASCULAR REACTIVITY AFTER ORAL ADMINISTRATION OF SILDENAFIL IN NON-DIABETIC MILD HYPERTENSIVE PATIENTS

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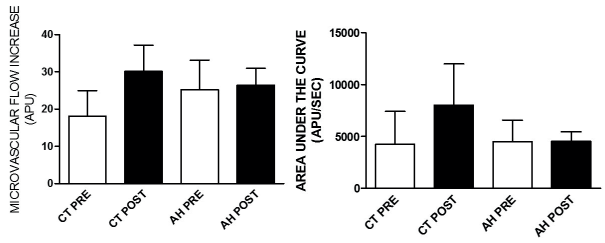
Objective: Erectile dysfunction is a frequent complaint of elderly subjects and is closely associated with endothelial dysfunction and cardiovascular disease, especially arterial hypertension. Here we evaluated the penile microvascular reactivity of non-diabetic patients presenting with mild essential arterial hypertension after oral administration of the phosphodiesterase-5 inhibitor sildenafil (SIL).

Design and method: Ten non-diabetic patients with mild essential hypertension (AH) under pharmacological treatment aged 59.5±8 years and six normotensive age-matched normotensive controls (CT), were submitted to evaluation of endothelial-dependent microvascular penile function before (PRE) and one hour after (POST) oral SIL (100 mg). Penile microvascular reactivity was evaluated using skin laser speckle contrast imaging (PeriCam PSI System, Perimed, Sweden) coupled to skin iontophoresis of increasing doses of acetylcholine (Ach, 0.3 - 1.8 mC, PeriIont, Perimed).

Results: Systolic (AH 144±9 and CT 135±11 mmHg, P=0.2512) and diastolic (AH 87±6 and CT 81±7 mmHg, P=0.2228) arterial pressures during the tests were not different between groups. Our preliminary results showed that SIL induced a tendency of increase of maximum penile microvascular flow increase (arbitrary perfusion units, APU) and of the area under the curve of endothelial-dependent microvascular vasodilation after Ach administration in control

subjects but not in hypertensive patients (figure). The lack of statistical significance was probably due to the still reduced number of subjects of our ongoing study.

Conclusions: Endothelial-dependent penile microvascular reactivity is reduced in hypertensive patients compared to normotensive age-matched control subjects.



PP.13.04 IMPACT OF CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY ON RETINAL MICROCIRCULATION IN PATIENTS WITH MODERATE-TO-SEVERE OBSTRUCTIVE SLEEP APNEA

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Objective: Repetitive hypoxemias characteristic for obstructive sleep apnea (OSA) may lead to impaired macro-, and microvascular response. Studies with flow-mediated dilatation (FMD) suggest that endothelial dysfunction may be one of the key mechanisms implicated in higher morbidity of OSA-patients. However the influence of OSA on microcirculation is still unclear. Therefore, we investigated the influence of untreated OSA and period of apnea reversal with CPAP on eye microcirculation, using method based on scanning laser Doppler flowmetry.

Design and method: We enrolled 25 patients (3 females, age 52.7±13.9 years, BMI 35.5±5.64 kg/m2) with newly-detected, moderate-to-severe OSA, who were subjected to short-term CPAP treatment (8 days ±2). Retinal capillary flow (RCF) was measured by Heidelberg Retina Flowmeter (HeidelbergEngineering, Germany). Both vessel and lumen diameter were studied in the reflection (vessel diameter) and perfusion image (lumen diameter) allowing evaluation of wall to lumen ratio (WLR). Subsequent off-line analysis of perfusion images was performed with automatic full-field perfusion imaging analysis (AFFPIA V.4.011). Office and ambulatory blood pressure (BP) and heart rate were obtained.

Results: 9 patients dropped out from the analysis due to either CPAP intolerance or unacceptable low quality of the retina imaging. Wall-to-lumen ratio before CPAP correlated with ambulatory HR (R=0.61; P=0.03).
AHI after CPAP therapy was significantly reduced (43.7±23.4 vs. 2.5± 2.4; P<0.001), however the mean retinal capillary flow did not change (296±94 vs. 273±85 [AU]; P=0.20). There was no significant difference in WLR (0.35±0.1 vs. 0.34±0.1; P=0.86), ambulatory systolic BP (132±18 vs. 131±17 mmHg; P=0.71) ambulatory diastolic BP (79±11 vs. 78±11 mmHg; P=0.52) and ambulatory heart rate (76±8.7 vs. 73±7.6 bpm; P=0.11) before and after CPAP, respectively.

Conclusions: The short-term CPAP therapy does not appear to influence retinal capillary flow and WLR. Whether long-term apnea elimination in OSA patients influences eye microcirculation warrants further studies.

PP.13.05 DETERMINANTS OF RETINAL VASCULAR REMODELING IN HYPERTENSIVE PATIENTS

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Objective: One of the early processes that occurs in response to increased blood pressure is vascular remodeling. Vascular remodeling in the retinal circulation represents an easy non- invasive possibility to assess microvascular changes in hypertensive patients. The aim of this study was to analyze the impact of age and the function of cofactors on the modification of retinal arteriolar structure in patients with essential hypertension.

Design and method: 158 hypertensive patients with hypertension stage 1and 2 and without renal disease (eGFR-CKD EPI>60ml/min/1.73m2) were included in various randomized controlled trials, but with all the same study protocol at baseline. All subjects were non-smokers. We analysed the modifying effect of age, gender, obesity and level of blood pressure on parameters of vascular remodelling of retinal arterioles (wall to lumen ratio, arteriole wall thickness, cross section area) by using non- invasively and in vivo scanning laser Doppler flowmetry SLDF at 670 nm (Heidelberg Retina Flowmeter, Heidelberg Engineering, Germany).

Results: Hypertensive patients with an age > 65 years have more pronounced hypertrophic vascular remodelling of retinal arterioles than those with an age <45 years whereas duration of hypertension, body mass index (BMI, kg/m2) and gender did not differ.

Table 1	Age < 45 yrs	Age > 65 yrs	
	Mean ± SD	Mean ± SD	p-value
Vessel diameter	102.58±16.65	109.36±10.26	0.079
Lumen diameter	77.31±10.16	78.32±4.72	0.622
Arteriole Wall Thickness	12.63±4.12	15.52±3.76	0.021
Arteriole Wall/Lumen Ratio	0.32±0.08	0.40±0.09	0.007
Cross section area	3700.82±1697.61	4633.12±1390.53	0.047

A comparison of all hypertensive patients with BMI>30 vs. those with BMI<25 did not reveal any significant difference in the retinal vascular structural parameters.
When comparing male vs. female subjects, no study difference in the retinal vascular structural parameters was observed.
Patients with high office blood pressure readings (above the median of 148mmHg) tended to have a greater WLR (0.337±0.097vs0.363±0.094, p=0.094). Finally a multiple linear regression analysis revealed an independent relationship of WLR with age (p<0.001) and a modest degree of systolic office BP (p<0.094), but not with gender or obesity.

Conclusions: The analysis of the study data showed a greater adaption of retinal vascular remodeling parameters in hypertensive patients at the age above 65 years.
Thus, age but not gender or obesity revealed to be an independent determinant of remodeling in small retinal arterioles as a sign of a vascular end-organ damage in hypertensive patients.

PP.13.06 RELATIONSHIP BETWEEN DIFFERENT POPULATIONS OF CIRCULATING ANTI-INFLAMMATORY T LYMPHOCYTES AND MICROVASCULAR DAMAGE

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Objective: Both innate and adaptive immune systems may contribute to the pathogenesis of cardiovascular disease and vascular remodeling through inflammation and oxidative stress. Particularly, the balance between Th1 effector lymphocytes (producing interferon-gamma) and T regulatory (Treg) lymphocytes, which elicit an anti-inflammatory activity, may be crucial for blood pressure elevation and organ damage development, at least in experimental models. Tregs have been previously demonstrated to inversely correlate with subcutaneous small resistance artery media to lumen ratio (M/L) and retinal arteriole wall to lumen ratio (W/L) (unpublished data). Moreover, Th2 lymphocytes (producing interleukin-4 and -5) seem to blunt inflammation. Therefore, we evaluate the possible relationship between Th2 lymphocytes and microvascular damage as well as between anti-inflammatory T lymphocytes and oxidative stress.

Design and method: We enrolled 11 normotensive subjects and 4 hypertensive patients undergoing an election surgical intervention (usually removal of adrenal gland for a non-producing adenoma). No sign of local or systemic inflammation was present in any subjects or patients. All patients underwent a biopsy of subcutaneous fat during surgery. Small resistance arteries were mounted on a wire myograph and M/L was measured. W/L of retinal arterioles was obtained by Scanning Laser Doppler Flowmetry. Functional (basal) and structural (total) microvascular density were studied by capillaroscopy before and after venous

congestion. A peripheral blood sample was obtained before surgery for assessment of T lymphocyte subpopulations. Lymphocyte phenotype was evaluated by flow cytometry after 5 hour and 5 day in vitro activation in order to assess Th2 lymphocytes. Superoxide anion production, as index of oxidative stress, was evaluated by florescent dye dihydroethidium and quantified using an image analyzer.

Results: Results are summarized in the Table. Significant positive correlations were observed between Th2 lymphocytes and capillary density measured at different sites. Additionally, a significant inverse correlation was observed between superoxide anion production and both total Tregs and recent thymus emigrant Tregs ($p<0.05$ and 0.01, respectively).

Correlation coefficients (n=15)	Th2 ($IL4^+CD4^+$) lymphocytes % (5 hours/5 days)	Th2 ($IL5^+CD4^+$) lymphocytes % (5 hours/5 days)
M/L	NS	NS
W/L	-0.51, p<0.05/NS	-0.55, p<0.05/NS
Basal capillary density	0.50, p<0.05/NS	NS/0.60, p<0.05
Total capillary density	0.50, p<0.05/0.62, p<0.01	0.56, p<0.05/0.51, p<0.05

Conclusions: Our data suggest that Treg and Th2 lymphocytes may be protective against microvascular damage, probably because of their anti-inflammatory and anti-oxidant properties confirming an involvement of adaptive immune system on microvascular remodeling and rarefaction.

PP.13.07 EFFECTS OF ENDOTHELIN-1 RECEPTOR BLOCKADE ON CONTRACTILE RESPONSES IN SMALL ARTERIES WITH AND WITHOUT PERIVASCULAR FAT OF OBESE MICE

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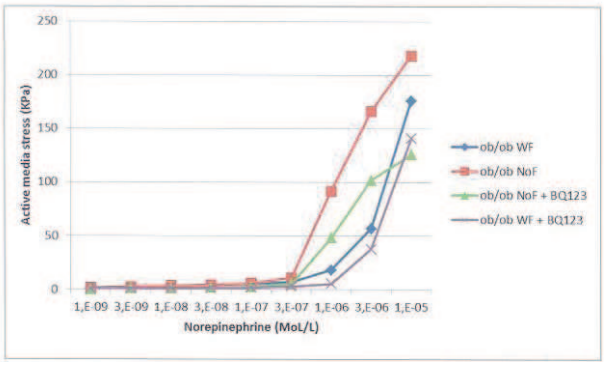
Objective: It has been previously demonstrated that perivascular adipose tissue (PVAT) has an anticontractile effect. This capacity is lost in obesity (Circulation 2009; 119(12):1661-1670) through adipocyte hypertrophy, leading to hypoxia, inflammation and oxidative stress. Aim of the study was to investigate functional responses of small mesenteric arteries with and without PVAT, in an animal model of genetic obesity, testing the hypothesis that endothelin-1 (ET-1) production may be involved in the contractile responses observed.



Design and method: We investigated 10 obese mice (B6.V-Lep ob/OlaHsd, Harlan Laboratories S.r.l.) (ob/ob) and 8 control lean mice (CLM). Mesenteric small resistance arteries were dissected and mounted on a wire myograph, according to Mulvany-Halpern technique (internal diameter about 200 µm). A concentration-response to norepinephrine (NE, from 10-9 to 10-5 Mol/l) was evaluated in vessels with intact prerivascular fat tissue (WF) and in vessels in which perivascular fat tissue was removed (NoF). Concentration-response to NE was repeated in small arteries WF in the presence of BQ123, a selective blocker of ET-1 type A receptors (preincubation with 10-6 Mol/L for 30'). Experiments were performed in both normoxic and hypoxic (30'95% N2/5%CO2) conditions.

Results: Results are partly summarized in the figure (active media stress: KPa, mean of two vessels for each mouse). During normoxia, the presence of perivascular fat reduced contractile response to NE in both ob/ob (ANOVA p=0.002 vs. noF) and CLM (ANOVA p= 0.001 vs. NoF), however, the effect was less in ob/ob compared with CLM. The anticontractile effect of perivascular fat completely disappeared during hypoxia in both groups. In ob/ob NoF, preincubation with BQ123 significantly reduced contractile responses (ANOVA p=0.01), this effect was less in ob/ob WF (ANOVA p= 0.11), since contractile responses were already partially reduced by the vasodilator properties of perivascular fat. Preincubation with BQ123 reduced contractile responses observed during hypoxia in CLM WF (ANOVA p= 0.019) as well as in ob/ob WF (ANOVA p= 0.001).

Conclusions: Contractile responses particularly during hypoxia may be partially mediated by ET-1. Blockade of ET-1 receptors may improve microvascular function, especially in ob/ob and in presence of perivascular fat in hypoxic conditions.

PP.13.08 EARLY ENDOTHELIAL DYSFUNCTION IN CEREBRAL SMALL RESISTANCE ARTERIES FROM CONGENIC LINES FOR A MAJOR STROKE QTL ON RAT CHROMOSOME 1

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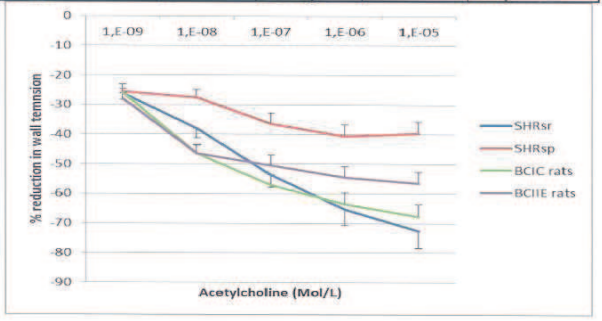
Objective: A quantitative trait locus (QTL) for stroke proneness between the kallikrein (Klk) and Mt1pa markers on rat chromosome 1 was previously identified, and to gain functional insights, congenic strains were constructed by introgressing a selected chromosomal segment from the stroke-prone (SHRsp) onto the stroke-resistant (SHRsr) spontaneously hypertensive rat genome (BCIC rats) and vice versa (BCIIE rats) (Rubattu S et al. Physiol Genomics 2006, 27: 108-113). In the present study we investigated cerebral small resistance arteries structure and function in 10 SHRsr, 10 SHRsp, 13 BCIC rats and 12 BCIIE rats. All rats were sacrificed at 6 week of age, before full development of hypertension.

Maximum acetylcholine-induced vasodilatation (10^{-5} mol/L)	SHRsp	BCIIE rats	BCIC rats	SHRsr
% reduction of wall tension	-39±34	-47±24 p<0.05 vs. SHRsp	-67±23	-72±26 p<0.001 vs. SHRsp



Design and method: Cerebral (basilar) small resistance arteries were dissected and mounted on a wire myograph. A concentration-response to acetylcholine (from 10-9 to 10-5 Mol/L) was evaluated in vessels precontracted with norepinephrine 10-5 Mol/L). Morphological parameter were also evaluated, according to Mulvany and Halpern technique. In particular the internal diameter, the media thickness, the media to lumen ratio and the media cross-sectional area were measured or calculated.

Results: No difference in the morphology of cerebral small vessesl was observed between rat strains.
Aceylcholine–induced vasodilatation (see Figure: mean values±SEM and Table: mean values±SD) was clearly less in SHRsp compared with SHRsr (ANOVAp<0.01). In BCIIE rats the vasodilation response was greater than SHRsp (ANOVA p<0.05), while in BCIC rats the vasodilation response was slightly, not significantly worse than in SHRsr (ANOVA: p=NS).

Conclusions: The introgression of a selected chromosomal segment from SHRsp to SHRsr and vice versa influences endothelium-dependent vasodilation even in very young rats. In particular, the introgression of a QTL from SHRsp to SHRsr (BCIC rats) slightly impairs endothelial function, while the introgression of a QTL from SHRsr to SHRsp (BCIIE rats) improves endothelial function compared with parental strains.

PP.13.09 ASSOCIATION BETWEEN INCREASED COLLAGEN TYPE IV TURNOVER AND LEFT VENTRICULAR HYPERTROPHY IN HYPERTONIC PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objective: Left ventricular hypertrophy (LVH) and myocardial remodelling are signs of cardiac damage in arterial hypertension (AH). Elastin and collagen are the main proteins of the vascular wall. Arterial hypertension and diabetic vascular complications are connected with an elevated degradation of elastic tissue, increasing rigidity of the arterial wall and an abnormal increase in elastin/collagen ratio. As a result collagen type IV derived peptides (CIVDP) are released in the circulated blood, which are a pathological stimulus for an increased production of antibodies to collagen type IV (ACIV Abs). In the present investigation we studied whether the serum levels of antibodies (IgG, IgM and IgA) to collagen are related with left ventricular hypertrophy.

Design and method: To monitor the metabolism of the basement membrane protein collagen in hypertonic patients with type 2 diabetes mellitus (T2DM), serum levels of antibodies to collagen ACIV Abs IgG, IgM and IgA were measured using an ELISA method in 93 patients with arterial hypertension (AH) and diabetes mellitus (mean age 61,4±11,3 years, diabetes duration 9,88±3,12 years; hypertension duration 9,28±4,98). These values were compared to serum antibodies to collagen type IV in 42 age and sex matched controls. The Sokolow-Lyon index criteria was used to diagnose LVH via electrocardiography: S in V1 + R in V5 or V6 (whichever is larger) >= 35 mm (>= 7 large squares); R in aVL >= 11 mm.

Results: Patients showed statistically significant higher levels of ACIV IgG incomparison to healthy controls (0.30±0.12 vs. 0.21±0.08); (p=0.0001). Serum AEAbs IgM and IgA levels in hypertonic patients with T2DM were lower than these in controls, but the differences are not statistically significant. ACIV IgG correlated with electrocardiography estimated left ventricular hypertrophy (r=0.24; P=0.03).

Conclusions: We suggest that there is association between biological markers of extracellular-matrix: ACIV IgG and clinically estimated left ventricular hypertrophy. Serum markers of collagen metabolism (ACIV IgG antibodies) are elevated and might be valuable markers for progression of LV hypertrophy in hypertonic patients with T2DM.

PP.13.10 LEVELS OF CIRCULATING ELASTIN-ANTIELASTIN IMMUNE COMPLEXES AND ANTI-ELASTIN ANTIBODIES IN SERA OF PATIENTS WITH OBESITY AND ESSENTIAL HYPERTENSION

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Objective: Antibodies to α-elastin (elastin breakdown product) and elastin sequences devoid of cross-linked regions (tropoelastin) are found in the serum of all human subjects and correlate with their respective serum peptide levels. The aim of our study was to: (1) Measure levels of elastin-antielastin antibodies (AEAbs) and elastin-antielastin circulating immune complexes (EA CIC) in sera of obese patients with essential hypertension and (2) to compare serum AEAbs and EA CIC levels of obese patients with essential hypertension with AEAbs and EA CIC in obese patients without essential hypertension and healthy controls.

Design and method: The study population consisted of 135 patients divided into three groups as follows: obese patients with elevated blood pressure (n=47), mean age 62.5±12.58 years (Group 1); obese patients with normal blood pressure (n=46), mean age 60.4±8.4 years (Group 2); and control group of healthy subjects (n=42), mean age 58.9±7.56 years (Group 3). Blood pressure (BP) was measured with a random zero sphygmomanometer in the sitting position after at least 5 min rest. Serum total cholesterol, triglycerides and HDL-C were determined enzymatically. ELISA was used to measure the levels of IgG, IgA and IgM AEAbs. EA CIC were investigated by new method for immune complexes detection by means of ELISA-type techniques (CIF-ELISA).

Results: Patients with obesity and AH (Group 1) showed statistically significantly higher levels of elastin-antielastin CIC (0.161±0.020) in comparison with Group 2 (0.118±0.030) and healthy controls (0.069±0.008) (p<0,05). Patients with obesity and AH showed statistically significantly lower levels of AEAbs-IgG (0.406±0.060), IgM (0.430±0.080) and IgD (0.130±0.031) than healthy controls (0.635±0.080), (0.509±0.108), (0.179±0.056) and higher levels of IgA (0.192±0.030) vs. (0.106±0.026) p<0.05. There were non-significant differences in serum AEAbs levels between obese patients without AH and healthy controls (p>0,05).

Conclusions: Our data suggest the existence of an association between changes in levels of serum AEAbs IgA, EA CIC obesity and essential hypertension in patients. Determination of serum AEAbs IgA and EA CIC levels may be a useful method for monitoring of development of arterial hypertension in obese patients.

PP.13.11 NORMAL-HIGH BLOOD PRESSURE OBESE SUBJECTS SHOW FIRST CAPILLARY RAREFACTION BEFORE ELEVATED ARTERIAL STIFFNESS

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Objective: The significant increase of arterial stiffness, as pulse wave velocity (PWV>12m/sec), and the capillary rarefaction are common findings in hypertensives. Aim of the study was to highlight the relationship between these markers of preclinical vascular damage in patients at risk for hypertension such as obese adult males with normal –high blood pressure (ONHBP).

Tertile/Var	age	SBP/DBP	BMI	HOMA	PWV	IMT	CVC
1st PWV	51±12	132±4/86±5	30.4±5.9	2.56±1.73	8.8±.6	.7±.2	61.4±8.6
2nd PWV	53±12	133±4/86±4	29.1±3.7	2.74±1.81	10.1±.4***	.8±.1	55.4±9.7**
3rd PWV	51±13	133±5/84±4	30.1±4.3	2.99±1.46	12.1±.6°°°°°°	.8±.2	51.9±6.9***

Design and method: 87 first-diagnosed ONHBP, confirmed by ABPM, with similar metabolic assessment and insulin resistance (HOMA) underwent echodoppler, to determine carotid intima-media thickness (IMT), and videocapillaroscopy of the medial and distal phalanx of the 2nd, 3rd and 4th finger of the non-dominant hand, to determine the structural capillary density by venous congestion (CVC). Patients were divided based on PWV (Arteriograph) values (27, 32 and 28 as 1st/3 2nd/3 and 3rd/3 tertile, respectively).

Results: The findings are presented as mean±s.d in the table (*:p<0.05; **:p<0.01; ***:p<0.001 vs 1st/3 and (°:p<0.05; °°:p<0.01; °°°:p<0.001 vs 2nd/3. CVC was early reduced in the 2nd/3.
Pearson test, adjusted for age and BP, showed a significant association between HOMA and PWV (-.355**) and CVC (-.297*).

Conclusions: The findings show that in ONHBP the structural microvascular damage tend to increase with insulin resistance, is manifest prior the onset of macrovascular preclinical damage at borderline values and suggest a precocious therapeutic approach.

PP.13.12 AGE, WAIST CIRCUMFERENCE AND BLOOD PRESSURE ARE ASSOCIATED WITH SKIN MICROVASCULAR FLOWMOTION: THE MAASTRICHT STUDY

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Objective: Skin microvascular flowmotion (SMF) – blood flow fluctuation attributed to the rhythmic contraction and dilation of arterioles – is thought to play an important role in ensuring optimal delivery of nutrients and oxygen to tissue and also in maintaining low peripheral resistance. It is unclear however, which determinants influence SMF. Therefore, we investigated which cardiovascular risk factors are associated with SMF.

Design and method: We measured SMF in 506 participants without a prior cardiovascular event. Of these, we selected a healthy subpopulation of 193 participants with normal glucose metabolism, normotension, BMI<30 kg/m2, and without use of cardiovascular medication for additional analysis. SMF was investigated using Fourier transform analysis of skin laser Doppler flowmetry at rest. The associations of the cardiovascular determinants age, sex, waist circumference, 24-h systolic blood pressure (SBP), total-to-HDL cholesterol, fasting plasma glucose (FPG), and cigarette smoking with SMF were analyzed by use of multiple linear regression analysis.

Results: The mean age of the study population (n=506) was 58.8 ± 8.5 years,

260 (51.4%) were men, mean waist circumference was 95.7 ± 13.0 cm, mean 24-h SBP was 119 ± 12 mmHg, and 73 (14.4%) were smokers. After adjustment for all the cardiovascular risk factors and cardiovascular medication use, per 1SD higher age SMF was 0.17 SD (95%CI: 0.08; 0.26; P < 0.001) higher. In addition, per 1SD higher waist circumference SMF was -0.12 SD (-0.23; -0.01; P = 0.03) lower. Finally, per 1SD higher 24-h SBP SMF was 0.17 SD (0.07; 0.27; P < 0.001) higher. We found no significant associations of sex, FPG levels, total-to-HDL cholesterol ratio, or pack years of smoking with SMF. Restriction of these analyses to the healthy subpopulation (n=193) showed similar results.

Conclusions: Age and blood pressure were directly, while waist circumference was inversely associated with SMF. The exact mechanisms underlying these findings remain elusive. The present data support the hypothesis that microvascular dysfunction, specifically, impaired SMF, plays a role in the development of obesity-related insulin resistance and hypertension.

PP.13.13 THE FUNCTIONAL STATE OF MICROCIRCULATORY VESSELS IN PATIENTS WITH ARTERIAL HYPERTENSION 1-2 DEGREE AND DIFFERENT DEGREES OF CARDIOVASCULAR RISK

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Objective: Changes in the microvasculature of patients with arterial hypertension (AH), which are presumed to be involved in the mechanisms of this disease have revealed in different studies. Purpose: to examine laser Doppler flowmetry (LDF) forearm skin microvascular flow and to determine its reserve capacity in patients with AH and different degrees of cardiovascular risk (CVR).

Design and method: 37 patients with 1st and 2nd degree AH, with medium (MR), high (HR) and very high (VHR) CVR (27 women; mean age 53,2±0,57) without antihypertensive treatment and 27 healthy volunteers (V) (21women; mean age 51,5±0,6) were included in the study. In all subjects LDF with studying initial perfusion parameters, constrictor and dilator tests with amplitude–frequency wavelet analysis of blood flow oscillations were performed. Time-averaged vasomotion amplitude was assessed using maximum values in the corresponding frequency band for endothelial, neurogenic, myogenic, venular and cardiac sections of blood flow modulation. Perfusion value (M), standard deviation (σ) and amplitudes of blood flow modulation sections were assessed in arbitrary units (AU).

Results: A significant increase in the rate of basal skin perfusion in all hypertensive groups compared with the V group was found (5,6±0,6AU MR, 5,7±0,6AU HR, 6,6±1,3AU VHR vs 4,3±0,2AU; p<0.05). The amplitude of venular oscillations was 30% higher in HR and VHR groups in comparison with V group (0,12±0,02AU vs 0,08±0,01AU; p<0.05), the amplitude of myogenic (0,5±0,1AU vs 0,23±0,05AU V; p<0.05) and neurogenic (0,5±0,1AU vs 0,26±0,03AU V; p<0.05) oscillations were maximal and reached significant values in VHR group. A reduction in constrictor response in hypertensive patients with MR and HR and its increase in the VHR group was shown during constrictor functional tests (Table 1). The perfusion increase was reduced in response to all kinds of dilator stimulus in all hypertensive patient groups, except data from heat test in VHR group.

Table 1. Constrictor and dilator functional tests results.

	Volunteers group (n=27)	Middle CVR group (n=10)	High CVR group (n=18)	Very high CVR group (n=9)
ΔM Hyperventilation test(%)	38,9±2,8	38,7±6,2	32,8±3,7	46,2±4,4
ΔM Venous occlusion test (%)	46,8±2,2	45,8±4,5	40,0±4,0	56,6±6,6
ΔM Heat test (%)	646,6±39,8	462,4±85,5 $p<0.05$	490,0±36,8 $p<0.05$	658,5±77,0
ΔM Electric stimulation test (%)	608,2±62,6	432,2±61,5	468,5±46,8	350,0±46,1 $p<0.05$
ΔM Arterial occlusion test (%)	410,7±28,0	388,5±66,0	315,1±29,8	351,2±51,9

Conclusions: The findings indicate a progressive increase in the level of basal skin perfusion and venous microcirculation reduction in hypertensive patients with different CVR: from MR to VHR group. Dilator functional tests showed a tendency to lower capillary blood flow reserve in hypertensive patients compared with healthy.

PP.13.14 HEMORHEOLOGICAL PARAMETERS AS THE PREDICTORS OF RECURRENT STROKE

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Objective: The aim of the work was to assess the possibility of using the hemorheological parameters as the predictors of recurrent strokes for different pathogenetic variants of disease.

Design and method: We examined 214 patients (47.7+0.8 years old) with stroke: 197 - with ischemic , 17 - hemorrhagic one, especially in subacute and residual periods (162 - in dynamics of therapy). Erythrocyte (Er) characteristics were studied by dielectrophoresis; hemostatic parameters, gene mutations - by standard techniques.

Results: We revealed different hemorheological variants of stroke: 149 patients had hard Er on the background of metabolic syndrome (the 1st group) and 65 patients had fragile cells on the background of connective tissue dysplasia, viral infections without traditional risk factors (the 2nd). In the 1st group, we assigned essential phospholipids, antioxidants, drugs increasing the level of intracellular macroergic phosphates along with the set of standard therapy. Positive dynamics of the Er parameters was reflected in increase of amplitude deformation, capacitance, speed of Er motion to electrodes , the dipole moment, polarizability and decrease in conductivity, Er viscosity, rigidity (p<0,001-0,05). Membrane stabilizing drugs, Mg-, S-containing drugs, 3,5,7,3,4-pentaoxiflavon, antiaggregants were additionally assigned in the 2nd group with fragile Er. Positive dynamics was accompanied by the increased polarizability at all frequencies, reducing the relative polarizability, aggregation, destruction indices while maintaining sufficient plasticity (p<0,0001-0,03). Positive changes in the Er parameters were correlated with the + dynamic on MRT, reduction in neurological symptoms (r =0,72, p<0.03), positive changes in hemostasis parameters (r =0,69, p<0,02). Lack of positive or negative dynamics of Er parameters (low deformability, high aggregation, destruction indices, low membrane capacitance, dipole moment, polarizability) in combination with high hematocrit, low activity of platelet aggregation, protein-C-deficiency and high D-dimer, soluble fibrin monomer complex in the monitoring of patients correlated with the recurrence of ischemic attacks, increased of hypoxia areas on MRT and neurological symptoms (p<0,0001-0,02). Most of these patients (68%) had mutations in the hemostasis and Er enzyme system genes (p<0,01).

Conclusions: Different pathogenetic variants of stroke required different approaches to the therapy. Hemorheological parameters were found to be the predictors of recurrent stroke.

PP.13.15 VASCULAR CONSTRICTOR RESPONSIVENESS OF FEMORAL AND RENAL ARTERIES ISOLATED FROM NORMOTENSIVE AND HYPERTENSIVE RABBITS

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Objective: This study aimed to assess if skeletal muscle and renal vascular reactivity to a range of constrictor agents are enhanced in hypertension and if this is uniform across the renal vasculature.

Design and method: Moderate hypertension was induced in New Zealand White rabbits via bilateral renal cellophane-wrap (wrap). Isometric contractions to noradrenaline, methoxamine, angiotensin II and endothelin-1 were assessed in vitro in femoral arteries (3rd order branch, internal diameter (i.d.) 322 ± 27 μm), renal interlobar (outer medulla, i.d. 693 ± 17 μm) and arcuate arteries (corticomedullary junction to cortex, i.d. 283 ± 10 μm) mounted on a wire myograph.

Results: Mean arterial pressure was 38 mmHg greater in 7 week wrap rabbits than sham-operated normotensive (sham) rabbits (p<0.0001). Agonist-induced contraction was variously altered by hypertension in the different vessels. Maximum contractile responses (Emax) to methoxamine, noradrenaline and endothelin-1 were enhanced in femoral arteries isolated from hypertensive (computed maximum active pressure, Pmax = 290, 275 and 134 mmHg, respectively) compared to normotensive animals (Pmax = 139, 158 and 194 mmHg, respectively, p<0.05) with negligible changes in sensitivity. In contrast, renal interlobar arteries from wrap animals had greater sensitivity (p<0.05) to methoxamine (2.5-fold), noradrenaline (6-fold) and angiotensin II (2.5 fold) than arteries from sham animals. An enhanced Emax was only observed in response to endothelin-1 (Pmax = 184 vs. 138 mmHg) in wrap arteries. Further, there were no appreciable differences in EC50 or Emax in the renal arcuate arteries of wrap and sham animals. Notably, arcuate arteries had poor contractile responses to angiotensin II.

Conclusions: Isolated renal interlobar vessels from wrap animals appear to have greater sensitivity to constrictor agents while femoral arteries were able contract to a greater maximum. Vascular responses in arcuate arteries appear not to be affected by wrap hypertension.

PP.13.16 A NOVEL TECHNIQUE TO DETERMINE THE CONTRIBUTION OF T- AND L-TYPE CALCIUM CHANNEL ACTIVATION TO VASOCONSTRICTION IN RAT ISOLATED RENAL ARTERIES

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Objective: Two voltage-operated calcium channels (VOCC) in vascular smooth muscle have been characterised as T-type (transient-opening low voltage depolarisation, -70 to -20 mV) and L-type (long-opening depolarisation, -20 to +30 mV). This study aimed to functionally characterise these 2 components in the renal vasculature, a tissue known to express T-channel current.

Design and method: We functionally characterised these 2 components through contraction of ring segments of rat interlobar renal arteries (internal diameter, i.d. 357±8 µm) mounted in a wire myograph. Arteries were depolarised and contracted by sequential incubation with potassium (10, 20, 40 and 62 mM) in the absence and presence of various L- and putative T-type calcium channel inhibitors. While 10 and 20 mM potassium causes depolarisations typically required to activate T-type VOCC (-62 mV to ~-40 mV in small mesenteric arteries), membrane depolarisation with higher potassium (40 and 62 mM) activates both T- and L-type VOCC. Thus, L-type VOCC-mediated contraction was taken as the response to 40 mM potassium minus the response to 20 mM potassium (within tissue). The half maximal inhibitory concentrations (IC50) of each inhibitor for the T- and L-type components were then determined from the corrected curves, allowing the estimation of T- and L-type VOCC selectivity.

Results: IC50 values were:
NNC 55-0396: T-type 55 nM, L-type >300 nM.
Mibefradil: T-type 54 nM, L-type >300 nM.
Felodipine: T-type 1.6 nM, L-type >3 nM.
Nisoldipine: T-type 3 nM, L-type 12 nM – T/L sensitivity ratio of 4.

Conclusions: These findings show that functional (constrictor) responses to activation of T-type VOCC channels are important in the overall vasoconstrictor response to a small depolarisation and that T-type-selective and non-selective T- and L-type VOCC inhibitors can contribute to the decrease in vasoconstrictor tone in renal small arteries.

PP.13.17 MODULATION OF NITRIC OXIDE-DEPENDENT RELAXATION OF RAT MESENTERIC ARTERY BY PERIVASCULAR ADIPOSE TISSUE

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Objective: Increasing prevalence of metabolic syndrome and subsequent cardiovascular disease is a growing health problem worldwide. The related visceral fat is now considered as an endocrine organ, and produces and releases various physiological substances. However, little is known about the direct effect of abdominal adipose tissue on adjacent arteries.

Design and method: We evaluated the effect of perivascular adipose tissue on the arterial relaxation in response to nitric oxide in isolated rat mesenteric arteries.

Results: Sodium nitroprusside (SNP, 10-11 to 3×10-5 mol/L), a nitric oxide donor, caused dose-dependent relaxation in arteries precontracted by phenylephrine (10-5 mol/L). The relaxing effect was significantly inhibited in arteries with perivascular adipose tissue. The arterial relaxation induced by BAY 41-2272 (10-10 to 3×10-5 mol/L), an activator of guanylate cyclase, was also diminished in the presence of perivascular adipose tissue, although 8-pCPT-cGMP (10-8 to 3×10-4 mol/L), a cGMP analogue, caused the similar arterial relaxation irrespective of perivascular adipose tissue. When arteries were incubated with ODQ (10-5 mol/L), a guanylate cyclase inhibitor, SNP-induced relaxation was abolished in arteries without perivascular adipose tissue, meaning that nitric oxide caused the arterial relaxation almost totally dependent on the increase of cGMP. However, in arteries with perivascular adipose tissue, this arterial relaxation induced by SNP was still observed. This residual relaxation was abolished by 20 mmol/L high potassium solution or iberiotoxin (10-7 mol/L), an inhibitor of BKCa channels.

Conclusions: These findings suggest that nitric oxide-induced relaxation is reduced by perivascular adipose tissue via the inhibition of guanylate cyclase in rat mesenteric arteries, which might in part be compensated by activated BKCa channels.

PP.13.18 ASSOCIATION OF PARENTAL BLOOD PRESSURE WITH RETINAL MICROCIRCULATORY ABNORMALITIES INDICATIVE OF ENDOTHELIAL DYSFUNCTION IN CHILDREN

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Objective: Microcirculatory abnormalities precede the onset of hypertension, and may explain its familial nature. We examined the relationship between parental blood pressure (BP) and offspring retinal microvasculature in Pakistani trios, [father, mother and child (aged 9-14 years)].

Design and method: This is a sub-study of a population-based trial of BP reduction. Data were available on 358 normotensive, and 410 offspring of at least one hypertensive parent. Retinal-vessel characteristics were measured from digital images. Multivariable linear regression models were built to assess the associations between maternal and paternal BP and offspring retinal microvasculature.

Results: Optimality deviation was greatest in offspring of two hypertensive parents, compared to those with one or no hypertensive parent (p=0.030 for trend). Paternal systolic and diastolic BP, were each significantly associated with optimality deviation in offspring (p=0.023 and p=0.006, respectively). This relationship persisted after accounting for offspring cardiovascular risk-factors (increase in optimality deviation (95% CI) 0.0053 (0.0001 to 0.0106, p=0.047) and 0.0109 (0.0025 to 0.0193, p=0.011), for each 10 mm Hg increase in paternal systolic and diastolic BP, respectively). Maternal diastolic BP was inversely associated with offspring arteriovenous ratio -0.0102 (-0.0198 to -0.0007, p= 0.035).

Conclusions: Microvascular endothelial dysfunction in children is associated with increasing levels of parental hypertension. The association with paternal BP is independent of other cardiovascular risk-factors, including the child's BP. Higher maternal diastolic blood pressure is associated with evidence of arteriolar narrowing in offspring. These early microcirculatory changes may help explain familial predisposition to hypertension in people of Pakistani origin at an early age.

PP.13.19 MENSTRUAL ANGINA IMPROVED AFTER TRIMETAZIDINE TREATMENT IN MIDDLE AGE FEMALE

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Objective: Case report showing effectiveness of Trimetazidine for menstrual angina.

Design and method: A 50yr old Caucasian female presented with complaint of chest pain, described it as a pressure and tightness on exertion that lasts for about 10 minutes and is relieved by rest. The pain comes only during menstruation for the past year. She has no history of diabetes, hypertension, and she had mild elevation of LDL 4.6mmol/l but her HDL is 1.5mmol/l, and Triglycerides 1.2mmol/l. No family history of heart disease, nonsmoker and minimal exercise. Her EKG showed sinus rhythm with non specific ST changes.
Patient was started on Rovastatin, Aspirin, and Nitroglycerine prn and underwent nuclear stress test which showed anterior reversible defect. Patient continued to be symptomatic during her menstruation so she underwent coronary angiogram which was completely normal.
Cardiac syndrome X, as defined by most literature, is described as angina with normal coronary arteries and usually affects women between the ages of 45-55 (post-menopausal mostly). It is thought to be related to low estrogen levels due to menopause, but there have also been other reasons indicated such as microvascular disorders and abnormal pain perception. It is usually diagnosed by exclusion. Treatment is symptomatic and will usually include anti-anginals and some even suggest hormone replacement therapy.
This case differs from the typical syndrome X pt, in the way that her symptoms appear only during menstruation.
Trimetazidine is shown to increase exercise tolerance and delay the ischemic threshold. This metabolic therapy is a new approach for the treatment of Syndrome X for peri-menopausal women, and seems to be very effective with no noted side effects or complications.

Results: After starting Trimetazidine 35 mg twice a day, patient felt much better after a month and has no chest pain. Follow up after one year, patient continued to be completely asymptomatic.

Conclusions: Metabolic therapy using trimetazidine was effective for eliminating angina in peri-menopausal women with menstrual angina. Further study of this treatment is warranted to evaluate the long-term safety and efficacy of the drug for patients with this syndrome.

PP.13.20 INFLUENCE OF INFLAMMATION ON SKIN THERMAL FLOW AMONG ELDERLY PATIENTS WITH OPTIMALLY TREATED HEART FAILURE

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Objective: The aim of the study was to assess the contributors of skin thermal flow among heart failure patients.

Design and method: Studied population consisted of patients over 60 years with heart failure. Blood pressure (BP) measurements, echocardiography, N-terminal pro-B-type natriuretic peptide (NTproBNP), C reactive protein (hsCRP), interleukin-6 (IL-6) and interleukin-18 (IL-18) were performed. Skin microcirculation was assessed by laser Doppler flowmetry -LDF (PeriFlux PF 5000). Resting and thermal flow (TF) were registered. Fast Fourier Transformation of LDF signal was also performed. Data were analyzed in 2 groups with NYHA I and II (group I) and NYHA III (group II). Statistical analysis was performed with U Mann-Whitney test and Spearman correlation.

Results: Study population consisted of 94 persons (I – 43 and II – 51 subjects) aged 70,8±8,6 years, 62,8% men. Both groups were similar according to age, BP values, hsCRP, IL-18 levels and resting flows. Group I had higher ejection fraction (EF) than group II (53,5±15,0 vs 27,2±11,2%, p<0,001), lower NT proBNP (528±839 vs 3093±3260 pg/ml, p<0,001) and IL-6 (4,2±3,2 vs 7,0±5,9 pg/ml, p<0,05). Use of ACE inhibitors was similar in both groups, but beta-blockers (64,7% vs 86,0%, p<0,02) and diuretics (58,8% vs 90,7%, p<0,001) were more frequently used in group II than group I. Positive correlations were observed between EF and mean TF (r=0,30), flowmotion of neurogenic (r=0,25) and myogenic (r=0,26) origin. NTproBNP correlated negatively with mean TF (r=-0,29) and neurogenic flowmotion (r=-0,30). Negative correlations were also observed between IL-6 and neurogenic flowmotion (r=-0,27) and between hsCRP and myogenic flowmotion (r=-0,24).

Conclusions: In addition to systolic dysfunction, inflammation plays essential role in the microcirculation dysfunction in elderly patients with heart failure.

PP.13.21 COMPARISON OF RETINAL MICROPERFUSION AND ARTERIOLAR STRUCTURE BETWEEN PATIENTS WITH PRIMARY ALDOSTERONISM AND ESSENTIAL HYPERTENSION

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Objective: It has been shown that retinal arteriolar structure might serve as an in-vivo parameter of vascular damage in patients with essential hypertension. However, retinal arteriolar structure has not been evaluated in patients with secondary hypertension. In the ongoing study we analyzed retinal arteriolar structure in patients with primary aldosteronism (PA), characterized by excessive aldosterone secretion.

Design and method: We examined 25 patients with PA (age 54.3±10.2 years, 16 M, 9 F) and 25 age, gender, body mass index, glycemic status, blood pressure levels and number of medication (p>0.05) matched patients (age 54.9±8.2 years, 14 F, 11 F) with essential hypertension (EHT). Retinal microperfusion (RCF) and retinal arterioles were assessed using scanning laser Doppler flowmetry (SLDF). The parameters of retinal morphology: outer diameter (AD), lumen diameter (LD), wall/lumen ratio (WLR), wall thickness (WT), and wall cross-sectional area (WCSA) were determined by automatic full-field perfusion imaging analysis (AFFPIA V.4.011).

Results: Patients with PA were characterized by higher AD, WT, WLR and WCSA as compared with EHT (Table). There was no significant difference in LD, as well as in RCF between the groups (Table). Parameters describing retinal arterioles' morphology were not correlated to serum aldosterone concentration and office and ambulatory blood pressure levels both in the PA group and in the EHT group.

	AD (μm)	LD (μm)	WT (μm)	WLR	WCSA (μm²)	RCF (AU)
PA	110.1±15.1	76.5±10.4	16.8±4.1	0.44±0.11	5026±1646	311±80
EHT	98.6±12.3	72.8±4.3	12.9±4.3	0.35±0.11	3573±1535	283±66
P	0.005	0.12	0.002	0.005	0.002	0.20

Conclusions: Patients with primary aldosteronism as compared to matched hypertensive controls are characterized by higher outer wall diameter, wall thickness, wall-to-lumen ratio and wall cross sectional area of retinal arterioles reflecting hypertrophic vascular remodeling in the retinal arterioles, which indicate the detrimental effect of excessive aldosterone on the cardiovascular system and retinal arterioles.

PP.13.22 CONTRIBUTORS OF RESTING FLOW IN SKIN MICROCIRCULATION AMONG SUBJECTS WITH EXTREME OBESITY AND NON-ALCOHOLIC FATTY LIVER DISEASE

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Objective: The aim of our study was to investigate, whether subjects with severe obesity and non-alcoholic fatty liver disease (NAFLD) present alteration of resting skin blood flow and flowmotion.

Design and method: Subjects were recruited to the study from the patients qualified to bariatric surgery. Body mass index (BMI), blood pressure (BP), serum glucose, total cholesterol, C reactive protein (hsCRP) and glycosylated haemoglobin (HbA1C) were measured. Resting skin blood flow (RF) was measured using PeriFlux Laser Doppler Flowmetry (LDF). Fast Fourier Transformation of LDF signal was also performed. Hepatic ultrasonography was used to estimate steatosis score. Data were compared in three groups: I – obese subjects with absent or mild steatosis, II – obese with moderate or severe steatosis, III - healthy control. Statistical analysis was performed with Anova Kruskal-Wallis test and Spearman correlation.

Results: The study population consisted of 29 obese patients (I-17, II-12) and 11 subjects of control group. The obese were older (I- 46,9±9,9, II-47,2±8,5, III-36,2±5,0 years), had higher values of BMI (44,1±5,5 vs 45,9±6,5 vs 24,4±2,7 kg/m2), glucose (5,3 ±0,4vs 6,0±1,5vs 4,8±0,5 mmol/l), HbA1C (5,7±0,4 vs 6,0±0,8 vs 5,3±0,4 %) and hsCRP levels (7,6±8,9 vs 7,7±6,9 vs 0,9±0,9mg/l) than healthy control. BP, cholesterol and mean RF were similar in study groups, but the power spectral density (PSD) of LDF signal was significantly lower among obese than healthy subjects. PSD of endothelium origin flowmotion correlated negatively with BMI (=-0,42) and hsCRP (r=-0,39). Negative correlation between PSD of neurogenic flowmotion and BMI (r=-0,38) and between PSD of myogenic flowmotion and age (r=-0,34), BMI (r=-0,59) HbA1C (r=-0,34) and hsCRP (r=-0,48) were also observed.

Conclusions: Obesity and inflammation may negatively influence on flowmotion in skin microcirculation in patients with severe obesity.

PP.13.23 MACRO- AND MICROCIRCULATION IN NORMAL-TENSION GLAUCOMA. A CASE-CONTROL STUDY

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Objective: In normal-tension glaucoma (NTG), optic nerve damage occurs despite a normal intraocular pressure. Studies implicating systemic blood pressure or, more recently, arterial stiffness in the pathophysiology of NTG have produced conflicting results. Our aim was to investigate whether NTG is associated with alterations in the macro- or microcirculation, cardiac function and peripheral and central hemodynamics.

Design and method: 30 patients with NTG (mean age 65y, range 46-79) and 33 healthy subjects (mean age 67y, range 42-79) matched for age and sex were recruited. Aortic stiffness was measured using carotid-femoral pulse wave velocity (PWV). Central hemodynamics (pressure, wave reflection) were assessed at the carotid artery using applanation tonometry. Diameter, stiffness and intima media thickness (IMT) of the elastic common carotid and the more muscular common femoral artery were measured using echo-tracking. Total peripheral resistance index (TPRI) was assessed from mean arterial pressure and cardiac index. Cardiac output was determined using ultrasound. Symptoms of vascular dysregulation and the presence of co-morbidities were assessed using a questionnaire.

Results: There were no statistically significant differences in arterial structure and function between NTG patients and age- and sex-matched controls, for any of the measured arterial segments; for NTG versus controls, respectively: blood pressure 126±15 / 77±8 mmHg vs. 127±16 / 76±7 mmHg, p=0.81; aortic PWV 9.8±2.1 m/s vs. 10.1±1.9 m/s, p=0.60; TPRI 1833±609 vs. 1779±602 dyne.s/cm5/m², p=0.79; carotid IMT 0.65±0.14 µm vs. 0.68±0.13 µm; p=0.39. Questionnaire reports revealed an increased prevalence of cold extremities in the NTG group (73% vs. 21%, p<0.001) and a trend towards more migraine prevalence (33% vs. 18 %, p=0.17), suggesting that NTG patients do exhibit vascular dysregulation.

Conclusions: NTG is not associated with altered arterial stiffness, intima media thickness, total peripheral resistance, cardiac output, peripheral or central hemodynamics. Although the majority of NTG patients do exhibit symptoms of vascular dysregulation, in the present study this did not translate into alterations in the micro- or macrocirculation at rest.

PP.13.24 THE KEITH-WAGENER-BARKER VERSUS THE MITCHELL-WONG GRADING FOR HYPERTENSIVE RETINOPATHY: REPRODUCIBILITY, AGREEMENT AND ASSOCIATION WITH ORGAN DAMAGE

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Objective: The Keith-Wagener-Barker (KWB) grading [G0-G4] is commonly used in clinical practice for the classification of hypertensive retinopathy; a new simplified grading has been proposed by Mitchell-Wong (MW) (Normal (N), Mild (M), Moderate (Mod), Malignant).We compared the KWB and MW gradings in individuals free of cardiovascular disease and diabetes mellitus.

Design and method: In 107 consecutive patients, referred for cardiovascular risk evaluation, digital retinal images were obtained from both eyes, aortic stiffness (pulse wave velocity, PWV-m/sec) and left common carotid hypertrophy (intimal-medial thickness, IMT-mm) were assessed. A total of 214 retinal images were graded - according to both classifications - by two independent and blinded observers (A & B). Inter-observer agreement was assessed through a repeat grading after 5 months.

Results: Intra-observer reproducibility: very good for both gradings (KWB: kappa [k]=0.81 (agreement 88%) MW: k=0.82 (91%)), yet slightly superior for MW. Inter-observer agreement: moderate for both gradings; (KWB: k=0.37 (64%) MW: k=0.42 (71%)) yet slightly superior for MW. Organ damage: KWB grading was significantly associated with both PWV and IMT (PWV: G0 8.2±0.2 vs. G1 9.4±0.2 vs. G2 9.3±0.4 vs. G3 9.5±1.3, p<0.001 for trend) (IMT: G0 0.67±0.02 vs. G1 0.74±0.02 vs. G2 0.74±0.03 vs. G3 0.82±0.15, p<0.001 for trend); MW grading was significantly associated with both PWV and IMT (PWV: N 8.2±0.2, M 9.4±0.2 Mod 9.5±1.3, p<0.001 for trend) (IMT: N 0.67±0.02, M 0.74±0.02, Mod 0.82±0.15, p<0.001 for trend).

Conclusions: Both gradings showed acceptable intra- and inter-observer variability, though slightly superior for MW. Since no difference were found in the large arteries damage indices between KWB G1 and G2 the merging of these stages into Mild grade of MW classification is clinically useful in terms of simplicity and cardiovascular risk stratification.

PP.13.25 COMPOUND EFFECT OF A REPERFUSION AUTOREGULATORY ABNORMALITY AND HIGH PULSE PRESSURE ON END ORGAN

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Objective: Elevated pulse pressure (PP; >= 60 mmHg) is associated with increased cardiovascular risk and impaired renal function. Between the conduit arteries and the tissues, however, there are several vascular beds responsible for the attenuation of pulsatility that would diminish the exposure of vascular beds to the extremes of pressure. We have previously described distinct microvascular reperfusion autoregulatory abnormalities, characterised by an early surge of reperfusion after an ischaemic stimulus within the first 2 seconds of cuff release, which are associated with a gradation of cardiovascular risk. We aimed to explore the compound effect of increased pulse pressure and reperfusion autoregulatory abnormalities on renal function and common carotid artery intima-media thickness (IMT).

Design and method: Post occlusive reactive hyperaemia was performed on 371 participants, and reperfusion autoregulatory peak responses classified as normal (NORM) or abnormal (ABN). Pulse pressure was calculated as systolic minus diastolic brachial blood pressure. An elevated PP (PP+) was defined as a PP>= 60 mmHg vs a normal PP < 60mmHg (PP-). The population was stratified by microvascular response and PP into NORM/PP-, NORM/PP+, ABN/PP- and ABN/PP+. Common carotid IMT images were obtained by ultrasound; eGFR was calculated using the modification of diet in renal disease method.

Results: 371 individuals were assessed (99 NORM/PP-, 29 NORM/PP+, 149 ABN/PP- and 94 ABN/PP+). eGRF and IMT were different across groups (p for ANOVA=0.003 and 0.005 respectively). IMT was higher in those with PP+, irrespective of microvascular status after adjustment for age and BMI (p=0.007 for PP- vs. PP+ in NORM, & p = 0.045 for PP- vs PP+ in ABN). With regard to eGFR, elevated PP had no effect, reperfusion autoregulatory abnormality had a marginal effect (p=0.04), whereas the presence of both PP+ and ABN had a compound detriment (78mls/min vs 69mls/min; p=0.003).

Conclusions: The cardiovascular risk factor, Carotid IMT is dependent predominantly on hypertension. End organ damage such as attenuated renal function requires a loss of autoregulatory function before hypertension precipitates end organ damage. Further work is required to evaluate the extent of the interaction between the microcirculation and large vessel hypertension.

PP.13.26 ROLE OF TISSUE DOPPLER IN ASSESSMENT OF LEFT VENTRICULAR FUNCTIONS IN HYPERTENSIVE RETINOPATHY

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Objective: Hypertension represents a significant global public health concern contributing to cardiovascular mortality and economic burden. One of the most important risk indicators of hypertension for morbidity and mortality is hypertensive retinopathy. Tissue Doppler Echocardiography is a well established non-invasive technique to assess left ventricular physiology. The aim of this work was to assess LV systolic and diastolic functions by using conventional echocardiography and tissue Doppler imaging (TDI) in patients with hypertensive retinopathy.

Design and method: In the period between December 2010 to December 2011 Eighty subjects were enrolled in this study; group I:30 hypertensive patients with hypertensive retinopathy, group II: 30 hypertensive patients without hypertensive retinopathy and group III: 20 individuals as a control group matched for age and sex. All study groups were subjected to full history taking, clinical examination, blood pressure measurement, conventional echocardiography and Pulsed wave tissue Doppler imaging. Retinal examination was performed and retinopathy was categorized into four grades based on Keith-Wagener classification.

Results: Results showed a significant increase in Tei index in hypertensive patients with hypertensive retinopathy explained by prolonged isometric contraction time (ICT) (P-value = 0.022). Hypertensive patients without hypertensive retinopathy showed a statistically significant increase in relative wall thickness (RWT) (P-value = 0.021). Other systolic, diastolic function parameters and cardiac morphology showed no significant difference when comparing between both hypertensive groups (P-value> 0.05).While a statistically significant difference was found when comparing LA diameter, RWT, LV mass, LV mass index, E/A, Ea/Aa and E/Ea ratios in both hypertensive groups to control group (P-value < 0.05).

Conclusions: This study concluded that TDI is a valuable tool for detection of early affection of systolic and diastolic functions caused by hypertension. However, it has a minimal diagnostic value to predict hypertensive retinopathy.

POSTERS' SESSION

POSTERS' SESSION PS14
RESISTANT HYPERTENSION

PP.14.01 SELECTION OF PATIENTS FOR RENAL DENERVATION: POSSIBLE CHALLENGES

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Objective: Renal denervation (RDN) is currently recommended as alternative procedure for resistant hypertension (RHTN), while confirmation of true treatment resistance time-consuming and laborious. Moreover, suitable may refuse from the procedure or have other contras. The aim of the study was to evaluate the process of detection of potential candidates for RDN in routine practice of specialized hypertension excellence center.

Design and method: We examined patients with uncontrolled hypertension referred to Federal Almazov Medical Research Centre (HTN Excellence Center of ESH). ABPM (SpaceLabs 90207, USA), renal ultrasound with Doppler, blood testing (creatinine level with calculation of GFR by MDRD formula, potassium, glucose, cortisol, metanephrines, aldosterone, renin concentration with calculation of aldosterone-renin ratio), verification of treatment compliance, overnight polysomnography were performed. Patients with confirmed RHTN were offered renal denervation procedure. After signing the informed consent patients were referred to CT angiography to assess renal artery anatomy.

Results: Over the 11 months we examined 502 patients with uncontrolled hypertension (149 males and 353 females) aged from 30 to 74 years (mean age 54 ± 9.6 years). True RHTN was confirmed in 70 patients (12.6%). However, contraindications were present in 32 patients: severe comorbidities (18; 56%), target blood pressure level on modified multicomponent antihypertensive treatment (14;44%). The procedure was offered to remaining 38 patients and of them 25 (66%) signed informed consent. According to the results of CT angiography so called normal anatomy of the renal arteries was observed in 4 (16%) out of 25 patients, in other cases some anatomical variants or pathologies were present: additional arteries-17 (68%), early proximal division - 3 (12%), fibromuscular dysplasia - 1 (4%). Technical feasibility of the procedure was confirmed in 15 (60%) out of 25 RHTN patients. So after examination of 502 patients with uncontrolled hypertension only 15 (3%) of them fulfilled all criteria for renal denervation procedure.

Conclusions: In summary, true RHTN was confirmed in 70 (12.6%) out of 502 patients referred to Federal Almazov Medical Research Centre due to uncontrolled hypertension, while only 15 (3% of the whole group and 21.4% among true RHTN) patients were suitable for renal denervation.

PP.14.02 QUANTITATIVE ANGIOGRAPHIC ANALYSIS IN RENAL DENERVATION

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Objective: Renal denervation (RDN) using radiofrequency energy can cause visible changes within the renal arteries (RAs). However, quantitative analysis of these so-called focal irregularities has never been performed.

Design and method: We investigated the RAs of 38 patients (15 females, 20 diabetics, mean age 62 years), treated bilaterally, pre and post RDN (Symplicity system), using quantitative angiography (CAAS 5.1 software, Pie Medical Imaging, Maastricht,NL). Arteries were analyzed in 5 mm slides, and identical images were selected, using ECG gating. Analysis was performed, using contour detection alone (circular area and volume – circArea, circVolume), and contour detection combined with densitometry (densitometric area and volume – densiArea, densiVolume).

Results: Mean number of completed ablations was 10 per patient. 12 patients had at least one accessory renal artery. Mean diameter of the RAs was 5.3 (SD 0.9) mm. Pre-procedure, the sum of circArea and circVolume of both RAs was 46.8 (SD 15.9) mm2 and 2335 (SD 917) mm3, the sum of densiArea and densiVolume was 51.5 (SD 23.6) mm2 and 2574 (SD 1233) mm3, respectively. The size of RAs pre procedure was related to body height. Men, diabetics, and patients without accessory RAs had larger RAs than their counterparts.
The number of ablation points was related to RA size (correlation coefficients 0.47 – RA length up to 0.71 – densiVolume).
Following RDN, mean RA diameter decreased by 0.31 (SD 0.37) mm or 2 % (SD 4%). CircVolume decreased by 41 (SD 230) mm3 or 2.3 % (SD 9.8), densiVolume by 199 (SD 721) mm3 or 6.7 % (SD 23.3). Categorical analysis revealed that RA size decreased in 2/3 of patients (intraarterial nitrate was administered in all RAs). This behaviour was unrelated to age, gender, diabetes status, baseline blood pressures and size of RA pre RDN. A higher number of ablation points / total RA length was related to decrease of RA size in densitometric analysis, the presence of accessory arteries was related to decrease of RA size in contour analysis.

Conclusions: Changes in RAs following RDN can be quantified, and are largely unrelated to baseline and procedural characteristics.

PP.14.03 RESISTANT HYPERTENSION, PATIENT CHARACTERISTICS, AND RISKS OF ISCHEMIC STROKE

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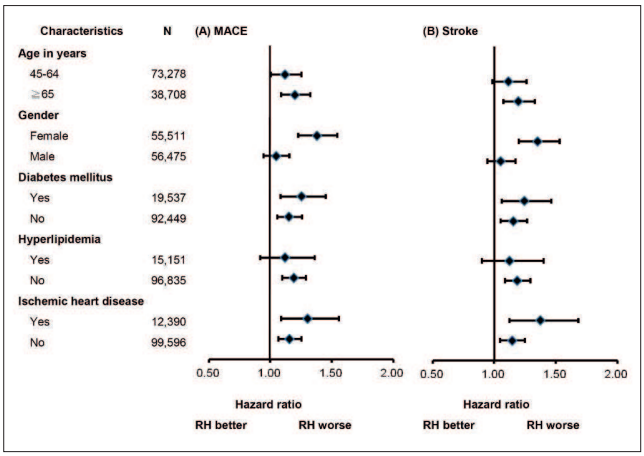
Objective: Little is known about the prognosis of resistant hypertension (RH) in Asian population. This study aimed to evaluate the impacts of RH in Taiwanese patients with hypertension, and to ascertain whether patient characteristics determine the outcome of RH.



Design and method: Patients aged >=45 years with hypertension were identified from the National Health Insurance Research Database. Medical records of 111,986 patients were reviewed in this study, and 16,402 (14.6%) patients were recognized as having RH. Risk of major adverse cardiac events (MACE) in patients with RH and non-RH was analyzed.

Results: A total of 11,856 patients experienced MACE in the follow-up period. There were more females in the RH group, they were older than the non-RH (63.1 vs. 60.5 years) patients, and had a higher prevalence of cardiovascular co-morbidities. Overall, patients with RH had higher risks of MACE (adjusted HR 1.17; 95%CI 1.09-1.26; p<0.001). Significantly elevated risks of stroke (adjusted HR 1.17; 95%CI 1.08-1.27; p<0.001), especially ischemic stroke (adjusted HR 1.34; 95%CI 1.20-1.48; p<0.001), but not all-cause mortality or acute coronary syndrome were noted in patients with RH compared to those with non-RH. A propensity score matched cohort confirmed this relationship. Subgroup analysis showed that RH increased the risks of stroke in female and elderly patients. However, no significant influence was noted in young or male patients.

Conclusions: Patients with RH had higher risks of MACE and stroke, especially ischemic stroke. The risks were greater in female and elderly patients than in male or young patients.

PP.14.04 TWELVE-MONTH OUTCOMES OF RENAL DENERVATION WITH THE ONESHOT™ SYSTEM: A SUB-GROUP ANALYSIS OF THE RAPID STUDY

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Objective: To report on the 12-month safety and effectiveness outcomes of renal artery denervation with the OneShot™ Renal Denervation System for the treatment of resistant hypertension.

Design and method: RAPID is a prospective, multicenter, single-arm study that enrolled 50 patients (29 men, 21 women; mean age 63.0 ± 9.5 years) with treatment resistant hypertension at 11 clinical sites in Europe and New Zealand. The primary study endpoint was the reduction in office systolic blood pressure (BP) at 6 months. Additionally, 24 hour ambulatory BP measurements at baseline and during follow up, as well as procedural safety were thoroughly analyzed.

Results: At baseline, patients had mean office systolic and diastolic blood pressure levels of 182/96 mmHg, despite taking an average of 5.1 antihypertensive medications including a diuretic. Renal denervation was performed safely in all patients with a median procedure time (defined as time from initial arterial access to closure) of 48 minutes and a median OneShot™ system ablation time of 4.0 minutes for both arteries. At 6 months, there was a significant reduction in office BP of -20/-8 mmHg (p<0.0001/p=0.0002), and in 24-hour ambulatory BP of -11/-6 mmHg (p=0.0085/p=0.037) when compared to the corresponding baseline values. In total, 61.7% of patients responded to renal denervation therapy, with treatment response being defined as a drop of >= 10 mmHg in office systolic BP. Furthermore, we assessed the reduction in office BP at 6 month follow-up for defined patient subgroups according to gender, age and diabetic status. Interestingly, a trend towards enhanced results in women, younger and non-diabetic patients was observed Table):

Sub-Groups	Change in office BP at 6 months from Baseline, mmHg	Between Group p-value
Men (n= 26)	-12/-6	0.15/0.56
Women (n=21)	-30/-10	
Age ≤ 65 years (n=27)	-26/-8	0.07/0.70
Age > 65 years (n=20)	-12/-8	
Non-Diabetic (n=27)	-24/-8	0.41/0.71
Diabetic (n=20)	-14/-7	

Importantly, there were no serious adverse events (SAEs) at discharge related to groin and vascular access complication or renal artery injury. 13 SAEs were reported at 6 months, 3 (6%) of which were device and/or procedure related.

Conclusions: Renal denervation with the OneShot™ system is safe and effective in patients with treatment resistant arterial hypertension, leading to a significant BP reduction at 6 months. 12 month outcomes of the RAPID study stratified by gender, age and diabetic status shall be presented at ESH/ISH.

PP.14.05 HB1AC AS A PREDICTOR OF ARTERIAL STIFFNESS AND ENDOTHELIAL DYSFUNCTION IN DIABETIC RESISTANT HYPERTENSIVE PATIENTS

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Objective: Endothelial function, intima-media thickness (IMT) and vascular stiffness are variables closely associated in normotensive subjects as well as in hypertensive and diabetic (DM) patients; however this correlation has not been tested in resistant hypertensive (RHTN) individuals. It is known that DM is a very common finding in RHTN, but it is controversial whether this condition causes some incremental impairment in vascular dysfunction in these patients. Also, it is controversial if glycated hemoglobin (Hb1Ac) plasma levels predict arterial abnormalities in RHTN individuals.

Design and method: Two hundred and six RHTN patients were divided in two groups: RHTN+DM (Hb1Ac=7.3%, age=58.7y, BMI= 30.8, n= 134) and RHTN-nonDM (Hb1Ac= 5.5%, age= 58.3y, BMI= 30.5, n=72). Blood pressure (ABPM and office) was similar between the 2 groups (RHTN+DM= 150/87/63 and RHTN-nonDM= 151/89/62 mmHg; p> 0.05). Arterial rigidity (PWV, m/s, Sphygmocor system), endothelial function (FMD,%) and carotid IMT (mm) were assessed and parametric tests (t-Student, Pearson correlation and linear regression) used analyse the data.

Results: RHTN-DM group had higher values of PWV (12.1±1.6 vs. 10.7±1.7 m/s; p<0.001) and lower measurements of FMD (7.3±1.8 vs. 8.2±1.9%; p<0.001); however, IMT values were found similar in the 2 groups (1.02±0.2 vs. 1.01±0.2 mm; p=0.77). Hb1Ac levels correlated with PWV (R=0.31; p<0.001) and FMD (R=-0,52; p<0,0001) only in the RHTN-DM group (RHTN-nonDM: R=0.01, p= 0.93, and R=-0.03, p=0.79, respectively). Linear regression analysis showed statistical significance between Hb1Ac and PWV and e FMD only in RHTN-DM patients (p<0.05).

Conclusions: DM worsened endothelial dysfunction and vascular stiffness, but not IMT, in RHTN subjects. Glycated hemoglobin is an important predictor of arterial ridigity and endothelial function in diabethic RHTN subjetcs.

PP.14.06 A PROPOSED ALGORITHM FOR STEP-UP ANTIHYPERTENSIVE TREATMENT IN RESISTANT ARTERIAL HYPERTENSION

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Objective: Currently there exists no algorithm how to combine antihypertensive medication in patients with resistant arterial hypertension. The aim of this paper is to provide a suggestion of a step-up approach to treatment of these patients.

Design and method: Medline Database was searched for published original papers on „resistant hypertension“. Antihypertensive efficacy of various types of antihypertensive medications was compared and interpreted with regards to personal experience and current hypertension treatment guidelines.

Results: The mainstay treatment for most patients with resistant hypertension should be a triple combination of a renin-angiotensin system inhibitor (either ACE-inhibitor or angiotension receptor antagonist) with calcium channel blocker (usualy dihydropyridine) and diuretic. Higher dosages of diuretics should be used (such as indapamide 2.5 mg, hydrochlorothiazide 50 mg or chlortalidone 25 mg daily). In patients with chronic kidney disease and estimated glomerular filtration rate (eGFR) <40-50 ml/min/1.73m2 furosemid should be used and administered at least twice daily. Fixed combinations of antihypertensive drugs are preferred. When administering 3 or more drugs, at least one of the antihypertensives should be taken in the evening. As a fourth drug we suggest adding betablocker. If blood pressure is still not controled, 25 mg spironolactone daily should be added as a fifth drug. As a sixth drug alpha-blocker (such as doxazosin) or centrally acting antihypertensive drug (such as urapidil) can be considered.

Conclusions: Most patients are likely to have their blood pressure controlled when treated by this step-up approach.

PP.14.07 IMPACT OF MEDICATION NON-ADHERENCE ON RENAL DENERVATION EFFICACY IN RESISTANT ARTERIAL HYPERTENSION

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Objective: Renal denervation presents a new method of treatment for resistant hypertension. The aim of this study was to evaluate the effect of catheter-based renal denervation (RDN) on blood pressure (BP) in patients with resistant arterial hypertension in relation to their adherence to the recommended antihypertensive medical treatment.

Design and method: Between July 2011 and May 2013 we performed RDN by the Symplicity Catheter System (Medtronic, Mountain View, CA, USA) in 23 patients with office systolic BP >=160 mm Hg, or >=150 mm Hg in diabetics, despite being treated with at least three antihypertensive drugs, including a diuretic. Office BP and 24-hour ambulatory blood pressure (ABPM) were evaluated at each visit, as were the serum levels of prescribed antihypertensive drugs. Patients were labeled as non-adherent at the given visit if the serum level of at least one of the evaluated drugs was below the limit of laboratory quantification.

Results: The mean change of office and ABPM blood pressure at 3, 6, 12 and 18 months in patients with medication adherence or non-adherence is shown in

Table 1.

Blood pressure (BP) change (mm Hg)	Adherence Mean (SD)	Non-Adherence Mean (SD)	P (Mann-Whitney U test)
3 months	N=16	N=7	
Office systolic BP	-19.2(21.8)	-10.4(23.8)	0.385
Office diastolic BP	-9.4(12.1)	-5.3(9.2)	0.255
24-hour ABPM systolic BP	-4.1(11.0)	0.0(6.6)	0.341
24-hour ABPM diastolic BP	-0.8(5.9)	-0.1(4.1)	0.936
6 months	N=19	N=6	
Office systolic BP	-27.6(22.5)	-11.5(21.9)	0.119
Office diastolic BP	-12.4(13.5)	-6.7(12.3)	0.483
24-hour ABPM systolic BP	-8.0(12.9)	-6.5(10.0)	0.920
24-hour ABPM diastolic BP	-3.6(6.4)	-1.5(5.2)	0.501
12 months	N=12	N=8	
Office systolic BP	-20.2(20.8)	-13.3(24.7)	0.563
Office diastolic BP	-7.0(10.0)	-6.1(14.8)	0.938
24-hour ABPM systolic BP	-3.2(14.1)	-3.8(14.9)	0.969
24-hour ABPM diastolic BP	-1.7(7.9)	-2.3(6.2)	0.588
18 months	N=13	N=3	
Office systolic BP	-28.8(19.6)	20.7(21.6)	**0.014**
Office diastolic BP	-11.1(12.5)	5.0(4.6)	**0.043**
24-hour ABPM systolic BP	-13.6(19.6)	14.0(7.2)	**0.009**
24-hour ABPM diastolic BP	-6.8(11.4)	4.0(7.8)	0.149

Conclusions: Patients with laboratory proven non-adherence to medication have lesser BP decrease after RDN than patients with good medication adherence.

PP.14.08 CLINICAL CHARACTERISTICS OF PATIENTS WITH RESISTANT HYPERTENSION IN GREECE. DATA FROM A MULTI-CENTER BASED REGISTRY: THE HERHODOTOS REGISTRY

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Objective: Resistant hypertension is related with adverse cardiovascular prognosis, whereas there are scarce data regarding its clinical characteristics in Greece. The aim of this national registry was to identify and analyze cases of resistant hypertension in Greece.

Design and method: For this purpose we studied 340 patients with resistant hypertension [office blood pressure (BP) >or=140 and/or 90 mmHg despite the use of >or=3 antihypertensive drugs at maximum tolerated doses including one diuretic) who participated in the Greek multi-center HERHODOTOS registry. From all participants data were collected regarding office and home BP, renal function, current antihypertensive treatment and clinical comorbidities.

Results: Resistant hypertensive patients (mean age: 68 years, 183 males, office BP: 158/87±18/11 mmHg, heart rate 70±19 bpm under 4.4±0.6 drugs) exhibited high body mass index (30.9±3.8 kg/m²) and 30% were smokers. In the whole population, home BP was 149/84±18/10 mmHg while creatinine values were 1±0.3 mg/dl. Severe resistant hypertension (office systolic BP>or=160 mmHg) was present in 39.2%. Regarding clinical comorbidities, 12% of the registered patients suffered from sleep apnea, 36% had diabetes mellitus and 54% exhibited dyslipidemia. The prevalence of coronary heart disease was 28%, while stroke and heart failure was present in 6% and 8% of the patients respectively. Chronic kidney disease was found in 11% of the resistant hypertensives, while 4% suffered from peripheral arterial disease and 16% from atrial fibrillation.

Conclusions: The present registry shows that in a Greek population of resistant hypertensive patients there is a high prevalence of severe resistant hypertension, coronary heart disease and atrial fibrillation. Our findings improve understanding of the clinical phenotype of resistant hypertension in Greece and could contribute in better clinical management of these high risk patients.

PP.14.09 RENAL SYMPATHETIC DENERVATION REDUCES RATE OF BLOOD PRESSURE VARIATION IN PATIENTS WITH RESISTANT HYPERTENSION

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Objective: Renal sympathetic (RDN) reduces BP in patients with treatment-resistant hypertension (RHTN). We assessed the effect of RDN on indexes of short-term blood pressure variability (BPV) in patients with RHTN.

Design and method: Thirty-one patients with RHTN, participants in the EnligHTN I study (office BP 178.3/94.3 mmHg, 24-hour BP 147.5/81.2 mmHg), underwent ambulatory BP measurements at baseline and 6 months after RDN using the EnligHTN ablation catheter (St. Jude Medical, CA, USA).Twelve patients matched for office BP served as the control group.

Results: At 6 months post RDN, office BP and 24-hour BP was reduced by 25.6/10.3 mmHg (p<0.001/<0.001) and by 10.2/6 mmHg (p<0.001 for both cases) respectively while no difference occurred in the control group.No significant changes were observed in standard deviation (SD) of 24-hour systolic and diastolic BP 6 months after RDN (from 15.9/10.5 to 15.9/10.8 mmHg), as well as in the daytime and nighttime SDs (p=NS for all). The weighted SD of 24-hour systolic and diastolic BP (from 13.7/9.2 to 13.5/9.2 mmHg) and the average real variability of 24-hour systolic and diastolic BP (from 10.1/7.4 to 10.3/7.5 mmHg) revealed no significant differences post RDN. In contrast, the rates of systolic and diastolic 24-hour BP variation were significantly decreased 6 months after RDN (from 0.40/0.30 to 0.34/0.24, p=0.030/0.006 respectively). Likewise, significant changes occurred in the daytime and nighttime rates of systolic and diastolic variation after RDN. We observed no significant difference in any of the above mentioned BPV parameters in the control group.
Receiver-operator characteristics analysis revealed an area under the curve for prediction of response to RDN by systolic time rate of 66.8% (95% confidence interval: 46.7% to 87%; p=0.16) and by diastolic time rate of 76.1% (95% confidence interval: 58.2% to 93.9%; p=0.030).

Conclusions: Although standard BPV indexes remained practically unchanged after RDN, the rate of systolic and diastolic BP variation was significantly decreased 6 months after RDN in patients with RHTN. These novel indexes might also be used as predictors of response.

PP.14.10 CARDIOVASCULAR MORBIDITY ACCORDING TO THE PHYSICAL COURSE OF RESISTANT HYPERTENSION: A TIME UPDATED ANALYSIS OF A 4 YEAR PROSPECTIVE STUDY

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Objective: To identify the associated cardiovascular risk of the presence of resistant hypertension (RH) in the physical course of treated hypertensive patients.

Design and method: In a prospective observational study, 1911 treated hypertensive patients (aged 59±11 years, 49% males) were followed for a mean period of 3.9±1.7 years. Four groups were created depending on presence or absence of RH (office-based uncontrolled hypertension under at least 3 drugs including a diuretic or controlled hypertension under 4 or more drugs) at baseline and follow-up: Endpoint of interest was cardiovascular morbidity defined as the composite of coronary heart disease and stroke. For the subjects with differential RH status at baseline and follow up a uniform distribution was assumed for the estimation of the time point of status change. A time updated Cox regression analysis was applied for the estimation of hazards of the predefined outcome.

Results: The distribution of the population between groups was as following: 1,153 patients (60%) never having RH, 189 (10%) with resolved RH, 204 (11%) with incident RH and 365 (19%) with persistent RH.During follow-up, 65 events occurred (9.7 cases per 1,000 person-years). Incidence rates of cardiovascular events were 6.4 cases per 1,000 person-years in the never having RH group, 9.1 cases per 1,000 person-years in the resolved RH group, 13.2 cases per 1,000 person-years in the incident RH group and 18.1 cases per 1,000 person-years in the persistent RH group. Unadjusted analysis showed that patients with persistent RH exhibited a significantly higher risk by 2.44 times (CI: 1.4 - 4.25, p= 0.002) for the composite cardiovascular outcome compared with the never having RH group, while there was also a higher risk in patients with incident RH (HR: 2.56 CI: 1.21-5.41, p=0.009). Of note, after adjusting for major cardiovascular risk factors only persistent RH was independent predictor of the outcome (HR: 2.01 CI: 1.17-3.77, p=0.013).

Conclusions: In treated hypertensive patients persistence of RH during follow up is associated with adverse cardiovascular prognosis.

PP.14.11 BLOOD PRESSURE LEVELS AT ONE AND TWO WEEKS AFTER MULTI-ELECTRODE CATHETER-BASED RENAL SYMPATHETIC DENERVATION IN PATIENTS WITH SEVERE RESISTANT HYPERTENSION

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Objective: Multi-electrode catheter-based renal sympathetic denervation (RDN) has been shown to significantly reduce blood pressure (BP) in patients with resistant hypertension at 1 month after the procedure, whereas there are no data on the potential earlier impact of the procedure on BP. The aim of the study was to investigate the effects of RDN on office and ambulatory BP levels at 1 and 2 weeks after the procedure in resistant hypertensive patients.

Design and method: Nineteen patients with drug resistant hypertension (age: 58±9 years, 12 males, office BP: 180/96±19/16 mmHg, 24-hour BP: 151/85±16/14 mmHg, daytime BP: 155/88±17/15 mmHg and nighttime BP: 142/79±14/13 mmHg, under 4.4±0.6 drugs) underwent RDN with the use of the EnligHTN multi-electrode ablation catheter (St. Jude Medical, CA, USA). In all participants office BP measurements and ambulatory BP recordings over a working day according to established methodology were performed at baseline as well as at 1 and 2 weeks after RDN. There were no alterations in antihypertensive therapy during this period of 2 weeks follow-up.

Results: Office BP decreased by -27/9±16/8 mmHg at 1 week and by -31/11±18/8 mmHg at 2 weeks compared to baseline ($p<0.001$ for both). In the 2 post-procedural time points 15 patients were consistently office BP responders defined as those with a systolic BP decrease of at least 10 mmHg. There was also a sustained significant reduction in 24-hour ambulatory BP by -16/9±9/7 mmHg at 1 week and by -16/7±12/8 mmHg at 2 weeks ($p<0.001$ for both). Furthermore, daytime BP was decreased by -18/10±11/9 mmHg at 1 week and by -17/8±11/8 mmHg at 2 weeks, while nighttime BP was also reduced by -12/6±11/5 mmHg and -13/6±11/6 mmHg at 1 and 2 weeks respectively ($p<0.001$ for all).

Conclusions: In resistant hypertensive patients RDN causes a very early and substantial reduction of office and ambulatory BP at 1 and 2 weeks after the procedure. These results underscore the efficacy of catheter-based RDN in favorable BP modulation and provide evidence for the time pattern of RDN-induced changes on hemodynamic load in resistant hypertension.

PP.14.12 EFFECTS OF MULTI-ELECTRODE CATHETER-BASED RENAL SYMPATHETIC DENERVATION ON CARDIAC DAMAGE AND NEUROHORMONAL ACTIVATION IN SEVERE DRUG RESISTANT HYPERTENSION

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Objective: In this study we investigated whether multi-electrode catheter-based renal sympathetic denervation (RDN) has favorable effects on left ventricular structural and functional indices, as well as on neurohormonal activation reflected by N-terminal pro B-type natriuretic peptide (NT-proBNP).

Design and method: Twenty patients with resistant hypertension [age: 57±10 years, 13 males, office blood pressure (BP): 180/96±19/16 mmHg under 4.4±0.6 drugs] who underwent RDN and 10 patients [age: 54±8 years, 6 males, office BP: 189/99±11/13 mmHg under 4.5±0.5 drugs] who served as controls were followed-up for 6 months. A full transthoracic echocardiographic study was performed in all patients and left ventricular mass was calculated using the Devereux formula and was indexed for body surface area and height. Moreover, blood sampling was performed in order to estimate NT pro-BNP levels.

Results: Apart from office systolic and diastolic BP reduction by -41±19 mmHg and -16±12mmHg, respectively, ($p<0.001$ for both), RDN decreased mean interventricular septum thickness from 12.1±1.2 mm to 11.6±1.2 mm ($p=0.04$) and left ventricular mass index from 136±20 g/m² (56.5±8.7 g/m2.7) to 123±22 g/m² (51.2±9.2 g/m2.7) ($p=0.004$) at 6 months. Left atrial diameter and volume were reduced from 42.1±4.3 mm to 41.0±3.6 mm ($p=0.002$) and from 62.3±13.5 ml to 51.8±9.5 ml ($p=0.001$), respectively. Regarding diastolic function RDN caused an increase in mitral valve E'/A' ratio from 0.62±0.28 to 0.82±0.39 ($p=0.021$) and a decrease in the E/E' ratio from 14.8±5.9 to 11.7±3.1 ($p=0.009$). Furthermore, RDN resulted in a statistically significant reduction in NT-proBNP levels from 85±34.4 pg/ml to 58.6±36.9 pg/ml ($p<0.001$). No significant changes in all the above parameters were observed in the control group (p=NS).

Conclusions: In resistant hypertensive patients RDN besides BP reduction causes favorable cardiac remodeling and attenuation of neurohormonal overdrive as reflected by decreased NT-proBNP levels. These hypothesis-generating results need further validation in larger well-designed clinical studies.

PP.14.13 BLOOD PRESSURE CONTROL STATUS AND THE PREVALENCE OF RESISTANT HYPERTENSION IN A HYPERTENSION CLINIC OF JAPAN

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Objective: The Japanese society of hypertension is revising hypertension guideline (JSH2014). We investigated blood pressure (BP) control status and the prevalence of resistant hypertension in a hypertension clinic and compared the achieving rate of goal BP advocated by either current guideline (JSH2009) or JSH2014.

Design and method: Subjects are 715 treated hypertensive patients (mean age 66.0±12.1 years, 329 males and 386 females) who had been regularly followed at National Kyushu Medical Center, Fukuoka, Japan. We assessed BP control status based on the average clinic blood pressure (CBP) on two occasions, background characteristics and antihypertensive drugs in 2012. In 439 patients, home BP (HBP) values based on the average morning HBP on three days preceding the clinic visit was also evaluated.

Results: The average CBP and HBP values were 131±11/76±9 mmHg and 125±9/73±9 mmHg, respectively, with the use of 2.3±1.0 antihypertensive drugs. The prevalence of controlled (CBP<140/90 and HBP<135/85 mmHg), uncontrolled (CBP>=140/90 and HBP>=135/85 mmHg), whitecoat (CBP>=140/90 and HBP<135/85 mmHg) and masked (BP<140/90 and HBP>=135/85 mmHg) hypertension were 62.2, 7.3, 18.2 and 12.3%, respectively. Achieving rate of goal BP advocated by JSH2009 was as follows; <140/90 (elderly, history of stroke): 72.8%, <130/85 (young/middle): 43.6%, <130/80 (diabetes, CKD, history of myocardial infarction): 35.8%, total 46.3%. When goal BP advocated by JSH2014 was applied, achieving rate improved; <150/90 (age>=75 years): 90.7%, <140/90 (age<75 years): 76.6%, <130/80 (diabetes, CKD with proteinuria): 34.4%, total 64.1%. Among 384 patients who failed to achieve goal BP based on JSH2009, 33.1 % turned to be controlled patients by JSH2014 definition. The prevalence of resistant hypertension defined as the patients who were taking at least 3 antihyprtensive drugs and failed to achieve 1) CBP<140/90 mmHg, 2) JSH2009 goals, 3) JSH2014 goals were 9.0, 21.3 and 15.8%, respectively.

Conclusions: Results suggest that BP of treated hypertensive patients is fairly well controlled in a hypertension clinic of Japan. BP control status improves and the prevalence of resistant hypertension decreases by the application of new hypertension guideline.

PP.14.14 RENAL SYMPATHETIC DENERVATION THERAPY: REAL WORLD AUSTRALIAN EXPERIENCE FROM THE SIR CHARLES GAIRDNER HOSPITAL RENAL DENERVATION REGISTRY

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Objective: Renal sympathetic denervation (RDN) is an emerging therapy for patients with resistant treatment hypertension. Recent published trials have demonstrated blood pressure reductions in a large proportion of treated patients. There is however, a paucity of real world registry data in the literature. The aim of our study is to contribute our local experience.

Design and method: 30 consecutive patients with resistant hypertension (mean of 165/90 mmHg) were referred for RDN using the Medtronic SimplicityTM RDN catheter. Treatment resistant hypertension was defined as systolic blood pressure >=160 mmHg (>=150mm Hg in Type 2 Diabetics) who were on >=3 antihypertensives. Blood pressures were measured by office blood pressures and/or 24hr BP monitoring. Prospective follow-up of patients was scheduled at 1,3 and 6 months. Follow-up data over 6 months were included if available. A BP response was defined as a systolic BP lowering of >=10 mmHg.

Results: Of the 30 patients referred for RDN, 1 was excluded due to unsuitable anatomy at renal angiography and 4 patients did not have sufficient follow-up data. Mean age of patients was 63 years old with a slight male predominance (14M:11F). 16/25(64%) patients were on 5 medications or more. Mean baseline systolic BP was 164mmHg vs post RDN systolic blood pressure of 146 mmHg with a mean BP lowering of 17.7mmHg (95%CI: 8.2mmHg:27.2mmHg, p<0.0003). Mean baseline diastolic BP was 92.8mmHg and post RDN was 85mmHg with a mean BP lowering of 7.8mmHg (95%CI: 1.2mmHg:14.3mmHg, p<0.007). 18/25 (72%) patients responded to RDN at 6 months with a mean systolic BP reduction of 28mmHg and diastolic BP reduction of 13mmHg. There were no adverse events during follow-up and no deterioration in renal function.

	Responders (n=18)	Non-Responders (n=7)
Age (years)	64	62
Sex (female)	9 (50%)	2 (29%)
Baseline SBP (mmHg)	166	160
Baseline DBP (mmHg)	93	90
Follow-up SBP (mmHg)	139	165
Follow-up DBP (mmHg)	80	96
Body-mass index (kg/m²)	32	32
Number of patients with:		
Type 2 Diabetes	7 (39%)	1 (14%)
Coronary Artery Disease	8 (44%)	2 (29%)
Hypercholesterolaemia	9 (50%)	5 (71%)
Obstructive Sleep Apnoea	4 (22%)	1 (14%)
Serum Creatinine (μmol/L)	82	70
eGFR >60 ml/min/1.73m²	16 (89%)	7 (100%)
eGFR 45-60 ml/min/1.73m²	2 (11%)	0
Number of antihypertensive medications	4.7	4.4
Patients on 5 or more medications	10 (56%)	6 (86%)
ACE inhibitors/ARBs	16 (89%)	6 (86%)
β Blockers	14 (78%)	5 (71%)
Calcium channel blockers	13 (72%)	6 (86%)
Diuretics	11 (61%)	7 (100%)
Aldosterone Antagonist	5 (33%)	3 (43%)
α blockers	5 (33%)	2 (29%)
Vasodilators	1 (6%)	0
Central acting sympatholytics	10 (56%)	3 (43%)
Fentanyl requirements (mcg)	158	162

Data are mean or number (%). eGFR=estimated glomerular filtration rate calculated on the basis of Modification of Diet in Renal Disease study criteria. ACE=angiotensin converting enzyme. ARB=angiotensin receptor blocker. SBP=systolic blood pressure. DBP=diastolic blood pressure

Table: Patient demographics, background characteristics, medication history and blood pressure outcomes assigned to

Conclusions: In our local experience, RDN with the Medtronic SimplicityTM catheter is a safe and effective therapy for treatment of resistant hypertension with a patient response rate in the medium term, similar to the published randomized trials. Further studies evaluating the long-term safety and efficacy of the procedure are required.

PP.14.15 DIFFERENT FORMS OF RESISTANT HYPERTENSION AT THE SAME PATIENT

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Objective: Resistant hypertension (HTN) is one of the most difficult questions in the treatment of high blood pressure (BP). The proper diagnosis is important we have to differentiate the "real" and the "pseudo" resistant cases. The most common causes of pseudo-resistant HTN are white-coat effect, measurement errors or "non-compliance". In case of "real" therapy resistant hypertension, renal denervation can lead to significant BP reduction, while it has no use on pseudo-resistant cases.

Design and method: A 60-year-old female had a history of hypertension for more than 30 years. Detailed examinations were performed but secondary form could not be confirmed. She suffered from type 2 diabetes mellitus and obesity. She had consistently elevated BP (170-180/110-120 mmHg) despite of the multiple combination of maximum tolerated antihypertensive therapy. In the last two decades her severe hypertension repeatedly led to encephalopathy and TIA occurred twice. Antihypertensive therapy was modified several times, finally using six-fold combination in a maximum tolerated dose.

Results: After excluding the possibility of pseudo-resistance a successful bilateral renal denervation was performed. Due to the intervention BP significantly decreased, less antihypertensive drugs were necessary. Three months after the renal denervation 24-hour BP was 141/67 mmHg. At the 6th month's control the patient had no complaints. She reported normal BP values based on repeated home measurements. Surprisingly, at this time the ABPM showed an extremely high BP: the 24-hour mean was 183/87 mmHg. Looking for the possible reason of this significant difference we found measurement error: the nurse who was performing substitution used a normal-sized cuff to our obese patients whose arm circumference was 46 cm. The ABPM was repeated on the following day with an obese cuff when we observed a well-treated hypertension, the 24-hour mean BP was 130/67 mmHg.

Conclusions: Our "real" therapy resistant hypertensive patient went through a successful renal denervation, but at the follow-up period we detected a pseudo-resistant condition, due to measurement error. We would like to point out the importance of the proper diagnosis, we have to differentiate the "real" and the "pseudo" form of therapy resistant hypertension.

PP.14.16 RENAL DENERVATION LEADS TO REDUCTION OF BLOOD PRESSURE WITHOUT ORTHOSTATIC HYPOTENSION IN A COHORT OF SWISS PATIENTS WITH TREATMENT-RESISTANT HYPERTENSION

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Objective: Hyperactivity of the sympathetic nervous system plays a pivotal role in the development and progression of hypertension. Catheter-based renal sympathetic denervation has been shown to significantly reduce blood pressure (BP) in patients with treatment-resistant hypertension.

Design and method: 38 patients (mean age 60.5±13.2 years, 61% men) with treatmentresistant hypertension (systolic BP>=160 mmHg on >=3 antihypertensive drugs, including a diuretic) were screened at the University Hospital Zürich and underwent renal denervation with different ablation systems (SymplicityTM, EnligHTNTM and VessixTM) between 2010 and 2012. Clinical follow-up were performed at 1, 3, 6 and 12 months

Results: Baseline values included mean office BP of 175.9/94.6±36.4/20.6 mmHg, using in the mean 4.5 antihypertensive drugs. Postprocedural office BPs were reduced by 23.0/9.6, 30.5/10.8, 25.1/8.8, and 27.1/9.0 mmHg, at 1, 3, 6, and 12 months, respectively (all statistical significant vs. baseline). The 24-hour BP was also significantly reduced as compared to baseline. The orthostatic changes in blood pressure (change in systolic BP 4.2, 6.7, 6.4, and 4.5 mmHg at baseline, 3, 6 and 12 months) were stable during the entire follow-up without evidence of development of orthostatic hypotension. No procedure related complications and no change in renal function were observed.

Conclusions: In conclusion, in patients with treatment-resistant hypertension, catheter-based renal sympathetic denervation results in a substantial reduction in BP up to 12 months without significant adverse events and without development of orthostatic hypotension.

PP.14.17 MALIGNANT HYPERTENSION: SINGLE CENTER EXPERIENCE

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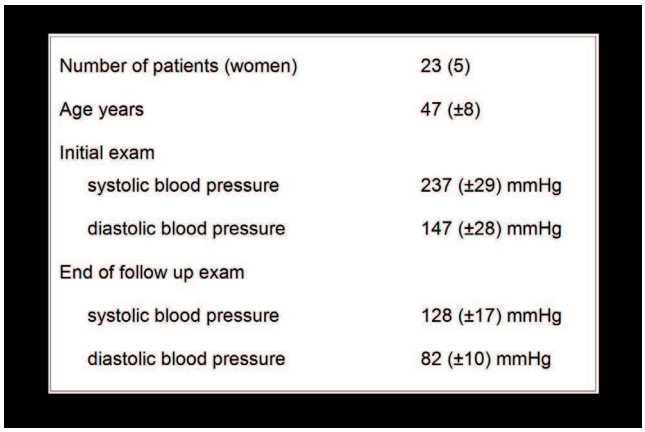
Objective: Malignant hypertension is characterized by extremely elevated blood pressure associated with acute organ damage. The aim of this report is to share our experience with this rare disorder.



Design and method: Enrolled were the patients referred to our hypertension clinic who presented with marked elevation of blood pressure and retinal hemorrhages, exudates and/or papilloedema on fundoscopic exam. The data analysis was focused on symptoms and signs of target organ damage, etiology of arterial hypertension and antihypertensive therapy given to achieve adequate blood pressure control.

Results: During the period of 4 years, 23 patients were enrolled according to the above-mentioned criteria. The basic characteristics are summarized in enclosed table.
Symptoms resulting from uncontrolled arterial hypertension were present in 18 (78%) individuals – heart failure was in 10 patients, blurred vision in 5, stroke in 2 and dissecting aortic aneurysm in 1. Surprisingly, 5 (22%) patients reported no symptoms despite the evidence of extremely high blood pressure.
All patients exhibited prominent signs of cardiac hypertrophy at electrocardiography, papilloedema was present in 14 (61%), renal impairment in 9 (39%) and hemolytic anemia and thrombocytopenia was found in 2 (9%) patients.
All patients were screened for the presence of secondary arterial hypertension. Renal parenchymal disease was diagnosed in 3 patients, primary aldosteronism in 2 and renovascular hypertension in 1.
In 12 patients, the development of malignant hypertension resulted from untreated hypertension. Poor compliance and/or inadequate medical therapy were noted in the remaining cases.
Adequate blood pressure control was achieved in all but one patient who remained non-compliant. The mean number of antihypertensive drugs used for adequate blood pressure control was 5 (±1).

Conclusions: Adequate blood pressure control was achieved in all cooperative patients presenting with malignant hypertension. While not negligible portion of these high-risk patients is free of symptoms, the electrocardiographic signs of left ventricular hypertrophy were invariably present.

PP.14.18 THE EFFECT OF LOWERING CLINIC BLOOD PRESSURES ON ARTERIAL STIFFNESS IN PATIENTS WITH RESISTANT HYPERTENSION AND TYPE 2 DIABETES

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Objective: To examine the effect of lowering clinic blood pressures (BPs) on non-invasive estimates of arterial stiffness in patients with resistant hypertension and type 2 diabetes (T2D).

Design and method: Patients with T2D and hypertension were included in the study. Exclusion criteria were cardiac arrhythmias and moderate renal failure.
Clinic BPs were measured using Omron HEM 7 and 24 hours ambulatory BPs (ABPs) were measured using Kivex and Spacelab devices.
Patients were characterized as resistant hypertensives (RHs) based on their ABPs and number of antihypertensive agents.
Carotid-to-femoral-pulse wave velocity was measured using the Sphygmocor device. Arterial pressure waves were obtained using applanation tonometry, and flow waves throughout the left ventricular outflow tract were obtained using echocardiography.
Pressure and flow waves were analyzed in Matlab customized software to obtain estimates of characteristic impedance and arterial compliance.
For statistical analysis we used multiple linear regression. Changes in estimates of arterial stiffness were adjusted for changes in heart rate and mean arterial pressure (MAP).

Results: Data are presented as medians and [interquartile ranges]. Follow-up time was 6 [5;8] months.
34 RHs were included for analysis.
The antihypertensive treatment during follow up resulted in increased use of RAS blockers with no change in use of other antihypertensive agents (diuretics, calcium channel blockers or aldosterone antagonists).
Clinic BPs were reduced from 154 [143;164] / 89 [81;94] mmHg to 140 [126;160] / 85 [78;93] mmHg ($P<0.04$) whereas ABPs did not change (139 [132;145] /75 [70;79) to 138 [129;148] / 76 [69;82] mmHg).
None of the changes in estimates of arterial stiffness were significant after statistical adjustment for changes in MAP and heart rate (table1).

	Baseline	Follow up
Pulse wave velocity (m/s)	10.8 [8.8;12.2]	9.9 [8.4;13.1]
Characteristic impedance (mmHg/ml*s^{-1})	0.1 [0.07;0.13]	0.08 [0.07;0.12]
Total arterial compliance (ml/mmHg)	0.82 [0.55;0.95]	0.81 [0.67;1.16]

Conclusions: Reductions in estimates of arterial stiffness were due to reductions in clinic BPs emphasizing the importance of statistical adjustment for BP when evaluating the effect of antihypertensive treatment on estimates of arterial stiffness.
It could be, that a reduction in intrinsic arterial stiffness is more likely to be seen with a more sustained reduction in BP as demonstrated by a reduction in ABP.

PP.14.19 RENAL DENERVATION IN REAL LIFE SETTING. SINGLE CENTER EXPERIENCE

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Objective: Renal denervation (RDN) as a treatment option for patients with resistant hypertension has become widely performed procedure. Many experts were with enthusiasm resulting from Symplicity HTN-1 and HTN-2 trials expecting data from more trials.

Design and method: In our center we have been performing RDN since 2012. We present results of prospective evaluation of 22 patients, which have completed at least 1-month follow-up. All patients were treated with Medtronic SymplicityTM system. Before RDN and 1, 6 and 12 months after RDN we measured office blood pressure (BP) and performed 24-hour ambulatory BP monitoring (ABPM).

Results: Twenty-two patients (13 men and 9 women, mean BMI 29.1±0.8) of mean age 54.6±2.2 years were treated by combination of 5 antihypertensive drugs prior to RDN. At the time of abstract submission all patients completed their 1-month follow-up, 17 and 6 patients their 6-month and 12-month follow-up, respectively, according to successive dates of procedures.
Systolic office BP was significantly decreased at 1 month (150.3±4.8 mmHg), 6 months (144.0±3.1 mmHg) and 12 months (144.3±6.4 mmHg) after RDN compared to values measured before the procedure (168.0±4.9 mmHg). Drop in diastolic BP reached statistical significance at 1 month (89.0±2.2 mmHg) and 6 months (85.0±2.4 mmHg) following RDN compared to baseline value (97.0±3.6 mmHg).
The baseline systolic BP measured by ABPM (sABPM) was 150.5±2.8 mmHg and diastolic BP (dABPM) was 91.0±3.0 mmHg. Changes of ABPM values were noticeably smaller: there was significant decrease of sABPM 1 month after RDN (145.4±4.0 mmHg), sABPM tended to decrease further both at 6 months (144.1±2.6 mmHg) and 12 months (140.0±5.9 mmHg). Decrease of dABPM did not reached statistical significance during the whole follow-up period.

Conclusions: RDN as a part of comprehensive approach in hypertensive patients significantly decreases office BP. Changes of sABPM values are smaller but significant already one month after RDN. Significant body of evidence is awaited from running randomized trials and until these results are published, RDN should remain reserved for strictly selected group of hypertensive patients.
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PP.14.20 RENAL SYMPATHETIC DENERVATION IMPROVES CAROTID ARTERY STIFFNESS AND FLOW-MEDIATED VASODILATION

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Objective: Renal sympathetic denervation (RDN) reduces sympathetic renal and central tonus and hence lowers arterial BP. The aim of our study was to determine the effect of BP lowering on carotid artery stiffness (CS) and flow-mediated vasodilation (FMD) in patients with resistant hypertension.

Design and method: A total of 17 patients with true resistant hypertension underwent RDN using Simplicity Renal Denervation System. All patients fulfiled the eligibility criteria for RDN. The measurements of CS, and FMD were realized using ultrasound and echo-tracking system. Following stiffness parameters were measured: beta stiffness (beta), pressure-strain modulus (Ep), arterial compliance (AC) and pulse wave velocity (PWV). Patients were followed up at 0 (N=17), 1 (N=17), 3 (N=14) and 6 (N=14) months after RDN.

Results: The office systolic and diastolic BP was reduced by 13/5 mmHg from 182/107 mmHg at baseline (p=0.0.23 for systolic BP) 1 month after RDN. The changes in office measurements of systolic BP and diastolic BP were improved after 6 months (14/5 mmHg, p=0.023 for systolic BP). There were observed significant changes in PP (9 mmHg from 75 mmHg at baseline; p=0.016) 6 months after the procedure, too. Stiffness parameters beta and Ep were significantly reduced (p=0.04; p=0.03) and AC increased (p=0.03), especially 1 and 3 months after RDN. Mean FMD in diastole was significantly improved (p=0.01). There were obtained correlations between systolic BP and Ep (r=0.613, p=0.02), PWV (r=0.559, p=0.03) and negative correlations with AC (r=-0.674, p=0.008). Using the linear regression model the fall in systolic BP>10mmHg would be associated with decrease of stiffness parameters beta>1,8%, Ep>55.92kPa and PWV>0.7m/s and with an increase of AC>0.009mm2/kPa.

Conclusions: In patients with resistant hypertension we have confirmed BP reduction effect of RDN. BP lowering effect of RDN was followed by improvement of carotid artery stiffness and endothelial function.
None of the authors have a conflict of interest.

PP.14.21 RENAL DENERVATION IN PATIENTS WITH RESISTANT HYPERTENSION: 12 MONTH FOLLOW-UP

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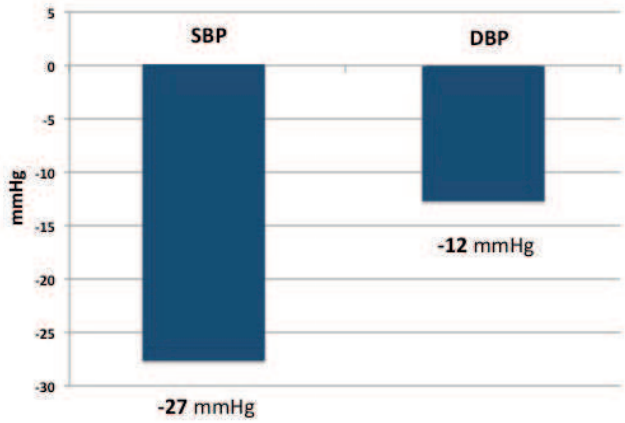
Objective: Renal denervation (RDN) has been successfully applied in the treatment of patients (pts) with severe resistant hypertension, especially in clinical trials settings. We report the results after 12 months of DNR in selected pts with severe resistant hypertension population.

Design and method: A prospective consecutive record of all pts with resistant hypertension submitted to RDN between July/2011 and December/2013. The primary endpoint was defined as a reduction in systolic blood pressure (SBP) >= 10mmHg in consultation with 12 month follow-up and the secondary by the combined occurrence of SBP reduction > 10 mmHg, reduction in the antihypertensive medication or obtaining SBP < 140mmHg.

Results: 42 of 191 pts with suspected resistant hypertension, evaluated in consultation dedicated HTA, were submitted to RDN (radio frequency systems: Symplicity®, N = 30 ; EnligHTN®, N = 8 and Oneshot®, N = 4) . There were no significant complications related to the procedure. The mean BMI was 31±5 kg/m2, 62 % had diabetes and 31% vascular disease in at least one territory. The average glomerular filtration rate (eGFR - MDRD) was 76±30 ml/min. Of the 18 (42.9%) pts with 12 months follow up, 13 (72.1%) were responders - lowering SBP: 181 ± 25 to 154 ± 14mmHg (p < 0.001) and diastolic: 92±17 to 80±15 mmHg (p = 0.004). There was also a significant reduction both in the median number of hypotensive drugs (p = 0.016) and the number of drug classes (p = 0.018), both from 5 to 4.



Conclusions: The effectiveness of renal denervation on reducing blood pressure at 12 months in patients with resistant hypertension remained, despite the significant reduction in the number of classes, and antihypertensive drugs.

PP.14.22 THE IMPACT OF RENAL SYMPATHETIC DENERVATION IN REDUCING ALBUMINURIA IN PATIENTS WITH RESISTANT HYPERTENSION

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Objective: Renal sympathetic denervation (RDN) is established as an efficient therapy in the management of patients with resistant hypertension (R-HTA). This therapy may have a positive impact by improving lesions in target organs, including kidney damage, however there is no sustained evidence.
Evaluate the effect of RDN in the albuminuria at 6 months after the procedure.

Design and method: Prospective registry of all patients with R-HTA, submitted to RDN, between JUL 2011 and JUL 2013, in a single hospital. Patients with systolic blood pressure reduction >= 10 mmHg at 6 months, in the consultation, were considered responders. Pre RDN values of albuminuria, measured according to Albumin to Creatinine Ratio (ACR), were compared with values obtained after 6 months.

Results: From a total of 39 patients submitted to RDN, 23 (age: 61 ±7 years, 52% females) had completed the 6 months follow-up. Most of these patients (83%) had the diagnosis of hypertension for more than 10 years, 70% had type 2 diabetes and 30 % were known to have arterial vascular disease in, at least, one territory. The estimated glomerular filtration rate (eDFR), calculated from serum creatinine by the method Chronic Kidney Disease - Epidemiology (CKD -EPI), was 76 cc/min ± 24 (30% in stage 3 CKD) and 11 patients (48%) had albuminuria. After 6 months, 19 patients were considered responders (83%). The ACR median significantly decreased (25.8 to 9.6 mg/g, p=0.009), and 82 % of the patients had reduced their value. The reduction in albuminuria was independent of RDN blood pressure response, which occurred in 10 of 19 patients in the responders group and in 2 of 3 patients from the nonresponders group.

Conclusions: In the population submitted to RDN, there was a significant reduction in albuminuria levels. This reduction was independent of blood pressure lowering.

PP.14.23 ARTERIAL STIFFNESS AND VASOMOTOR ENDOTHELIAL FUNCTION IN PATIENTS AFTER RENAL DENERVATION

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Objective: We study the effect of renal denervation (RDN) on arterial stiffness and vasomotor function in patients with resistant hypertension 6 months after RDN.

Design and method: We examined 12 patients with hypertension, mean age 57 ± 10 years before and 6 months after successful RDN with used Medtronic Ardian Symplicity Catheter System ™. Arterial stiffness was determined by volume sphygmography (VaSera 1000). We used the following parameters: PWVaorta measured by an original method and cardio-ankle vascular index (CAVI) - new parameter independent of blood pressure. Vasomotor endothelial function was evaluated by finger photopletismography during reactive hyperemia (Angioskan-01). We used the occlusion amplitude index for the determination of endothelial function in the microvasculature and the occlusion phase shift index for the determination of endothelial function in the arteries of muscular type.

Results: In patients after RDN PWVaorta decrease from 7.76±2.5 at baseline to 6.81±2.58 m/s at 6 months (p=0,28). The office blood pressure measured at the time of study was baseline SBP 148,9±15,3 mmHg DBP 84,6±14,7 mmHg and after 6 months was 147,4±17,6 mmHg and 84,3±13,7 mmHg. The CAVI decreased from 8.29 ±1.15 to 8.06±2.18 at baseline and after 6 months (p=0,16), respectively. Parameters of vasomotor endothelial function were violated initially in patients with resistant hypertension. Occlusion amplitude index and occlusion phase shift index were originally 1.37±0.57 and -8.21±-3.54, and changed to 1.61±0.4 (p=0,3) and -6.23±-4.56 (p=0,16) respectively after 6 months.

Conclusions: In our investigation we could not detect significant changes in vascular stiffness and endothelial function in patients after RDN in the long-term.

PP.14.24 QUALITY OF LIFE IN PATIENTS WITH RESISTANT HYPERTENSION

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Objective: The quality of life in chronic patients, and particularly in those who are hypertensive, is known but has been insufficiently studied. We have sought to study in depth the quality of life in patients with resistant HT.

Table 1. Health Scale Chart. Transformed percentage scale.

Health Scale	Average Score	Scale
Physical Function (PF)	2.09 ± 0.60	54.5
Physical Performance (PP)	1.48 ±0.46	48
Body Pain (BP)	3.65± 1.18	53
General Health (GH)	2.73± 0.61	43.2
Vitality (VT)	3.24 ± 1.23	44.8
Social Function (SF)	3.37± 1.13	59.2
Emotional Performannce (EP)	1.57 ± 0.45	57.2
Mental Health (MH)	4.04 ± 1.15	60.8

Transformed Scale: (obtained score – lowest possible score/rank) x 100. The responses have been previously recoded so that the items have a gradient from low to high.

Table 2. Correlation between quality dimensions and the SBP and ABPM values.

	PF	PP	BP	GH	VT	SF	EP	MH
24hSBP	-0.47	-0.53	-0.32	-0.41	-0.23	-0.54	-0.62	-0.45
	0.08	0.05	0.26	0.13	0.41	0.04	0.01	0.10
DaySBP	-0.49	-0.54	-0.33	-0.44	-0.15	-0.53	-0.58	-0.41
	0.07	0.04	0.23	0.11	0.60	0.05	0.02	0.13
NightSBP	-0.38	-0.44	-0.23	-0.35	-0.30	-0.48	-0.57	-0.43
	0.17	0.11	0.41	0.21	0.28	0.07	0.03	0.12

Design and method: 50 patients who met the criteria for resistant HT were selected consecutively. The patients underwent 24-hour ABPM. We followed the SF-36 questionnaire to assess health as perceived by patients. The questionnaire includes 8 health dimensions which are: Physical Function (PF), Physical Performance (PP), Body Pain (BP), General Health (GH), Vitality (VT), Social function (SF), Emotional Performance (EP) and Mental Health (MH). The items are recoded into a 0-100 scale (being 0 equal to worst health and 100 best health). Statistical analysis: basic descriptive statistics, t-Student test and Pearson correlation coefficient. Significant value for $p < 0.05$.

Results: Mean age 60.12 ± 11 years, 22 women and 28 men. The average clinic blood pressure was 168/94 mmHg. The average of years known hypertensive was 11.06 ± 9.1 years. The average of antihypertensive drugs was 4.2 (3-6). The average of pathologies associated with hypertension was 3.05 (0-6). The number of general drugs was 6.5 (3-11). The overall results were: PF (54.5%), PP (48%), BP (53%), GH (43.2%), VT (44.8%), SF (59.2%), EP (57.2%) and MH (60.8%). Women showed poorer quality of life than men. There was no correlation with clinical blood pressure or 24-hour record. There was a significant correlation with the years of HT evolution for PF (r:-0.37 p<0.03), PP (r:-0.53 p<0.001), VT (r-0.54 p<0.001), SF (r: -0.54 p<0.001)). There was a significant correlation with the number of drugs taken by patients for BP (r: -0.41 p<0.01), VT (r:-0.61 p<0.0001), SF (r:-0.55, p<0.001), MH (r:-0.35 p<0.04) but not with the number of antihypertensive drugs. There was no correlation with age or associated pathology.

Conclusions: Hypertensive patients have a worse quality of life than the general population of reference for all health dimensions. Organic affection, heart rate, weight, level of education, age and sex are variables clearly related with the quality of life.

PP.14.25 ARTERIAL STIFFNESS ASSOCIATED WITH INFLAMMATION AND OBESITY IN RESISTANT HYPERTENSION

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Objective: Resistant hypertension (RH) is a multifactorial disease associated with clinical conditions such as obesity, inflammation and vascular stiffness. Those conditions may contribute for resistance to antihypertensive therapy. Furthermore, lipid factors secreted by adipose tissue stimulate inflammatory processes that are involved in cardiovascular lesions, such as arterial stiffness, leading to higher blood pressure (BP) levels and lack of BP control. Our objective was to evaluate markers of obesity (BMI and waist-hip ratio (W/H)) and inflammation in resistant hypertensive patients with and without arterial stiffness.

Design and method: Resistant hypertensive patients were divided into 2 groups (31 patients with pulse wave velocity (PWV) above 10m/s and 27 patients with PWV less than 10m/s). Also, were evaluated BMI, W/H and interleukin -10 (IL -10). Statistical analysis: The variables were analyzed comparatively by Student's t test or Mann-Whitney according to data distribution. Significance level of α error = 0.05 was adopted.

Results: Higher BMI (34.3 ± 7.9 vs 30.0 ± 5.34 kg/m ², p = 0.02) , W/H (0.98 ± 0.12 vs 0.88 ± 0.07, p < 0.01) and IL - 10 levels (5.33 ± 6.4 vs 1.83 ± 2.4 pg/mL, p = 0.01) were found in the group with arterial stiffness (greater than 10m/s) compared to the control group.

Conclusions: Resistant hypertensive patients with arterial stiffness had higher BMI, W/H and IL-10. Those results demonstrate that obesity and inflammation are strongly associated with vascular stiffness, and this may contribute to the lack of blood pressure control in resistant hypertension.

PP.14.26 OUR EXPERIENCE WITH TREND: RENAL DENERVATION IN PATIENTS WITH RESISTANT HYPERTENSION

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Objective: Epidemiological studies show how difficult is the optimal control of blood pressure worldwide: about 50% of hypertensive patients does not achieve a good control of blood pressure.
Controlled Clinical trials indicate that at least 10% of hypertensive patients don't reach adeguate pressure control despite appropriate drug therapy. Is defined resistant hypertension an uncontrolled blood pressure (BP Office – ABPM >140/90) despite the use of optimum doses of three antihypertensive drugs, one being a diuretic.
The HTNT-2 Trial assess the safety and the effectiveness of catheter–based renal denervation (TREND – Transcatheter RENal Denervation) which is able to obtain a significant decrease in pressure in a populations of patients.
We wanted to experience this data on patients with resistant hypertension referred to our hospital.

Design and method: Since december 2010 we subjected 23 patients with resistant hypertension to this procedure, aged 38-84 years, 16 man and 7 women, in chronic treatment with an average of 4-5 antihypertensive drugs, one of which was a diuretic. Patients were hospitalized on Monday, underwent the procedure TREND on Thursday and discharged by Saturday.

The renal sympathetic denervation with radiofrequency (TREND) has been well tolerated and led to a reduction in blood pressure in all the patients.
We showed no changes in measured renal function after TREND, suggesting that the procedure itself and associated haemodynamic change have no adverse effects on the kidneys.

Results: To this time we obtained a reduction in blood pressure in all patients This reduction don't' start immediately, but gradually after the renal denervation and allowed us to reduce in some patients the number of antihypertensive drugs. The reduction of blood pressure obtained is significant, therefore we can predict benefits to the patient in terms of reduction of cardiovascular events and reduction of the consumption of drugs.

Conclusions: This new therapeutic approach to hypertension resistant attests to both its efficacy in terms of reduction in blood pressure systolic and diastolic, and on the other the option to reduce the dosage of antihypertensive drugs.
The procedure is well tolerated and there were no adverse events.

PP.14.27 INFLAMMATION AND TARGET ORGAN DAMAGE IN RESISTANT HYPERTENSION

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Objective: Resistant hypertension (RHTN) has unfavorable high prevalence of target organ damage. Inflammatory mediators are involved in pathophysiology of those lesions. Therefore, this cross-sectional study aims to investigate the relation of the plasma levels of inflammatory cytokines: tumor necrosis factor alpha (TNF- alpha), interleukin 6 (IL-6) and 10 (IL-10) with the target organ damage: left ventricular hypertrophy (LVH), microalbuminuria and arterial stiffness in resistant hypertension.

Design and method: 106 patients were recruited from the Ambulatory of Resistant Hypertension HC-FCM/UNICAMP and submitted to clinical and laboratorial evaluations, including 24h urinary albumin excretion and plasmatic levels of IL-6, IL-10 and TNF- alpha (ELISA). The left ventricular mass was evaluated with two-dimensional echocardiography and the arterial stiffness was evaluated by pulse wave velocity (PWV). Left ventricular hypertrophy (LVH) was defined as left ventricular mass index (LVMI) >95g/m(2) in women and >115g/m(2) in men. The albumin / urinary creatinine was categorized as absence microalbuminuria (<30mg/24hrs) and presence (>=30mg/24hrs). The PWV was been dichotomized and considered vascular lesion PWV>10m/s. Statistical analysis: The associations between inflammatory cytokines and target organ damage marker were performed using logistic regression adjusted for potencial confounders (age, body mass index and blood pressure).

Results: The prevalence of LVH, arterial stiffness and microalbuminuria were 67%, 46% and 35% of resistant hypertension patient, respectively. The logistic regression revealed that the levels of IL-6 were independently associated of LVH (OR:0.88; $p<0.05$) and microalbuminuria (OR:1.23; $p<0.05$). Also, regression mole including the presence of microalbuminuria and the level of IL-6 revealed that both were associated with LVH (OR: 5.5 and 0.88; $p<0.05$).

Conclusions: Our finding suggests that IL-6 might be involved in pathophysiology of vascular and cardiac injury in resistant hypertension.

PP.14.28 DYNAMICS OF PARAMETERS HOME BLOOD PRESSURE AND CEREBRAL BLOOD FLOW AFTER RENAL SYMPATHETIC DENERVATION

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Objective: The purpose of this research was to study dynamics of parameters self-home blood pressure (SHomeBP) and cerebral blood flow after renal sympathetic denervation(RSD).

Design and method: All participants of research have given the informed agreement. We used HomeBP-protocol from Guidelines for BP Measurements ESH/ESC used initially(i.) and after(a.) RSD during 30days(d) every d and a.24weeks (1d). BP should be used at least thrice in the morning between 06-10h. Measures of BP were reported by the participants on a booklet and into the automated memory of the OMRON M6 Comfort of 24patients with essentially hypertension(BP > 160/100 mm Hg despite three or more antihypertensive drugs), age 51,4±9.7Y. We used ultasonography for extra- and trans- cranial Doppler`s method in the carotid internal(IC), vertebral(Ver) and middle cerebral(MC) arteries (A), we studied the changes of volume(Vo) and flow (F) velocity mean(Vm), Acceleration Time(AcT) and Ac Index(I) starting and in 5-10d after RSD. RSD was done bilaterally using transfemoral access (8 ablation points, temperature control mode, target t=600C, power limit=8 watt, duration=2min). The patients were instructed to maintain pharmacotherapy unchanged during the study. Values are presented as mean±SD.

Results: Dynamics and variability day by day SBP/DBP were:1-5d -25.4/-6.4 and 14.3/5.9; 6-10d -22.1/-4.3 and 11.5/6.9; 11-15d -14.9/-1.1 and 10.7*/6.7; 16-20 d -15.1/-2.2 and 8.7*/6.3; 21-25 d -17.6/7.1 and 9.3*/6.1; 26-30 d -21.8/9.8 and 9.9*/5.9 mmHg (*$p<0.05$ between i. and a. RSD). Correlation was between the dynamics of BP during the time 0-5d and the dynamics of BP a.24w: r=0.76/0.79 p=0.003/0.001 and variability day by day -0.75/-0.15 p=0.003/0.6. Cerebral blood flow were i./a. RSD right-left:VoVm of ICA 180±69-178±79/179±57-175±56 p=0.32-0.29;VVm of VerA 209±56-198±59/201±63-211±77ml/min p=0.4-0.5;for MCA FVm 46.3±7.2-45.3±11.3cm/s p=0.6-0.7 and AcT 62.4±16.9/55.1±9.2 p=0.01;AcI 9.4±1.6/10.9±0.8 p=0.02.

Conclusions: SBP decreased during 1-10d very considerably, but significant difference was not found for cerebral blood flow baseline and in these short time. Change in AcT and AcI show a decrease in the tone of the arterial wall, which is good for patients with resistant hypertension. Significant decreased in variability day by day SHomeBP and correlation these parameters with some distant dynamics of BP reduction have important prognostic value.

PP.14.29 ASSOCIATION OF SINGLE NUCLEOTIDE POLYMORPHISMS WITH RESISTANT HYPERTENSION

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Objective: Single nucleotide polymorphisms (SNPs) can contribute to differences in the prevalence of some common complex diseases such as hypertension. Patients with resistant hypertension (RH) have a two-fold increased risk for adverse cardiovascular (CV) events compared to patients with controlled blood pressure (BP). Several studies have demonstrated contribution of genetic factors to development and progression of hypertension. Much less is known about the genetics of RH. Therefore, the aim of this study was to access the associations between SNPs and RH.

Design and method: The study sample consisted of unrelated participants of the CARE NORTH project: 60 resistant and 60 well-controlled hypertensive patients without any established cardiovascular disease. The two groups had similar age (mean ± standard deviation=59.3 ± 7.7 vs. 59.3 ± 5.6) and body mass index (BMI) (31.7 ± 5.0 vs. 31.8 ± 3.9) and did not differ in the distribution of sex, diabetes mellitus and smoking status.
The RT was defined as systolic BP >140mmHg or/and diastolic BP >90mmHg obtained in 24h ambulatory blood pressure monitoring (ABPM) despite appropriate drug treatment regimen with three or more antihypertensive drugs including diuretic. All subjects were genotyped for 171 SNPs that have been previously shown to be associated with CVD and its risk.
Pearson's chi-square statistic was used to calculate the differences in genotypes distribution under co-dominant, recessive and dominant genetic model between two groups.

Results: In co-dominant and recessive model, 5 SNPs and in dominant, 9 SNPs showed genotype distribution that were significantly different between groups at $p<0.05$. The detailed results with chi-square statistics, p-value and odd ratios (OR) calculated with reference to 'protective' genotype(s) are presented in a table. E.g. the CC genotype of rs1329650 are associated with increased risk of RH both in co-dominant and dominant model with OR= 2.44 and 3.78, respectively.

dbSNP	Candidate gene(s)	CV phenotype	χ2	df	p	N	PROT	RISK	OR(95%CI)
co-dominant genetic model									
rs1329650	*LOC100188947*	Smoking behavior	11.92	2	0.0026	116	CA	CC	4.16(1.8-9.59)
rs1703492	*SNX29*	DM2/obesity	6.44	2	0.0400	117	GT	GG	2.44(1.11-5.34)
rs17465637	*MIA3*	MI/CAD	10.25	2	0.0059	112	CA	CC	2.92(1.32-6.48)
rs2288774	*NEDD4L*	BP	10.22	2	0.0061	120	CC	TT	3.7(1.22-11.27)
rs838880	*SCARB1*	HDL	7.48	2	0.0238	112	CT	TT	2.6(1.17-5.76)
recessive genetic model									
rs10195252	*COBLL1*	TG	5.28	1	0.0216	117	CC	TT+CT	3.44(1.15-10.29)
rs17319721	*SHROOM3*	Serum creatinine level	4.50	1	0.0339	119	GG+AG	AA	3(1.08-8.37)
rs2288774	*NEDD4L*	BP	9.62	1	0.0019	120	CC	TT+CT	4.5(1.66-12.23)
rs3733829	*EGLN2*	Smoking behavior	4.18	1	0.0408	120	TT+CT	CC	3.04(1.01-9.16)
rs8017377	*NYNRIN*	LDL	4.19	1	0.0407	118	AA	AG+GG	2.86(1.02-8.07)
dominant genetic model									
rs1051730	*CHRNA3*	Smoking behavior	3.87	1	0.0492	117	CC	CT+TT	2.13(1.01-4.53)
rs1173771	*C5orf174/NPR3*	BP	4.48	1	0.0342	120	CC	CT+TT	2.29(1.06-4.99)
rs1329650	*LOC100188947*	Smoking behavior	11.51	1	0.0007	116	CA+AA	CC	3.78(1.73-8.29)
rs1703492	*SNX29*	DM2/obesity	6.24	1	0.0125	117	GT+GG	GG	2.57(1.22-5.44)
rs17465637	*MIA3*	MI/CAD	5.25	1	0.0219	112	CA+AA	CC	2.44(1.13-5.25)
rs579459	*ABO*	CAD	4.89	1	0.0271	120	TT	TC+CC	2.29(1.09-4.78)
rs7255436	*ANGPTL4*	HDL	5.33	1	0.0209	119	CC+AC	AA	2.65(1.14-6.14)
rs8068318	*TBX2*	Serum creatinine level	4.13	1	0.0422	107	CC+CT	TT	2.22(1.2-4.8)
rs838880	*SCARB1*	HDL	7.09	1	0.0078	112	CC+CT	TT	2.8(1.3-6.04)

dbSNP –database of single nucleotide polymorphism; χ2 – chi-squared statistics; df – degrees of freedom; p – p-value; N – number; PROT – 'protective' genotype(s); RISK – 'risk' genotype(s); OR – odd ratio; CI – confidence interval; DM – diabetes mellitus; MI – myocardial infarction; CAD – coronary artery disease; BP – blood pressure; HDL – high density lipoprotein; TG - triglyceride

Conclusions: Our findings indicate that RH is associated with genetic polymorphisms independently of obesity, presence of diabetes and smoking status.

PP.14.30 BLOOD PRESSURE PATTERNS IN PATIENTS WITH RESISTANT HYPERTENSION IN A PORTUGUESE POPULATION

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Objective: The purpose of this study was to identify the prevalence and characteristics of resistant hypertension and its relationship with the blood pressure patterns in a Portuguese group of patients.

Design and method: We made a descriptive study, with a group of patients whose had done Ambulatory Blood Pressure Monitoring and that we follow at Hypertension unit.
We used oscillometric SpaceLabs 90207 monitors (SpaceLabsInc) to obtain blood pressure readings at 15 minute intervals at daytime and every 30 minutes at nighttime in the first 24 hours and we collected demographic characteristics.
We identify the patients with resistant hypertension as non-controlled patients with 3 drugs or more, including diuretic.
The control level was defined as mean systolic blood pressure 135mmHg or higher and mean diastolic blood pressure 85 mmHg or higher.
The patterns were: Dipping:10% or more systolic blood pressure fall during nighttime from baseline and Non dipping was defined as a fall in average nighttime systolic blood pressure lower than 10% from baseline.

Results: Among the 304 participants 53.9% were female; mean age: 59.56 years.
41% had Resistant Hypertension, 58.5% male; mean age: 53.7 years; the dipping prevalence was 36.6%, non-dipping 48.8%.

Conclusions: Resistant Hypertension is a prevalent condition in our population and represents a great problem in the daily clinical practice.
These patients have a greater risk for stroke, renal insufficiency, and morbid cardiovascular events than patients whose blood pressure is well controlled by medical therapy.
The non-dipping pattern is very common in this group of patients and is known that this condition would increase the cardiovascular risk.
Many tools may be used in this patients, the chronotherapy for instance, although there isn´t a global consensus about this topic.

PP.14.31 BILATERAL RENAL DENERVATION IN CHRONIC KIDNEY DISEASE: PRELIMINARY DATA

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Objective: Recent studies have shown that bilateral renal denervation by radiofrequency catheter is successful in inducing a significant reduction in blood pressure and sympathetic nerve activity in patients affected by resistant arterial hypertension. The aim of this study is to verify the effects of this procedure on blood pressure, sympathetic nerve activity, renal function and cardiac mass, both in the short and long term, in patients with resistant arterial hypertension affected by stage III Chronic Kidney Disease (CKD).

Design and method: Three patients with age 55-71 years old, affected by resistant arterial hypertension and stage III CKD, underwent bilateral renal denervation by radiofrequency catheter. During the follow-up anti-hypertensive treatment was not changed. We measured: clinical blood pressure (mean of three measurements), muscle sympathetic nerve activity (MSNAc, values corrected for heart rate) by peroneal nerve microneurography, plasma creatinine with estimated glomerular filtration rate (eGFR, CKD-EPI formula), intraparenchimal renal resistance indices (kidney Doppler ultrasonography), left ventricular mass index (LVMI, transthoracic echocardiography, calculated by ASE formula) before the procedure (T0), at 1 month (T1M), 6 months (T6M) and 12 months (T12M) after the procedure.

Results: See data on Table 1 (values expressed in mean ± standard deviation).

	T0	T1M	T6M	T12M
SBP (mmHg)	174±16	130±14	137±6	141±3
DBP (mmHg)	90±11	75±8	81±3	71±14
MSNAc (bursts/100beats)	60±3	38±1	26±1	41±3
Right RI	0,67±0,06	0,63±0,10	0,69±0,09	0,69±0,04
Left RI	0,69±0,06	0,67±0,03	0,63±0,13	0,67±0,04
eGFR (ml/min)	47±5	47±12	46±6	43±2
LVMI (g/m²)	127±32	128±30	112±29	115±25

Conclusions: Bilateral renal denervation by radiofrequency catheter was able to reduce blood pressure, sympathetic nerve activity and cardiac mass in stage III CKD patients with resistant arterial hypertension, without further impairment in renal function.

PP.14.32 GLOBAL LONGITUDINAL STRAIN OF LEFT VENTRICLE AND FLOW VELOCITY IN LEFT ARTERIAL DESCENDING ARTERY AFTER RENAL SYMPATHETIC DENERVATION IN PATIENTS WITH RESISTANT HYPERTENSION

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Objective: The aim of this study was to estimate left ventricle (LV) Global Longitudinal Strain (GLS) and blood flow velocity in distal segment of left arterial descending (LAD) coronary artery before and after12 months of performed renal sympathetic denervation (RSDN) in patients with resistant hypertension.

Design and method: Seven patients with resistant hypertension (52,0±6,6 years) and office blood pressure (BP) 180,95±16,15/107,63±8,53 mm Hg and mean systolic and diastolic BP during 24 hours of BP monitoring 159,36±19,7/99,16±17,9 mmHg and heart rate (HR) 75,16±10,12 beat/min were investigated. According to angiographic data all patients had normal coronary arteries. GLS of LV was estimated by Speckle Tracking Imaging from the long axes 4C, 2C apical views. Coronary flow velocities in distal segments of LAD artery were assessed by transthoracic method. Distal segments of LAD coronary artery were visualized in a modified apical position. Velocity time integral (VTI), maximal velocity (Vmax) and mean velocity (Vmn) of blood flow during systole and diastole were calculated. 24 hours BP monitoring, HR, GLS of LV and coronary flow velocities in distal LAD artery were assessed before and after 12 months of RSDN.

Results: To the 12th month of the investigation office BP decreased by 31/20 mmHg after RSDN. According to 24 hours BP monitoring mean systolic and diastolic BP decreased by 17,1/14,9 mm Hg in the day time and by 21,1/14,47 mm Hg in the night time. HR lowered from 75,71±7,72 beat/min to 70,10±4,17 beat/min. GLS of LV decreased in all patients (5C: from -15,97±6,60% to -20,35±2,26%; p<0,04; 4C: from -15,06±3,12% to -20,20+2,62%; p<0,03; 2C: from -17,20±2,90% to -17,90±1,41%). Blood flow velocity during diastole in distal LAD artery decreased (FVI: 14,00±4,6 cm to 11,14±2,4 cm; p=0,02; Vmax: 30,82±5,9 cm/s to 24,87±3,22 cm/s; p=0,01; Vmn: 24,85±5,5 cm/s to 19,12±3,68 cm/s; p=0,01). No difference was found in velocities in LAD artery during systole before and after 12 months of RSDN.

Conclusions: RSDN in patients with resistant hypertension leads to decrease in BP, heart rate, improvement of LV longitudinal contractility and decrease in blood flow velocities during diastole in LAD artery.

PP.14.33 PREVALENCE AND CHARACTERISTICS OF TREATMENT RESISTANT HYPERTENSION IN CONSECUTIVE OUTPATIENT ANALYSIS

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Objective: The purpose of this study was to retrospectively investigate prevalence and characteristics of treatment-resistance hypertension (R-HT) in consecutive outpatients, since such patients would be candidates for catheter-based renal sympathetic denervation (RD).

Design and method: Consecutive hypertensive outpatients (June 2009-May 2013, n=999) in our hospital were recruited for analysis. The patient of R-HT was defined as SBP over 160 mmHg taking three or more antihypertensive drugs with more than routine doses, which was the same selective BP condition for RD.

Results: This investigation found only 26 (2.6%) R-HT patients. R-HT group included 8 (31%) CKD patients with less than G3a (eGFR < 45 ml/min/1.73 m²). Compared to non-R-HT group, R-HT group showed significantly higher age (3 were not in 15-85), BNP, urinary albumin-creatinine excretion ratio of spot urine, pulse wave velocity, left ventricular end-diastolic diameter and intrerventricular septal thickness measured by UCG. Hemoglobin, serum albumin, eGFR, plasma renin activity, plasma aldosterone were significantly lower in R-HT group. Urinary Na/creatinine ratio was tend to be higher in R-HT group.

Conclusions: Our retrospective cross sectional study revealed that the prevalence of R-HT among generally treated hypertensives was quite low. R-HT was in high risk and appeared to be under high salt intake. Our survey revealed that only 15 patients (1.5%) out of 999 hypertensive outpatients matched with selection criteria for RD.

PP.14.34 RESISTANT HYPERTENSION IN HIGH-RISK METABOLIC SYNDROME WITH REDUCED GFR

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Objective: The metabolic syndrome is a constellation of metabolic and vascular abnormalities that include insulin resistance, central or visceral obesity, hypertension, dyslipidemia and oxidative stress. The development of a particularly resistant form of hypertension in these individuals can be attributed to a number of factors including vasoconstriction and inappropriate activation of the renin-angiotensin-aldosterone system.This case demonstrates a high risk patient with metabolic syndrome and poorly controlled resistant hypertension. Additionally due to the inadequately controlled hypertension she was beginning to develop rhythm disturbances.

Design and method: Case description: Female Caucasian 63years age was admitted in the Cardiology Department, University Hospital, Pleven in May 2009 with complaints of fatigue, dyspnea, precordial discomfort, arrhythmia and palpitations precipitated by moderate physical activity. The symptoms started due to poor ambulatory BP control with BP values reaching upto240/140mmHg. The hypertensive crisis usually continued for about 30-40minutes and came under control only with Chlofazolin tablet. Presence of long term poorly controlled hypertension, Diabetes Mellitus type 2, Hypercholesterolemia, overweight and family history of cardiovascular diseases worsened the patient's prognosis. Paraclinics showed hypercholesterolemia and GFR=45ml/min/1.73m3. Interestingly, on normal ECG the patient registered sinus rhythm but during the occurrence of hypertensive crisis, the evening of admission, a short period of Atrial Fibrillation was recorded with spontaneous conversion to sinus rhythm on normalization of the BP. Echocardiography demonstrated extensive hypertrophic changes in the interventricular septum and posterior wall of the left ventricle with diastolic dysfunction. The therapy started in the clinic with appropriate antihypertensives and OHD.For the atrial fibrillation we advised the strategy of using Rhythmonorm as per need. On CHADS2 VAS score=3 and Apixiban 2x2.5mg was started.

Results: On exercise stress test good BP and HR control was achieved and after 2 weeks on follow-up checkup the dose of Chlofazolin was reduced to 3x1/2tab due to poor tolerace to normal BP values.

Conclusions: Therapeutic strategy is successful on proper assessment of risk factors and comorbidities. The use of loop diuretic provides a small number of large volume micturition. In ischemic heart disease and reduced GFR, ACE-inhibitors with double elimination are required.

PP.14.35 LARGE ARTERIES COMPLIANCE IS A PREDICTOR OF MYOCARDIAL ISCHEMIA IN RESISTANT HYPERTENSIVE PATIENTS

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Objective: Hypertension is the most prevalent and significant modifiable risk factor for coronary heart disease. A part of these hypertensive patients presents resistant hypertension (RHTN), which impacts greater cardiovascular risk, and altered arterial elastance, with higher arterial stiffness. Myocardial ischemia incidence increases along with blood pressure (BP) levels. However, the prevalence of myocardial ischemia in patients with RHTN is unknown, as well as the factors associated with it.

Design and method: We enrolled 129 patients with true RHTN regularly followed in our specialty hypertension clinic and evaluated then by resting and dipyridamole pharmacological stress myocardial perfusion scintigraphy. Patients were then divided in two groups: with (I-RHTN, n=36) and without (NI-RHTN, n=93) myocardial ischemia. Biochemical markers, flow mediated dilation and pulse wave velocity (cf-PWV) were also evaluated.

Results: Thirty-six (28%) patients had myocardial ischemia. There was no difference between groups regarding age, gender, biochemical parameters, office and 24h-ABPM BP levels. Patients in the I-RHTN group were more likely diabetic (31 vs. 11%, $p<0.05$) and obese (75 vs. 40%, $p<0.001$). Adjusting for age, BMI and beta-blockers use, multiple logistic regression showed that that diabetes (OR 4.8; 95%CI: 1.2-19.3, $p<0.001$), flow mediated dilation (OR 0.27; 95%CI: 0.14-0.54, $p<0.001$), microalbuminuria (OR 26.4; 95%CI: 6.0-117, $p<0.001$) and cf-PWV<10m/s (OR 12.8; 95%CI: 2.9-56.3, $p<0.001$) were independent predictors of ischemia.

Conclusions: There is a high prevalence of myocardial ischemia in patients with RHTN. Diabetes, microalbuminuria and endothelial dysfunction are associated to myocardial ischemia in RHTN. Interestingly myocardial ischemia was associated with the absence of arterial stiffness in these patients. This may instigate some new aspects of coronariopathy and large artery rigidity in this unique group of RHTN patients.

PP.14.36 PREVALENCE OF RESISTANT HYPERTENSION AT THE HYPERTENSION UNIT HOSPITAL CENTRAL SAN CRISTÓBAL TACHIRA DURING 2009-2013

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Objective: Resistant hypertension is a common clinical problem faced by both primary care clinicians and specialists. While the exact prevalence of resistant hypertension is unknown, clinical trials suggest that it is not rare, involving 10% to 30% of study participants. As older age and obesity are 2 of the strongest risk factors Resistant hypertension is defined as blood pressure that remains above goal in spite of the concurrent use of 3 antihypertensive agents of different classes. Ideally, one of the 3 agents should be a diuretic . The former includes patients who lack blood pressure control secondary to poor adherence and/or an inadequate treatment regimen, as well as those with identifiable causes of hypertension.
The aim was evaluated prevalence of resistant hypertension at the Hypertension unit in San Cristòbal,during 2009 - 2013.

Design and method: An observational,crossectional Study,including all patients atended during 2009 to 2013, at minus of three antihypertension agents at maximal doses,including diuretic,who not reached targets systolic and diastolic blood pressure,under 140/90 mm mercury,Excluded non adherent patients, using the Morinsky 8 item medication adherence scale psuedohypertension using a 24 hour ABPM, a Mobilograph NG,and identifiable causes of hypertension. performed laboratory test and images.

Results: Of 2850 clinical records were included 734 who meet all inclusión criteria, only 15 (1.98%) were classified as resistant hypertension. 12 famale, age averege was 65,27 years, all sedentary, hyperlipidemic, in a high and very high cardiovascular risk ,10 with left ventricular hypertrophy,1 with angina,1 with myocardial infaction, and 2 with stroke.12 had an a non dipping pattern.

	Media	Median	Standar desviation	Sample Variance	Minimum	Maximun	Confidence lev (95,0%)
age	65,27	68,00	15,09	227,78	46,00	87,00	8,36
weight	75,95	75,00	22,01	484,28	52,00	128,00	13,30
Height	1,57	1,56	0,09	0,01	1,45	1,76	0,05
Vaist circunference	101,67	100,00	13,47	181,47	85,00	125,00	14,14
Body mass index	30,54	30,10	6,65	44,20	22,52	45,45	4,02
Heart reate	73,92	78,50	13,77	189,54	52,00	92,00	8,75
Resoiratory rate	18,25	19,50	2,87	8,25	14,00	20,00	4,57
Baseline systolic blood pressure	184,17	189,00	24,94	622,17	137,00	205,00	26,18
Baseline diastolic blood pressure	99,67	97,50	18,99	360,67	70,00	121,00	19,93
Last systolic blood ressure at maximal 3 class drugs including diuretic	152.91	145.00	14.91	222.29	140.00	181.00	10.02
ast diastolic blood ressure at maximal 3 class drugs including diuretic	87.18	91.00	20.05	401.96	52.00	126.00	13.47

Conclusions: The prevalence of resistant hypertension was 1.98 %, major of them were women, older and obese,with high level of blood pressure values at baseline, with high and very high cardiovascular risk, with organ damage,and cardiovascular clinical condition.and non dipping pattern.

PP.14.37 THINKING OUT OF THE BOX IN THE WORKUP OF A YOUNG HYPERTENSIVE PATIENT

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Objective: To discuss the management of a young patient who presents with secondary hypertension. The patient had the usual standard workups, but eventually have uncommon diagnosis at the end.

Design and method: Study design and method: We present a young patient, in her 30s who present with poorly controlled hypertension, who was referred to the Hypertension Specialty Clinic in a tertiary hospital in Singapore. Laboratory investigations and treatment follow up will be discussed.

Results: 1. This is a 32 year old Malay lady who was referred to the Hypertension Specialty Clinic. She was initially seen at the General Practitioner (GP) clinic, for which her blood pressure was noted to be 160 mmHg systolic. Her physical examination was unremarkable. Her basic blood tests revealed serum potassium of 2.6 mmol/L, with normal serum creatinine level. Other workups revealed serum aldosterone of 1789 pmol/L and serum renin of 87.44 ng/mL/hr (after discontinuation of calcium channel blocker antihpertensive). Doppler ultrasound of the renal arteries revealed no hemodynamically signifcant renal artery stenosis. The clinical problem was that of a young hypertensive who is asymptomatic, no significant clinical signs, but with hypokalemia and raised renin and aldosterone ratio in the setting of a normal renal arterial Doppler studies. The clinician still had to entertain the possibility of renal artery stenosis, for which the patient underwent renal arteriography. The procedure revealed beaded appearance of the mid to distal right renal artery with areas of severe stenosis and aneurysmal dilattaion, suspicious of fibromuscular dysplasia. The patient underwent renal artery angioplasty and weaned off antihypertensive therapy. On follow up after 2 months, patient has been off from antihypertensives and with controlled blood pressure levels.

Conclusions: A young patient presenting with secondary hypertension should be properly worked up, as the underlying clinical condition can be treated, and will free the patient from long-term antihypertensive therapy. Patients presenting with hypokalemia, elevated renin/aldosterone levels, but with normal renal arterial Doppler studies should alert the clinician to consider a more definitive study (such as renal arteriogram), for which fibromuscular dysplasia was diagnosed.

POSTERS' SESSION

POSTERS' SESSION PS15
AGEING

PP.15.01 A SURVEY OF COGNITIVE FUNCTION AND RELATED FACTORS IN MIDDLE AGED AND ELDERLY CHINESE MEN LIVING IN NURSING HOUSES

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Objective: To investigate the cognitive function and related factors in middle aged and elderly men living in nursing houses in rural northern China.

Design and method: Cognitive function was invastigated using the Mini Mental State Examination (MMSE) in 338 men age >=50 years, who living in nursing houses in Leting County, Hebei Province. Suvey items included questionaire, physical examnation, fasting serum tests. Blood pressure was measured three times, the mean of 2nd and 3rd blood pressure readings was used for data analysis. The education level was divided into three groups (illiteracy, elementary school and middle school or above) for data analysis.

Results: The prevalence of hypertension was 85.8%. The mean of MMSE scores was16.0±9.2, 19.2±7.5, and 25.0±6.5 (P=0.000) for participants in illiterary, elementary school, and middle school or above groups respectively. The percentage of MMSE score <20 was 61.7%, 44.6% and 17.9% (p =0.000) for illiterate, elementary and middle school or above group respectively. The mean of MMSE score was 17.8.±9.1, 19.8±7.8, 19.4±7.4 and 14.1±7.5 (P= 0.003)for age 50-59, 60-69, 70-79 and >=80 year group respectively. Simple correlation analysis showed that MMSE score was negtively correlated with SBP, DBP, Age, Glucose, but no statistical significance, and it was significantly positively correlated with total cholesterol (r= 0.132, P= 0.015). The result of Multiple Regression showed that after adjusted for age, SBP and Glucose, MMSE score was significantly negatively related to education level (B=4.007, SE=3.756, P=0.000) , and significantly positively related to serum total cholesterol (B=1.218, SE=0.425, P=0.004).

Conclusions: People with less education or very elderly (>=80 years) are more prone to cognitive dysfunction. Cognitive impairment is a common condition in elderly persons living in nursing houses in northern rural China. Total cholesterol level may be interrelated to cognitive dysfunction.

PP.15.02 CORRELATION BETWEEN HYPERTENSIVE HISTORY AND HYPERTENSION CONTROL

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Objective: Hypertension history may be a factor for hypertension control. We analyzed if there is such a correlation. We studied also weather there is a potential connection between family history for hypertension and its control, as well as education and hypertension control.

Design and method: 931 treated hypertensive patients were included during the first visit: 347(37.27%) males, 584 (62.73%) females. After a mean follow-up of 12 months (6-20 months) 263 (28.25% of the initially recruited patients) went through a follow-up evaluation: 178 females (30.48% of all recruited females), 85 males (24.49% of all recruited males). The mean age was 65.90±10.00 years. We gathered full medical history, physical examination, laboratory screening, echocardiography, office and home measured blood pressure (HMBP), ambulatory blood pressure monitoring. All the patients were on combination treatment. T-test was used.

Results: 18 (90.00%) of the patients with hypertension history >40 years had suboptimal HMBP. The relative percent for the other groups were: 52 (83.87%) for the 30-39 years history; 122 (77.71%) for 20-29 years history; 159 (69.74%) for 10-19 years and 248 (53.91%). The group of patients with hypertension history less than 10 years had lower (p<0.0001) HMBP values than the groups with longer hypertension history. 371(39.84%) of the included patients were with family history for arterial hypertension.The patients without family history for hypertension had lower (p<0.0001) mean HMBP values than those with family history. The mean values of HMBP were lower for the group with high education in comparison with those with primary (p=0.03 for the systolic and p=0.06 for the diastolic) and secondary education (p=0.001 for the systolic and p=0.0008 for the diastolic). Between the mean values of HMBP of the groups with primary and secondary education there wasn't any significant difference.

Conclusions: Patients with longer hypertension history are with higher blood pressure values and their rate of control of HMBP is lower. Patients with family history for hypertension are with elevated HMBP values and with poorer control than the group without family history.

PP.15.03 EFFICACY AND SAFETY OF VALSARTAN/AMLODIPINE SINGLE-PILL COMBINATION IN VERY ELDERLY OR ELDERLY CHINESE HYPERTENSIVE PATIENTS: SUB-GROUP ANALYSIS OF A PROSPECTIVE OBSERVATIONAL STUDY

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Objective: The aim of this subgroup analysis was to evaluate the short-term efficacy and safety of valsartan/amlodipine SPC in a large-scale real-world setting in very elderly or elderly patients with BP uncontrolled by at least 4 weeks of prior antihypertensive monotherapy.

Design and method: 8-week, prospective, multicenter, open-label, observational study.
Methods: Patients were recruited from 238 sites in 29 provinces of China.
Participants were primary/essential hypertensive patients (HTPs) with BP uncontrolled (> 140/90) by at least 4weeks of prior monotherapy. Patients were switched to valsartan/amlodipine (80/5 mg) SPC once-daily and entered into an 8-week treatment period. If BP was uncontrolled after 4 weeks, additional agents could be added.

Results: This study enrolled 10252 HTPs. 747 (7.3%) of them were very elderly, >= 80 years of age (VE-Very Elderly group), 2872 (28.0%) were elderly, 65-79 (E-Elderly group), and 6633 (64.7%) were middle aged, 40-64 (MA-Middle Age group). The baseline mean sitting systolic/diastolic blood pressures (SSBP/SDBP) were 161.6/90.7, 161.2/93.0 and 160.0/96.6 mmHg for the VE, E and MA group, respectively. At the end of week 8, significant reductions of SSBP by 28.6, 28.0, 26.8 mmHg, respectively (VE vs E, P=0.7658; VE vs MA, P=0.0524; E vs MA, P=0.1999) and SDBP by 12.8, 13.6 and 15.9 mm Hg (P=0.4882, P<0.0001, P<0.0001) were achieved when compared with baseline. The control rates for SSBP were 80.6%, 79.2%, 82.5% (P=NS, P=NS, P<0.001), respectively, for SDBP 90.9%, 88.6%, 86.8% (P=NS, P<0.01, P<0.05), respectively, and for both SSBP/SDBP 76.4%, 75.8%, 77.5% (P=NS, P=NS, P=NS). The change of heart rate from baseline among the three groups was comparable (P>0.05 among groups). Drug-related adverse events in the VE, E and MA group were 4(0.53%), 6(0.21%) and 45(0.68%) (P=0.1323, P=0.8143, P<0.01), respectively. The tolerance rates (well/very well tolerated) evaluated by patients were 99.6%, 99.0% and 98.4%, respectively (P>0.05 among groups).

Conclusions: In very elderly or elderly Chinese HTPs who didn't respond to prior monotherapy, valsartan/ amlodipine SPC based antihypertensive treatment was highly effective for the control of BP and well-tolerated during an 8-week treatment period.

PP.15.04 A SHIFT IN THE RELATIVE IMPORTANCE OF EDRFS INDUCED VIA DIETARY RESTRICTION ON VASODILATOR DYSFUNCTION DUE TO GENOMIC INSTABILITY

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Objective: We explored if dietary restriction (DR) alters the vascular signalling of prostaglandins (PG), nitric oxide (NO) or endothelium-derived hyperpolarizing factors (EDHF) in Ercc1d/- and wild type (WT) littermates that were fed ad lib (AL) or were on DR.

Design and method: Male and female mice Ercc1d/- and WT mice were on DR or fed ad libitum for 9 weeks from the age of 7 weeks (Ercc1d/-) or 11 weeks (WT). Thoracic aortas were collected for organ bath experiments to investigate endothelial dilator function by exposure to acetylcholine (ACh: 1nM-10μM) in the absence or presence of NG-Methyl-L-Arginine acetate salt (L-NMMA, 10μM), cyclo-oxygenase inhibitor indomethacin (INDO, 10μM) or both inhibitors. Inhibitors were added to the organ bath 10 minutes prior to U46619, which was used to precontract the aortic segments. Ach was given after a stabile precontraction was reached (>10 minutes). Maximal dilator responses to ACh (mean ± SEM) are shown between brackets, and were calculated as % decrease of precontraction. Significance values are those of dose-related responses tested by general linear model for repeated measures.

Results: In Ercc1d/- mice, fed DR diet group Ach responses were improved In WT no changes occurred. In AL-fed Ercc1d/- L-NMMA decreased the Ach responses, and INDO had no effect. In AL-fed WT, L-NMMA inhibited Ach responses. Also INDO inhibited the vasodilations. The combination of L-NMMA and INDO did not further inhibit dilations as compared to L-NMMA pretreated segments. In DR-fed Ercc1d/- L-NMMA decreased the Ach responses, and INDO inhibited the vasodilations. In DR-fed WT, L-NMMA inhibited Ach responses and INDO had no effect. The combination of L-NMMA and INDO did further inhibit dilations as compared to L-NMMA pretreated segments in Ercc1d/- mice.

Conclusions: WT mice do not show an age-related decrease of endothelium-dependent vasorelaxation, NO as the major EDRF in aorta, and DR shows no effect to WT mice. In Ercc1d/- mice, show an accelerated age-dependent decrease of endothelial function, mice respond to DR by increasing prostaglandin-mediated vasorelaxations.

PP.15.05 PULSE PRESSURE DIPPING IS RELATED TO CORONARY ARTERY DISEASE COMPLICATIONS IN OLD HYPERTENSIVES

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Objective: Pulse pressure (PP), particularly estimated according to Ambulatory Blood Pressure Monitoring has recently played an increasing role in the cardiovascular risk assessment. The goal of our study was to evaluate the impact of diurnal pulse pressure profile on cardiovascular events in different age-groups of hypertensive patients with significant atherosclerosis established in coronary angiography. The present study is a part of PROGNOSIS study.

Design and method: We enrolled 891 patients with coronary artery disease confirmed in angiography, 63.7±9.4 years of age. Clinic blood pressure measurement and 24-hour ambulatory BP monitoring were performed. PP was calculated as difference between systolic and diastolic blood pressure values. PP dipping was calculated as percentage of decrease in nighttime pulse pressure in relation to daytime PP values. The studied subjects were divided into three age groups: <65 years of age, 65-74 years of age and >=75 years of age. During a follow-up period of 6.7 years in total, cardiovascular events were assessed.

Results: In the group >=75 years of age in comparison to group <65 years of age were observed: higher values of 24-h pulse pressure (60.7±12.3 mmHg vs. 49.4±9.9 mmHg, p<0.01), daytime (60.4±12.9 mmHg vs. 49.5±9.9 mmHg, p<0.01) and nighttime (61.3±12.4 mmHg vs. 49.2±10.6 mmHg, p<0.01). Moreover, nighttime PP/PP dipping ratio was significantly higher in patients >=75 years of age in comparison to <65 years of age (1.1±0.1 mmHg vs. 49.2±10.6 mmHg, p<0.01). In the group >=75 years of age in comparison to group <65 years of age higher total mortality (20% vs. 11%, p<0.05) and prevalence of major advanced cardiovascular event (42% vs. 30%, p<0.05) were observed. Only in the group >=75 years of age PP dipping was associated with a hazard ratio of major advance cardiovascular events of 0.98 (95%CI 0.96-0.99, p<0.03), and revascularization (percutaneous coronary angioplasty or coronary by-pass grafting) with a hazard ratio of 0.98 (95% CI 0.97-0.99, p<0.04).

Conclusions: PP dipping is a good indicator is related to major advance cardiovascular events and coronary revascularization in older hypertensive patients with coronary artery disease.

PP.15.06 THE EFFECT OF MEDITERRANEAN LIFESTYLE ON AGE AS A RISK FACTOR IN PATIENTS WITH HYPERTENSION AND OBESITY

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Objective: To identify the influence of Mediterranean life style in different levels of obesity and age is associated to hypertension.

Design and method: We evaluated 777 consecutive patients were evaluated, 199 (25.6%) males and 578 (74.4%) females. Of the 534 patients studied 68.7% had Hypertension, 243 (31.3%) no hypertension; 219 (28.2%) with DM2, 558 (71.8%) without DM2; 231 (29.7%) with Dyslipidemia 546 (70.3%) without Dyslipidemia. Three age groups were formed based on table's ideal % of body fat: i) between [18, 40] years (G1), ii) [41, 65] years (G2), iii) more than 65 years (G3). Evaluations were performed before and after recommended hypocaloric Mediterranean diet adjusted for age, gender and activity for: i) anthropometric: weight, height, waist circumference; ii) assessment of blood pressure (BP). The period of follow-up was 15 years, having been carried out observations for monitoring and dietary adjustments every 3 months.

Results: We found that systolic blood pressure (SBP) increased significantly with age, weight, BMI, waist circumference (WC) both in hypertensive and in normotensive patients. The SBP is higher in men (normotensive and hypertensive) than in women, when adjusted for age. SBP during the evaluation time decreases with age, years of duration of hypertension, BMI and waist circumference were the variables that significantly increase the predictive value of SBP (p <0.001). The diastolic blood pressure (DBP) presented a decrease over the duration of the study. The variables that significantly influence the predictive value of DBP are: marital status (unmarried presented less hypertension), diabetes (patients with DM2 also present lower values for DBP). WC, the time (in years) of diagnosed hypertension and BMI significantly raise DBP (p <0.001). The analysis of the sample according to % body fat and based on tables ideal % of body fat, identified significant differences among the three groups, with greatest difference observed among the group of younger and older persons groups.

Conclusions: Weight loss and consequent WC decrease blood pressure and causes a significant improvement of co-morbidities associated with excess of weight or obesity. Patients with co-morbidities associated with hypertension and obesity present increased benefits over time.

PP.15.07 LACK OF ASSOCIATION BETWEEN DD GENOTYPE OF ANGIOTENSIN CONVERTING ENZYME AND HEALTHY SURVIVING AFTER SIEGE OF LENINGRAD

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Objective: The possible unequal distribution between older and younger European population of the one of the most investigated gene of the cardiovascular disease - angiotensin coverting enzyme (ACE) gene – is now discussed. Many studies showed negative role of DD genotype but now possible protective function leading to healthy aging of this genotype is explored. The aim of our study was to assess the distribution of ACE genotypes in elderly population of subjects who survived of Leningrad Siege during Second World War (1941-1944) compared to randomized control group of the younger age. We hypothesized that D allele can be one of the possible markers of survival selection in this cohort.

Design and method: 234 survivors of Siege of Leningrad (80 males and 154 females) with mean age 68,5±2,5 years (69-86) were examined. The cohort was exposed intrauterine starvation or undergone to famine in early childhood. 455 control subjects (72 males and 383 females) were randomly selected from Saint-Petersburg inhabitants in epidemiology survey with the mean age 39,7±3,8 years (29-61). Informed consent was obtained from all participants. Genomic DNA

was purified from peripheral lymphocytes and genotyping was performed using real time PCR.

Results: Leningrad siege survivors had the similar ACE genotypes distribution II -23,5%, ID 52,5% and DD 23,9% compared to control group II -23,2%, ID 62,7% and DD 13,9%.

Conclusions: Neither D allele nor DD genotype of ACE gene was found to be more frequent in the cohort of Leningrad siege survivors. Perhaps, the studied cohort is not old enough to see the association with survival rate.

PP.15.08 ALDOSTERONE IS A COMPONENT OF THE RAAS MOSTLY ASSOCIATED WITH VASCULAR AGING

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Objective: Increased arteries stiffness, measured with pulse wave velocity (PWV) and atherosclerotic plagues (AP) and intima-media thickness (IMT) are the core features of arterial aging. It is known that the RAAS is involved in the development of age-related changes in the vascular wall.
The aim of our study was to establish the relationship between components of RAAS (rennin, angiotensin I, aldosterone levels) and signs of arterial aging.

Design and method: The study group included 145 subjects free of known cardiovascular diseases, anti-diabetes, antihypertensive and lipid lowering medications. The study group were divided into two groups of "young" (n=73) (< 45 year for men, < 55 year for female) and "elderly" (n=72) (45 and more than 45 year for men, 55 and more then 55 year for female) subjects. These groups did not differ by the presents of hypertension.
Methods: PWV was measured with the help of SphygmoCor (AtCor Medical). IMT in plaque-free site and atherosclerotic plaques in the extracranial carotid arteries were determined using a standardized protocol. Renin, angiotensin I, aldosterone levels were determined = using routine laboratory methods.

Results: In the group of "elderly" aldosterone level was significantly lower then in the "young" group (61,65 ±38,03 (p= 0,001); 137,65±166,55, respectively). According to the Pearson's correlations there was significant negative correlation of aldosterone and PWV (r=-0,171, p=0,050), and the tendency to significant negative correlation of aldosterone and IMT (r=-0,154, p=0,078). There was no correlation between rennin, angiotensin I and parameters of arterial aging.

Conclusions: In conclusion, the aldosterone deficiency seen in the elderly plays important role in arterial aging in healthy subjects.

PP.15.09 FREQUENCY AND AWARENESS OF HYPERTENSION AMONG THE POLISH ELDERLY POPULATION ACCORDING TO THE OCCURRENCE OF THE GERIATRIC GIANTS

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Objective: The aim of the analysis was to assess the frequency of hypertension (HT) among the elderly people with geriatric giant problems and proportion of elderly people being unaware of their hypertensive status.

Design and method: The PolSenior Project was a nationwide, multi-centered cross-sectional research conducted between 2007-2011 in Poland. The respondents were interviewed by the pre-trained nurses with the use of standardized questionnaires. HT was confirmed if blood pressure (BP) was >=140/90mmHg during two visits (mean BP values of two measurements in each visit) or the patient took antihypertensive medicines for the last 2 weeks before the visit. All patients were tested for the presence of the main geriatric problems as follow: vision impairment with Snellen arrays for the near; hearing impairment by whisper test; screening assessment for dementia with Mini-Mental State Examination, and depression with Geriatric Depression Scale; functional disability with Instrumental Activities of Daily Living Scale; bowel and bladder incontinence with a selected question from Activities of Daily Living Scale; falls with standardized question in the questionnaire; malnutrition was diagnosed if the serum albumin level was below low range of values for the central laboratory for the Project.

Results: Group consisted of 3420 respondents aged 65-104 years (52.3% men). Mean age was 78.2±8.4 years. The frequency of HT and the proportion of patients being aware and unaware of their hypertensive status according to the geriatric problems were presented in table.

Geriatric problem:	HT-confirmed (%)	Unaware of HT (%)	HT reported during interview, but not confirmed (over-reported) (%)
Vision impairment	73.9	18.4	2.2
Hearing impairment	70.4	18.8	3.0
Dementia	70.6	19.3	2.9
Depression	75.3	17.0	2.4
Falls	72.5	15.7	1.9
Malnutrition	54.1	14.9	4.1
Incontinence	65.5	15.7	3.5
Functional disability	67.1	17.3	2.3

Conclusions: Awareness of hypertensive disease may differ according to individual health status in the elderly people with geriatric giant problems, however about one fifth of them was unaware of HT.

PP.15.10 EFFECTS OF AGING AND ESTROGEN STATUS ON SEROTONIN INDUCED CONTRACTION IN AORTA FROM AN EXPERIMENTAL MURINE MODEL OF MENOPAUSE

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Objective: Serotonin is an important neurohormonal factor implicated in the regulation of vascular tone. In the cardiovascular system, estrogens regulate expression of several serotonin signalling components. This study investigates the effects of the ovariectomy on vascular reactivity to serotonin of aortas from senescence-accelerated (SAMP8) and senescence-resistant (SAMR1) mice, as experimental model to study vascular changes during aging and menopause.

Design and method: Five-month-old female SAMP8 or SAMR1 were divided into three groups: sham-operated, ovariectomized and ovariectomized plus estradiol. 28 days after surgery, mice were anesthetized and plasma levels of glucose, creatinine, and estradiol were determined. Vascular rings (4 mm long) of the thoracic aortas were mounted for isometric recording of tension and cumulative concentration-response curves for serotonin (10-8 - 10-5 M) were performed.

Results: Estrogen plasma levels decreased with ovariectomy (P<0.05), assuring the efficacy of surgery. Estrogen treatment prevented the loss in estrogens by ovariectomy to similar levels as seen in Sham females. Plasmatic concentration of glucose and creatinine were not affected by ovariectomy or estrogen treatment in both SAMR1 and SAMP8 groups. In sham operated-group maximal contraction to serotonin of SAMP8 aortas was similar than in SAMR1 (846±39 vs 855±42, respectively) suggesting that senescence did not affect contractile response to serotonin in female mice. In SAMR1, ovariectomy or ovariectomy plus estrogen treatment did not change (P>0.05) the contractions to serotonin. Maximal contractile responses to serotonin of aortic rings from SAMP8 were enhanced by ovariectomy (855±42 vs 1071±51, P<0.05, respectively), and estradiol supplementation prevented the effects of ovariectomy.

Conclusions: These data reveal that at six monthsSAMP8 mice did not change the contraction to serotonin, probably because these mice have a good ovarian function and normal plasma levels of estrogens. Ovariectomy and reduction of estrogen plasma levels increase the contractions to serotonin in SAMP8 mice, an effect that is completely prevented by exogenous administration of estradiol.

PP.15.11 AGE AND DEPRESSION: THE TWO ENEMIES OF SEXUAL FUNCTION

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Objective: Hypertension is associated with high prevalence of diabetes mellitus and other quality-of-life diminishing complications, like sexual dysfunction. Several risk factors have been implicated in the prevalence of sexual dysfunction in hypertensive patients. However, the predictive role of each independent risk factor regarding sexual dysfunction in hypertensive patients with comorbid type 2 diabetes mellitus has not been clarified. We thus aimed at investigating the association of several predictors with the prevalence of sexual dysfunction in patients suffering concurrently from hypertension and type 2 diabetes mellitus.

Design and method: Our sample consisted of consecutive hypertensive patients suffering from type 2 diabetes mellitus who attended the Hypertensive Outpatient Clinic of the 2nd Propedeutic Department, Aristotle University, Thessaloniki, Greece. A thorough medical history was taken and blood sampling was performed in order to estimate 15 probable risk factors like age, systolic and diastolic blood pressure, waist, type 2 diabetes mellitus duration, Body Mass Index, HDL and LDL cholesterol, triglycerides, HbA1c, glucose, anxiety, depression, Glomerular Filtration Rate, cardiovascular disorders. All patients had their sexual function evaluated by use of the Female Sexual Dysfunction Index (FSFI) and the International Index of Erectile Function (IIEF) questionnaires. Depression and anxiety were detected using the Zunk and the Hamilton questionnaires respectively.

Results: Two hundred eighty-one patients, 111 males and 170 females, of mean age 67±10 years were studied. Two hundred forty nine patients (88.6%) suffered from sexual dysfunction. Depression and anxiety were detected in 12.5% and 37.7% of our sample, respectively. Multiple logistic regression analysis showed that only age (adjusted OR: 1.1 [CI: 1.05-1.43], p<0.001) and depression (adjusted OR: 1.12 [CI: 1.05-1.82], p<0,001) affect the prevalence of sexual dysfunction.

Conclusions: Aging and depression in hypertensive patients suffering from type 2 diabetes mellitus are two major risk factors of sexual dysfunction. Prompt diagnosis for depression might be of paramount importance in improving sexual functioning of these patients.

PP.15.12 CORONARY ARTERY DISEASE PREVENTION IN POSTMENOPAUSAL WOMEN WITH SUBCLINICAL HYPOTHYROIDISM

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Objective: Menopause is established risk factor for coronary artery disease (CAD). Gonadotropins rise in postmenopause contributing in thyroid stimulating hormone (TSH) increase, resulting in high incidence of subclinical hypothyroidism (SH) in postmenopausal women associated with atherogenic changes. The purpose was to establish the role of SH for CAD in postmenopause.

Design and method: 94 postmenopausal women were evaluated. All patients were assessed by Kupperman menopausal index, blood lipids levels, levels of follicle stimulating (FSH), luteinizing hormone (LH), TSH, free thyroxin (fT4) with radioimmunoassay (RIA). SH was defined as TSH levels higher than 4 IU/L, in presence of normal fT4 concentration. Patients were divided into 4 groups comparable by age. 1st group included women with SH managed with hormone replacement therapy (HRT) with low doses of thyroxin (27 patients). 2nd group contained women with SH managed by statin therapy (26 patients). 3rd group included women with CAD without thyroid and pituitary disorders (21 patients), control group included 20 healthy postmenopausal women.

Results: Gonadotropins reflected postmenopausal changes in all patients: high levels of LH (36,3±4,5 IU/L) and FSH (51,8±6,9 IU/L) were equivocal in 4 groups. TSH (8,3±1,3 IU/L) and fT4 (15±1,7 pmol/L) levels in 1st and 2nd groups confirmed SH. The mean Kupperman index in 1st and 2nd groups was 45,2±6,7 points, in 3rd - 34,7±2,3, in control – 29,8±3,2, that evidenced severe climacteric symptoms in women with SH. Atherogenic changes of blood lipids were registered in 3 groups, control group showed increased triglycerides levels and slightly decreased high density lipoproteins (HDL). Following HRT blood lipids showed relatively rapid response: total cholesterol (TC) level (p<0,05) and low density lipoproteins (LDL) (p<0,05) reliably decreased. Lipid lowering with statin therapy justified lipoproteins improvement trend with gradual response: TC level (p<0,05) and LDL (p<0,05) reliably decreased.

Conclusions: LDL has positive correlation with TSH and negative – with fT4 levels. Blood lipid profile and evaluation of thyroid and pituitary activity should be included for screening patients in postmenopause for individual CAD risk evaluation. HRT with low doses of thyroxin may be recommended for secondary prevention of CAD in postmenopausal women with SH.

PP.15.13 AGING AND ARTERIOGRAPHY VARIABLES

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Objective: To assess the influence of aging on arteriography variables in patients with high normal blood pressure and hypertension.

Design and method: A total of 94 patients, aged 50±19 years, with hypertension or high normal blood pressure, underwent arteriography. Brachial augmentation index (Aix Brach), pulse wave velocity (PWV), ejection duration (ED), diastolic reflection area (DRA), diastolic area index (DAI), arterial age (AA), blood pressure, pulse pressure (PP), systolic blood pressure in the aorta (SBPAo) and pulse pressure in the aorta (PPAo) were measured.

Results: Aix Brach, PWV, ED, DAI, DRA, AA were: -22±28 %, 9.41±2.24 m/s, 297±29 ms, 50±7%, 49±21, 49±16 years, respectively. Endothelial dysfunction, arterial stiffness and impaired coronary perfusion were more likely to occur in middle aged and elderly patients, but not an accelerated arterial aging (arterial age>biological age) and a prolonged ED. An impaired DAI was more prevalent in middle aged and elderly patients (OR=3.991; 95%CI: 1.626-9.798). Multiple regression analysis revealed significant associations between age and pulse wave velocity (p<0.01) and DRA (p=0.00236) (multiple R=0.966, R square=0.933, adjusted R=0.912, significance F<0.01). Age was also significantly associated with systolic blood pressure, pulse pressure, SBPAo and PPAo (multiple R=0.961, R square=0.923, adjusted R=0.909, significance F<0.01).

Conclusions: Aging increases the prevalence of endothelial dysfunction, arterial stiffness and impairs coronary perfusion in patients with high normal blood pressure or hypertension.

PP.15.14 INDOXYL SULFATE PROMOTES ENDOTHELIAL SENESCENCE THROUGH ARYL HYDROCARBON RECEPTOR

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Objective: Vascular senescence is accelerated in the individuals with CKD. Oxidative stress is considered to play a pivotal role in the progression of senescence, however, little is known about the mechanisms involved in. In the current study, we examined if indoxyl sulfate (IS) regulates sirtuin 1 (SIRT1), which in turn, affects endothelial senescence through aryl hydrocarbon receptor (AhR) in HUVEC.

Design and method: HUVECs were incubated with IS for various time periods. Oxidative stress is estimated with DHE staining Sirt1 activity, NAD+/NADPH ratio and Nampt activity are analyzed by Western analysis of acetylated p53 and colorimetric assay, respectively. Endothelial senescence is assessed with senescence-associated ß-galactosidase (SA-ß gal) staining. Involvement of AhR in endothelial senescence by IS is determined with AhR inhibitors and siAhR.

Results: We found that treatment with IS decreased cellular NAD+ levels as well as SIRT1 activity with increased ROS production. SA-ß gal assay revealed that IS increased SA-ß gal positive endothelial cells. Administration of either apocynin or NAD reversed IS-induced endothelial senescence. Inhibition of AhR reversed IS-induced increase in ROS production and decrease in cellular NAD+ levels and SIRT1 activity, resulting in amelioration of senescence-related changes in HUVEC, including impaired phosphrylation of eNOS and increased ICAM-1 and PAI-1 expression.

Conclusions: AhR-ROS pathway which is stimulated with IS impairs SIRT activity and promotes endothelial senescence. These findings suggest that blockade of AhR pathway in endothelium is a new therapeutic target against cardiorenal syndrome.

PP.15.15 HIGH PREVALENCE OF REVERSE DIPPING PATTERN AND SYSTOLIC NOCTURNAL HYPERTENSION IN HOSPITALIZED OLD-ELDERLY PATIENTS

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Objective: Hospitalization is a stressful condition which may alter blood pressure particularly in elderly patients(pts).

Design and method: We measured clinical (C) and 24-hours monitored (M) systolic and diastolic blood pressure (SBP and DBP, mmHg) in 75 old-elderly patients (>= 85 years) hospitalized in the unit of Internal Medicine mostly for cardiovascular disorders.

Results: CSBP and CDBP measured in the morning at the bedside were respectively 130±2 and 71±1. Daytime MSBP and MDBP were respectively 135±2 and 70±1, while the corresponding nighttime values were 136±3 and 68±1. Overall only 6 (8%) pts were dippers (D) i.e. with a nocturnal reduction of MSBP between 10% and 20% of diurnal values, 25 (33%) were partial dippers (PD) i.e. with a nocturnal reduction between 0% and 10%, whereas the remaining 44 (59%) were reverse dippers (RD), i.e. with nocturnal MSBP higher than diurnal MSBP. According to conventional upper limits of normalcy for daytime and nighttime MSBP (respectively 135 and 120 mmHg), 18 (24%) pts were normotensive throughout the 24 hours, 39 (52%) had both diurnal and nocturnal systolic hypertension (DH and NH), 17 (23%) had isolated NH while only 1 patient had isolated DH. Moreover, the RD pattern was observed in 8/18 (44%) of the normotensives, in 22/40(55%) of pts with DH and/or NH and in 14/17 (82%) of those with isolated NH ($p<0.06$ for trend). There was also a trend towards the RD pattern with increasing age since among the 39 pts aged 85-90 years those with D, PD and RD patterns were respectively 4 (10%), 16 (41%) and 19 (49%) whereas among the 36 pts aged >= 91 years those with D, PD and RD patterns were 2 (6%), 9 (25%) and 25 (69%).

Conclusions: Thus, in old-elderly hospitalized patients the RD pattern of MSBP is highly prevalent, increases with age and tend to be more frequent in patients with isolated NH.

PP.15.16 PREVALENCE OF DEPRESSSION AND THE ASSOCIATED FACTORS AMONG MALAYSIAN ELDERS WITH HYPERTENSION IN TWO RURAL COMMUNITIES

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Objective: Hypertension and depression are very common among the elderly. Late life depression often affects people with chronic medical illnesses. It may lead to emotional suffering, family disruption and deteriorate the outcome of many chronic medical illnesses. However, data on the relationship between depression and hypertension in the elderly are scarce in Malaysia. Since hypertension is a very common disease in the community, there is a need to investigate the prevalence of depression in hypertensive patients. The aim of this study was to determine the prevalence rate of depression and the associated factors for depression among elderly hypertensive.

Design and method: A total of three hundred and ninety-eight elderly hypertensive patients participated in this cross-sectional study. The baseline socio-demographic and clinical variables were recorded through face to face interview. The anxiety and depressive symptoms were assessed using validated hospital anxiety and depressive scale (HADS). Data analysis was done using x2 test, simple and multiple logistic regressions.

Results: The prevalence of depression among hypertensive Malaysian elders was 22.6%. Factors associated with depression were age AOR (95% CI) 1.07 (1.03, 1.11), no formal education, living alone 2.51 (1.14, 5.53), underweight 4.88 (1.34, 17.67) and anxiety symptoms 5.18 (2.55, 10.52).

Conclusions: The prevalence of depressive symptoms among patients with hypertension was 22.6% and the associated factors were age, low education level, living alone, underweight and anxiety symptoms. Our findings could help medical staff identify high risk patients with hypertension for screening of mental disorders. Education of caregivers and medical staff about old age depression may increase its rate of detection and facilitate improved treatment.

PP.15.17 LEVEL OF MYOCARDIAL OXYGEN CONSUMPTION IN PATIENTS WITH ISCHEMIC HEART FAILURE. THE ROLE OF DOUBLE PRODUCT

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Objective: Double product, or rate pressure product is an indirect measure of myocardial oxygen consumption. Although in healthy subjects RPP declines with aging due to decline of heart rate, higher RPP in patients with heart failure indicates the need for higher cardiac work and higher myocardial oxygen consumption, so failing heart could maintain the metabolic requirements. Aim was to estimate the level of double product and thus the myocardial oxygen consumption in patients with heart failure.

Design and method: Research included 150 patients with heart failure of ischemic etiology, treated in our clinic from June 2010-June 2011. Blood pressure was measured after 5 minutes of rest upon admission, in a supine position, and heart rate was recorded by electrocardiogram. We used baseline blood pressure and heart rate levels to calculate double product using formula: RPP=HR (beats per minute) * SBP (mmHg) defining RPP >10.000 bpm/mmHg as threshold. All data were stored in a specially designed database, and statistically analyzed in the SPSS for Windows.

Results: Among 150 patients, 76 (50.7%) were female and 74 (49.3%) were male, with the mean age of 72.66±8.45 years. Baseline systolic blood pressure was elevated in 115 patients (76.7%; x2-test; p=0.000) with the mean value 144.63±27.64mmHg, and baseline heart rate was >80 bpm in 95 patients (63.3%; x2-test; p=0.000), mean value 96.97±31.31. Rate pressure product (double product) was higher than 10.000 bpm/mmHg in 112 patients (74.7%; x2-test; p=0.000) having the mean value of 14063.75±5357.25. There was a significant positive correlation of RPP to HR and SBP (r=0.519 and 0.445; p=0.000) and negative, but no significant correlation to age (r=-0.004; p=0.964).

Conclusions: In this group of mainly elderly patients (>65 years) double product didn't declined with aging probably due to higher baseline heart rate and the presence of hypertension in these patients. With its influence on diastole shortening heart rate lowers the myocardial oxygen supply which demand higher cardiac work of failing heart and higher myocardial oxygen consumption in order to maintain adequate metabolic requirements.

PP.15.18 INTERACTION BETWEEN PLASMA HOMOCYSTEINE AND SMOKING AS RISK FACTORS FOR HYPERTENSION AND NON-FATAL ISCHEMIC HEART DISEASE AMONG ELDERLY: RESULTS OF THE MARACAIBO AGING STUDY

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Objective: There is s paucity of information on risk factors for hypertension among elderly residing in developing countries. The present study examined the role of total plasma homocysteine (HCY) as a risk factor for hypertension and non-fatal ischemic heart disease (non-FIHD) among community-dwelling elderly in Maracaibo, Venezuela.

Design and method: The Maracaibo Aging Study (MAS) included 2438 participants, 55 years or older, who underwent standardized medical, cardiovascular, and laboratory assessments. A subset of participants (n = 673) received ambulatory blood pressure monitoring (ABPM) and conventional blood pressure (CBP) recordings. Subjects with CBP: SBP<140, DBP<90 mmHg, and ABPM: SBP<135 and DBP<85, were considered normotensives. Subjects with higher CBP (SBP>=140 or DBP>=90 mmHg) and ABPM (SBP>=135 or DBP>=85 mmHg) measurements were considered hypertensive. Participants were identified as smokers, if they reported current or past smoking. HCY was measured using commercial kits for the Abbott IMx analyzer™ (Abbott Park, IL, USA). Results are presented as mean ± standard

deviation and percentages (%). ANOVA and chi-square were used to determine the significance of differences between mean values for smokers and subjects with non-FIHD. Sequential multivariate logistic regression analysis, adjusted for age, sex, education, EMEM score, alcohol intake, obesity, diabetes mellitus, hypercholesterolemia, and hyperuricemia, was performed to determine the significance of elevated HCY as a risk factor for hypertension and non-FIHD.

Results: Plasma HCY levels were higher in males than in females (14.86±7.36 vs. 13.66±5.79, P=0.042), and in smokers than non-smokers (14.67±7.48 vs. 13.43±4.96, P=0.022). Hypertension affected 44.9% of all subjects, and HCY levels were significantly higher in hypertensives than in normotensives. Regression results indicated that elevated HCY was a significant risk factor for hypertension, but only among smokers (OR=1.04, 95% CI=1.01-1.09, P=0.024). Elevated HCY level was also a significant risk factor for non-FIHD only among smokers (OR=1.05, 95% CI=1.01-1.09, P=0.002).

Conclusions: Because elevated HCY was a significant risk factor for hypertension and non-FIHD only among smokers, smoking is a confounding factor that needs to be accounted for when studying effects of HCY on cardiovascular health.

PP.15.19 INSULIN RESISTANCE AND FASTING HYPERGLYCEMIA MAY CONTRIBUTE TO TELOMERE LENGTH ATTRITION

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Objective: The length of telomere (TL) is widely considered as a biomarker for cardiovascular aging and cardiovascular diseases. Whether TL is purely inherited characteristic or are affected by cardiovascular risk factors still remains a challenge. The aim of this study was to determine the effect of cardiovascular risk factors, oxidative stress and inflammation on telomere biology.

Design and method: The study group included 150 subjects mean age 51,34 ± 12,32 years, free of known cardiovascular diseases, diabetes mellitus, antihypertensive and lipid lowering medications, but with one or more cardiovascular risk factors (smoking, arterial hypertension, obesity, dyslipidemia, fasting hyperglycemia, insulin resistance (HOMA-IR > 2,5)). Oxidative stress was assessed by malonyl dialdehyde measuring, inflammation was estimated by interleukin-6 (IL-6), C-reactive protein (CRP) measuring. TL was determined by quantitative polymerase chain reaction.

Results: TL had significant inverse association with age (r= - 0,372, p=0,004). There was a tendency to significant inverse association between TL and fasting glucose level (r= - 0,256, p=0,052), homeostasis model assessment of insulin resistance - HOMA-IR (r= - 0,312, p=0,082), IL-6 level (r= - 0,257, p=0,052). No association between TL and smoking, obesity, arterial hypertension, total cholesterol, cholesterol of low density lipoproteins, malonyl dialdehyde level, CRP were observed.

Conclusions: Fasting hyperglycemia and insulin resistance may be the main targets in preventing accelerating aging in patients without clinical manifestations of cardiovascular diseases.

PP.15.20 ARTERIAL HYPERTENSION IN ELDERLY AND VERY OLD PATIENTS ON HAEMODIALYSIS

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Objective: There is increasing number of elderly/very old patients with end stage renal disease on haemodialysis (HD). The aim of study was to investigate arterial hipertension in these patients on HD.

Design and method: For each patient were recorded blood pressure at the start, 2 hours after the onset, and 5 minutes at the end of HD. Unregulated arterial hypertension was determined as >140 mmHg for systolic and/or >90 mmHg for diastolic blood pressure.

Results: We investigated 164 patients (68.91±13.08 years) on intermittent HD. The antihypertensives were taken by 123 (75%) patients. We investigated subgroups of patients: <65 years (59, 35.98% patients), and >65 years (105, 64.02 % patients). (Table 1). There were 34 patients (20.73%) >80 years. Arterial hypertension before HD session was poorly regulated overall in 60 (36.6%) patients, in >65 years in 39 (37.1%) patients, and >80 years in 10 (29.41%) patients (x2= 0.039; p =0,490 and x2= 0.039; p =0.490).

Table 1. The differences between haemodialysis patients >65 years (105) and <65 years (59).

	>65		<65		
	X±SD		X±SD		significance
pre-HD SYS (mmHg)	128.90±	23.41	126.39±	27.47	0.268
pre-HD DIAS (mmHg)	64.81±	11.29	68.49±	13.76	0.033*
pre-HD MAP (mmHg)	86.17±	13.70	87.79±	17.25	0.256
pre-HD PP (mmHg)	64.10±	18.97	57.90±	18.99	0.023*
post-HD SYS (mmHg)	116.90±	23.47	115.42±	23.98	0.331
post-HD DIAS (mmHg)	62.05±	9.42	65.68±	11.24	0.035*
post-HD MAP (mmHg)	80.33±	12.45	82.26±	14.66	0.187
post-HD PP (mmHg)	54.86±	19.89	49.75±	16.57	0.048*
2 hrs-HD SYS (mmHg)	113.63±	27.70	114.08±	26.23	0.459
2 hrs-HD DIAS (mmHg)	59.06±	11.33	64.17±	13.42	0.017*
2 hrs-HD MAP (mmHg)	77.85±	15.08	80.81±	17.10	0.126
2 hrs-HD PP(mmHg)	53.67±	22.70	49.92±	16.04	0.132
Δ pre/post HD SYS (mmHg)	12.00±	17.22	10.97±	19.45	0.363
Δ pre/post HD DIAST(mmHg)	2.76±	9.83	2.81±	11.90	0.488
Δ pre/post HD MAP(mmHg)	5.84±	10.39	5.53±	12.70	0.433
Δ pre/post HD PP (mmHg)	9.24±	15.76	8.15±	16.34	0.339

X±SD, arithmetic mean±standard deviation; *, p<0.05; SYS: systolic blood pressure; DIAS: diastolic blood pressure; MAP, mean arterial blood pressure; PP: pulse pressure.

Conclusions: Arterial hypertension is an unsolwed problem in old HD population.

PP.15.21 PULSE WAVE VELOCITY CHANGES IN PATIENTS WITH HYPERTENSION

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Objective: The increasing of pulse wave velocity (PWV) is an independent predictor of cardiovascular diseases and mortality at patients with essential hypertension (EH).
Research objective was studying of PWV age changes in patients with EH stage II.

Design and method: It were surveyed 104 patients (55 men and 49 women) with hypertension stage II. The average age in the observation group was 56,87±10,15 years, hypertension duration - 9,18±2,5 years, body mass index - 31,43±5,15. Family history of hypertension was detected in 86,60% (90 patients). On stratification of risk factors for cardiovascular events 48% of patients were classified as very high risk group and 52% - as the high-risk group. All patients were separated into groups depending on the age: 30-39 years (n=16), 40-49 years (n=19), 50-59 years (n=31), 60-69 years (n=24) and 70-79 years (n=14).
Measurement of systolic (SBP) and diastolic blood pressure (DBP) and PWV was carried out using the device Arteriograph TensioMed (Tensio-Clinic, Hungary).

Results: The average office SBP and DBP in the observation group recorded in the supine position after 5 min. rest, was 162,3±4,9 mmHg and 101,12±1,35 mm Hg respectively. The pathological increasing of PWV over 10 m/s was observed in 70% of the observation patients, of which 38,5% were younger than 55 years. According to age PWV levels increased. In the group 30-39 years PWV was 9,92 m/s, 40-49 years – 10,13 m/s, 50-59 years – 11,68 m/s, 60-69 years – 11,80 m/s, 70-79 years – 12,01 m/s respectively. There was a significant association between age and SBP (r=0,23; p<0,05) and PWV (r=0,33; p<0.01).

Conclusions: It was determined direct associations between patients' age and PWV level. This suggests growth of the arterial wall stiffness according to age.

PP.15.22 COGNITIVE FUNCTIONS IMPAIRMENT AND PULSE WAVE VELOCITY AMONG THE RESPONDENTS OF POLSENIOR PROJECT

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Objective: The aim of the analysis was to compare pulse wave velocity according to cognitive status in the group of elderly people.

Design and method: Pulse wave velocity was determined as a part of geriatric assessment of respondents recruited into nationwide PolSenior Project. Carotid-femoral pulse wave velocity (cf-PWV) was measured using an automatic com-

puterized recorder and analyzed by the Complior program. Cognitive screening assessment was performed with the use of Mini-Mental State Examination (MMSE). Dementia was suspected when MMSE was lower than 24 points, MCI when result was between 24-27 points.

Results: Cf-PWV measurements were performed in 146 respondents aged 65+ years old. Suspicion of dementia was made in 20.5% and of MCI in 41.1% of respondents.
Cf-PWV higher than 10m/s was measured among 75% respondents with suspicion of Mild Cognitive Impairment, in 76.7% of those with suspicion of dementia and in 64.3% respondents without cognitive impairment symptoms. Both, mean and median values of cf-PWV were higher among those cognitively impaired in comparison to those non-impaired, however trend was not significant. Mean cf-PWV among respondents with dementia was 12.7±5m/s, among those with MCI was 12.7±4.2m/s and in those with normal cognition was 10.9±3.8m/s. There was significant difference between the groups of different cognitive status when standardized for age.

Conclusions: Cf-PWV higher than 10m/s was measured more often among cognitively impaired elderly respondents. Mean values of cf-PWV were different accordingly to cognitive status of probates, which may indicate greater arterial stiffness as one of the factors observed among demented respondents more often.

PP.15.23 POSSIBLE RELATIONSHIP BETWEEN ATRAP, AN AT1 RECEPTOR BINDING PROTEIN, AND KLOTHO IN THE KIDNEY OF AGING MICE MODELS

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Objective: Previous reports have indicated that renin-angiotensin system (RAS) plays a key role in senescence. Angiotensin II (Ang II) via AT1 receptor (AT1R) stimulation can activate reactive oxygen species (ROS) and deactivate pro-survival genes including Sirtuins and Klotho, resulting in senescence acceleration. AT1R-associated protein (ATRAP/Agtrap), a molecule which interacts with the AT1R, promotes AT1R internalization along with a suppression of pathological activation of tissue AT1R signaling. However, pathophysiological significance of ATRAP in senescence should be determined, and as a first step we investigate a possible association of ATRAP expression and aging in mouse models of senescence.

Design and method: In the first experiment, 11-week-old C57BL/6 mice were infused with Ang II (2000ng/kg/min) for 14 days, and effects of chronic Ang II infusion on renal expression of ATRAP, AT1R and pro-survival genes (Sirtuin1, Sirtuin3, nicotinamide phosphoribosyltransferase and Klotho) were examined. In the second experiment, C57BL/6 mice were fed for a long term (~33 months), and renal expression of ATRAP, AT1R and pro-survival genes were examined in these aged mice.

Results: In the Ang II-infused mice compared with the saline- infused mice, the following took place: (1) the renal expression of ATRAP mRNA was decreased ($P<0.05$), and the immunohistochemical staining showed the decrease of renal tubular ATRAP in the outer medulla and cortex, (2) the renal AT1R mRNA expression was comparable, (3) the renal Klotho mRNA expression was decreased ($P<0.01$), but other pro-survival genes were comparable. In the 33-month-old mice compared with the 3-month-old mice, the following took place: (4) the renal expression of ATRAP and Klotho mRNA was decreased ($P<0.01$), and (5) the correlation between ATRAP and Klotho was strong (Pearson's correction coefficient: $R=0.73$, $P=0.01$), but (6) the renal AT1R mRNA expression was comparable.

Conclusions: Two aging model mice showed the deacrease of ATRAP and Klotho in the kidney without the change of AT1R. Furthermore, the mRNA expression of ATRAP was strongly correlated with that of Klotho in old mice. These results suggest that modulation of ATRAP has relevance to regulation of Klotho in senescence.

PP.15.24 AORTA STRUCTURE AND ARTERIAL STIFFNESS IN ELDERLY: THE ROLE OF PARIETAL INFLAMMATION

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Objective: The purpose of this study was to determine the relationship between thoracic aortic inflammation and arterial stiffness in hypertensive and control elderly. Vascular aging is accompanied by gradual remodeling affecting both cardiac and arterial structure and mechanical properties. Hypertension is suggested to exert pro-inflammatory actions thru several biological mediators enhancing arterial stiffness.

Design and method: .Thirty individuals over 65 years of age were examined, 15 hypertensive subjects and 15 controls. Pulse wave velocity, a surrogate for aortic stiffness, was measured by applanation tonometry. Left ventricular parameters were measured with MRI. Brachial pulse pressure, central pulse pressure and pulse pressure amplification, predictors of cardiovascular mortality were also quantified. Thoracic aorta local inflammation (expressed as maximal standard uptake value) and calcification were measured by 18 F-fluorodeoxyglucose positron emission tomography/computed tomography imaging. Moreover, biomarkers of low grade inflammation (high-sensitivity C-reactive protein, interleukin 6) were also determined.

Results: For the overall population, in univariate analysis, tonometry aortic pulse wave velocity was correlated to the maximal standard uptake value at the level of ascending aorta ($p=0.03$), and was also strongly linked to the volume of calcifications at the level of descending thoracic aorta ($p=0.007$). Pulse pressure amplification was negatively correlated with maximal standard uptake value at the level of ascending aorta ($p=0.04$). Systemic arterial stiffness was linked to ascending aorta inflammation and to left ventricular concentric remodelling ($p=0.001$). As expected, tonometry pulse wave velocity was higher in elderly hypertensive subjects than controls (15.50±5.28 vs 11.98±2.54, $p=0.046$). Individuals with high levels of calcifications and/or inflammation had higher PWV values than the others ($p=0.003$).

Conclusions: It's well established that calcification of thoracic and abdominal aorta play a great role in elevation of arterial stiffness. In fact, this study point out the importance of the ascending aorta local inflammation which seems to be an actor of major importance in the determination of aortic pulse wave velocity. Targeting this specific localisation could help to reduce level of arterial stiffness in hypertensive and control elderly patients.

PP.15.25 ADHERENCE TO 2013 ESH/ESC GUIDELINES FOR MANAGEMENT OF HYPERTENSION IN OLDER ADULTS IN A NURSING HOME POPULATION

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Objective: The 2013 ESH/ESC guidelines for the management of arterial hypertension include recommendations for the treatment of hypertension in older adults. With regards to patients aged over 80, a target systolic blood pressure (SBP) between 140 and 150 mmHg was recommended, provided the patient is in good physical and mental condition. These guidelines are particularly applicable to nursing homes where many residents are aged over 80.
This audit aims to examine patterns of SBP and use of oral antihypertensives (OHAs) in a cohort of nursing home (NH) patients aged over 80.

Design and method: The audit was performed in an Irish community NH. All patients aged over 80 were eligible for inclusion. Medical and drug prescription records were reviewed to obtain data regarding SBP, medical history and medications.

Results: 74 patients were included (67.6% female) with a mean age of 86.5±5.2 years. The mean SBP for the study population was 126.7±15.3 mmHg. 74.3% were documented as being hypertensive. 66.2% of the patients had additional cardiovascular (CV) risk factors. Mean SBP for those with CV risk factors was 127.9±15.6.
62.2% of the population and 75.5% of those with CV risk factors were on

OHAs. The median number of OHAs used was 1. The most commonly used OHAs were beta blockers (37.9%) and ACE inhibitors (24.3%).
18.9% of patients were documented as having hypotension at some point. 57.1% of those patients on OHAs had experienced hypotension (median number of OHAs used was 1).

Conclusions: NH patients aged over 80 are more likely to be frail. In this NH population, mean SBP was lower than that recommended in international guidelines. There was also a high prevalence of hypotension particularly in those treated with OHAs. This may potentially increase the risk of falls and adverse events.
The results of this audit highlight the importance of medication review and rationalisation in this potentially frail cohort of patients.

PP.15.26 SEX DIFFERENCES IN CIRCADIAN VARIATION OF BLOOD PRESSURE IN JUVENILE, MIDDLE-AGED AND ELDERLY INDIVIDUALS

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Objective: Sex differences exist in blood pressure (BP) in adults, due mainly to hormonal differences between sexes. Such differences in BP appear from adolescence. The aim of this study was to determine sex differences in circadian variations of BP and several parameters in juvenile (JV), middle-aged (MA), and elderly (EL) individuals from the same region and race.

Design and method: All subjects were Kazakh people in Xinjiang, China. JV (age, 9~10 years), MA subjects (age, 30~35 years), and EL subjects (age, 65~70 years) provided blood and urine samples and underwent 24-h ambulatory BP monitoring. Serum creatinine (SCr) and urinary creatinine, urinary Na and urinary K levels were measured to determine renal function and urinary Na excretion (UNaE) and urinary K excretion (UKE). No subjects had previously received any antihypertensive agents or other any medications.

Results: No sex differences were seen in JV in BP, pulse pressure (PP), heart rate (HR), SCr, body weight or UNaE. These parameters except HR and UNaE were higher in men than in women for MA and EL subjects. In MA, HR and UKE were higher in women than in men. UNaE was higher in men than in women only in EL subjects. Higher circadian variation of BP in men was observed in EL subjects. A significant positive relationship was observed between BP and UNaE only in men among EL subjects.

Table. Comparison of demographic and biochemical characteristics between the study groups

	JV		MA		EL	
	Boy	Girl	Men	Women	Men	Women
SBP (mmHg)	115.9±1.6	114.2±1.6	121.9±1.1>	116.0±1.5	144.2±3.5>	134.0±2.2
DBP (mmHg)	70.9±70.	70.1±1.2	72.3±0.8	71.4±1.0	81.6±2.1 >	76.4±1.2
HR (b/m)	79.1±1.4	79.7±1.8	71.0±1.0 <	74.2±0.9	68.8±1.5	69.8±0.7
PP (mmHg)	44.9±1.3	44.1±1.0	49.6±0.8 >	43.4±1.0	62.6±1.9 >	57.6±1.5
BW (Kg)	29.2±3.9	32.4±1.7	67.5±1.2 >	58.6±1.4	62.6±1.8 >	54.3±1.2
SCr (mg/dl)	0.63±0.02	0.64±0.02	0.77±0.02>	0.70±0.02	1.4±0.03 >	1.1±0.2
UNaE (mEq/day)	188.5±13.7	198.3±12.9	177.6±7.3	195.8±8.4	219.9±14.4>	159.6±7.8
UKE(mEq/day)	25.4±1.9	34.2±2.4	28.3±1.5 <	34.8±1.9	20.5±1.2	18.0±1.1

<, > statistical significance

Conclusions: JV, who showed no difference in sex hormone levels, revealed no sex differences in BP, PP, or HR; however, sex differences in BP and PP did not disappear among EL subjects.

PP.15.27 ARTERIAL STIFFNESS IS ASSOCIATED WITH TELOMERE LENGTH

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Objective: Arterial stiffness is one of the most important parameter of vascular aging and predictor for cardiovascular events. Telomere length (TL) has been identified as a marker for cellular aging. Telomere shortening can be slowed down by activation of telomerase activity (TA). We hypothesized, cellular aging have association with arterial stiffness and can leads to the earlier development of cardiovascular disease.
The aim of this study was to determine the association between telomere biology and vascular aging.

Design and method: TL and TA was assessed by quantitative polymerase chain reaction in 250 patients free from established cardiovascular diseases, mean age 51,34 ± 12,32 years. Arterial stiffness was appreciated by aortic pulse wave velocity (PWV) measuring with the help of SphygmoCor (AtCor Medical).

Results: TL had significant inverse association with arterial stiffness (r= -0,2657, p=0,0096). No association between arterial stiffness and TA (r= -0,1449, p=0,2903).

Conclusions: The effect of TL on arterial aging may be through the predisposition to arterial stiffness. So, preservation of TL can be one of the main targets in preventing of vascular aging in patients without clinical manifestations of cardiovascular diseases.

PP.15.28 PREVALENCE OF ANXIETY, DEPRESSION AND THEIR ASSOCIATED FACTORS AMONG THE ELDERLY HYPERTENSIVE PATIENTS IN TWO RURAL DISTRICTS

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Objective: Depression and anxiety are frequently associated with the elderly hypertensive patients. They may lead to emotional suffering, family disruption and deterioration of the outcome of many chronic medical illnesses. However, data on the relationship between anxiety and depression with hypertension in the elderly are scarce in Malaysia. Since hypertension is a very common disease in the community, there is a need to investigate the prevalence of anxiety and depression in hypertensive patients. The objective of this study is to determine the prevalence of depression and anxiety among elderly hypertensive patients aged 60 years old and above attending health clinics in Hilir Perak and Sabak Bernam districts. In addition, we would also like to identify significant factors that are associated with anxiety and depression in the same study group.

Design and method: This cross-sectional study included two hundred and nine elderly hypertensive patients aged 60 years old and above. It was carried out in six randomly selected health clinics in Hilir Perak, Perak and Sabak Bernam, Selangor from 18th November until 29th November 2013. Hospital Anxiety and Depression Scale (HADS) questionnaire was used to measure depression and anxiety level of these elderly hypertensive patients. SPSS version 18 software was used to analyze the data using both descriptive and inferential statistics.

Results: Overall, the prevalence of anxiety among the elderly patients with hypertension was 16.3% while the prevalence of depression was 18.2%. From the study, significant association was found between weight of patient [p=0.002 (2.804, 12.802)] and body mass index of patient [p=0.005(0.819, 4.610)] with anxiety symptom. Depression status however showed no significant association with any variables tested in the study.

Conclusions: The prevalence of anxiety and depression among elderly hypertensive patients in Hilir Perak and Sabak Bernam were relatively low. However, preventive measures should be taken accordingly to improve the mental health status of elderly hypertensive patients. Therefore, these results may serve as a point of reference for clinicians to screen hypertensive patients in Malaysia and treat them as components of hypertensive care.

PP.15.29 ALL CAUSE MORTALITY IN ELDERLY PATIENTS WITH HIGH BLOOD PRESSURE: A 6 YEAR FOLLOW-UP

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Objective: The prevalence of high blood pressure (BP) in the elderly is high. Untreated hypertension can accelerate the rate of vascular aging. The aim of this study was to analyze, mortality, and the causes and predictors of mortality, in elderly patients with high BP and a 6-year follow-up.

Design and method: A prospective, observational study was performed in 66 elderly patients with high BP, who were randomly recruited in Geriatrics and Nephrology consultations between January and April 2006 and were followed-up for 6 years (second evaluation between January and April, 2012). The mean age of the patients was 82.3±6 years (range, 69-97 year), and there were 50 women and 16 men.

Results: A total of 44 patients (66.6%) died during the 6-year follow-up. Among the known causes of mortality, the main cause was progressive deterioration

in the patient's general health status (n = 14), while less frequent causes were cardiovascular disease and stroke (n = 9). No significant variations were found between survivors and nonsurvivors in the number of antihypertensive agents or in the types of drugs used in the baseline period, except for angiotensin II receptor blockers, which were less frequently used in nonsurvivors (P=.018).
In the univariate analysis of the baseline characteristics, nonsurvivors were significantly older (P=.002), were mostly men (P=.006), had greater renal function impairment (P=.000), and higher levels of serum uric acid serum (SUA) (P=.000). In the multivariate Cox analysis, the only independent predictors of mortality were sex (P=.029) and SUA levels (P=.000).

Conclusions: In our cohort of hypertensive elderly patients, predictors of mortality were sex and SUA levels. The main cause of mortality was progressive deterioration in general health status.

PP.15.30 IS BLOOD PRESSURE RELATED TO AGE IN HYPERTENSIVES?

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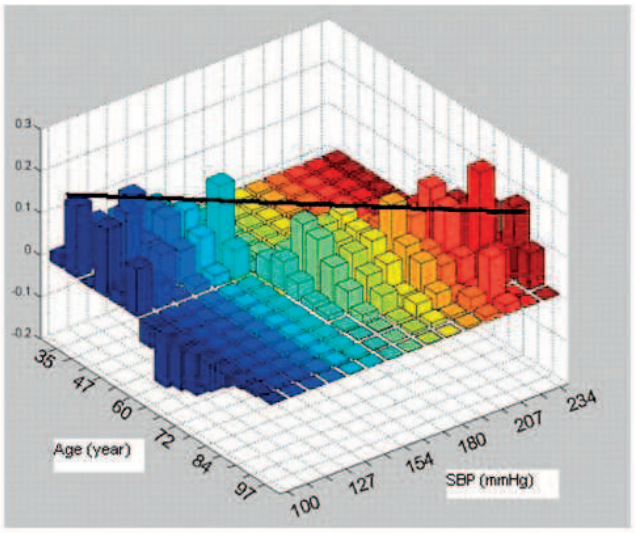
Objective: Systolic blood pressure (SBP) is a well-known predictor of cardiovascular events. In population studies, SBP is linearly related to age. However, this relationship in hypertensive subjects (treated or not) has never been fully described. The objective of this analyse was to study the relationship between blood pressure (BP) and age using the large INDANA data base built with the STOP, SHEP, COOPE, MRFIT and SYST-EUR studies.

Design and method: The nature of the link between BP and age was studied in a group of patients treated either with placebo or antihypertensive drugs. BP and age were analysed using a validated filter binding (Z test), seeking more frequent than chance events associations.

Results: Nine thousand nine hundred and eight patients with placebo and 4538 patients with antihypertensive drugs were included. Mean SBP/DBP (+ SD) was slightly higher in placebo-treated patients vs antihypertensive drugs treated patients (157+22 mm Hg vs 154+ 22 mm Hg). Using the Z-filter methodology, SBP or DBP and age were not continuously nor linearly related in placebo-treated hypertensive patients. In contrast, as shown in figure 1, there was a linear relationship between values of SBP (not DBP) linked to values of age (bold line in figure 1: SBP = 1.84 age +43, r = 0.83, P<0.001) in patients on antihypertensive therapy.



Conclusions: These results suggest that antihypertensive therapy, beyond its lowering effects on BP, may unmask the relationship between SBP and age in hypertensive patients. Furthermore, the Z-methodology gives an algebraic expression that could be helpful to define BP goals in relation with age.

PP.15.31 IMPROVING IN ARTERIAL STIFFNESS PARAMETERS BY PULSE-WAVE ANALYSIS IN OBESE PATIENTS WITH ARTERIAL HYPERTENSION AND DYSLIPIDEMIA USING DIFFERENT STATIN-BASED REGIMENS

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Objective: Arterial stiffness is independent risk factor of cardiovascular events. Suggest that the statins benefit associated with improvement in arterial stiffness parameters beyond lipidslowering effects. Aim: to evaluate changes in pulse-wave shape in obese high risk patients with AH and dyslipidemia treated with rosuvastatin compared with atorvastatin.

Design and method: 82 obese patients (age 61.5±10 ys) with AH,dyslipidemia were randomized to Atorvastatin group(n=41) or Rosuvastatin (n=41). ACEi and thiazide diuretics added blood pressure control. Pulse-wave characteristics measured before and after 5 weeks of treatment using finger photoplethysmographic device. Stiffness index (SI), reflection index (RI), augmentation index (AIx), systolic BP in aorta (SPa), digital pulse amplitude augmentation (PAA) were accessed.

Results: Before the treatment impared SI, elevated RI, AIx, Spa were shown. Lipids and BP goals were achieved in all patients validating further analysis. Decrease in SI (δ SI, m/s -0,87 Atorva and -0,89 Rosuva), RI (δRI, % -7,89 Atorva and -7,21 Rosuva) were revealed in both treatment arms (p>0.05), whereas significant trends towards AIx decrease were demonstrated only in Rosuvastatin-treated patients (δAI, % -1.88 Atorva and -1.92 Rosuva, p< 0.05) Rosuvastatin group demonstrated better increasing in PAA than Atorvastatin group (PAA (Atorva): before treatment 1,58±0,42 and After 5 weeks: 1,82±0,51 p=0.06 vs PAA (Rosuva): before 1,68±0,22 and After 5 weeks1,95±0,23, p< 0.05).

Conclusions: Pulse-wave analysis in obese AH patients demonstrated increasing vascular stiffness. Both Atorvastatin and Rosuvastatin treatment resulted in arterial stiffness parameters, whereas only Rosuvastatin treatment was significantly associated with trends in AIx and PAA improvement in short-term follow-up.

PP.15.32 PULSATILE VS. STEADY COMPONENT OF BLOOD PRESSURE IN ELDERLY PATIENTS WITH HEART FAILURE

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Objective: Blood pressure is characterized by its steady component, estimated by mean arterial pressure (MAP), and pulsatile component, estimated by pulse pressure (PP). After age of 60 years diastolic blood pressure (DBP) decreases while systolic (SBP) continues to rise, which results in a significant increase in PP giving him higher importance compared to MAP. The age-dependent rise in PP is largely determined by progressive stiffening of central elastic arteries, which reflects the biological aging of the arterial system. Aim was to investigate whether pulsatile component of blood pressure has higher significance than steady component in ischemic heart failure.

Design and method: This prospective research included 150 patients (74-male; 76-female) with moderate heart failure of ischemic etiology, treated in Clinic of Cardiology, University Clinical Center Kragujevac from June 2010-June 2011. Blood pressure was measured on admission, after 5 minutes of rest in a supine position, PP was defined as arithmetic difference between SBP and DBP, and MAP was calculated using the formula [(2*diastolic)+systolic]/3. All data were stored in a specially designed database, and statistically analyzed in the SPSS for Windows.

Results: Mean age was 72.66±8.45 years. PP was elevated >40mmHg in 127 patients (84.7%; x2 test;p=0.000), with a mean value of 62.5±20.9 mmHg. The majority of patients, 107(71.3%) had normal MAP (x2-tets; p=0.000), with the mean value 106.82±17.92 mmHg, and only 39 patients (26%) had levels >110mmHg. Pulse pressure had negative correlation to both SBP and DBP (Pearson's coeficient -0.642;p=0.000, and -0.212;p=0.009), while MAP was positively correlated to both (SBP 0.583; p=0.000; and DBP 0.738; p=0.000). There was also negative correlation of PP and MAP (Pearson's coeficient -0.206: p=0.011). Elevated PP had a slightly higher, but not significant, prevalence in women compared to men (88.2% vs 81.1%).

Conclusions: The age-dependent rise in pulse pressure is the price of human longevity. Pulse pressure may be regarded as an index of arterial aging, while

MAP loses the significance that have in younger age. During the postmenopausal period PP increases faster in women so that by the age of 70 years PP is about the same in both genders.

PP.15.33 WALKING SPEED AND RISK OF FALL IN THE ELDEST WITH HYPERTENSION

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Objective: This study assessed the variability in walking speed and the risk of fall in elderly people with hypertension.

Design and method: The patients were hypertensive and were assessed in the Laboratory of Kinesiology. Design included: 1) Physical Performace Test; 2) Tinetti balance and gait Scale; 3) Grip Force Measure. We studied 13 women (mean age 76 + 7) and 10 men (mean age 75 + 6) whose walking speed was < 2 (group A). They were compared with a 15 women (mean age 74 + 6) and 9 men (mean age 76 + 5) whose walking speed was > 2 (group B).

Results: 5 women and 5 men in group A had a 24 + 4 mean Tinetti score showing a low risk of fall, while 8 women and 6 men had a 14 + 5 mean score indicating a high risk of fall. In the group B 6 women and 2 men had a 25+ 3 mean score showing a low risk of fall, while 3 women and 2 men had a 16+3 mean score related to a high risk of fall. The mean grip force score was Kg 17.5 in group A and Kg. 21.0 in group B. In group A patients with a Tinetti score showing a high risk of fall we also detected significant relations between the risk of fall and the grip force score ($p<0.05$). In those subjects belonging to group B the same relation was not significant. We also found out that a minor grip force was directly linked to a higher risk of fall ($p<0.01$). Actually 89% of patients in group A had a grip force score < Kg 16 and a Tinetti score = 12 predictive of risk of fall ($p<0.5$).

Conclusions: This study detected the incidence of fall and of a reduced muscular strength in elderly people with a variability in walking speed . Thus we established a relation between the variability in walking speed , the risk of fall and the reduction of muscular strength.

PP.15.34 SEX DIFFERENCES IN ESSENTIAL HYPERTENTION

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Objective: Essential hypertension (EH) is an established cardiovascular risk factor. The influence of sex on the clinical expression and pathophysiology of arterial hypertension is under-recognized. This study sought to assess thegender differences innewly diagnosed essential hypertensive patients.

Design and method: A total of 685 consecutive newly-diagnosed, never-treated patients with EH grade 1-3 (age 52±13 year, 53.3% males) referred to the outpatient antihypertensive unit of our institution were studied in accordance to the European Society of Hypertension guidelines.

Results: Sex-specific differences in clinical, laboratoryand imaging parameters are presented in Table. Male patients compared to female were younger with higher office and 24-hour blood pressure (BP) levels but without significant differences in the dipping status. Men presented with higher BMI and were more frequently obese or overweight. Surprisingly, the prevalence of abdominal obesity was higher in women while the prevalence of metabolic syndrome and pre-diabetes was similar in the 2 groups. Males were more frequently smokers while females reported more frequently a daily consumption of fruits and vegetables.Non-significant sex-specific differences were noted considering physical activity.Men presented with higher triglycerides, lower HDL-Cholesterol and similar LDL-Cholesterol levels compare to women. There were not found any significant differences between sexes considering left ventricular mass (indexed to height2.7), carotid intima-media thickness, carotid plaques prevalence,carotid-femoral pulse wave velocityand findings from fundoscopic examination. Indices of left ventricular diastolic dysfunction such as left atrial volume index, transmitral E/A ratio and tissue Doppler imaging Em/Am ratio were significantly affected in females, despite that there was no difference as far as left ventricular diastolic dysfunction grades it concerns. Sex-specific differences were significant regarding augmentation index (adjusted for 75 beats/min)and albumin-to-creatinine ratio who were higher in females while ankle-brachial index was higher in males.

Conclusions: Newly diagnosed malehypertensive patients presents more prevalent and severe cardiovascular risk factors than females. Despite thatare younger by7 years, subclinical morphological and functional cardiovascularalterations has the same degree of involvement as in females.

PP.15.35 DETERMINANT OF AORTIC REMODELLING ASSESSED BY MRI AND TONOMETRY

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Objective: To estimate diameters and stiffness of the thoracic aorta by using cardiovascular magnetic resonance imaging (CMR) and to studies relationship between geometry and function in apparent healthy subjects.

Design and method: 137 apparent healthy subjects (56 women, 81 men mean age 40.1 ± 14.5 years) were included. Thoracic aortic length and diameters were calculated using cine-SSFP sequences from of thesinuses of Valsalva to the descending aorta. Arterial stiffness parameters (CF PWV, AIx) were assessed by carotido-femoral tonometry (CFT). Ascending aorta flow prameters and aortic arch pulse wave velocity were assessed by CMR. Aortic ascending characteristic impedance was calculated (Zci=Pi-Diastolic Pressure)/Qmax.
Relationship with Age, anthropomorphic characteristics, central blood pressure and aortic stiffness was studied.

Results: Age, male gender and BSA were the main determinants of the aortic diameters.
cDBP for the tube ($p=0.018$), aortic arch ($p=0.04$) and descending aorta ($p=0.003$); Zci for aortic arch ($p=0.001$) and descending aorta ($p=0.002$) and AIx for the junction ($p=0.001$), tube ($p=0.011$) and aortic arch ($p=0.016$) after adjustment to age sex and BSA.

Conclusions: Aortic diameters were found to be related strongly to age, BSA, sex, and weakly to Zci, AIx and cDBP.

PP.15.36 COMPARISON BETWEEN REDUCED EJECTION FRACTION AND PRESERVED EJECTION FRACTION HEART FAILURE IN THE ELDERLY

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Objective: Heart failure is a common problem in elderly people. In the elderly population, heart failure with preserved ejection fraction (HFPEF) has been increasingly recognized.
Previous reports suggested that the rate of HFPEF was up to 30-50% of all patients with heart failure and the rate of HFPEF increases according to age.
The aim of this study was to compare clinical features and clinical outcomes between HFPEF and HFREF in patients older than 65 years.

Design and method: We enrolled 30 patients over 65 years old, who were admitted for heart failure between April 2009 and February 2010. We retrospectively analysed the clinical features including laboratory data and echocardiography parameters.

Results: In 19 patients (63%) left ventricular ejection fraction was preserved. The clinical characteristics and treatment between HFPEF and HFREF showed that acute pulmonary edema (74% vs 27%) is the most frequent presentation in patients with HFPEF. Those patients have thicker left ventricular wall (68% vs 27%). The ischemic heart diseases as background disease is more frequent in HFREF (46% vs 5, 2%).
There was no difference in short-term outcomes between HFPEF and HFREF.

Conclusions: Our study has shown that more than the half of the CHF patients over 65 years of age had HFPEF. Left ventricular hypertrophy was one of the risk factors for HFPEF, and the short-term outcomes of HFPEF in this population were not different from that of HFREF.

POSTERS' SESSION

POSTERS' SESSION

ISH NEW INVESTIGATOR COMMITTEE SECTION 1: BASIC SCIENCE

PP.NIC01.01 HIGH PREVALENCE OF KCNJ5, ATP1A1 AND ATP2B3 SOMATIC MUTATIONS IN ALDOSTERONE PRODUCING ADENOMAS

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Objective: Primary aldosteronism (PA) is the most common form of secondary hypertension and aldosterone producing adenomas (APA) account for approximately 30% of all PA cases. Somatic mutations in the KCNJ5 gene, which encodes G-protein–activated inward rectifier K+ channel 4 (GIRK4) have been identified in around 40% of sporadic APAs. Recently, additional somatic mutations in ATP1A1 and ATP2B3, encoding Na+/K+-ATPase 1 and Ca2+-ATPase 3, respectively, have been reported. The objectives of the study were: to define the prevalence of KCNJ5, ATP1A1 and ATP2B3 somatic mutations in a large cohort of sporadic APAs and to identify new mutations responsible for PA in these genes.

Design and method: 112 APAs diagnosed and removed in Italian referral hypertension centers have been screened for mutations in KCNJ5, ATP1A1 and ATP2B3. Na+/K+ ATPase functional assays (ATPase activity assays, Na+ dependence of phosphorylation by MgATP and K+ inhibition of phosphorylation by MgATP) were performed in COS cells. Electrophysiological effects of Na+/K+-ATPase Gly99Arg mutation were studied in HEK293 cells by whole cell patch-clamp.

Results: Herein we report a 6.3%, 0.9%, and 39.3% prevalence of somatic mutations in ATP1A1, ATP2B3, and KCNJ5 respectively, including two novel mutations (Na+/K+-ATPase p.Gly99Arg and GIRK4 p.Trp126Arg). CYP11B2 gene expression was higher in APAs carrying ATPase mutations compared with tumors without ATP1A1, ATP2B3 or KCNJ5 mutations.
Overexpression of Na+/K+-ATPase p.Gly99Arg and GIRK4 p.Trp126Arg in HAC15 adrenal cells resulted in upregulation of CYP11B2 gene expression and its transcriptional regulator NR4A2.
Structural modeling of the Na+/K+-ATPase revealed that, in the Gly99Arg mutant, the introduction of the large positively charged arginine side-chain is likely to cause a structural alteration affecting surrounding residues including Glu334, that binds K+. In vitro functional assays demonstrated that Gly99Arg substitution severely impaired the ATPase activity and decreased Na+ and K+ binding. Moreover, whole cell patch-clamp recordings demonstrated that overexpression of Na+/K+-ATPase Gly99Arg resulted in cell membrane depolarization.

Conclusions: This study demonstrate that somatic mutations are common in APAs and may account for the dysregulation of aldosterone production in a subset of patients with sporadic primary aldosteronism.

PP.NIC01.02 GENE-SPECIFIC INACTIVATION OF THE ANGIOTENSIN II TYPE 1 RECEPTOR-ASSOCIATED PROTEIN STIMULATES RENAL SODIUM RETENTION AND EXACERBATES ANGIOTENSIN II-INDUCED HYPERTENSION

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Objective: The angiotensin II (Ang II) type 1 receptor (AT1R)-associated protein (ATRAP) is a molecule which specifically interacts with the AT1R and promotes AT1R internalization along with a suppression of pathological activation of tissue AT1R signaling. Although the endogenous ATRAP protein is abundantly expressed along the renal tubules, functional significance of ATRAP in the modulation of renal function is not fully resolved. In this study, we hypothesized that ATRAP deficiency affects renal sodium handling and BP regulation under pathological stimuli.

Design and method: We generated mice with a gene-specific disruption of ATRAP (ATRAP-KO mice). We examined the effects of chronic Ang II infusion on BP and renal sodium handling in ATRAP-KO mice and their littermate wild-type control mice (WT mice).

Results: Renal function and BP measured by a radiotelemetric method of ATRAP-KO mice were comparable to those of WT mice at baseline (systolic BP 120±2 versus 123±4, mmHg, P=0.545; diastolic BP 92±5 versus 95±4, mmHg, P=0.793). However, in ATRAP-KO mice compared with WT mice, the following took place: (1) the development of Ang II-induced hypertension was exacerbated (systolic BP, ATRAP-KO mice; 193±4 versus WT mice; 170±2, mmHg, P<0.001), (2) the extent of positive sodium balance was increased during Ang II infusion, (3) the renal expression of the major sodium transporters in proximal tubules, urinary pH which reflects sodium-hydrogen exchanger 3 (NHE3) activity in proximal tubule, and renal angiotensiongen production and Ang II content were not affected, and (4) the Ang II-induced stimulation of renal expression and activity of epithelial sodium channel (ENaC), which is a major sodium transporter in distal tubules, was significantly enhanced, and (5) the circulating and urinary aldosterone levels were comparable, and the BP response and renal ENaC expression by aldosterone infusion were not affected.

Conclusions: These results indicate that pathological overactivation of renal tubular AT1R in response to chronic Ang II infusion, which is caused by ATRAP deficiency, directly provokes ENaC activation in distal tubules to promote sodium retention in aldosterone-independent manner and to play a major role in the exacerbation of Ang II-induced hypertension.

PP.NIC01.03 MELANOCORTIN 4 RECEPTOR IN THE PARAVENTRICULAR NUCLEUS PLAYS AN ESSENTIAL ROLE IN APPETITE AND BLOOD PRESSURE REGULATION IN OFFSPRING OF OBESE MICE

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Objective: Recent unpublished evidence from our laboratory suggests that the central melanocortin system, including melanocortin 4 receptors (Mc4r), play a key role in early origins of hypertension in offspring of obese rat dams. Our aim was to manipulate the melanocortin system in mice to investigate the regional action of Mc4r on energy balance and blood pressure control in offspring of obese dams.

Design and method: We have employed a global Mc4r knockout using a Cre/LoxP approach to silence the Mc4r allele (loxTBMc4r), and Cre –recombinase to reactivate Mc4r in the paraventricular nucleus (PVN) of the hypothalamus (SimCre, loxTBMc4r). Heterozygote transgenic female mice (C57Bl6/J and 129Sv background) were fed a standard or obesogenic diet before and throughout pregnancy and during lactation. Offspring mice were weaned onto a standard diet at 3 weeks postpartum and transgenic mice distinguished using genotyping. Baseline body weight (BW), food intake (FI), energy expenditure (EE) was measured at 6 months by indirect calorimetry and mean arterial pressure (MAP) and heart rate (HR) recorded using radio-telemetry. Leptin (10 mg/kg, ip) and MTII (α-MSH agonist, 100 µl, ip) challenges were performed, and FI, EE and MAP were recorded for 6 hours.

Results: Mice homozygous for loxTBMc4r were markedly obese with greater FI and reduced EE compared to wild-type (WT). MAP and HR were similar in the loxTBMc4r mice to WT, suggesting a protective mechanism against obesity-induced hypertension. SimCre, loxTBMc4r mice showed reduced FI, with no change in EE in response to leptin compared to WT. MAP ($p<0.01$, n=6) and HR ($p<0.05$, n=6) were however increased in both WT and SimCre, loxTBMc4r following leptin and MTII challenge, thus implicating PVN Mc4r in appetite and blood pressure regulation. Offspring of obese dams showed increased BW, FI, and MAP in WT and SimCre, loxTBMc4r whilst these responses were lost in the global knockout loxTBMc4r mice.

Conclusions: Mc4r in the PVN nuclei appear to contribute to hyperphagia and sympathetic mediated hypertension secondary to maternal obesity. The data also suggest diverging sympathetic pathways controlling energy expenditure versus blood pressure at the level of the hypothalamic PVN.

PP.NIC01.04 INTERLEUKIN-1SS (IL-1SS) AND TRANSFORMING GROWTH FACTOR-SS1 (TGF-SS1) HAVE OPPOSITE ROLES ON CATHEPSIN S EXPRESSION IN HUMAN VASCULAR SMOOTH MUSCLE CELLS (VSMCS) IN VITRO

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Objective: In the intima of atherosclerosis-prone region as the carotid bifurcation, the vSMCs undergo a phenotypic modulation that confers on them migratory and elastolytic activities to escape from the media. By comparison with the elastolytic matrix metalloproteases (MMPs), the regulation of the expression of the elastase cathepsin S (CTSS), also involved in MHC class II-associated antigen presentation, is poorly understood. The inflammatory cytokine IL-1beta secreted by the macrophages or the activated endothelium takes part into the inflammatory and migratory phenotype of intimal vSMCs. In contrast, TGF-ß1, a potent immunosuppressor, is considered as an atheroprotective cytokine in the vessel wall. Here we investigated how CTSS expression is regulated by IL1-ß and TGF-ß1 in cultured human vSMCs from endarterectomy specimens.

Design and method: Confluent human vSMCs between passages 3 and 5 were transferred to medium without serum and treated for 24 h with 40 pM TGF-ß1 and 10-9 M IL-1ß either separately or simultaneously. Total RNA from treated cells was extracted with Trizol and analyzed by real-time RT-PCR for measuring the expression level of CTSS, MMP12, MMP2 MMP9 and their endogenous inhibitors (TIMP2 and CST3) as well as NOS2, a marker of inflammation. Expression levels were compared between treatments with 1-way ANOVA for repeated measures followed by Tukey post-hoc tests.

Results: TGF-ß1treatment did not significantly modify mRNA level of studied genes. In contrast, IL1-ß treatment induced large increases of mRNA level for CTSS (Expression Ratio (ER):19.9±6.4; n=12; $p<0.001$), MMP12 (ER: 82.3±69.3; n=5; $p<0.05$), NOS2 (ER: 44.3±10.3; n=6; $p<0.001$). In contrast, TIMP2 levels decreased (ER: 0.61±0.07; n=6; $p<0.01$) while MMP2, MMP9 and CST3 levels were unchanged.
Simultaneous treatment with TGFB1 and IL1-ß, significantly repressed the effect of IL1-ß alone on CTSS, TIMP2 and NOS2.

Conclusions: In conclusion, IL-1ß induces in cultured human vSMCs an inflammatory phenotype and an elastolytic activity. In contrast, TGF-ß1, which has no effect alone, exerts effects opposite to those of IL-1ß on the same phenotypic markers. Moreover, our results show the involvement of CTSS expressed by vSMCs in atherosclerotic vascular remodeling.

PP.NIC.01.05 PRESSOR RESPONSIVENESS TO ANGIOTENSIN II IN ADULT FEMALE MICE IS ENHANCED WITH AGE: ROLE OF THE ANGIOTENSIN TYPE 2 RECEPTOR

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Objective: The prevalence of hypertension increases in women post menopause. We, and others, have demonstrated that the pressor response to angiotensin II (AngII) is attenuated in adult females as compared to males. Furthermore, this response was mediated via an angiotensin type 2 receptor (AT2R) dependent pathway. We hypothesised that estrogen provides protection against AngII-induced hypertension by counter-balancing the pressor actions of the angiotensin type 1 receptor (AT1R) via an enhanced AT2R mediated pathway. A corollary of this hypothesis is that with age this pathway may no longer operate in females.

Design and method: Mean arterial pressure (MAP) was measured via telemetry in adult (20 week old) and aged (65 week old) FVB/N wild-type (WT) and AT2R knock-out (KO) female mice during baseline and 14 day infusion of vehicle (saline) or AngII (600ng/kg/min). Renal expression of the AT1R and AT2R was determined using real time RT-PCR.

Results: Basal MAP was similar between the adult females (WT 93±1 mmHg, n=13; AT2R-KO 93±1 mmHg, n=12). With age, there was no change in basal MAP (aged WT 93±1 mmHg, n=11; aged AT2R-KO 93±1 mmHg, n=14). In the 20-week old adult females, the pressor response to AngII was significantly attenuated in the WT as compared to the AT2R-KO mice (29±3 mmHg vs 10±4 mmHg, respectively on day 14, $P<0.01$). However, the pressor response to AngII was augmented in the aged WT as compared to the 20-week old adult WT mice ($P<0.01$). Consequently, the increase in MAP in response to AngII was similar between aged WT and AT2R-KO females (34±3 mmHg vs 31±4 mmHg, respectively on day 14, $P>0.05$). In WT females, ageing was associated with an increase in the renal AT1R/AT2R ratio.

Conclusions: The augmented pressor response to AngII in the aged female WT mice demonstrates that the protective role of the AT2R depressor pathway is lost with age. Loss of this mechanism may contribute to the sharp rise in arterial pressure post menopause. Consequently, targeting deficits in AT2R expression and/or signalling represents a novel therapeutic target for postmenopausal hypertension.

PP.NIC.01.06 SUSTAINED BLOOD PRESSURE LOWERING ACTIONS OF M-ATRIAL NATRIURETIC PEPTIDE: A NOVEL DESIGNER NATRIURETIC PEPTIDE IN A CHRONIC CANINE MODEL OF ANGIOTENSIN II-INDUCED HYPERTENSION

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Objective: M-Atrial Natriuretic Peptide (M-ANP) is a Mayo designed novel 40 amino-acid, particulate guanylyl cyclase (pGC) activating peptide, highly resistant to enzymatic degradation and possessing greater and more sustained beneficial actions than ANP and which is under development for resistant hypertension. Here we investigated the therapeutic potential of chronic subcutaneous (SQ) M-ANP administration in a canine model of chronic Angiotensin II (AngII)-induced hypertension.

Design and method: We induced hypertension in three male adult mongrel dogs by continuous AngII administration for 24 days via an osmotic minipump, at a dose of 80ng/kg/min, beginning 2 days after baseline assessment (total study duration: 26 days). Twenty four hour mean arterial pressure (MAP) was measured by telemetry. A metabolic cage was used for 24 hour urine collection. M-ANP was administered SQ for 5 days (10µg/kg/day), starting day 17. Data are mean±SEM. *P <0.05 vs. AngII Day 16.

Results: Chronic AngII administration resulted in a model of hypertension with MAP increasing from 112±2 to 155±4 mmHg (day 16) prior to M-ANP administration. MAP, Heart rate (HR) and urinary volume rate (UVolR) are reported below. M-ANP reduced significantly MAP and increased significantly UVolR, without changes in HR. Table reports the actions of M-ANP on MAP, UVolR and HR.

Monitored Parameters	Baseline Day 1	AngII Day 16	M-ANP Day 17	M-ANP Day 18	M-ANP Day 19	M-ANP Day 20	M-ANP Day 21	AngII Day 26
MAP (mmHg)	112±2	155±4	131±3*	132±3*	129±6*	118±5*	114±7*	143±4
HR (beats/min)	71±8	94±1	98±8	89±8	89±8	87±9	94±3	83±7
UVolR (ml/min)	0.20±0.03	0.32±0.06	0.30±0.08	0.52±0.1*	0.45±0.1*	0.48±0.1*	0.47±0.06*	0.20±0.05

Conclusions: This is the first study to report, in a canine model of experimental hypertension, that chronic subcutaneous administration of M-ANP, a novel ANP-like designer natriuretic peptide, significantly reduces blood pressure and increases diuresis, without changes in heart rate. The potent blood pressure lowering properties of M-ANP, associated with renal enhancing actions, without a secondary increase in HR, supports further studies in human hypertension.

PP.NIC01.07 THE ROLES AND MECHANISMS OF (PRO)RENIN RECEPTOR MEDIATED ENDOTHELIAL DYSFUNCTION IN HYPERTENSIVE DIABETIC PATIENTS

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Objective: To determine the role and mechanism of excessive activation of the (pro)rennin receptor [(P)RR] in inflammation, endothelial vasomotion function in hypertensive diabetic patients.

Design and method: Hypertensive diabetes mellitus (DM) patients were divided into normal renin activity (NRA, n=20) and high renin activity (HRA, n=20) subgroup, healthy people (n=20) were selected as controls. Flow mediated dilation (FMD) was preformed to evaluate the endothelial dependent vasomotor function. Plasma adhesive molecular intercellular cell adhesion molecule-1 (ICAM-1) and vascular cell adhesion molecule (VCAM), vasomotion molecular nitric oxide (NO) and endothelin-1 (ET-1) were detected. Human umbilical vein endothelial cells were cultured in hyperglycemia medium in vitro. Adhesive molecular and vasomotion molecular were detected as in patients. (P)RR expression was silenced by (P)RR small interference RNA (si-RNA) to observe its role and mechanism of endothelial cells.

Results: FMD decreased in both HRA and NRA group compared with healthy subjects, and it was even lower in NRA group with hypertension and DM compared with those in NRA group. ICAM-1, VCAM and ET-1 increased in both HRA and NRA group compared with healthy subjects, but there was no difference between them. NO descended in both HRA and NRA group, and was even lower in HRA group. Hyperglycemia activated (P)RR expression in endothelial cells leading to the upregualtion of ICAM-1, VCAM and ET-1 expression and downregulation of NO production. Hyperglycemia inhibited the expression of eNOS and provoked the synthesis of asymmetric dimethylarginine (ADMA) may explained the reason of decreased NO production. (P)RR-siRNA could significantly inhibit (P)RR in endothelial cells. Hyperglycemia inhibited the expression of eNOS and provoked the synthesis of ADMA, which could be significantly reversed by (P)RR-siRNA.

Conclusions: Hyperglycemia inhibited expression of eNOS and provoked ADMA production in turn reduced NO release in endothelial cells through the activation of (P)RR. The inhibition of (P)RR expression could reduce upregulation of ADMA and increase expression of eNOS by hyperglycemia, in turn reverse its inhibition of NO release. Moreover, this may partially explain that FMD was lowered in hypertensive diabetic patient with high renin activity.

PP.NIC01.08 CHRONIC P38 MAPK INHIBITION IMPROVES VASCULAR FUNCTION AND REMODELING IN ANGIOTENSIN II DEPENDENT HYPERTENSION

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Objective: AngiotensinII (AngII) dependent AngII-Typ1-receptor activation causes vasoconstriction and vascular injury leading to hypertension. The activation of mitogen activated protein kinase p38 (p38-MAPK) plays a substantial role in AngII dependent endorgan damage. Recently, we showed that AngII dependent p38-MAPK activation increased vasoreactivity through phosphorylation of the myosin-light-chain (MLC20). In this study, we evaluate the effect of chronic p38-MAPK inhibition in AngII dependent hypertension on vascular function and remodeling.

Design and method: C57Bl/6 mice were infused with AngII (1000ng/kg/min) for 14 days via osmotic minipump and treated either with an oral p38-MAPK inhibitor (BIRB769; 50mg/kg/day) or a placebo.

Results: Chronic p38-MAPK inhibition did not alter blood pressure at baseline but attenuated the development of AngII-dependent hypertension significantly (placebo vs. BIRB796: 120.7±2.6 vs. 121.2±3.0 (baseline); 147±4.2 vs. 133.4±2.2 (after 1 week of AngII)P<0.01; 176.3±5.2 vs. 155.7±3.2 (after 2 weeks of AngII)P<0.001; values in mmHg). Additionally,in BIRB769 treated mice a significant reduction of aortic media-to-lumen ratio after AngII infusion was observed (placebo: 0.65±0.05; BIRB796: 0.46±0.02; P<0.05). Evaluating relative expression of genes involved in aortic hypertrophy and remodeling revealed a significant down regulation of MMP1, MMP9 and fibronectin in BIRB769 treated mice (P<0.05). In these mice, vascular function was tested in the isolated perfused kidney. AngII dependent pressor was significantly attenuated in BIRB769 treated mice. NO-dependent vasorelaxation was significantly improved in BIRB769 treated compared to placebo treated hypertensive mice. To rule out the possibility that the improved vascular function to chronic p38-MAPK inhibition could be ascribed to blood pressure reduction or vascular remodeling, p38-MAPK was inhibited by SB203580 (5μM) ex vivo in the isolated perfused kidney. Acute p38-MAPK inhibition attenuated AngII-dependent pressor response similar to that seen in mice chronically treated with BIRB769.

Conclusions: In summary, chronic p38-MAPK inhibition improves blood pressure and vascular injury in AngII-dependent hypertension. These effects could be assigned to blood pressure independent effects as acute p38-MAPK inhibition improves vascular function. Thus, our findings indicate an important role of the p38-MAPK in regulating blood pressure and vascular injury and highlights its potential as a pharmaceutical target.

PP.NIC01.09 COMPUTATIONAL IDENTIFICATION OF POTENTIAL TRANSCRIPTIONAL REGULATORS OF TRANSFORMING GROWTH FACTOR BETA 1 IN HUMAN ATHEROSCLEROTIC ARTERIES

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Objective: TGF-ß ubiquitous and pleiotropic cytokine. It was often stated that TGF-ß was a double-edged sword due to its context-dependent roles. It is protective in atherosclerosis but deleterious in metastatic cancers.
Our aim was to determine whether TGF-ß transcriptional regulation is tissue-specific in early atherosclerosis.

Design and method: We used microarray expression datasets in a peculiar way. Firstly, among the genes the expression of which was positively correlated to that of TGFB1, we intentionally selected the 10 genes the most highly co-expressed with TGFB1 to increase the chance that this small cluster of highly correlated genes shared a transcriptional command. Secondly, after having identified the common binding sites of the putative transcription factors on the promoter sequences of the genes of the cluster, we returned to the microarray data to determine which transcription factors, among those shared by the gene cluster, were co-expressed with the genes of the cluster. Finally, we compared the common TFs in the early lesions to those identified in advanced atherosclerotic lesions and in various cancers.

Results: Our results show that EGR1, SP1 and KLF6 could be responsible for TGFB1 basal expression, KLF6 appearing specific to atherosclerotic lesions. Among the TFs co-expressed with the gene cluster, transcriptional activators (SLC2A4RG, MAZ) and repressors (ZBTB7A, PATZ1, ZNF263) could be involved in the fine-tuning of TGFB1 expression in atherosclerosis.

Conclusions: Our study proposes that a combination of transcription factors might specifically regulate TGFB1 expression in atherosclerosis. The basal and finely tuned levels of TGFB1 expression could be regulated by the transcription factors respectively not co-expressed and co-expressed with the gene cluster.

PP.NIC01.10 IMPROVEMENT OF BRAIN MICROCIRCULATION INDUCED BY CENTRAL SYMPATHETIC NERVOUS SYSTEM MODULATION IN OBESE RATS WITH METABOLIC SYNDROME

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Objective: Cardiovascular and metabolic risk factors that characterize the metabolic syndrome (MS) are accompanied by sympathetic hyperactivity. In this study, we investigated the effects of a chronic oral treatment using centrally-acting sympatho-inhibitory drugs, clonidine or a selective I1-imidazoline agonist LNP599, on the brain microvascular function in rats under long-term high-fat diet.

Design and method: Fifty male Wistar rats were maintained under normal diet (CON, n=10) or high-fat diet (HFD, n=40) during 20 weeks. Thereafter, the HFD group received oral clonidine (HFD+CLO, 0.1 mg/kg), LNP599 (HFD+LNP599, 20 mg/kg) or vehicle (HFD). Systolic blood pressure (SBP) was evaluated by photo-plethysmography during the long-term treatment and the cerebral microcirculation flow was evaluated by laser speckle contrast imaging and the brain functional capillary density and endothelial-leukocyte interactions were evaluated by intravital videomicroscopy. Topic administration of acethylcholine (Ach, 100 μM) on the cranial window was used to assess the brain microvascular function.

Results: The HFD group presented a decreased blood perfusion in the brain (163±25 APU, arbitrary perfusion units) compared to control group (239±14 APU). Chronic treatment with both clonidine and LNP599 lowered SBP to control values and increased blood flow perfusion (HFD+CLO: 185±30 APU and HFD+LNP599: 190±29 APU) when compared to HFD group ($p<0.05$). Endothetial-dependent vasodilator response to Ach was significantly increased in HFD+CLO group (25 % from baseline) and in HFD+LNP599 group (5% from baseline) while on the non-treated group we observed a vasoconstrictor effect (-1.3% from baseline). HFD group presented a marked brain functional capillary rarefaction (117±11 capillaries/mm²) which was reversed to control group values by clonidine and LNP599 treatment (326±51 and 378±31 capillaries/mm², respectively). Clonidine and LNP599 treatments were able to significantly reduce the number of rolling of leukocytes (HFD+CLO: 4±0.5 cells/min; $p<0.05$ or HFD+LNP599: 4.3±1 cells/min; $p<0.05$, vs. HFD: 12±0.5 cells/min).

Conclusions: These results suggest that the modulation of central sympathetic activity results in a reduction of SBP accompanied by a reversion of capillary rarefaction and improvement of blood flow and endothelial microvascular function in the brain of rats with metabolic syndrome. The treatments also reduced microvascular endothelium/leukocyte interactions suggesting reduced vascular inflammation involved in MS.

POSTERS' SESSION

ISH NEW INVESTIGATOR COMMITTEE SECTION 2: CLINICAL SCIENCE

PP.NIC02.01 THE AGE DEPENDENT ASSOCIATION BETWEEN AORTIC PULSE WAVE VELOCITY AND TELOMERE LENGTH

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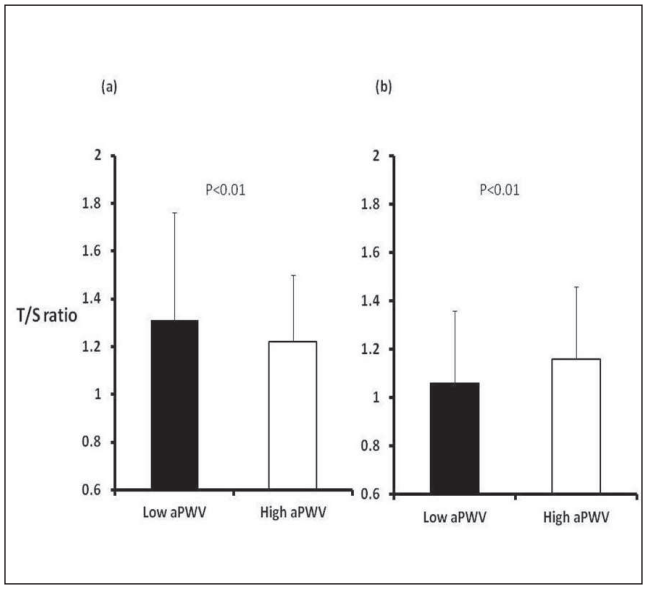
Objective: With aging, the arteries stiffen as a consequence of elastin degradation and vascular remodelling, which in turn leads to an increase in aortic pulse wave velocity (aPWV). Recently, telomere shortening, which is being increasingly regarded as a marker of biological ageing, has been linked to vascular stiffness. However, the existing studies have been inconsistent and based on relatively small sample sizes. Therefore, in order to clarify the connection between TL and increased vascular stiffness, we investigated TL in a large number of well–characterised, healthy adults, pre-selected on the basis of having either low or high aPWV.

Design and method: Data on 939 men and women, where information concerning demographic, haemodynamic and biochemical characteristics was complete, were drawn from the Anglo-Cardiff Collaborative Trial. Two age groups were examined: those <30 years (younger) or >50 years (older). Within each age-group, aPWV was firstly adjusted for the confounding influence of mean arterial pressure (MAP) and then TL was compared between those in the highest versus lowest quintile of aPWV. TL was measured in triplicate by a monochrome multiplex q-PCR assay using a Bio-Rad CFX96 Real-Time PCR Detection System (Bio-Rad, Hemel Hampstead, UK) and data presented as T/S ratio.

Results: The average age, MAP, aPWV and T/S ratio was 20±3years, 81±9mmHg, 5.7±1.2m/sec and 1.27±0.38 (younger), and 68±7years, 100±12mmHg, 9.4±3.0m/sec and 1.11±0.31 (older), respectively. In the younger group, T/S ratio was significantly lower in those with high aPWV group compared to those with low aPWV. In contrast, in older subjects, T/S ratio was significantly higher in those with high aPWV compared to those with low aPWV (figure).

Conclusions: The demonstration of significantly shorter TL in young individuals with high aPWV suggests a strong genetic influence linking telomere shortening and increased aPWV in these subjects. In contrast, in older adults, the significantly longer TL in subjects with high versus low aPWV suggests that additional effects of life-course environmental exposures may be influencing the association between TL and aPWV.

Figure. Difference in T/S ratio between Low aPWV and High aPWV groups, in the younger cohort (a) and the older cohort (b).



PP.NIC02.02 ARTERIAL COMPLIANCE IS THE MAIN DETERMINANT OF SYSTOLIC CENTRAL BLOOD PRESSURE AND CENTRAL PULSE PRESSURE IN YOUNG HYPERTENSIVES

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Objective: Increased pulse wave velocity results in premature arrival of reflected waves increasing pulse pressure. The interaction between the primary components of the Windkessel hemodynamic model (i.e, total arterial elastance) and the pulse wave transmission model as determinant of central systolic blood pressure (cSBP) and central pulse pressure (cPP) in young hypertensives is not know.

Design and method: We included patients of the Enigma Study1, a study performed in 1668 healthy university students from the UK. Office BP and heart rate (HR) were measured with an oscillometric device and pulse wave analysis was performed to estimate central blood pressure (cBP), augmentation index (Aix) and mean arterial pressure (MAP). Carotid to femoral pulse wave velocity (cfPWV) was determined. Stroke volume (SV) was measured non-invasively using a mixed gas rebreathing process with a photoacustic infrared sensor for the expired gases (InnoCor; Innovision A/S).
The ratio of SV to cPP (SV/cPP) was used as measure of arterial compliance (Arterial Compliance Index, ACI).
We selected only hypertensives patients.
The determinants coefficients (R^2), regression coefficients (β) and standardized coefficient (sβ) was calculated in multiple linear regression models (cPP and cSBP as dependent; cfPWV, SV, ACI, MAP and gender as independent).

Results: A total of 156 hypertensives were included, 109 (70%) males, 28 years old (18-40 y), table shows the clinical and hemodynamics characteristics according cPP tertils.
The main determinants of cPP on regression model (R^2 0.93±2; p<0.001) was ACI (sβ= 1.2; p<0.001), followed by SV (sβ=1.08; p<0.001). Gender (female) had a little effect in this model. There was no involvement of the cfPWV as determining cPP in this model adjusted for MAP (p=0.34).
The same variables, ACI and SV, which together with the steady component (MAP) represent 98% of the variability in cSBP (R^2 0.98±0,01; p<0.001). The gender and cfPWV were not involved in determining the cSBP (p>0,05).

Table.- Patients characteristics according cPP tertiles

	Low cPP	*Intermediate cPP*	*High cPP*	*p*
n (156)	52	52	52	
Age (y)	26.7±7.4	26.6±6.8	30±6.6	**<0.05**
Gender (male %)	53.8	78.8	80.8	**<0.01**
Height (m)	1.72±0.1	1.75±0.1	1.74±0.1	0.33
BMI	26.8±5.4	26.2±3.3	26.2±3.9	0.7
Smoker (%)	28.8	19.2	30.7	0.9
Office SBP (mmHg)	134.1±10	143.1±7.6	156.1±12.5	**<0.001**
Office DBP (mmHg)	98±7	96.9±7.1	96.6±6.5	0.52
HR (beats per min)	78.7±10.4	77.2±13	68,6±12	**<0.001**
cSBP (mmHg)	121.5±8.4	127.4±7.7	136.9±11	**<0.001**
cDBP (mmHg)	99.1±6.9	98.3±7,2	97.7±6.8	0.53
cPP (mmHg)	22.4±3.6	29.1±1.8	39.2±6.1	**<0.001**
CI ($L/m^2/min$)	3.8±0.8	4.2±0.9	4.2±1	0.12
SV (ml)	90.7±25.8	105.9±34	109.2(31.4)	**<0.05**
SVI (ml/m^2)	47.7±11.2	53.9±15.7	56.5±16.7	**<0.03**
PVRI (dyne.sec. $cm^{-5}.m^{-2}$)	682±276.6	599.6±202.2	619.6±254.4	0.34
cfPWV (m/s)	6.5±0.9	6.7±1.1	7.1±1.1	0.32
Aix	8.7±12.6	9.1±14.8	17.5±13.9	0.07
ACI (ml/mmHg)	3.95±1.3	3.65±1.2	2,77±0,8	**<0.001**

Conclusions: In young hypertensive patients, cSBP and cPP are mainly associated with components of Windkessel hemodynamic model (compliance and stroke volume) without involvement of pulse wave velocity.

PP.NIC02.03 ANTIHYPERTENSIVE COMBINATION-THERAPY MAY HAVE BENEFITS ON LEFT VENTRICULAR MASS BEYOND BLOOD PRESSURE MAINTENANCE USING MONO-THERAPY

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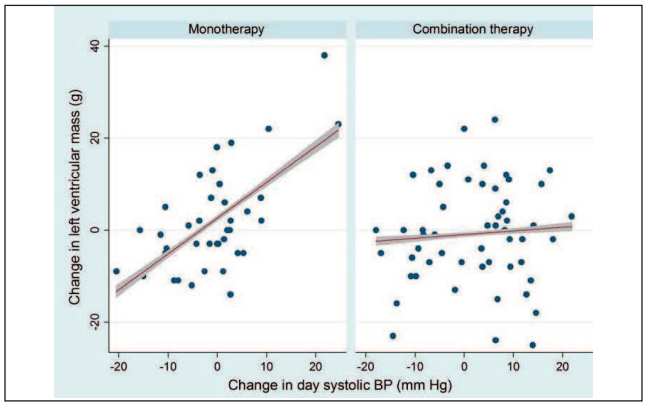
Objective: There is a growing call to initiate antihypertensive treatment with combination-therapy to control blood pressure (BP) and reduce cardiovascular risk, but there are limited data on the clinical effects of this approach compared with mono-therapy for patients with hypertension. The aim of this study was to investigate the effect of antihypertensive mono-therapy versus combination-therapy on end organ damage associated with hypertension (left ventricular mass; LVmass).

Design and method: 24-hour ambulatory BP and three-dimensional echocardiographic LVmass were measured at baseline and 12 months in 91 patients with uncomplicated hypertension (aged 64±7, males 47%) who were on stable mono-therapy (n=37; with either angiotensin converting enzyme inhibitors, ACEi, or angiotensin receptor blockers, ARBs) or combination-therapy (n=54; with ACEi or ARBs combined with other drugs). Changes in BP and LVmass were calculated by the difference between baseline and 12 months. Linear regression methods were used to estimate relationships between variables.

Results: There were no significant differences in age or body mass index between patients on mono-therapy compared with combination-therapy. The change in daytime ambulatory systolic BP was not significantly different between groups over time (-0.6±9.1 versus 2.3±9.9 mmHg, P=0.27). The change in LVmass was also not significant between groups over time (0.6±2.5 versus -0.1±2.7 g, P=0.27). Changes in daytime ambulatory systolic BP were more strongly related to changes in LVmass for patients taking mono-therapy (r=0.63, β=0.77, P<0.001) than for those on combination-therapy (r=0.07, β=0.08, P=0.59) with a statistically significant difference in slopes (β=-0.73, P=0.007 Figure). The relationship for the patients on mono-therapy was little changed by adjustment for age, body mass index, sex or drug dose (β=0.78; P<0.001) and the difference in slopes remained statistically significant (P=0.003).

Conclusions: Although mono-therapy may adequately control BP over time, combination-therapy may have added benefits regarding maintenance of LV mass. These findings suggest that combination antihypertensive therapy may be superior to mono-therapy for maintaining lower cardiovascular risk in patients with uncomplicated hypertension.



PP.NIC02.04 ANALYSIS OF RETINAL MICROPERFUSION AND ARTERIOLAR STRUCTURE IN PATIENTS WITH PHEOCHROMOCYTOMA

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Objective: It has been shown that retinal arteriolar structure might serve as an in-vivo parameter of vascular damage in patients with essential hypertension. However, retinal arteriolar structure has not been evaluated in patients with secondary hypertension. In the ongoing study we analyzed retinal arteriolar structure in patients with pheochromocytoma, a form of secondary hypertension characterized by excessive catecholamine secretion as compared with patients with essential hypertension.

	AD (µm)	LD (µm)	WT (µm)	WLR	WCSA (µm2)	RCF (AU)
Pheo	109.6±17.1	77.6±8.7	16.0±5.6	0.41±0.13	4869±2207	286±69
EHT	98.1±10.4	73.1±6.6	12.5±3.3	0.34±0.09	3423±1117	293±51
p	0.017	0.082	0.026	0.079	0.017	0.74

Design and method: We examined 19 patients with pheochromocytoma (age 45.5±11.7 years, 12 F, 7 M) and 19 age, gender, body mass index, glycemic status and blood pressure (BP) levels and number of hypertensive medication matched (p>0.05) patients (age 47.6±11.4 years, 12 F, 7 M) with essential hypertension (EHT). In all patients evaluation of plasma free normetanephrine (NMN) and metanephrine (MN) concentrations by liquid chromatography with tandem mass spectrometry was performed. Diagnosis of pheochromocytoma was confirmed on pathological examination. Retinal microperfusion (RCF) and retinal arterioles were assessed using scanning laser Doppler flowmetry (SLDF). The parameters of retinal morphology: outer diameter (AD), lumen diameter (LD), wall/lumen ratio (WLR), wall thickness (WT), and wall cross-sectional area (WCSA) were determined by automatic full-field perfusion imaging analysis (AFFPIA V.4.011).

Results: Patients with pheochromocytoma were characterized by higher AD, WT and WCSA as compared with EHT (Table). A tendency towards higher LD and WLR in patients with pheochromocytoma as compared to EHT was also noted (Table). There was no difference in RCF between patients with pheochromocytoma and EHT. There were no correlations between free plasma NMN and MN levels nor ambulatory or office BP and parameters of retinal arteriolar structure in Pheo and EHT groups.

Conclusions: Patients with pheochromocytoma compared to matched EHT patients are characterized by higher outer wall diameter, higher wall thickness and higher wall cross-sectional area of retinal arterioles. This may indicate potential relationship between deleterious effect of high catecholamine levels and changes in retinal arterioles.

Abstract PP.NIC 02.06 – Table.

	Aliskiren	Ramipril		Aliskiren	Ramipril
Systolic blood pressure mm Hg			Diastolic blood pressure mm Hg		
Basal	153±8.9	151±10.6	Basal	94.2±7.17	84.7±12.22
After treatment	128±7.3 ***	121±12.1 **	After treatment	81.4±6.31 **	78.6±7.48
SUBCUTANEOUS RESISTANCE ARTERIES			RETINAL ARTERIOLES		
M/L			Wall to lumen ratio		
Basal	9.2±2.16	9.31±1.61	Basal	0.43±0.10	0.36±0.047
After treatment	8.37±1.90**	8.86±1.54	After treatment	0.19±0.11*	0.19±0.08*
Media thickness (μm)			Wall thickness (μm)		
Basal	20.55±3.60	22.36±8.81	Basal	12.08±3.99	9.32±0.92
After treatment	18.11±4.32	21.90±5.76	After treatment	7.35±5.36	7.82±3.21
Internal diameter (μm)			Inner diameter (μm)		
Basal	230.65±49.93	247.82±108.93	Basal	55.00±5.77	51.57 ± 5.71
After treatment	221.86±58.56	246.41±47.81	After treatment	76.17±18.17	82.50 ± 16.20*
Media cross sectional area (μm^2)			Wall cross sectional area (μm^2)		
Basal	16426±5565	21578±19794	Basal	2630.08 ± 1221.63	1794.66 ± 305.55
After treatment	14039±5729	19146±8574	After treatment	2110.40 ± 1973.95	2292.13 ± 1116.97

PP.NIC02.05 DOES ARTERIAL STIFFNESS AND PLASMA RENIN ACTIVITY EVALUATION REVEAL INDEPENDENT TYPES OF UNTREATED ARTERIAL HYPERTENSION?

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Objective: To test K.Kario hypothesis (J Am S Hypertens 2010; 4(5):215–218) that predominant arterial stiffness (AS) and volume-dependent (V) types of arterial hypertension may exist and thus evaluation of arterial stiffness and volume-dependency status may help to choice between a calcium channel blocker (as anti-stiffness drug) and a diuretic (as anti-volume drug) to achieve blood pressure (BP) control.

Design and method: Pulse wave velocity (PWV, SphygmoCor, AtCor, Australia) and plasma renin activity (PRA, radioimmune assay) were measured in 124 (48 men) untreated hypertensive patients aged 50-65 years (mean 59,6±5,1 years) with GFR CKD-EPI >60 ml/min/1,73 m2. Patients with established cardiovascular disease or diabetes mellitus were not included into the study. To avoid influence of age and BP results of PWV were interpreted according Arterial Stiffness Collaboration Normal Values. AS-type of arterial hypertension was diagnosed if PWV exceeded the mean value for age and BP category (Boutouyrie P., Vermeersch S.J. Eur Heart J 2010;31:2338–2350). Patients with PRA <0,65 ng/ml/h were considered as having V-type arterial hypertension, with PRA >0,65 ng/ml/h - as having renin-dependent (R) type arterial hypertension.

Results: V-type arterial hypertension was found in 57,3%, R-type - in 42,7%, AS-type in 47,6% patients. Isolated types of arterial hypertension (without elevation of PWV) were observed in 52,4%, and isolated R-type was more prevalent (38,7%) than isolated V-type (13,7%). AS+V-type was found in 43,6%, AS+R-type - in 4,0%. It means that 76,1% of patients with V-type arterial hypertension had elevated PWV and 91,5% of patients with increased arterial stiffness are volume-dependent. Multifactor analysis failed to reveal independent predictors of isolated or mixed types of arterial hypertension, but independent correlation between PRA and PWV (β=-0,45, p<0,001) and pulse pressure amplification (β=0,76, p<0,001) was found.

Conclusions: Significant over-lap in arterial stiffness and volume-dependent types of arterial hypertension agues against possibility of differential choice between a calcium channel blocker and a diuretic for BP lowering guided by evaluation of PWV and PRA. The results suggest that antihypertensive drugs with impact on both mechanisms of BP elevation (either arterial stiffness or volume factor) may be beneficial in terms of BP control.

PP.NIC02.06 EFFECTS OF A LONG-TERM TREATMENT WITH ALISKIREN OR RAMIPRIL ON STRUCTURAL ALTERATIONS OF SUBCUTANEOUS SMALL RESISTANCE ARTERIES OF DIABETIC HYPERTENSIVE PATIENTS

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Objective: Structural alterations of subcutaneous small resistance arteries are associated with a worse clinical prognosis in hypertension and non-insulin dependent diabetes mellitus (NIDDM). The effects of the direct renin inhibitor aliskiren on microvascular structure were never previously evaluated. Therefore, we investigated the effects of aliskiren in comparison with those of an extensively used ACE inhibitor, ramipril, on subcutaneous small resistance artery morphology, retinal arteriolar structure and capillary density in a population of patients with NIDDM.

Design and method: Sixteen patients with mild essential hypertension and with a previous diagnosis of NIDDM, were included in the study. Patients were then randomized to one of the two active treatments (aliskiren 150 mg once daily, n=9 or ramipril, 5 mg once daily, n=7). The dose of the drugs was up-titrated, and hydrochlorotiazide was added if target blood pressure was not reached (130/85 mm Hg). Each patient underwent a biopsy of the subcutaneous fat from the gluteal region, an evaluation of retinal artery morphology (Scanning Laser Doppler Flowmetry) and capillary density (capillaroscopy), at baseline and after 1 year of treatment. Subcutaneous small arteries were dissected and mounted on a pressurized micromyograph and the media to internal lumen ratio was evaluated.

Results: Results are reported in the Table and expressed as mean±standard deviation (*=p<0.05, **=p<0.01, and **=p<0.001 vs basal). A similar blood pressure lowering effect and a similar reduction of the wall to lumen ratio of retinal arterioles were observed with the two drugs. Aliskiren significantly reduced media to lumen ratio of subcutaneous small resistance arteries whereas ramipril-

induced reduction of media to lumen ratio was not statistically significant. No relevant effect on capillary density was observed.

Conclusions: Treatment with aliskiren or ramipril was associated with a correction of microvascular structural alterations in patients with NIDDM. Aliskiren, but not ramipril, seems to significantly reduce the media to lumen ratio of subcutaneous small resistance arteries.

PP.NIC 02.07 VASCULAR REMODELING PREDICTIVE VALUE OF A NEW INDEX INTEGRATING CIRCADIAN VARIATION OF MEDIAN BLOOD PRESSURE AND HEART RATE NOCTURNAL DROP

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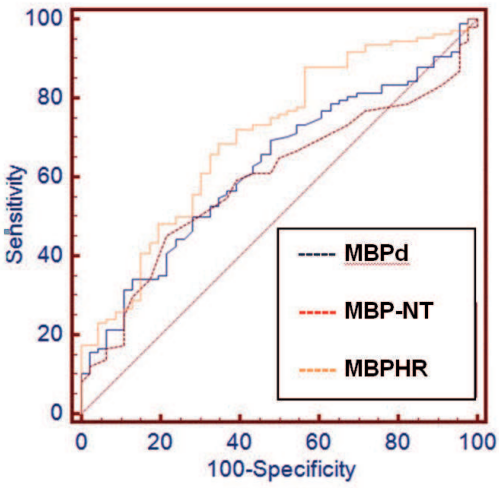
Objective: Circadian and nocturnal blood pressure (BP) and heart rate (HR) behaviors have been reported to be associated with cardiovascular risk and vascular remodeling (VR) (subclinical atherosclerosis). However, VR impact of HR variability or its nocturnal drop has not been widely explored. Our hypothesis proposed that identifying the HR nocturnal variability or day to night drop, could increase predictive value to those provided from nocturnal median BP. To establish whether the night-time drop of the heart rate (HRd) adds information to the median blood pressure (MBP) to predict VR.



MBPd ~ MBPHR	
Difference between areas	0,0763
Standard Error	0,0352
95% Confidence interval	0,00739 to 0,145
z statistic	2,17
Significance level	P= 0,0300
MBP-NT ~ MBPHR	
Difference between areas	0,108
Standard Error	0,0503
95% Confidence interval	0,00934 to 0,207
z statistic	2,146
Significance level	P=0,0319

Design and method: We evaluated 200 consecutive patients who attended to the Arterial Hypertension Centre of the Austral Hospital (January 2012-May 2013). After applying the established exclusion criteria 150 patients were included in the trial (67% male, 50±10 years, BMI 28± 4.5, 76% hypertensive patients with a MBP 99±9 mmHg). All patients underwent anthropometric measurements, ambulatory blood pressure monitoring (Spacelab Mod. 90.270), carotid ultrasound to determine the intima media thickness (IMT) and the presence of asymptomatic atherosclerosis in carotid and femoral arteries (Esaote My Lab 40). We defined VR as an IMT > 0.9 mm and/or the presence of plaques. We evaluated the capacity to predict VR of the night-time drop of the median blood pressure (MBPd) (%) and the night-time median blood pressure (MBP-NT), and we develop a new index (named: MBPHR) by including MBPd and the HRd in % (MBPd+HRd/2). ROC curve was used to compare different prognostic variables and their predictive value.

Results: We evaluated the sensibility (S) and specificity (E) of the MBPd, MBP-NT and MBPHR to predict VR. The under the curve areas where 0,62, 0,59 y 0,70 respectively. The MBPHR index showed to have a 68.5% S and a 65.2% E (figure).

Conclusions: The HRd adds information to the MBP to predict VR. Consequently, the new index MBPHR shows a higher VR predictive value than the MBPd and the MBP-NT, suggesting it could offer more accuracy than isolated BP autonomic response. This could be probably related to autonomic response or other factors beyond BP increased.

PP.NIC 02.08 POLYCYSTIN DEFICIENCY RESULTS IN LOSS OF NITRIC OXIDE SYNTHESIS DURING SUSTAINED FLOW-MEDIATED DILATATION OF CONDUIT ARTERIES IN AUTOSOMAL DOMINANT POLYCYSTIC KIDNEY DISEASE

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Objective: Autosomal dominant polycystic kidney disease (ADPKD) is a renal hereditary disorder associated with increased cardiovascular mortality, due to mutations in polycystin-1 and polycystin-2 genes. Endothelial polycystin-deficient cells have an altered mechanosensitivity to fluid shear stress and subsequent deficit in calcium-induced nitric oxide (NO) release, and these abnormalities are prevented by dopamine receptor stimulation in vitro. However, the impact of polycystin deficiency on endothelium-derived factor release during flow variations in conduit arteries and the vascular effects of dopamine in ADPKD patients are unknown.

Design and method: Endothelium-dependent flow-mediated dilatation was assessed in 21 normotensive ADPKD patients with normal kidney function and 21 healthy control subjects, during a sustained (hand skin heating from 34 to 44°C) and transient (post-ischemic hyperemia) flow stimulation. Local blood samples were drawn during heating to quantify plasma nitrite, indicator of NO availability, epoxyeicosatrienoic acids (EETs) and endothelin-1.

Results: Basal characteristics, inflammatory and oxidative stress markers were similar between groups. Flow-mediated dilatation was lower in ADPKD patients than in controls during heating (16.1±1.1 vs 23.2±1.0%, p<0.001) but not during post-ischemic hyperemia, without change in endothelium-independent dilatation to glyceryl trinitrate. The decreased flow-mediated dilatation during heating was confirmed by the marked downward shift of the slope of the diameter–mean wall shear stress relationship in ADPKD patients (Figure 1). Plasma nitrite increased during heating in controls but not in patients (30±10 vs. -16±8 nmol/L, p<0.001), without significant difference between groups for plasma EET and endothelin-1 variation. Brachial infusion of dopamine (0.25-0.5 µg/kg/min) during heating induced a dose-dependent upward shift of the diameter-shear stress relationship in ADPKD patients and restoration of NO release.

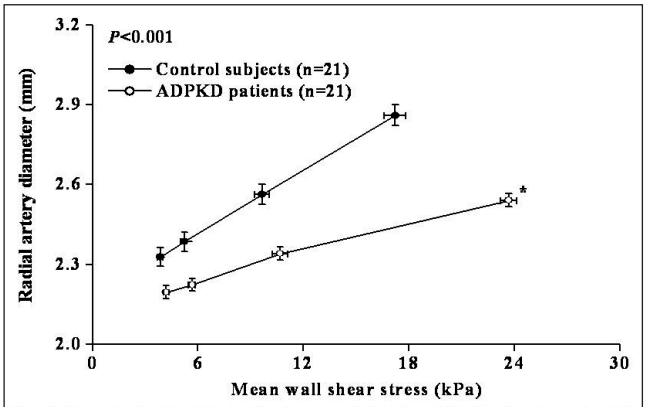

Figure 1. Line graphs show the radial artery diameter-mean wall shear stress relationship obtained during hand skin heating in autosomal dominant polycystic kidney disease (ADPKD) patients and in control subjects. There was a downward shift of this relation in ADPKD patients compared with controls. *P<0.05 *vs.* control subjects.

Conclusions: ADPKD patients display a loss of NO release and associated reduction in endothelium-dependent dilatation of conduit arteries during sustained

flow increase. The prevention of these alterations by dopamine could reduce the prevalence of cardiovascular diseases in ADPKD.

PP.NIC02.09 PLASMA COPEPTIN, THE C-TERMINAL PORTION OF VASOPRESSIN, IS INCREASED IN PATIENTS WITH PRIMARY ALDOSTERONISM

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Objective: The pathophysiological role of vasopressin in primary aldosteronism (PA) remains debated. Copeptin is the C terminal portion of provasopressin, the vasopressin precursor. Plasma copeptin concentration (PCop) is a reliable marker of vasopressin secretion in both acute and chronic settings.
We compared PCop in hormonogically proven patients with PA to those measured in healthy normotensive controls (NT) and essential hypertensive (EH) patients.

Design and method: This cross-sectional study included 108 NT, 20 patients with EH and 31 patients with PA maintained on a free NaCl intake. Blood was sampled at 09:00 in fasting conditions after 1 hour rest in semi-recumbent position. PA and EH patients were treated if needed with antihypertensive medications that did not interfere with the renin-angiotensin-aldosterone system. Plasma renin (PRC, IRMA) and aldosterone (PAC, RIA) and PCop (LIA) concentrations were measured using commercially available kits. PA was defined by a PRC/PAC ratio>64 pmol/mU + supine PAC>500 pmol/l.

Results: There was no significant difference in ages between the 3 groups, but PA patients had a significantly higher BMI than both NT and EH. Office BP was higher in EH and PA patients compared to NT as expected. PA patients had lower PRC, higher PAC and PAC/PRC ratio and lower plasma K concentration than NT and EH. PA patients had a slightly higher plasma Na concentration than NT. PCop was significantly higher in PA patients than NT. PCop was higher in PA than EH but the difference was not significant. PCop did not significantly differ between EH and NT.

	NT (n=108)	EH (n=20)	PA (n=31)
Men, n	55 (51%)	13 (65%)	21 (68%)
Age, years	47 [34-61]	43 [32-57]	47 [40-51]
BMI, kg/m²	24.1 [21.7-26.0]	24.9 [23.3-25.9]	27.6 [25.0-30.1]***††
SBP, mmHg	124 [116-134]	139 [131-144]***	145 [136-155]***
DBP, mmHg	72 [66-80]	89 [85-96]***	92 [85-98]***
Plasma Na, mmol/l	140 [139-141]	140 [139-141]	141 [140-143]*
Plasma K, mmol/l	4.0 [3.8-4.3]	3.8 [3.6-4.0]**	3.3 [3.0-3.7]***†††
PRC, mU/l	17 [11-22]	13 [7-21]	4 [2-6]***††
PAC, pmol/l	135 [79-199]	126 [99-199]	671 [543-842]***†††
PAC/PRC ratio, pmol/mU	9 [5-12]	12 [5-19]	113 [98-157]***†††
PCop, fmol/ml	4.1 [2.7-6.9]	5.7 [3.6-7.9]	8.5 [5.1-11.4]***

Data are median [interquartile range]. *: p<0.05 for EH vs NT or PA vs NT; **: p<0.01; ***: p<0.001. †: p<0.05 for PA vs EH ; ††: p<0.01; †††: p<0.001

Conclusions: PCop is significantly increased in patients with PA compared to NT, indicating a chronic increase in vasopressin release. The increase in PCop was unexpected in PA which is characterized by increased plasma volume and total body water. It could be explained by a different osmotic stimulus since plasma Na is higher in PA than in NT. However, the full mechanism of the stimulation of vasopressin release and its pathophysiological implication in PA deserve further study.

PP.NIC02.10 LEVELS OF CIRCULATING ENDOTHELIAL PROGENITOR CELLS IN HYPERTENSIVE PATIENTS AT HIGH/VERY HIGH CARDIOVASCULAR RISK COMPARED TO A CONTROL GROUP

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Objective: Many patients properly treated and with good control of their cardiovascular risk factors (CVRF) have cardiovascular complications, suggesting the possible existence of unidentified risk factors.
Each day becomes more important the fundamental role of circulating endothelial progenitor cells (EPCs), in the maintenance of vascular homeostasis. In fact, some studies suggest that the number/function of these cells may reflect the endogenous repair capacity of the vessel.
To study the levels of circulating EPCs in hypertensive patients at high/very high cardiovascular risk compared with a group of patients with no CVRF.

Design and method: A cross-sectional study in a cohort of patients attending the Hypertension Unit .Hospital Clínico. Madrid. We determined: Brachial and central blood pressure, body mass index (BMI), heart rate (HR), and a sample of blood was drawn for fasting assessment of glucose, lipid and renal profile and high sensitivity C-reactive protein (HS-CRP), and the number of EPCs [measured as CD34+/KDR+ cells, CD34+/CD144+ (VE-cadherin) or CD14 +/CD105+ (endoglin)] by flow cytometry.

Results: We studied 108 hypertensives (52.8% women), aged 61±12 years-old. 67.6% dyslipidemic, 31.5% diabetic, 14.8% smokers and 17.6% had heart disease. All patients were treated with good control of clinical and biochemical variables (Brachial SBP/DBP 129±19/75±12 mmHg, central SBP/DBP 118±21/76±12 mmHg, HR 74±12 bpm, BMI 30.03±4.7 Kg/m2, fasting glucose: 111±24 mg/dL, HbA1c: 6.12±0.72%, total cholesterol: 184±35 mg/dL, HDL-c: 55.8±15.1 mg/dL, LDL-c 103±30 mg/dL, triglycerides 115 (CI 91-156) mg/dL, creatinine: 0.98±0.19 mg/dL, creatinine clearance: 106±33 ml/min, cystatin C: 0.78±0.15 mg/L]. The HS-CRP remains high [0.37 (IC:0.24-0.65) mg/dL].
Biochemical parameters did not differ significantly from the values of the control group without CVRF, hypertensive patients showed significantly lower levels of CD34+/KDR+ [0.01 (CI:0.01-0.03) vs 0.08 (0.04-0.14)], CD34+/VE-cadherin+ [0.04 (CI:0.02-0.08) vs 0.07 (0.04-0.11)], and higher CD14+/endoglin+ [5.7 (CI:3.8-10.6) vs 3.2 (1.7-5.1)%].

Conclusions: Despite of an optimal control of high/very high CVR patients, EPCs levels persist altered, and may be partly responsible for the increased CVR. It is possible that these cells may serve as markers of CVR, as well as a possible line of therapeutic approach in these patients.

POSTERS' SESSION

ISH NEW INVESTIGATOR COMMITTEE SECTION 3: POPULATION SCIENCE

PP.NIC03.01 PROGNOSTIC SIGNIFICANCE OF VISIT-TO-VISIT BLOOD PRESSURE VARIABILITY: A META-ANALYSIS OF 80,622 SUBJECTS

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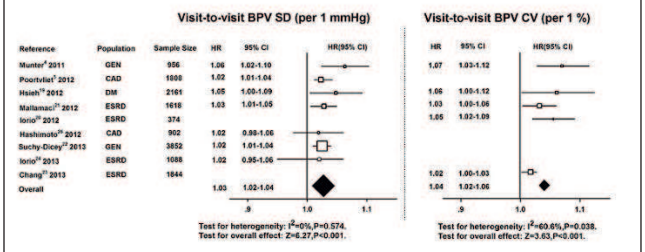
Objective: To calculate robust quantitative estimates of the predictive value of visit-to-visit BPV, in different settings, for cardiovascular events and all-cause mortality, by meta-analysis of prospective studies.

Figure.1 Forest Plot of HR of Visit-to-Visit BPV SD and CV with All-Cause Mortality



Association of cardiovascular events and mortality with visit-to-visit blood pressure variability

Outcomes	SD (per 1 mmHg)			CV (per 1%)			VIM (per 1 unit)			ARV (per 1-mmHg)		
	n	HR	95%CI	n	HR	95%CI	n	HR	95%CI	n	HR	95%CI
All-cause Mortality	7	1.03	(1.02-1.04)‡	5	1.04	(1.02-1.06) ‡	2	1.02	(0.98-1.07)	2	1.03	(1.00-1.05)*
Cardiovascular Mortality	3	1.09	(1.00-1.18)*	2	1.01	(0.99-1.03)	2	1.06	(1.02-1.10)*	2	1.05	(1.01-1.09) †
Cardiovascular Events	1	1.08	(1.02-1.15)	2	1.05	(1.00-1.10)*	1	1.02	(0.99-1.05)	1	1.04	(0.99-1.09)
Stroke	3	1.02	(1.01-1.04) ‡	-	-	-	2	1.05	(1.00-1.09)*	2	1.04	(1.00-1.07)*

Data were pooled HRs.
SD, standard deviation; CV, coefficient of variation; VIM, variability independent of the mean; ARV, average real variability; n, numbers of included studies;
*P≤0.05; †P≤0.01; ‡P≤0.001.

Design and method: Visit-to-visit blood pressure variability (BPV) was proven in some clinical investigations, as a strong predictor of cardiovascular events and all-cause mortality, independent of mean blood pressure (BP), but inconsistent results exist in this field, especially when this long-term BPV was assessed by different parameters in various populations.We performed a meta-analysis of 15 longitudinal studies that evaluated the predictive value of visit-to-visit BPV for cardiovascular events and all-cause mortality in BP standard deviation (SD), coefficient of variation (CV), variability independent of the mean (VIM) or average real variability (ARV), involving 80,622 subjects with a mean follow-up of 6.2 years.

Results: The pooled age- and mean BP- adjusted hazard ratios (HRs) of all-cause mortality were 1.03(95%confidence interval(CI) 1.02-1.04) per 1 mmHg in BP SD and 1.04(95%CI 1.02-1.06) per 1% in BP CV, and the corresponding values of cardiovascular mortality were 1.09(1.00-1.18) and 1.01(0.99-1.03), respectively. Furthermore, 1 mmHg increase in BP SD was significantly associated with stroke, for a HR of 1.02(1.01-1.04). Our findings, except for the association of cardiovascular mortality with BP SD, remained unaltered in all subgroup analyses, regardless of various populations and follow-up durations.

Conclusions: Visit-to-visit BPV, independent of mean BP, is a strong predictor of all-cause and cardiovascular mortality and stroke.

PP.NIC03.02 PREDICTORS AND OUTCOMES OF NEW ONSET DIABETES IN TREATED HYPERTENSIVE PATIENTS DURING 40-YEAR FOLLOW-UP

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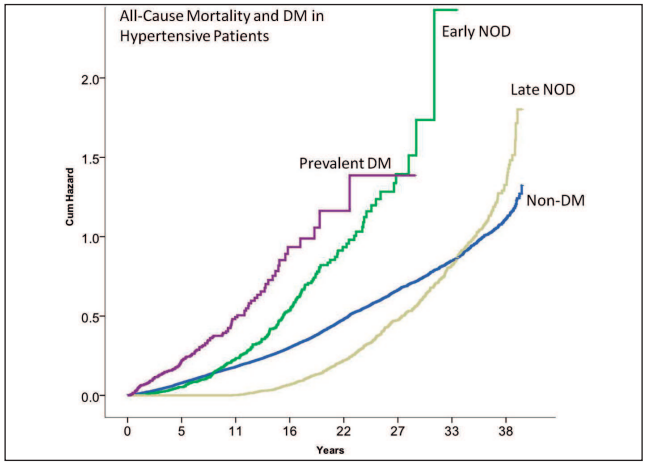
Objective: Hypertension and diabetes mellitus (DM) frequently cluster together and synergistically increase CV risk. We studied the predictors and mortality outcomes in a large treated hypertensive cohort followed up for 40 years.

Design and method: The Glasgow BP Clinic database contains data on 15,111 patients with 40 year follow-up for mortality and hospital admissions. Diabetes status was defined based on hospital admissions for any diabetes related diagnosis or prescription of anti-diabetic drugs or diabetes monitoring materials. The date at first hospital encounter either for prescription or admission was considered as the onset of diabetes. New onset DM (NOD) were classified into early and late (diagnosis <10yrs or >10years from first clinic visit). Cox proportional hazards (Cox-PH) models were used to explore the multivariate-adjusted associations between DM status and cause-specific mortality and explore the predictors of NOD. In order to exclude any potential competing risk introduced due to the long follow-up period and additional composite end point of all-cause mortality or NOD was analysed.

Results: There were 2521 patients (17%) with DM, of whom 2061(14%) had NOD. The incidence rate of NOD was 9.2 per 1000 person-years. Prevalence of early NOD was 898 (6%) in the first 10 years after their first visit and, 1163 (8%) developed DM thereafter (late NOD). The total time at risk was 239,952 person years with a median survival time of 28.04 years (IQR: 16.24-39.95). There were 5225 deaths (52% from cardiovascular causes) over a 40 year follow-up period. Independent predictors of new-onset diabetes in order of decreasing significance were baseline glucose, BMI, age, alanine transaminase, alkaline phosphatase, gamma glutamyl transpeptidase and bilirubin. Of these age, glucose, BMI and alkaline phosphatase remained top predictors for the composite outcome of NOD+all-cause death. The mortality risk was the highest in those with prevalent DM (HR=1.5[95%CI=1.2;1.9]) and lowest in those with late NOD (0.79[0.68;0.92]). Early NOD and non-diabetic subjects had similar risks.

Conclusions: Alkaline phosphatase and gamma glutamyl transpeptidase predict the risk of NOD and mortality in addition to BMI and baseline glucose. Duration of diabetes is the pre-eminent predictor of mortality in diabetic patients.



PP.NIC03.03 CONSEQUENCE OF PRIMARY ALDOSTERONISM ON PLASMA PRORENIN: IMPLICATIONS FOR THE DIAGNOSIS OF ALDOSTERONE PRODUCING ADENOMA

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[2] *Villefranche Nord West hospital of Villefranche and Mixed Research Unit of Functional Genomic EAM 4173, Lyon, FRANCE*

Objective: Prorenin (Pr), the inactive precursor of renin, is essentially secreted by the kidney. Primary adolsteronism (PA) could exert a negative feedback on Pr secretion, possibly of different magnitude whether it is related to an adenoma or a hyperplasia. Such an effect, if observed, could be used for diagnostic purposes. The objectives of this study were: 1) to evaluate the level of Pr in three subgroups: essential hypertension (EH); idiopathic hyperaldosterinism (IHA); and aldosterone-producing adenoma (APA); 2) to assess the performance of the adolsterone/Pr ratio (APrR) for the diagnostic of an APA.

Design and method: 746 hypertensive patients with a standardised check-up including Pr measurement were considered. 96 patients because of an ongoing antihypertensive treatment unsuited for hormonal measurements and 38 patients with other cause of secondary hypertension were excluded.
The three groups were defined as follows:
APA group 1) PA with RAR>130pg/ml/pmol/ml, and aldosterone after saline infusion test>100pmol/ml if available, 2) morphologic lateralisation with computed tomography scan or adrenal venous sampling (AVS) (ratio>4) if available 3) adenoma on pathological 4) cure or improvement of hypertension at follow up.
IHA group: 1) PA (same definition than for APA), and 2) normal or hyperplasic adrenal glands on computed tomography and no lateralisation on AVS when available.
EH group: no evidence for secondary hypertension.

Results: Results are as follows: median [interquartile ranges].

	APA n=35 (5.3%)	p APA vs. HPS	IHA n=57 (8.7%)	EH n=504 (77.5%)	p for all
Age (years)	50,2 [40,8-60,5]	0,1	54,9 [47,2-59,9]	51,0 [39,5-60,1]	0,09
Renin (pg/ml)	1,65 [1,0-2,8]	0,9	1,7 [1,0-2,7]	4,1 [2,4-7,0]	0,9
Prorénine (pg/ml)	32,9 [23,2-52,7]	0,06	40,4 [32,3-56,0]	50,3 [33,6-76,9]	<0,01
$\frac{Renin}{Renin+Prorenin}$ (%)	4,1 [3,0-5,6]	0,3	3,7 [2,5-5,9]	6,9 [4,4-11,9]	<0,01
Aldosteron (pmol/l)	891,5 [469,3-1465,5]	0,01	513,0 [389,0-709,0]	192,0 [114,0-303,0]	<0,01
ARR (pmol/l/pg/ml)	493,0 [195,6-997,3]	0,02	277,4 [188,5-419,5]	44,4 [22,5-89,6]	<0,01
APrR (pmol/l/pg/ml)	24,0 [11,5-50,9]	<0,01	11,8 [7,7-17,6]	4,0 [1,8-7,3]	<0,01

In a second analysis, 10 patients with a likely APA and 6 with a likely IHA were added, (all criteria were not fulfilled).
The APrR is more discriminant than the ARR to identify APA compared to IHA AUC of the ROC curve at 0.75 and 0.64 respectively, p=0.04), The optimal cut-off value of the APrR was 22pg/ml/pmol/ml (sensibility 57%, specificity 93%, 79.3% of patients correctly classified). In the second analysis the results were quite similar: AUC=0,72 for the APrR and 0,63 for ARR (p=0.04).

Conclusions: A chronic PA seems associated with a lower level of Pr particularly in its characteristical form, the APA. The Pr or the APrP could be valuable in the diagnostic strategy of APA.

PP.NIC03.04 THE PREVALENCE OF PRIMARY ALDOSTERONISM IN PATIENTS WITH UNCONTROLLED HYPERTENSION AND IN SUBGROUP WITH PREVIOUSLY DETECTED ADRENAL INCIDENTALOMA

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Objective: Primary aldosteronism (PA) is considered to be far more frequent reason for elevated blood pressure or resistance to antihypertensive therapy that it had been believed several decades ago, but still the precise rate is unknown and data from different centers are contradictory. The aim of the present study was to assess the prevalence of PA in patients with uncontrolled hypertension and in subgroup with known adrenal incidentaloma in routine practice of specialized hypertension excellence center.

Design and method: We examined 314 patients with uncontrolled hypertension [161 males (51.3%) and 153 females (48.7%)] and 195 hypertensive patients with known adrenal incidentaloma [52 males (26.7 % and 146 females (73.3%)] referred to Federal Almazov Medical Research Centre (HNT Excellence Center of ESH). Ambulatory blood pressure monitoring (SpaceLabs 90207, USA), renal ultrasound with Doppler were performed as well as blood testing for creatinine level with calculation of GFR by MDRD formula, potassium, glucose, cortisol, metanephrines, plasma aldosterone, renin concentration with calculation of ARR. In case of elevated ARR the patients proceeded to confirmatory saline infusion test.

Results: ARR was high in 141 (52.2%) patients with uncontrolled hypertension (n=314), which may be explained by a high proportion of severe and resistant hypertension, obesity, obstructive sleep apnea (63.1%). The diagnosis of PA was confirmed in 27 patients (8.6% of all hypertensive patients, 19.2 % of patients with elevated ARR). Among 195 hypertensive patients with adrenal incidentaloma hormone-inactive tumors were found in 134 patients (58.8 %), Cushing's syndrome – in 18 (9.2 %) patients, pheochromacytoma - in 9 (4.6 %) patients and PA was confirmed in 34 (17.6 %) patients. All patients with confirmed PA were characterized by long-term moderate-to-severe hypertension or resistance to antihypertensive treatment.

Conclusions: The prevalence of PA constitutes 8.6% in patients with uncontrolled hypertension and 17.6% in hypertensive patients with known adrenal incidentaloma, PA is usually associated with severe or resistant hypertension.

PP.NIC03.05 THE RIGHT HEART DEFORMATION AND HIGH-NORMAL BLOOD PRESSURE: A THREE-DIMENSIONAL ECHOCARDIOGRAPHY AND TWO-DIMENSIONAL SPECKLE TRACKING IMAGING STUDY

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Objective: We sought to investigate the right ventricular (RV) and right atrial (RA) mechanics in subjects with high-normal blood pressure (BP) and recently diagnosed arterial hypertension by using two-dimensional echocardiography (2DE) strain analysis and three-dimensional echocardiography (3DE).

Design and method: This cross-sectional study included 205 subjects who were separated into the three groups according to 24-hour systolic blood pressure: (i) optimal BP group (72 subjects); (ii) high-normal BP group (65 individuals); and (iii) 68 recently diagnosed untreated hypertensive patients (cut-off values were 120 and 130 mmHg, respectively). All subjects underwent complete 2DE and 3DE examination.

Results: Global longitudinal RV strain gradually decreased from controls, across high-normal BP subjects, to hypertensive patients (-32 ± 4 vs. -28 ± 3 vs. -26 ± 3 %, p<0.01). Global RV systolic strain was similar between high-normal BP and hypertensive patients, but decreased in comparison with optimal BP subjects (-1.64 ± 0.45 vs. -1.39 ± 0.4 vs. -1.34 ± 0.38 s-1, p=0.003). The same trend was observed for global longitudinal RA strain (44 ± 8 vs. 39 ± 7 vs. 38 ± 7 %, p=0.001), systolic (2.3 ± 0.6 vs. 1.92 ± 0.62 vs. 1.86 ± 0.59 s-1, p=0.007), and early diastolic strain rates (-2.25 ± 0.63 vs. - 2 ± 0.6 vs. – 1.95 ± 0.63 s-1, p=0.012). 3DE examination revealed that RV volumes indexed for body surface area were similar between optimal BP and high-normal BP subjects, but decreased in comparison with hypertensive patients (end-diastolic RV volume: 55 ± 12 vs. 59 ± 14 vs. 65 ± 16 ml/m2, p=0.002; end-systolic RV volume: 24 ± 7 vs. 26 ± 8 vs. 29 ± 9 ml/m2, p=0.01), which resulted in lower 3DE RV ejection fraction in hypertensive patients. Multivariate analysis showed that left ventricular mass index was the only echocardiographic parameter that was simultaneously independent predictor of global RV and RA strain.

Conclusions: The right heart mechanics is significantly influenced by systemic BP, even in high-normal BP individuals who have the similar level of subclinical impairment of RV and RA mechanics as newly diagnosed hypertensive patients.

PP.NIC03.06 BLOOD PRESSURE IN SICKLE CELL DISEASE SUBJECTS IS LOWER THAN IN HEALTHY CONTROLS

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Objective: Blood pressure (BP) in sickle cell disease has been suggested to be lower than published standards for age-, sex-, and race matched controls. These findings are counterintuitive in view of well known vascular and renal complications of sickle cell disease. The aim of the present study was to compare the BP profile of sickle cell disease patients compared to age-, sex- and body mass index matched controls.

Design and method: 86 subjects were recruited 46 patients (male=15), and 36 healthy controls (male=18). Mean age of the population was 43.3±9.9 years for patients and 40.0±11.2 years for controls (p>0.05). Patients had no history of hypertension or diabetes. Blood pressure was measured three times according to guidelines and the average was used in the analysis.

Results: Systolic blood pressure (SBP) was significantly lower in subjects with sickle cell disease compared to controls (mean±sd=115.1±13.8 mmHg for patients and 122.1±11.9mmHg for controls, p<0.05). Diastolic blood pressure (DBP) was also higher in the controls (68.5±8.0 mmHg vs 81.2±9.4 mmHg p<0.05) while heart rate was comparable in the two groups (76.5±10.5 bpm for patients and 74.4±10.4 bpm for controls, p>0.05).

Conclusions: Sickle cell patients had lower SBP and DBP compared to controls. While the cause of this phenomenon is not apparent, progressive renal tubular defect could be an underlying mechanism, while increased sodium loss may also co-exist.

PP.NIC03.07 TREATMENT STRATEGY AND OUTCOME WITH PRIMARY ALDOSTERONISM: A NATIONWIDE LONGITUDINAL COHORT BASED STUDY

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Objective: Along with better recognition of the role of primary aldosteronism (PA) in increasing cardiovascular risk and the potential of targeted therapy for PA, the long-term mortality according to different treatments are poorly understood. Objectives: Along with better recognition of the role of primary aldosteronism (PA) in increasing cardiovascular risk and the potential of targeted therapy for PA, the long-term mortality according to different treatments are poorly understood.

Design and method: We investigated PA patients using the validated algorithms between 1999 and 2011. Their data were extracted from the whole claims of the Taiwan National Health Insurance. We used Cox regression with time-varying covariates to adjust for subsequent adrenalectomy, mineralocorticoid receptor antagonist (MRA) and potassium prescription after diagnosis.

Results: Among the 3,362 PA patients who were identified, 846 patients received adrenalectomy and 452 patients expired. The incidence rate of death was 23.4 per 1,000 person-years during a mean follow- up of 5.75 years. In time varying Cox model, patients who received adrenalectomy were associated with decreased risk of mortality (hazard ratio (HR), 0.32), independent of the effects of potassium supplement (HR, 2.39), and age (HR, 1.09). Patients who received MRA after diagnosis did not relate to mortality risk. An additional analysis was conducted to show the defined daily dose (DDD) of MRA between 0.2 and 1.3 has the lowest impact on mortality.

Conclusions: In national wide population claim data, we provide the first time that PA patients with adrenalectomy could improve long-term risk of death, while MRA did only within appropriate prescription. The result suggests that early diagnosis and target therapy may warrant PA patients care. The findings made in the present association study need to be confirmed by randomized controlled trials to prove the observed beneficial effect of adrenalectomy on PA mortality.

PP.NIC03.08 ASSOCIATION OF SERUM PARATHYROID HORMONE WITH NIGHT TIME BLOOD PRESSURE IN PATIENTS WITH ESSENTIAL HYPERTENSION. INSIGHTS FROM THE STYRIAN HYPERTENSION STUDY

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Objective: High parathyroid hormone (PTH) concentrations, even within the normal ranges, are a cardiovascular risk factor. Clinical studies linked PTH with arterial dysfunction, vascular stiffening and arterial hypertension. We hypothesized that PTH is related to nighttime blood pressure in a well selected cohort of hypertensive patients.

Design and method: We performed cross-sectional analyses in hypertensive patients (n=298, mean age 61 +/- 11 years, 53% females) who participated in the Styrian Hypertension Trial. Arterial hypertension was defined as a positive medical history of arterial hypertension. Patients underwent blood sampling after an overnight fast and ten minutes in the sitting position. All laboratory parameters were determined immediately after blood sampling. PTH was measured with a sandwich ElectroChemiLuminescence Immunoassay (ECLIA) on an Elecsys 2010 (Roche Diagnostics, Mannheim, Germany). 24-hours ambulatory blood pressure monitoring (ABPM) was performed using a Spacelabs 90207 device (Spacelabs Healthcare, Snoqualmie, USA) and was started on the day of blood sampling. Nighttime blood pressure was recorded 2 times per hour. Mean systolic, mean diastolic and mean arterial pressure were defined as the means of measurements obtained between 1:00 and 6:00, respectively. We performed linear regression analyses for PTH with systolic, diastolic and mean arterial blood pressure, adjusting for common cardiovascular risk factors, parameters of calcium metabolism, glomerular filtration rate (CKD-EPI) and intake of anti-hypertensive drugs.

Results: Median PTH (IQR) was 49.25 pg/mL (39.3 – 60.7). PTH was significantly correlated with mean systolic, mean diastolic and mean arterial nighttime blood pressure (Spearman correlation coefficient 0.149, 0.131 and 0.149, respectively; p<0.05 for all). In linear regression analyses PTH was related to mean systolic, mean diastolic and mean arterial nighttime blood pressure (beta-coefficient 0.121, p=0.046; 0.155, p=0.01; and 0.139, p=0.026, respectively).

Conclusions: PTH is independently associated with systolic, diastolic and mean arterial nighttime blood pressure among hypertensive patients. These data indicate that PTH exerts some of its deleterious effects by increasing nighttime blodd pressure. Whether lowering circulating PTH concentrations reduces the burden of high blood pressure remains to be shown in future studies.

PP.NIC03.09 ADULT STATURE, BLOOD PRESSURE AND RENAL FUNCTION IN GENERAL POPULATION

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Objective: Epidemiological data indicated that shorter stature in adult age is related to hypertension, diabetes, coronary heart disease, early vascular ageing and diabetic nephropathy. Our aim was to compare the effect of height on blood pressure (BP), pulse pressure (PP) and kidney function in general population.
Design and method: In this cross-sectional survey conducted in general rural population from continental Croatian region 2412 subjects (median age 48 (IQR:35-64; 47.3 % men) were enrolled. BP was measured using Omron device following ESH/ESC guidelines.
Glomerular filtration rate (eGFR) was estimated with MDRD equation,

and albuminuria normalized to urine creatinine (ACR) was determined from the morning spot urine sample. Height was measured without shoes and weight wearing light clothing. Men and women were separately divided into quartiles (Q1 the lowest and Q4 the highest height)

Results: In the whole group we observed significant difference in systolic BP (141.71(23.03) vs. 133.84(19.86); p<0.001), PP (59.31(18.25) vs. 51.11(14.69); p<0.001), eGFR (71.16(17.11) vs. 82.82(16.15); p<0.001), but not in diastolic BP (82.40(12.48) vs. 82.74(11.54); p=0.94) between shortest and tallest quartile.Both men and women with shortest stature (Q1) had significantly higher values of systolic BP and PP (Q1 vs.Q4 men:64.4(19.8) vs.54.7(15.4); women:68.9(21.5) vs.52.6(16.6);p<0.001).In addition both genders in Q1 had significantly lower eGFR (Q1vs.Q4 men:71.1(17.1) vs.84.2(14.8);p=0.015; women:69.2(16.1) vs.78.1(14.1); p<0.001). There was no difference in ACR between Q1 and Q4 (for both gender p>0.05).Age, BMI, waist circumference adjusted shortest quartile was predictor of higher PP and heart rate in women (B=-1.394,SE=0.575,p=0.016; B=-1.564, SE=0.587,p=0.008, respectively) but not in men (B=-0.998,SE=0.783,p=0.21; B=-1.589,SE=0.889,p=0.08, respectively). PP adjusted adult stature was a risk factor for renal impairment in women (OR 0.372 [0.162, 0.857] p=0.02), but not in men (OR 0.581 [0.107, 3.166] p=0.581).

Conclusions: In general population, men and women with shorter stature had higher BP and PP values and decreased eGFR. Short stature was predictor of higher PP in women but not in men. Additionally, PP adjusted adult stature was related to renal impairment only in female gender. Observed difference between men and women deserve further investigation. Data obtained from epidemiological surveys should be accompanied with functional studies.

POSTERS' SESSION

LATE-BREAKERS POSTERS' SESSION 1

PP.LB01.01 HYPERTENSION AWARENESS, TREATMENT, AND CONTROL IN IN-PATIENTS WITH CHRONIC KIDNEY DISEASE

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Objective: A high prevalence of hypertension and a low rate of blood pressure control has been reported in patients with chronic kidney disease (CKD). We discussed the hypertension prevalence, awareness, treatment patterns, control rate of in-patients with CKD, and investigate the risk factors associated with CKD patients with hypertension.

Design and method: A cross-sectional and retrospective epidemiological study. Those data was derived from November 2009 to February 2010,in which period all the CKD in-patients from renal department. Subjects were divided into groups based on their GFR levels.

Results: (1). 439 subjects were included, dialysis patients accounted for 18.2% (80/439). The prevalence of hypertension is 69.5% (305/439) in all CKD patients, 90.0% (72/80) in dialysis patients, 64.9% (233/359) in non-dialysis patients ($p<0.001$). The prevalence of hypertension is 50.5% (154/305) in male and 49.5% (151/305) in female. ($p>0.05$). (2). Hypertension awareness, treat rate and control rate are 95.4 (291/305), 92.8% (283/305) and 36.4% (111/305), respectively. Hypertension control rate is 52.7% (38/72) in dialysis patients ,which is significantly higher than CKD early stage patients 33.8% (45/133) and non-dialysis middle—end stage CKD patients 28.0% (28/100) ($p<0.05$). (3). Old age, renal dysfunction (eGFR <60ml/min/1.73m2), hyperglycemia, smoking, are risk factors of CKD in-patients with hypertension. (4). 38.7% (118/305), 42% (128/305), 14.1% (43/305) and 5.3% (16/305) CKD patients with hypertension were taking one, two, three and four or more antihypertensive medications, respectively. Calcium channel blockers (CCBs) is most widely used (69.2%,211/305) in all kind of antihypertensive medications, secondly account to angiotensin receptor blocker (ARBs) or angiotensin-converting enzyme inhibitors (ACEIs) (62.6%, 191/305), 27.5% (84/305) of B/a+B receptor blocker, 9.2% (28/305) of diuretics, 11.5% (35/305) in all other kinds of hypertensive drugs. (5). Proportion of patients taken 3 or more antihypertensive drug treatment is significantly higher in renal dysfunction group 23.3% (40 /172), compared with CKD early stage of patients with 14.3% (19 /133) ($p <0.05$).

Conclusions: (1). Although almost universal hypertension awareness and treatment in in-patients with CKD, rates of hypertension control were low. (2). Old age, renal dysfunction, hyperglycemia, smoking, these variables are risk factors of CKD in-patients with hypertension. (3). The majority of patients need more than one kind of antihypertensive drugs to control blood pressure.

PP.LB01.02 VALIDITY OF SELF-REPORTED ANTHROPOMETRIC VARIABLES AND BLOOD PRESSURE: RESULTS OF THE HONG KONG WOMEN'S HEALTH STUDY

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Objective: To assess the validity of self-reported weight, height, waist circumference and blood pressure by comparison with measured values in a sample of Hong Kong adult women, and to determine the extent of misclassification of body mass index (BMI) arising from differences between self-reported and measured values.

Design and method: This pilot study was integrated in a life course study named 'Hong Kong Women's Health Study' in 1253 Hong Kong female nurses aged from 35 to 65 years. A mailed self-administered questionnaire was used to collect data. The validity of self-reported weight, height, waist circumference and blood pressure was examined by inviting 144 (11.5%) participants to have their body measurements at the research center according to the standard measurement protocol. The measured values were compared with their self-reported values to assess the validity.

Results: On average, there was a high correlation between the self-reported and measured anthropometric and blood pressure values (correlation coefficients ranged from 0.72 to 0.96). No significant differences were found between self-reported and measured weight and blood pressure values (all $P>0.05$). However, women tended to overestimate their height (mean difference between self-reported and measured height: 0.42cm, $P<0.05$) and underestimate their waist circumference (mean difference between self-reported and measured: 2.33cm, $P<0.05$). The Kappa consistency tests all showed good consistency between the categories of the self-reported and measured BMI, waist circumference and blood pressure values, percentage of overall agreement ranging from 60% to 100%. The use of self-reported weight and height resulted in the correct classification of BMI in 85% of women.

Table 1. Mean values of measured and self-reported variables, the mean differences and the correlations between paired variables

	Mean (SD)		Mean differences (SD)	Correlation R
	Measured values	Self-reported values		
Height (cm)	158.5 (5.7)	158.9 (5.7)	-0.42 (1.58)**	0.96***
Weight (kg)	56.6 (5.9)	56.5 (8.1)	0.02 (3.31)	0.92***
BMI (kg/m^2) a	22.5 (3.1)	22.3 (3.0)	0.14 (1.36)	0.90***
Waist Circumference (cm)	79.9 (8.0)	77.6 (7.5)	2.33 (5.21)***	0.78***
Systolic Blood Pressure (mmHg)	110.9 (13.6)	111.3 (12.6)	-0.37 (5.78)	0.91***
Diastolic Blood Pressure (mmHg)	72.4 (9.7)	71.7 (9.7)	0.67 (7.28)	0.72***

a. BMI was calculated from measured height and weight, and self-reported height and weight, respectively

** P<0.01, *** P<0.001

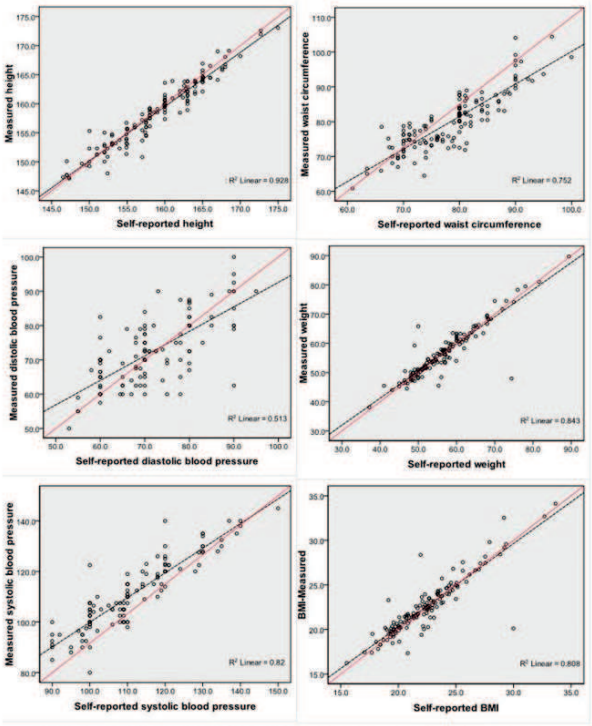

Figure 1. Scatter plots of the height, weight, BMI, waist circumference and blood pressure according to self-reported and measured values

Conclusions: We suggest that the self-reported height, weight, waist circumference and blood pressure measures were generally reliable in this population of Hong Kong female nurses. However it is still important to carefully consider potential biases in the interpretation of data when using self-reported indicators in epidemiological studies.

PP.LB01.03 NOCTURNAL HYPERTENSION AND NON DIPPING PATTERN. ARE THEY THE SAME THING?

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Objective: Determine the relationship between non- dipper pattern and NH, and the usefulness of the evaluation of the absolute values of blood Pressure (BP) at night over circadian patterns in patients followed in the Hypertension unit.

Design and method: We made a descriptive study, with a group of patients whose had done Ambulatory Blood Pressure Monitoring and that we follow at Hypertension unit.
We used oscillometric SpaceLabs 90207 monitors (SpaceLabsInc) to obtain blood pressure readings at 15 minute intervals at daytime and every 30 minutes at nighttime in the first 24 hours and we collected demographic characteristics. Nocturnal hypertension was defined as systolic mean pressure over 120mmHg at bed time, the patterns were: Dipping:10% or more systolic blood pressure fall during nighttime from baseline) and Non dipping was defined as a fall in average nighttime systolic blood pressure lower than 10% from baseline
For data base management and statistical analyses we used the data processing was made using SPSSS 21.

Results: We studied 304 patients. 44.7 % had NH, 57.4 % female, 66% of patients with HN were classified as non- dipper, and 27% dipper. 43.38 % had isolated nocturnal hypertension with normal daytime values, within this group 64.4 % were under antihypertensive therapy and 35.59 % did not receive any medication.

Conclusions: Nocturnal hypertension is a prevalent condition in our population, which concurs with data from different population studies. The relationship of the circadian pattern of BP and NH was not constant because the dipper pattern was attributed to 27% of patients with NH, we can conclude that circadian patterns alone aren´t the best tools to assess NH. A significant number of patients had isolated nocturnal hypertension in 43.38% in the most cases, because the usual treatment wasn´t enough to control the BP at nighttime this condition only could be diagnosed with the ABPM.

PP.LB01.04 ISOLATED SYSTOLIC HYPERTENSION, FINDINGS IN A PORTUGUES POPULATION

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Objective: The purpose of this study was to identify the incidence of isolated systolic hypertension in a Portuguese group of patients.

Design and method: We made a descriptive study, with a group of patients whose had done Ambulatory Blood Pressure Monitoring and that we follow at Hypertension unit.
We used oscillometric SpaceLabs 90207 monitors (SpaceLabsInc) to obtain blood pressure readings at 15 minute intervals at daytime and every 30 minutes at nighttime in the first 24 hours and we collected demographic characteristics. Isolated systolic hypertension was defined as systolic mean pressure over 130mmHg, with normal diastolic mean, 80mmHg or lower, in the 24 hours register.
For data base management and statistical analyses we used the data processing was made using SPSSS 21.

Results: Among the 304 participants, 54 had isolated systolic hypertension (17%), 63% female, mean age: 66.17 years, mean heart rate was 69 bpm, mean pulse pressure 66.63, non-dipping was the circadian pattern most frequently seen. Almost 30% of those patients wasn´t treated neither diagnosed. This condition was more prevalent in people from 61 to 80 years old.

Conclusions: Isolated systolic hypertension is a prevalent condition in our study, as has been communicated by others authors it´s more frequently seen in elderly people, and results primarily from elastic artery stiffening, comp roved by the high pulse pressure mean in these group of patients, in 70 percent of those patients the regular treatment wasn´t enough to control the systolic pressure, 30% wasn´t treated neither diagnosed this confirms that the ambulatory blood pressure monitoring is very useful in our clinical practice.

PP.LB01.05 ISOLATED NOCTURNAL HYPERTENSION, FINDINGS FROM A PORTUGUESE POPULATION STUDY

F. Suescun Calderon, G. Polania Zuleta, J. Urbano Galvez, I. Tavares, F. Mascarenhas, V. Escoto, J. Aguila, A. Cordeiro, J. Alba, M. Barba, A. Massalana. *Hospital Santa Luzia, Elvas, PORTUGAL*

Objective: The purpose of this study was to identify the prevalence and characteristics of Isolated Nocturnal Hypertension in a Portuguese group of patients

Design and method: We made a descriptive study, with group of patients whose had done Ambulatory Blood Pressure Monitoring and that we follow at Hypertension unit.
We used oscillometric SpaceLabs 90207 monitors (SpaceLabsInc) to obtain blood pressure readings at 15 minute intervals at daytime and every 30 minutes at nighttime in the first 24 hours and we collected demographic characteristics. The definitions were: For Isolated Nocturnal Hypertension (readings above 120/70 mm Hg at nighttime) and readings above 135/85 mm Hg at daytime.
For data base management and statistical analyses we used the data processing was made using SPSSS 21.

Results: Among the 304 participants 50 were normotensive (16%) on both nighttime and daytime measurements, 4.9% had Isolated Nocturnal Hypertension, 53.3% male; mean age: 63.1 years, non-dipping prevalence was 80%; the most often disease reported was Diabetes (86.7). Patients with Isolated Nocturnal Hypertension, compared with subjects with ambulatory norm tension (16. %), were older (63.1 versus 57.1 years) and had higher pulse pressure (51.87 versus 44.94).

Conclusions: Many studies reported that abnormal circadian blood pressure pattern with decreased nighttime dipping led to higher risk of cerebrovascular complications and now we know that some people have less nocturnal blood pressure dipping and it only can be proven with the Ambulatory Blood Pressure Monitoring.
The isolated nocturnal Hypertension is prevalent in our population, is more often seen in the elders, males and diabetic patients and is associated to pulse pressure arise that is a harbinger of unfavorable outcome.
Important things must be eluded: Is necessary and correct to do an ambulatory blood pressure monitoring in normotensive patients? and what should we do with the Isolated Nocturnal hypertensive patients?; Should these patients be treated?.

PP.LB01.06 RENAL ARTERY STENOSIS IS ASSOCIATED WITH HIGHER BLOOD PRESSURE AT NIGHT AND UNFAVORABLE BLOOD PRESSURE PROFILE

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Objective: Renovascular hypertension is one of the most common form of hypertension with potentially reversible cause. The main etiology of this form of hypertension is atherosclerotic renal artery stenosis (ARAS). Recent studies suggest that the optimal conservative treatment is the treatment of choice in most of the patient with ARAS.
The aim of the study was to evaluate the blood pressure profile in hypertensive people with new diagnosis of renal artery stenosis.

Design and method: The study was carried out in the Department of Hypertension, Angiology and Internal Diseases, Poznan University of Medical Sciences, in 162 patients with arterial hypertension. Patients were recruited among those referred to the hospital for elective coronarography with risk factors of renovascular hypertension. In addition to simultaneous coronary and renal angiography, all patients had 24-hour automated blood pressure measurements (ABPM).
Patients were compared in relation to the presence of renal artery stenosis (RAS+, n=46, 28.4% and RAS-, n=116, 71.6%). The mean age of the study group was 59.5±8.9 years. Mean arterial pressure in the office measurement was 156.4/91.5 ± 26.1/16.5 mmHg. Patients were using 3.5±1.2 antihypertensive drugs, among them 90.2 % were taking blockers of RAA system.

Results: There were no significant differences in ABPM between patients with low-grade (<50%) and high-grade (>/50%) RAS. When comparing patients with and without ARAS (RAS+ vs. RAS-), there was no significant difference in daytime blood pressure (BP) in ABPM (134.6/77.9 ± 17.3 / 8.4 mmHg vs. 129.3/76.3 ± 14.6/9.3 mmHg). BP during the night was significantly higher in

RAS+ group (128.7/72.8 ± 20.5/10.5 mmHg vs. 116.4/67.3 ± 15.2/9.6 mmHg). Also the night systolic blood pressure fall was lower in patients with RAS+ (3.6%±11.2% vs. 9.9%±7.3%).

Conclusions: 1. Patients with renal artery stenosis have higher blood pressure at night and lower night blood pressure fall regardless of a degree of the stenosis. 2. Assessment of blood pressure in ABPM should play an important role in optimal management of patients with hypertension and renal artery stenosis.

PP.LB01.07 T1143 ESSENTIAL FOR CAV1.2 INHIBITION BY DILTIAZEM: REFINED DRUG BINDING MODEL

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Objective: Hypertension remains a serious clinical problem. Numerous drugs of different classes like dihydropyridine (DHP), phenylalkylamine (PAA) and benzothiazepine (BTZ) are in clinical use. All these classes are targeting l-type calcium channels CaV1.2. Although Diltiazem (BTZ) has been in clinical use for the treatment of heart pain (angina pectoris), high blood pressure, and abnormal heartrhythem, its molecular mechanism of action and binding to CaV1.2 are not fully understood.

Design and method: To identify the molecular mechanism of Diltizem we did site directed mutagenesis studies on the basis of homology modeling predictions. We transiently expressed WT and mutant CaV1.2 channel in mammalian cells and analyzed use-dependent block of inward Barium current by diltiazem (Dil) and quarternary diltazem (qDil) in whole cell patch-clamp configuration.

Results: Homology modeling of CaV1.2 predicts T1143 as potential H-bond acceptor interacting with Dil. Mutational analysis confirmed an important role of this residue in drug binding. Substitution of T1143 by alanine T1143A almost completely diminished channel block by Dil or qDil. Whereas, channel activation and inactivation kinetics was not changed compare to WT. These findings support the view that T1143 serves as drug binding determinant. Other mutations in this position than T1143A (T1143L/Y/S/N/C/V/E) diminished channel inhibition by qDil but additionally affected channel activation and inactivation and may therefore affect channel block allosterically

Conclusions: These data show that T1143 is a novel diltiazem binding determinant in CaV1.2.

PP.LB01.08 MONITORING AMBULATORY BLOOD PRESSURE IN PATIENTS WITH HIV INFECTION CONFINED

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Objective: To determine the prevalence of hypertension in patients with HIV infection confined by office blood pressure and ambulatory blood pressure monitoring.

Design and method: Prospective study of the cohort of patients with HIV infection Huelva Provincial Prison, attended by the Infectious Diseases Unit of the Hospital Infanta Elena de Huelva area.
Scope of the study: The provincial prison of Huelva is located in the province of Huelva (South West Andalusia, Spain). Formed by 1500 inmates. The Infectious Diseases Unit of the Hospital Infanta Elena provides specialized care to patients with HIV infection by querying prison located in the penitentiary and a hospital unit at the Hospital Infanta Elena.
Patients: Eligible population: elderly patients with HIV infection held in Huelva Provincial Prison. Inclusion criteria: Patients older than 18 years; HIV infection; informed consent, approved by the Research Committee Penitentiary Institutions to participate in the study.

Results: 98 patients of which was performed ambulatory monitoring of blood pressure (ABPM) of 72 patients, while 26 rejected the placement thereof were recruited.
The prevalence of hypertension clinic after a measurement was 15.3%. The average prevalence of hypertension clinic 1st and 2nd measurement was 11.1%. The average prevalence of hypertension clinic 1st, 2nd and 3rd measurement was 12.5%. The average prevalence of hypertension in 2nd and 3rd measurement was 11.1%. The prevalence of hypertension after ABPM was 11.1%.

The mean age of patients was 43 years, 7.1% were women. 28.6% had had AIDS criteria. The average level of CD4 437cell/mm3. Mean viral load 20973.69. HCV infection 85.7%. The general characteristics of the patients are presented in Table 1.

			HTA CLASSIFICATION ABPM				
			NORMAL (nº)	HTA (nº)	X^2 yates (p)	significance	Phi
HTA CLINICAL CLASSIFICATION	1st measurement	No HTA	60	1	30,2	p<0,001	0,71
		HTA	4	7			
	Media 1st and 2nd measurement	No HTA	63	1	44,8	p<0,001	0,85
		HTA	1	7			
	Media 1st, 2nd and 3rd measurement	No HTA	63	0	54,3	p<0,001	0,93
		HTA	1	8			
	Media 2nd and 3rd measurement	No HTA	64	0	62,2	p<0,001	1
		HTA	0	8			

Conclusions: The prevalence of hypertension estimated by ABPM in HIV patients is 12%.
Blood pressure in clinical measure 3 consecutive times and by averaging 2nd and 3rd measurement eliminates the masked hypertension and isolated clinic hypertension, providing an estimated value comparable to ABPM.

PP.LB01.09 6-MERCAPTOPURINE INDUCED VASCULAR CALCIFICATION IN VASCULAR SMOOTH MUSCLE CELLS IN VITRO: HINT FOR PREMATURE AGEING?

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Objective: Arterial ageing is a major contributing factor to increase the incidence and prevalence of cardiovascular disease. Patients with chronic kidney disease exhibit an extremely high cardiovascular mortality. They develop accelerated medial vascular calcification and arterial stiffening, also used to measure biological vascular age. The immunosuppressive agent 6-mercaptopurine (6-MP) leads to vascular calcification by driving phenotypic changes of rat vascular smooth muscle cells (rVSMCs). The aim of this study was to investigate the potential relationship between the pro-calcific properties and cellular senescence in rat VSMCs after 6-MP treatment.

Design and method: Calcium deposition was quantified by O-cresolphthalein method and stained with alizarin red. Superoxide (O2-) production was assessed by dihydroethidium. Alkaline phosphatase (ALP) enzyme activity was determined by p-nitrophenol method. Gene expression was measured by quantitative real time PCR. The detection of g-H2AX was carried out by western blot and visualized as nuclear foci with fluorescence microscopy.

Results: 6-MP significantly induces mineralization of VSMCs quantified by measuring the extracellular calcium content after 21 days of stimulation and visualized with alizarin red staining. In addition, 6-MP leads to a significant increase in ALP enzyme activity. The 6-MP metabolites 6-thioinosine-monophosphate (6-MTIMP) and the 6-thioguanine nucleotides (6-TGNs) also show a significant increase in mineralization of VSMCs after 21 days determined by calcium deposition and enhanced ALP enzyme activity. Gene expression of the cyclin-dependent kinase inhibitors p16INK4a and p21Waf1/Cip1 are up-regulated after 6-MP stimulation. These genes are also increased upon stimulation with 6-TGNs and 6-MTIMP. Furthermore, vascular senescence is thought to be caused by elevated reactive oxygen species, which lead to oxidative DNA damage. 6-MP results in a significant and dose-dependent O2- production after 30 minutes of stimulation, which could be diminished with tiron and allopurinol. Also 6-TGNs and 6-MTIMP significantly increase O2- production. 6-MP promotes DNA damage, a key factor driving cellular ageing, carried out by accumulation of g-H2AX detected by fluorescence microscopy. These findings could be confirmed by detection of g-H2AX using western blot.

Conclusions: This study indicates that 6-MP not only increases vascular calcification, but also plays a role in cellular senescence processes in VSMCs in vitro.

PP.LB01.10 FEMORAL PULSE PRESSURE, BUT NOT BRACHIAL, CAROTID OR AORTIC, ASSOCIATES WITH INCIDENT CORONARY HEART DISEASE IN A POPULATION WITH HIGH PREVALENCE OF TYPE 2 DIABETES

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Objective: Central (aortic or carotid) pulse pressure (PP) associates better with local organ damage and potentially mortality than brachial PP. We aim to investigate for the first time the association of femoral (f) PP with the incidence of all-cause mortality, cardiovascular disease (CVD), coronary heart disease (CHD) and cerebrovascular disease (CerVD) events, as well as with markers of renal function (estimated GFR and the presence of microalbuminuria).

Table. Hazard ratios (95% confidence intervals) between local pulse pressure (PP) and outcomes.

Arterial site:	brachial PP	aortic PP	carotid PP	femoral PP
All cause mortality				
Number of deaths: 66				
unadjusted model	**1.31 (1.13 - 1.52)**	**1.27 (1.09 - 1.48)**	**1.18 (1.05 - 1.32)**	**1.18 (1.07-1.30)**
model 1	1.17 (0.98 - 1.39)	1.15 (0.96 - 1.37)	1.11 (0.95 - 1.31)	**1.14 (1.01-1.29)**
model 2	1.10 (0.87 - 1.38)	1.07 (0.85 - 1.34)	1.05 (0.86 - 1.28)	1.10 (0.95 -1.28)
model 3	1.06 (0.83 - 1.35)	1.02 (0.81 - 1.30)	1.02 (0.82 - 1.25)	1.08 (0.93 - 1.26)
Cardiovascular disease events				
Number of events: 102				
unadjusted model	**1.17 (1.03 - 1.32)**	**1.15 (1.02 - 1.29)**	**1.15 (1.02 - 1.30)**	**1.15 (1.04-1.28)**
model 1	1.11 (0.96 - 1.28)	1.13 (0.97 - 1.31)	1.13 (0.97 - 1.32)	**1.16 (1.02-1.31)**
model 2	1.13 (0.93 - 1.36)	1.15 (0.95 - 1.38)	1.15 (0.96 - 1.38)	**1.17 (1.02-1.36)**
model 3	1.11 (0.91 - 1.35)	1.12 (0.92 - 1.34)	1.01 (0.90 -1.33)	1.11 (0.99 - 1.31)
Coronary heart disease events				
Number of events: 45				
unadjusted model	1.21 (1.00 - 1.45)	1.20 (0.99 - 1.45)	1.14 (0.95 - 1.37)	**1.21 (1.05 - 1.40)**
model 1	1.14 (0.91 - 1.43)	1.10 (0.94 - 1.47)	1.10 (0.80 - 1.37)	**1.25 (1.07 - 1.48)**
model 2	1.31 (0.98 - 1.74)	1.34 (1.00 - 1.79)	1.16 (0.91 - 1.50)	**1.36 (1.01 - 1.65)**
model 3	1.28 (0.95 - 1.72)	1.35 (1.00 - 1.82)	1.15 (0.84 - 1.51)	**1.35 (1.11 - 1.66)**

model 1: age, sex, glucose metabolism status ; **model 2:** model 1 & mean blood pressure, **model 3:** model 2 & plus prior cardiovascular disease BMI, triglycerides, total/HDL cholesterol ratio, eGFR, microalbuminuria, physical activity, smoking habits and use of lipid-lowering and anti hypertensive medication.

Design and method: We used data from a population-based study in elderly individuals, by design including 50% type 2 diabetes and impaired glucose metabolism (IGM). The baseline examination included non-invasive PP assessment at the brachial, aorta (Sphygmocor device), carotid and femoral (Kelly-Fitchett method) arteries.

Results: After 7.8 years of follow-up (n=449; age: 68.9±6.0 males: 52%) 66 participants died, 102 had a CVD event, 45 a CHD event, and 31 a CerVD event. PP at all sites was associated with incident all-cause mortality and CVD events (table). Only fPP was associated with the incidence of CHD events 1.31 (1.07 - 1.61), even after adjustment for CVD risk factors (table). No association between PP and incident CerVD events was found – probably due to the small number of events. fPP was associated with renal function but this was similar to other PP indices. No significant interaction between each local PP index and glucose metabolism status or renal function was observed with respect to all studied outcomes.

Conclusions: Beyond anatomical topography, local PP at other arteries than the central provide important information related to CVD events. This possibility and the underlying reasons should be further investigated.

PP.LB01.11 PREVALENCE OF HYPERTENSION IN BRNO, RESULTS OF KARDIOVIZE BRNO 2030 STUDY

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Objective: To assess value of blood pressure in a representative sample of population of Brno city the second biggest city in Czech republic.

Design and method: Our study represent the populations as rather healthy, motivated and cooperating volunteers tend to participate in monitoring surveys.

Results: 1297 volunteers have been examined. Depending on a blood pressure in outpatient clinic we classified 752 (58%) volunteers as normotensive and 545 (42%) volunteers as hypertensive. From hypertensive volunteers 365 (67.1%) declared knowledge about their hypertension. From former classified hypertensive patient only 263 (72.1%) have been on hypotensive medication. Only106 (40.3%) medically treated patient had blood pressure below 140/90 mmHg.

Conclusions: Prevalence of hypertension is very high in our study population. Blood pressure control in our study is absolutely insufficient totally and even in medically treated group.

PP.LB01.12 TREATING HYPERTENSION, EXPERIENCE IN A PORTUGUESE HOSPITAL

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Objective: The aim of this study is to share our experience to treating hypertension in a Portuguese hospital and help to characterize our population in order to improve our medical practice and get better results in cardiovascular risk control.

Design and method: We made a descriptive study, with group of patients whose had done Ambulatory Blood Pressure Monitoring (ABPM) and that we follow at Hypertension unit.
We used oscillometric SpaceLabs 90207 monitors (SpaceLabsInc) to obtain blood pressure readings at 15 minute intervals at daytime and every 30 minutes at nighttime in the first 24 hours and we collected demographic characteristics.
The normal values obtained in the ABPM were, mean global systolic and diastolic pressure under 130/80mmHg, daytime systolic and diastolic mean: under 135/85mmHg, bedtime systolic and diastolic mean: under 120/70mmHg, we collected demographic and medication data.

Results: We obtained a 304 patients sample, mean age 59.56 years, 53.9 female, 47% dipper pattern, 49% com daytime hypertension, 40% with bedtime hypertension, 95 patients with global hypertension, 28 patients with isolated nocturnal hypertension, 41% had Resistant Hypertension.
40.7% didn´t achieve the treatment goals and 36% were missed diagnosed.

Conclusions: An important number of ABPM was made in the hypertension unit, the dipper pattern was the most prevalent in our group, 40% had nocturnal hypertension, this fact confirms the ABPM´s relevance in the internist´s clinical practice. Resistant hypertension is a prevalent condition in our study, it maybe been explained by the cultural characteristics of our zone: very salty meals, elderly people, withdraw of treatment and economic difficulties.

PP.LB01.13 SUBCUTANEOUS RESISTANCE ARTERY FUNCTION AND REMODELING IN CHRONIC KIDNEY DISEASE PATIENTS

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Objective: Chronic kidney disease (CKD) is associated with cardiovascular (CV) complications. However, interventional trials targeting classical CV risks factors have been often unsuccessful in advanced stage CKD, which emphasizes the need to better understand CKD-associated vascular disorders. Resistance arteries are a key determinant of blood pressure (BP) and their changes in different CV conditions contribute to target organ damage. The aim of the present study was to characterize resistance artery remodeling and function in CKD patients, compared to vessels from hypertensive (HTN) subjects.

Design and method: Twenty-two stage 4 CKD patients (aged 63.6±3.1 years) and 16 HTN subjects (45.6±16.1 years) were included in the present study. They all underwent a subcutaneous biopsy under local anaesthesia. Small artery remodeling and function were studied on a pressurized myograph, and subcutaneous fat CD3 infiltration and media fibronectin expression by immunostaining. Vascular smooth muscle cells (VSMCs) were counted after hematoxilin-eosin staining.

Results: CKD systolic BP was similar to HTN (133±18 vs. 143±10 mmHg, respectively). Vasodilatory responses to acetylcholine were lower in CKD compared to HTN (maximal relaxation (%), 74.3±3.4 vs. 87.5±2.7, P<0.05). Media/lumen at 60 mmHg was lower in CKD than in HTN (6.7±0.5 vs 8.8±0.7, P<0.05). Resistance artery stiffness was lower in CKD compared to HTN (strain at 120 mmHg, 0.845±0.126 vs 0.585± 0.099, P<0.05). Fibronectin staining in resistance arteries was lower in CKD than HTN (8.2±0.8 vs 23.3±1.7 RFU/µm2, P<0.001). Less VSMCs were present in the arterial wall of CKD compared to HTN (5.4±0.4 Vs 7.2± 0.5 cells/µm2, P<0.05). Subcutaneous fat presented fewer CD3+ cells in CKD than HTN (12.8±4.1 vs 23.7±12.8 cells/mm2, P<0.05).

Conclusions: Despite higher levels of BP, resistance arteries isolated from CKD patients exhibited no vascular remodeling and lower arterial stiffness compared with HTN patients. These results are in line with the maladaptive hypotrophic remodeling observed in large vessels in CKD, suggesting a generalized vascular defect in mechanotransduction in CKD.

PP.LB01.14 EFFECT OF MODERATE EXERCISE ON GLOMERULOSCLEROSIS AND HYPERTRIGLYCERIDEMIA AFTER REGULAR COLA BEVERAGE

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Objective: To evaluate: 1) the effect of cola drinks (CD) consumption on lipid profile and kidney damage in rats and 2) the possible beneficial role of aerobic exercise. High consumption of cola drinks (CD) increases the risk of obesity, diabetes, metabolic syndrome and chronic kidney disease. Actually, we have reproduced metabolic syndrome characteristics long after chronic consumption of sucrose-sweetened cola beverage in rats. Chronic intake of sucrose-sweetened beverages appears to be linked to proteinuria and associated with poor physical activity, hyperlipemia and renal damage.

Design and method: Forty-eight adult male Wistar-Kyoto rats were randomized to treatment groups. Runners (aerobic exercise): WR (drinking water), CR (drinking sucrose-sweet cola). Sedentary: WS and CS analogously. Lipid profile, glycemia, atherogenic index of plasma (AIP) and systolic blood pressure (SBP) were determined at different times. Euthanasia was practiced 6 months after the beginning of the study. Kidney histopathological score was obtained using a semiquantitative scale. Glomerular size and glomerulosclerosis were estimated by point-counting.

Results: Histopathological score in sedentary rats was higher than in runner rats regardless drink treatment. Glomerulosclerosis increased only in sedentary rats after chronic sucrose-sweetened cola drinking. Chronic sucrose-sweetened cola consumption resulted in a reduction of food intake with increase in drinking volumes, increased the circulating triglycerides and the atherogenic index of plasma and led to glomerulosclerosis.

Conclusions: These findings evidenced a detrimental effect of chronic sucrose-sweetened cola beverage drinking on lipid metabolism and kidney structure and suggest that a routine of moderate aerobic exercise might exert a protective effect against renal damage. In this regard, hypertriglyceridemia might be critical in boosting renal damage.

PP.LB01.15 OBESITY ASSOCIATED DYSLIPIDEMIA INCREASES THE RISK OF HYPERTENSION IN A CAMEROONIAN POPULATION

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Objective: The objective of this study was to investigate the relationship between obesity, high blood pressure and dyslipidemia in a Cameroonian population and characterize the genetic origin.

Design and method: This was a case control study, carried out from February to December 2011. Obese (n = 62) and matched healthy controls (n = 60) were consecutively recruited and clinical characterized via the Cameroon Diabetes Epidemiology and Registry (CAMDER) active surveillance network. TCF7L2 was analyzed by genotyping for rs12255372 (G/T) using RFLP-PCR. Biochemical (fasting plasma glucose, total cholesterol, HDL cholesterol and triglycerides) analyses were performed using a spectrophotometer with CHRONOLAB kits. Blood Pressure tests and anthropometric (height, weight and waist to hip ratio) measurements were taken on all subjects. Statistical analyses were carried out using IBM SPSS 17and Microsoft office excel 2007 softwares.

Results: The mean age was significantly higher in the obese group when compared to the non obese group (43±11 Vs 34±12). Fasting plasma glucose, waist to hip ratio, systolic blood pressure and diastolic blood pressure were significantly higher in the obese group than the non obese group ($p<0.05$). The prevalence of high blood pressure was higher in the obese group (35.48%) than the non obese group (10%) group. The relative risk of having high blood pressure when obese was high (RR = 3.55). Mean total Cholesterol was higher in the obese than the non obese group and the difference was significant ($p<0.05$). No significant association was observed between the rs12255372 T allele (x2= 0.0684, p = 0.79) or TT genotype (x2= 0.372, p = 0.54) of the TCF7L2 gene and obesity in the Cameroonian population. However, amongst the weight related traits, triglycerides were significantly associated with the TCF7L2 gene (p=0.012).

Conclusions: This study on Cameroonian subjects confirms that the risk of having high blood pressure is higher in obese individuals especially in the presence of other cardiovascular risk factors including high total cholesterol and high fasting plasma glucose. The rs12255372 (G/T) polymorphism is a risk variant of dyslipidemia as confirmed by its association with triglycerides level.

PP.LB01.16 CARDIOMETABOLIC DISEASES IN ZIMBABWE: AN ANALYSIS OF NATIONAL MORTALITY DATA

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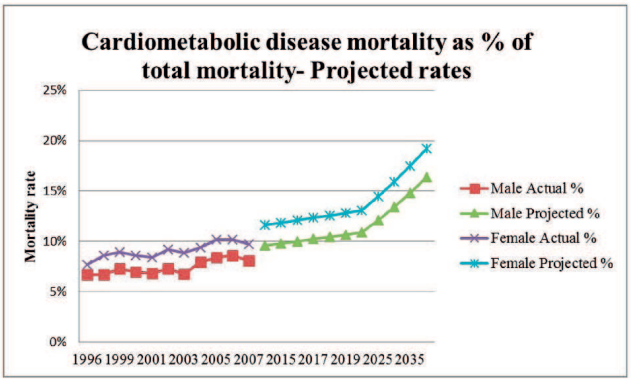
Objective: Cardiometabolic disease (CMD) is an emerging term that incorporates the particular disease cases that are either consequences or late stages of metabolic syndrome (MetS). The identification criteria differ, but the core components of MetS are obesity, insulin resistance, dyslipidemia, and hypertension. There is insufficient data on the trends in the mortality rate among people with cardiometabolic diseases in Zimbabwe. The objective of the present study was to examine the change in the all-cause mortality rate among people with cardiometabolic in Zimbabwe and whether any such changes differed by sex.



Design and method: All-cause mortality data from the Zimbabwe National Statistics Agency was examined from 1996 to 2007. A total of 942, 319 deaths were registered for the study period and 9% of these deaths were a result of CMD during the period.

Results: From 1996 to 2007 the mortality attributable to cardiometabolic diseases for males increased from 6.7% to 8.1%, and increased from 7.7% to 9.7% for females. The leading causes of deaths were pulmonary and circulatory disease, cardiovascular disease, and hypertensive disease and a higher mortality rate was found in females. The analysis of variance test was significant as $P<0.01$, for both male and female CMD mortality indicating a statistically significant trend over the period of 1996 to 2007. Using a regression model, CMD mortality was projected to increase from 9.6% in 2014 to 16.4% in 2040 for males, and from 11.6% in 2014 to 19.2% in 2040 in females.

Conclusions: The increase in mortality from CMD poses a serious burden on the socio-economic stability of the country. Preventive measures and raising awareness of CMD are cost-effective measures the government of Zimbabwe can put in place to prevent premature deaths resulting from CMD.

PP.LB01.17 PREVALENCE AND RADIOLOGICAL PECULIARITIES OF METABOLIC SYNDROME AND HYPERTENSION IN STROKE PATIENTS

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Objective: Hypertension, obesity and diabetes (metabolic syndrome) are significant risk factors of stroke. A better understanding of relation between metabolic syndrome and hypertension may lead to the reduction of cerebrovascular risks and improve the stroke treatment and outcome as well.

Design and method: A total of 345(F=198, 69,7±5,3) patients with acute stroke were investigated. Diagnosis of Metabolic syndrome (MetS) was ascertained according to the revised National Cholesterol Education Program Adult Treatment Panel III (ATP III-r). Stroke was diagnosed using NIHSS criteria. Type, side and site of stroke was assessed by MRI. Hypertension (HYP) was defined according to cardiovascular criteria, based on target organ damage. In addition to hypertension, other modifiable and non-modifiable risk factors were recorded. Neuropsychological battery and MMSE tests were performed in the target population. The data statistically evaluated by SPSS-11.0.

Results: Among Stroke patients 124/35,9% found to have MetS, 106/85,4% diagnosed as ischemic stroke with lacunar or multiple brain lesions. Most of the patients with female preponderance(76) had moderate to severe leucoaraiosis(71%), mild-to moderate cognitive disturbances(54%) and dementia(14%). The HYP and obesity alone-146/42,3% patients had more haemorrhagic stroke (79/54,1%) with male dominance and psychological disturbances, such as depression(46%) or depression-anxiety disorders(31%).

Conclusions: Mets may be considered as independent risk factor for ischemia and dementia($P > 0.001$), while the Hypertension and obesity alone may carry the risk of bleeding and neuropsychological disturbances($P > 0.001$).

PP.LB01.18 CARDIOPROTECTION BY ALISKIREN, VALSARTAN AND THEIR COMBINATION IN RATS WITH CHRONIC MYOCARDIAL INFARCTION

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Objective: Aliskiren is a renin inhibitor approved for the treatment of hypertension. Aliskiren increases cardiac tissue kallikrein and bradykinin levels, both of which are important for cardioprotection. We showed previously that aliskiren reduced myocardial ischaemia-reperfusion injury via a bradykinin B2 and angiotensin AT2 receptor-mediated mechanism. In the present study, we investigated the effects of aliskiren on cardiac remodelling and haemodynamics post myocardial infarction (MI).

Design and method: Female Sprague-Dawley rats were subjected to either sham MI or MI produced by permanent ligation of the left anterior descending coronary artery. MI rats were then randomly divided into 4 treatment groups at 2 days post MI: vehicle (n=11), aliskiren (10 mg/kg/day s.c.; n=8), valsartan (30 mg/kg/day p.o.; n=8), or the combination of aliskiren and valsartan (n=11). Cardiac function was assessed by echocardiography and in vivo pressure-volume loop analysis of haemodynamics at 28 days post MI.

Results: None of the treatments affected body weight. Neither aliskiren nor valsartan influenced systolic blood pressure (SBP) as assessed by tail cuff plethysmography, whereas the combination of aliskiren and valsartan reduced SBP by 12 mmHg (P=0.016). Untreated MI rats developed left ventricular dilation, with higher end-diastolic volumes (530±60 µl c.f. 370±30 µl) and end-systolic volumes (300±50 µl c.f. 120±10 µl) when compared with sham MI rats. Untreated MI rats had reduced ejection fraction (45±4% c.f. 69±2%) and fractional shortening (20±2% c.f. 43±3%) as compared to sham MI rats. Treatment with either aliskiren or valsartan alone improved ejection fraction to 53±4% and 56±4%, and the improvement with combination therapy at 57±4% was statistically significant. Fractional shortening improved significantly with aliskiren (32±3%) and valsartan (31±3%) alone, but the improvement with combination of aliskiren and valsartan (26±3%) did not achieve statistical significance. Apart from a lowering of SBP with valsartan and the combination of aliskiren and valsartan, there were no effects of treatment on haemodynamics.

Conclusions: We conclude that aliskiren and valsartan were similarly cardioprotective with no additional benefit from their combination.

PP.LB01.19 PREVALENCE, AWARENESS, TREATMENT AND CONTROL OF ARTERIAL HYPERTENSION IN ASTANA, KAZAKHSTAN. CROSS-SECTIONAL STUDY

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Objective: The aim of the study was to assess the prevalence, awareness, treatment, and control of arterial hypertension and factors associated with these indices in a population sample of Astana, the capital of Kazakhstan.

Design and method: We conducted a cross-sectional study of subjects randomly selected from registers of subjects aged 50-75 years attached to outpatient polyclinics in Astana city, Kazakhstan. A total of 497 adults (response rate 56%) completed a questionnaire and underwent an examination in a clinic. Hypertension was defined as a mean systolic and/or diastolic blood pressure of more or equal to 140/90 mmHg and/or antihypertensive medication use during the last 2 weeks.

Results: The overall prevalence of hypertension was 70%. Among hypertensive subjects, 91% were aware of their condition, 77% took antihypertensive medications, and 34% had blood pressure controlled (<140/90 mmHg). The prevalence of hypertension and its awareness, treatment and control was more common in women, among persons aged 60 years of more and (except control) among those with high body mass index. None of several available socioeconomic measures was associated with any of hypertension indices.

Conclusions: The levels of awareness, treatment and control of hypertension were higher than in most Eastern European and Central Asian populations with available data, most likely reflecting high education and large proportion of civil servants in the new capital city. However, even in this relatively privileged population the rates of successful control of hypertension were modest.

PP.LB01.20 EPIDEMIOLOGICAL EVALUATION OF CARDIOVASCULAR RISK FACTORS IN PATIENTS WITH THEIR FIRST CONSULTATION WITH CARDIOLOGIST

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Objective: Cardiovascular risk factors are the leading cause of morbidity and mortality, many FR are modifiable or eradicable.
Interhart`s study showed 9 risk factors are the main cause of cardiovascular events, and that the presence of more than 1 of risk factor increases exponentially the probability of the event.
Determine the percentage of presence of each of the risk factors in patients who arrive at the first cardiological consultation by age and sex.
Determine the percentage of population at risk (presence of 3 or more risk factors) of the total population by age and sex.

Design and method: Retrospective and consecutive registration where CV risk factors of patients who attended the first consultation with the cardiologist was evaluated.
1010 patients between September 2011 and August 2012, with 465 men (46.1%) and 545 women (53.9%) were included; young (<45 years) 429P (42.5%) and adults (> 46 years) 581p (57.5%).
Completed a medical record where ask about the presence of known risk factors by patients.
Rates of incidence and frequency rates by age, sex and their combination were analyzed.

Results:

RISK FACTORS (FR)	Man		Woman		TOTAL
	Young	Adult	Young	Adult	
Without Sedentary	27%	21%	19%	33%	18,5%
With Sedentary	18%	28%	24%	30%	81,5%
Without Diabetes	23%	30%	22%	26%	87,8%
With Diabetes	7%	41%	9%	43%	12,2%
Without Hypertension	26%	18%	33%	23%	47,9%
With Hypertension	13%	35%	14%	38%	52,1%
Without Dyslipemia	22%	24%	30%	24%	86,4%
With Dyslipemia	14%	32%	9%	45%	13,6%
Without Overweight	20%	9%	40%	31%	32,2%
With Overweight	19%	35%	15%	31%	67,8%
Without Smoking	18%	26%	23%	33%	69,1%
With Smoking	23%	27%	23%	27%	30,9%
Without Estres	21%	20%	24%	29%	69,5%
With Estres	17%	29%	22%	32%	30,4%
Over 3 FR	46%	84%	58%	76%	65,7%
Within 3 FR	54%	16%	42%	24%	34,3
Sample	42,15%	57,85%	42,75%	57,25%	
	455 (46,1%)		545 (53,9%)		
	1010				

YOUNG (16 A 45 years) 42,5% (233 M / 196 W)
ADULTOS (>46 years) 57,5% (312 M / 269 W)

Conclusions: The Risk Factors have higher incidence in the adult population (> 45 years).
The combination of more than 3 FR is more common in adulthood, regardless of the sex of the sample.
These findings are consistent with most studies and force us to reinforce strategies in health promotion and primary prevention, especially in the adult population.

PP.LB01.21 ASSESSMENT OF FACTORS CONTRIBUTING TO ARTERIAL HYPERTENSION DEVELOPMENT IN GREEK AIR FORCE PILOTS

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Objective: Hypertension represents one of the most important public health problems worldwide. Early detection and treatment is imperative in order to decrease cardiovascular morbidity and mortality. Although flight environment appears to contribute to higher values of blood pressure, fighter pilots do not present statistically significant blood pressure changes over time, according to the literature. The purpose of this study was to investigate the factors contributing to early presentation of hypertension in military air force pilots.

Design and method: In this cross sectional study, 300 pilots and 600 ground personnel working in Hellenic Air-Force were assessed. Participants were randomly selected from each group's medical files. Blood pressure levels were measured in five successive visits with approximately one week interval. Demographics, dietary habits and lifestyle factors as well as laboratory exams were recorded.

Results: Overall pilots' health condition is outstanding. Mean age was 39.09 ± 7.95 years. Mean systolic and diastolic blood pressure was 117.51 mmHg and 77.02 mmHg, respectively. 200 pilots (66.7%) had optimal blood pressure, 80 (26.7%) had normal blood pressure and the remaining 20 (6.6%) had marginally normal blood pressure. Mean age of ground personnel was 40.4 ± 8.9 years. 438 people from ground personnel (73%) had normal blood pressure while 152 (25.3%) presented hypertension.
Pilots were exercising up to two times weekly (66.9%) or more (21.1%), while 36 didn't exercise at all (12%). Ground personnel were exercising up to two times weekly (61.5%) while, 25.3% of participants didn't exercise at all.
In addition, there was a high proportion of overweight pilots (48.67%) and smokers (31.7%). Factors that were found to influence systolic blood pressure levels were body mass index (BMI), flight hours, HDL values and exercise intensity in pilots and age, BMI, years of exercise and smoking, in ground personnel, respectively.

Conclusions: Blood pressure levels is within desirable limits in air force pilots, however, emphasis should be placed on the continuation of exercise programs for ground personnel. Smoking cessation interventions in both groups is needed as well as promotion of measures that can effectively lead to long standing lifestyle changes and dietary modifications.

PP.LB01.22 EFFECTS OF EXERCISE TRAINING ON RENIN-ANGIOTENSIN SYSTEM IN THE KIDNEY OF DAHL SALT-SENSITIVE RATS

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Objective: Exercise training (Ex) has anti-hypertensive and renal protective effects. Renin-angiotensin system (RAS) are involved in the regulation of blood pressure and renal damage. This study investigated the effects of the Ex on renal RAS in Dahl salt-sensitive rats.

Design and method: Six-week-old male Dahl salt-sensitive rats were divided into four groups: 1) normal salt diet (NS); 2) NS + Ex; 3) high salt diet (HS); 4) HS+ Ex. NS or HS groups were fed diet containing 0.6% or 8% NaCl, treadmill running was performed in Ex groups for 8 weeks (5 days/week; 60 min/day at 16-20 m/min, 0 % grade). Systolic blood pressure (SBP) was monitored by tail-cuff method. Urine samples were collected on ice for 24 hours with metabolic cage. After 8 weeks, blood samples were collected by decapitation, and kidney were quickly removed. Biochemical analyses of blood and urine samples were performed by standard autoanalysis technique. Protein expression of RAS components in renal cortex and medulla were investigated by western blotting.

Results: HS significantly elevated SBP, and Ex did not change SBP. HS significantly decreased creatinine clearance, but Ex significantly mitigated creatinine clearance. HS significantly increased urinary protein excretion, but Ex significantly suppressed urinary protein excretion. HS induced kidney weight gain and glomerular sclerosis, but Ex suppressed them. HS increased angiotensinogen expression (138 % and 328 %) and decreased renin expression (47 % and 24%) in the cortex and medulla. HS increased angiotensin II type 1 (AT1) receptor expression in the medulla (149 %) and Mas receptor expression in the cortex (198 %), but decreased angiotensin II type 2 (AT2) receptor expression in the cortex and medulla (53 % and 36 %) and Mas receptor expression in the medulla (20 %). Ex improved HS-increased angiotensinogen and AT1 receptor expressions only in the medulla. Ex improved HS-decreased renin expression in the cortex and medulla, and HS-decreased AT2 and Mas receptor expressions only in the medulla.

Conclusions: Ex improves HS-induced renal damage with changes of RAS component in the blood pressure-independent manner. These results suggest that Ex may have beneficial effects in HS-induced renal damage.

PP.LB01.23 PITAVASTATIN PREVENTS DEVELOPMENT OF HYPERTENSION WITH UPREGULATION AND ACTIVATION OF NITRIC OXIDE SYNTHASES IN THE KIDNEY OF SPONTANEOUSLY HYPERTENSIVE RATS

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Objective: Statins improve endothelial dysfunction by upregulation of endothelial nitric oxide synthase (NOS). However, the effects of statins on nitric oxide synthase (NOS) in the kidney remain to be elucidated. Thus, the aim of this study was to examine the effect of chronic treatment with pitavastatin (PTV) on blood pressure and renal NOS activity and expression in spontaneously hypertensive rats (SHR).

Design and method: Five-week-old male SHR were given PTV (2mg/kg/day) administration or vehicle by gavage for 8 weeks. The systolic BP (SBP) was measured by tail-cuff method. The plasma lipids and creatinine were determined. The activity of NOS was examined in the cortex, outer medulla and inner medulla of kidney. The expression of eNOS, neuronal NOS (nNOS), inducible NOS (iNOS) and the phosphorylated eNOS at Ser1177 (stimulation of eNOS activity) and Thr495 (inhibition of eNOS activity) in the kidney sections were analyzed by Western blot.

Results: SBP was significantly lower in PTV group than in control (CON) group (180±4 vs. 204±6 mmHg, $P<0.01$). The plasma lipids and creatinine had no differences between the groups, but the urinary albumin was 37% lower in PTV group than in CON group ($P<0.05$). The NOS activity in the outer medulla was 26% higher in PTV group than in CON group ($P<0.05$). The eNOS expression in the outer medulla was 90% higher in PTV group than in CON group ($P<0.01$). The nNOS or iNOS expression had no differences between the groups. The phosphorylation rate of eNOS at Ser1177 in cortex was 32% higher in PTV group than in CON group ($P<0.05$), while the phosphorylation rate of eNOS at Thr495 in outer medulla tended to reduce in PTV group.

Conclusions: Chronic treatment with PTV attenuates the development of hypertension in SHR without changes of plasma lipids or creatinine levels and up-regulates the expression of eNOS in the outer medulla and increases the phosphorylation rate in cortex. They suggest that the depressor effect of PTV may be mediated in part by an increase in the renal medullary NO production and phosphorylation in cortex.

PP.LB01.24 PRACTICAL OF AMBULATORY BLOOD PRESSURE MONITORING (ABPM) IN BRAZZAVILLE, CONGO: PRELIMINARY DATA

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Objective: To evaluate the contribution of ABPM in the management of hypertension in Brazzaville.

Design and method: This descriptive cross-sectional study was conducted to Brazzaville between January 2011 and December 2013. It included a consecutive series of 1040 patients having profited from an Ambulatory Blood Pressure Monitoring (ABPM). We used the TONOPORT V and the software Cardiosoft 6.51 of GE Health Care, respectively for the recording and the data analysis. The threshold fixed on the average of 24-hour was BP < 130/80 mmHg for the controlled patients. Hypertension confirmation was defined as daytime BP average > 135/85 mmHg.

Results: They were 573 men (55%) and 467 women (45%), old on average of 51.7 ± 10.6 years (ranges: 22 and 89 years). The indication of ABPM was therapeutic evaluation in 627 cases (60.3%), diagnosis of hypertension in 410 cases (39.4%), and suspicion of white-coat hypertension in three cases. In the diagnosis indication, hypertension was confirmed in 303 cases (74%). The 24-hour average was 139 ± 12 mmHg for SBP and 89.7 ± 9.6 mmHg for DBP ; 141.2 ± 13.9 mmHg of SBP and 92.4 ± 10.0 mmHg of DBP in daytime; 131.1 ± 13.5 mmHg of SBP and 80.7 ± 9.9 mmHg of DBP in nighttime. In the therapeutic evaluation, hypertension was controlled among 220 patients (35%). The 24-hour average was 139 ± 14 mmHg for SBP and 88.1 ± 10 mmHg for DBP. The daytime and nightime averages were respectively 140.7 ± 14.0 mmHg and 133.1 ± 16.2 mmHg for SBP, 90.3 ± 10.5 and 81.1 ± 10.9 mmHg for DBP. The antihypertensive protocol used was a monotherapy in 126 cases (22%), bitherapy in 270 cases (47%), triple therapy in 149 cases (26%), quadri-therapy or more in 29 cases (5%).

Conclusions: This preliminary study showed the importance of the ABPM like diagnostic tools and therapeutic evaluation. Its rational use in our context would make it possible to improve the management of the hypertensive patients.

PP.LB01.25 HYPERTENSION AND RATE CONTROL IN BRAZZAVILLE, CONGO: PLACE OF AMBULATORY BLOOD PRESSURE MONITORING (ABPM)

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Objective: To evaluate the rate control in the hypertensive patients and to identify the predictive factors of non-control.

Design and method: It was about a cross-sectional study with prospective collection of data over one period 36 months. It has been held in Brazzaville, and included a consecutive series of 620 hypertensive patients known and treated for at least six weeks, having profited from an Ambulatory Blood Pressure Monitoring (ABPM) with therapeutic aiming. We used the TONOPORT V and the software Cardiosoft 6.51 of GE Health Care, respectively for the recording and the data analysis. The threshold fixed on the average of 24-hour was BP < 130/80 mmHg, and the patients divided into two groups according to whether they were or not controlled.

Results: They were 352 men (56.8%) and 268 women (43.2%), old on average of 53.8 ± 9.7 years (ranges: 29 and 89 years). The standard of living of the patients was average in 330 cases (53.2%), weak in 132 cases (21.3%), and high in 71 cases (11.5%). The other associated risk factors were sedentariness in 275 cases (44.4%), overweight/obesity in 134 cases (21.6%), dyslipidemia in 121 cases (19.5%), diabetes mellitus in 90 cases (14.5%), and tobacco addiction in 25 cases (4%). The hypertension, old of 5.8 ± 5.7 years on average, was controlled among 215 patients (34.7%). The 24- hour BP average was 139 ± 14 mmHg for the SBP and 88.2 ± 10.2 mmHg for the DBP. The awake and asleep BP averages were respectively 141 ± 14 mmHg and 133 ± 16.2 mmHg for the SBP, 90.5 ± 10.5 and 81.2 ± 11.1 mmHg for the DBP. The antihypertensive protocol used was a monotherapy in 130 cases (21%), bitherapy in 287 cases (46.3%), triple therapy in 154 cases (24.8%), quadri-therapy or more in 27 cas (4.3%). Prevalence of non-dipping was 43%. Age and male gender were the significant predictors of poor control.

Conclusions: The rate control of hypertension in our study population remains low. Its improvement passes by the education of the hypertensive patients and the improvement of their living conditions.

PP.LB01.26 DIAGNOSTIC AND EVOLUTION PARTICULARITIES IN A PATIENT WITH PRIMARY HYPERALDOSTERONISM

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Objective: We present you the case of a patient with primary hyperaldosteronism confirmed by biochemical, imaging and histopathological tests.

Design and method: Female, 52 years old, is transferred from Neurology Clinic, where was admitted for proximal nontraumatic tetraparesis, for anterior chest pain accompanied by ECG changes (diffuse ST segment depression of 4 mm and U wave) and the cytolysis markers (CK, CK -MB, AST). Patient's personal history is positive for hypertension (TAmax 200/100mmHg) and ischemic cardiac disease (rest ECG changes, no specific clinical manifestations) from the age of 40, received treatment with beta-blocker and ACE inhibitor; 3 days prior to symptomatology onset the patient received in addition to this treatment a thiazide diuretic. At admission, laboratory investigations revealed normal haematological profile and renal function, but severe hypokalemia, mild hypernatremia, elevated cytolysis enzymes, with normal troponin; the echocardiographic assessment revealed normal cardiac kinetics. Suspicion of hyperaldosteronism was raised and sustained by an additional argument - the presence of a left adrenal tumor evident on abdominal CT. Left laparoscopic adrenalectomy was performed, given the latency of hormonal results, severe hypokalaemia, resistent to correction attempts, and left adrenal tumor present on abdominal CT with characteristics of an adenoma.

Results: Histopathological exam and favorable postoperative evolution of patient, with hypokalemia remission and normalization of blood pressure in the absence of antihypertensive therapy, sustained the diagnostic of primary hyperaldosteronism with secondary hypertension.

Conclusions: Recent studies report an increasing frequency of hyperaldosteronism in hypertensive population. Only a minority of patients with hyperaldosteronism (9-37%) presents with hypokalemia, often suggested by clinical and laboratory examinations. However, the usefulness of electrolyte analysis in the initial evaluation of the hypertensive patient should not be overlooked, and this fact is supported by our case.
The peculiarity of this case consists in the delay in the diagnosis, in a patient with primary hyperaldosteronism, hypertensive from the age of 40; the diagnostic was revealed by the thiazide diuretic associated to the antihypertensive treatment. In addition, we can mention the severe, treatment-resistant hypokalemia and also the numerous differential diagnostic problems that have imposed in the initial approach of this patient.

PP.LB01.27 HYPERTENSION IN PATIENTS WITH POLYCYSTIC KIDNEY DESEASE: A COMPARATIVE STUDY

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Objective: Hypertension (HT) is a common early finding in autosomal dominant polycystic kidney disease (ADPKD) even before any significant reduction in glomerular filtration rate.We aim to show the clinical presentation, the impact on renal function and overall survival between patients with ADPKD with and without hypertension.

Design and method: It is a retrospective analysis of 336 patients admitted with ADPKD between January 1970 and December 2013. We divided them into two groups with and without HT .We considered patients with hyper tension those who presented a systolic blood pressure (BP) above 140 mmHg or a diastolic BP above 90 mmHg on admission or who have history of HT.

Results: The average age is 49, 8 years old (extremes:8-79)with a sex ratio H/F at 1,03. The group with HT includes 139 patients, the mean BP on

admission was 123, 74 mm Hg (extremes: 110-206). 82% of patients had already chronic HT, 50% of them were admitted with renal failure. Initial mean creatinine was estimated at 673 µmol/l [extremes: 60-2457]. The end-stage renal failure (ESRF) was retained in 70% of cases. Angiotensine converting enzyme inhibitors were the most used in the treatment of hypertension: 44%, calcium channel blockers: 30.2%, diuretics: 6.1% and beta blockers: 2%. HT is well controlled on treatment in 73% of cases. Among the 139 patients, 48 died by cardiovascular causes, 39were lost to view. The survival rate, calculated on a 5-year basis is estimated to 52% of cases. Six patients received a kidney transplant (KT) with a good clinical outcome. For the second group which includes 197 cases, initial mean creatinine was estimated at 118 µmol/l (extremes: 60-198). The ESRF was retained in 41% of cases and 14 patients received a KT with a good clinical outcome.

Conclusions: It has been suggested as the pathogenesis of HT in ADPKD that cyst expansion, leading to renal ischemia and enhanced renin release, is responsible for at least the initial rise in BP. Early and rigorous treatment of HT is beneficial in more ways than one: prevention of cardiovascular complications and slower degradation renal function.

PP.LB01.28 PRE-HYPERTENSION OR PRE-DIABETES: WHICH IS BETTER FOR PREDICTING CARDIOVASCULAR EVENTS?

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Objective: The present study aimed to assess the value of these factors to predict cardiovascular events including myocardial infarction, brain stroke, and sudden cardiac death in general population.

Design and method: A population-based, cross-sectional survey was conducted representing a great sample of the general Iranian population, aged 19 years and older, from the Isfahan Province and determined using a random, multistage cluster-sampling scheme. The three endpoints considered as study outcome were acute occurrence of myocardial infarction, brain stroke, and sudden cardiac death.

Results: Of the 5398 studied subjects scheduled for assessing diabetes state, 536 were diabetics and 623 were pre-diabetics and other were non-diabetics. Also, of 6323 participants who scheduling for assessment of blood pressure abnormalities, 506 had hypertension, 461 had pre-hypertension, and other ones were normotensive. Adjusted for gender and age variables, pre-diabetes status could effectively predict occurrence of myocardial infarction (OR = 1.965, 95%CI: 1.135-3.401, P = 0.016), but did not predict appearance of brain stroke or sudden cardiac death. In the same logistic models, pre-hypertension status could not predict any of these events after adjustment for gender and age.

Conclusions: Our data provide valuable evidences on triggering role of pre-diabetes on appearance and progression of acute ischemic events even in healthy individuals. In this line, the value of pre-diabetes for predicting acute myocardial infarction is clearly superior to pre-hypertension state.

PP.LB01.29 ADIPOKINE APELIN ACTIVITY IN PATIENTS WITH ESSENTIAL HYPERTENSION AND CENTRAL OBESITY

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Objective: Obesity has been consistently associated with hypertension and increased cardiovascular risk.
BMI as a measure of obesity is a good predictor of all-cause and cardiovascular mortality, cardiovascular mortality seems to be better predicted by abdominal or central obesity in addition to BMI.

Design and method: Aim of the study: to investigate apelin's activity in patients with essential hypertension with obesity according to the type of obesity.
96 patients with essential hypertension were examined. Inquiring, inspection and laboratory investigations were provided. Diagnosing was done according ESH 2009 guidelines. Apelin-12 plasma levels were detected using ELISA (Phoenix pharmaceuticals).

Results: The average means of BMI – Me-Q25-Q75 (30,47 (27,70; 33,70) kg/m2) and apelin level (0,28 (0,16; 0,48) ng/ml) in total group were significantly higher in comparing with control group (BMI – 21,23 (18,96; 23,12) kg/m2and apelin – 0,12 (0,10; 0,15) ng/ml). Patients were categorized into 4 cluster groups based on k-means according apelin and BMI data. No significance were in WC data between patients of 3rd and 4th clusters, but the opposite apelin activity was detected. In cluster 4, adipokine's activity was the lowest one from total amount of patients and in cluster and was associated with pronounced carbohydrate disorders and dyslipidemia. In patients of 3rd cluster apelin level was the the highest one and was associated with lowest IL-6 range. Analysis of apelin's interrelations in total group showed significant correlations with WC (R=0,23, p<0,05), fasting insulin (R=0,29, p<0,05), -post OGTT glucose and insulin levels (R=0,39, R=0,41 respectively, p<0,05), -HOMA index (R=0,24, p<0,05) and HbA1c (R=0,24, p<0,05).

Conclusions: The increased level of peptide apelin in hypertensive patients with central type of obesity was detected. Overexpression of apelin in hypertensive patients with moderate abnormalities in lipid and carbohydrate metabolism is considered as compensatory reaction. Increasing of plasma apelin level in initial stage of obesity may play protective role by delaying the development of type 2 diabetes mellitus.

PP.LB01.30 DIFFERENCES IN PULSE PRESSURE VALUES IN PATIENTS WITH MICROVASCULAR ANGINA AND ACUTE CORONARY SYNDROME

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Objective: Microvascular angina, syndrome of angina and normal coronary arteries, includes a heterogeneous group of patients with typical chest pain, positive exercise stress test and angiographically smooth epicardial coronary arteries. Acute coronary syndrome (ACS) includes patients with unstable angina pectoris, myocardial infarction without ST segment elevation (NSTEMI) and myocardial infarction with ST segment elevation (STEMI). The aim of this study was to examine differences in pulse pressure values in patients with microvascular angina and acute coronary syndrome patients with unstable angina, STEMI and NSTEMI.

Design and method: This study included 300 patients, of whom 75 with microvascular angina and 225 patients with acute coronary syndrome (75 patients with unstable angina, 75 patients with NSTEMI and 75 patients with STEMI) who were treated at the Clinic for Cardiology, Clinical Centre Kragujevac in the period from 2005. to 2013. All patients with microvascular angina were taken into account, and patients with acute coronary syndrome were randomised using randomising tables. Blood pressures were measured 30 minutes after admission. Pulse pressure was calculated as a difference between systolic and diastolic pressure. All data was entered into SPSS and statistically processed using descriptive and analytical methods.

Results: Pulse pressure values were significantly different between the patients with microvascular angina and all patients with acute coronary syndrome, with higher values of pulse pressure in patients with ACS (49.72 ± 9.341 versus 54.67 ±14.691, p=0.001). When comparing pulse pressures values between the groups (microvascular angina vs. unstable angina, NSTEMI and STEMI) significantly higher values were noticed between patients with microvascular angina and unstable angina (49.72 ± 9.341 versus 55.14 ± 12.471, p=0.004) and between patients with microvascular angina and NSTEMI (49.72 ± 9.341 versus 56.64 ± 16.279, p=0.002),while there was no statistically significant difference between patients with microvascular angina and STEMI (49.72 ± 9.341 versus 52.36 ± 15.005, p=0.201).

Conclusions: Values of pulse pressure were significantly different between patients with microvascular angina and acute coronary syndrome, and between patients with microvascular angina and unstable angina and NSTEMI, while there wasn't statistical significancy between patients with microvascular angina and STEMI.

PP.LB01.31 DIFFERENCES IN THE VALUES OF SYSTOLIC BLOOD PRESSURE IN PATIENTS WITH MICROVASCULAR ANGINA AND ACUTE CORONARY SYNDROME

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Objective: Microvascular angina or cardiac syndrome X, describes patients with anginal chest pain, signs of ischemia on ECG and a positive stress test, but with non-obstructive coronary angiography. Acute coronary syndrome (ACS) includes patients with unstable angina pectoris, myocardial infarction without

ST segment elevation (NSTEMI) and myocardial infarction with ST segment elevation (STEMI). The aim of this study was to examine differences in systolic blood pressure in patients with microvascular angina and acute coronary syndrome patients with unstable angina, STEMI and NSTEMI.

Design and method: This study included 300 patients, of whom 75 with microvascular angina and 225 patients with acute coronary syndrome (75 patients with unstable angina, 75 patients with NSTEMI and 75 patients with STEMI) who were treated at the Clinic for Cardiology, Clinical Centre Kragujevac in the period from 2005. to 2013. All patients with microvascular angina were taken into account, and patients with acute coronary syndrome were randomised using randomising tables. Systolic blood pressure was measured 30 minutes after admission. All data was entered into SPSS and statistically processed using descriptive and analytical methods.

Results: Systolic blood pressure significantly differed between patients with microvascular angina and all patients with acute coronary syndrome, with significantly higher values in patients with acute coronary syndrome (131.18 ± 15.485 versus 138.29 ± 22.457, p=0.013). When comparing systolic blood pressures between the groups (microvascular angina vs. unstable angina, NSTEMI and STEMI) significantly higher values were noticed only between patients with microvascular angina and NSTEMI (131.18 ± 15.485 versus 141.64 ± 22.805, p=0.002); while in other groups, no statistical significancy was noticed MVA vs. unstable angina (131.18 ± 15.485 vs. 135.96 ± 17.031, p=0.079) and microvascular angina vs. STEMI (131.18 ± 15.485 vs. 133.41 ± 26.401, p=0.535).

Conclusions: Values of systolic blood pressure were significantly different between patients with microvascular angina and acute coronary syndrome, and between patients with microvascular angina and NSTEMI, while there wasn't statistical significancy between other groups of patients.

PP.LB01.32 ESTROGENS MODULATE ALDOSTERONE SYNTHASE VIA GPER-1 AND ESTROGEN B RECEPTORS

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Objective: Fertile women have lower blood pressure (BP) value and cardiovascular risk than age-matched men, which suggests that estrogens exert cardiovascular protective effects. However, if 17 β-estradiol modulates aldosterone secretion and thereby the gender dimorphism of BP is unknown.
We therefore investigated the effect of 17 β-estradiol on aldosterone synthesis and the involved receptor subtypes in humans.

Design and method: We used gene and protein expression studies in human adrenal tissues ex vivo and performed in vitro functional experiments in the adrenocortical cells HAC15.

Results: The most expressed estrogen receptor was the estrogen receptor β (ERβ) and the G protein-coupled receptor-1 (GPER-1) in the human adrenal cortex and aldosterone-producing adenoma cells, respectively. 17 β-estradiol (10 nmol/L) markedly increased the expression of aldosterone synthase and the production of aldosterone (5 to 7 fold vs baseline, p <0.001) after selective ERβ blockade. Under the same conditions the GPER-1 receptor agonist G-1 (10 nmol/L) mimicked this effect. Co-treatment with the GPER-1 receptor antagonist G15, or with a selective protein kinase A (PKA) inhibitor (Rp-8-Br-MB-cAMPS) abrogated this increase. Silencing of the ERβ significantly raised aldosterone synthase expression and aldosterone production.

Conclusions: In humans 17 β-estradiol inhibits aldosterone synthesis by acting via ERβ. Blockade of ERβ unmasks a potent secretagogue effect of 17 β-estradiol that involves PKA signaling.

PP.LB01.33 HYPERTENSIVE EMERGENCY AND HYPERTENSIVE URGENCY: PRECLINICAL PREVALENCE, ORGAN MANIFESTATION AND TREATMENT

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Objective: The aim of the study was the investigation of preclinical prevalence, organ manifestation and treatment of hypertensive urgencies and emergencies.

Design and method: Data of patients who had called the Viennese emergency ambulance system due to hypertensive urgency or hypertensive emergency in 2011 were collected and analyzed. Hypertensive urgency was defined by increased blood pressure above 180/100 mmHg without end organ damage and hypertensive emergency was defined by blood pressure above 180/100 mm Hg with end organ damage. This analysis included following key parameters: blood pressure, sex, age, hospital admission, medication, electrocardiogram, Glasgow Coma Scale, NACA-Score, symptoms and end organ damage.

Results: Out of 165.811 emergency calls a total of 1552 (0,9 %) patients (1051 women; 68%) were included into the study (hypertensive urgencies n=1334; 86% and hypertensive emergencies n= 218; 14%). The average age was 72 years. 1357 (87%) patients had to be hospitalized. In hypertensive urgency and emergency systolic (210 ± 21mm Hg vs 220 ± 24 mm Hg, p= 0,985) and diastolic (110 ± 17mm Hg vs 110 ± 17 mm Hg; p= 1) blood pressures did not differ. The prevalence of women in hypertensive urgency was higher (n=939, 70%) and women were older than men (73y ± 13y vs 65y ± 15y; p = 0,000). In hypertensive emergency the number of women (n=112; 51%) and men (n=108; 49%) was balanced, but women were older than men (77y ± 13y vs 67y ± 13y; p = 0,014). The most frequently symptom in hypertensive urgency was chest pain (24%) and in hypertensive emergency dyspnoea (57%). The distribution of end organ damages for hypertensive emergency was acute left ventricular failure (49%), acute coronary syndrome (26%) and transient ischemic attack (TIA), stroke or cerebral hemorrhage (24%).

Conclusions: Hypertensive urgency and emergency did not differ in blood pressure values but in symptoms. More than half of the patients were women and women were older than men. Hypertensive urgency and emergency is a less common cause for the consultation of the emergency ambulance of Vienna but most patients had to be hospitalized.

PP.LB01.34 COUNTRY OF BIRTH MODIFIES THE ASSOCIATIONS OF BODY MASS AND HBA1C WITH OFFICE BLOOD PRESSURE IN MIDDLE EASTERN IMMIGRANTS AND NATIVE SWEDES

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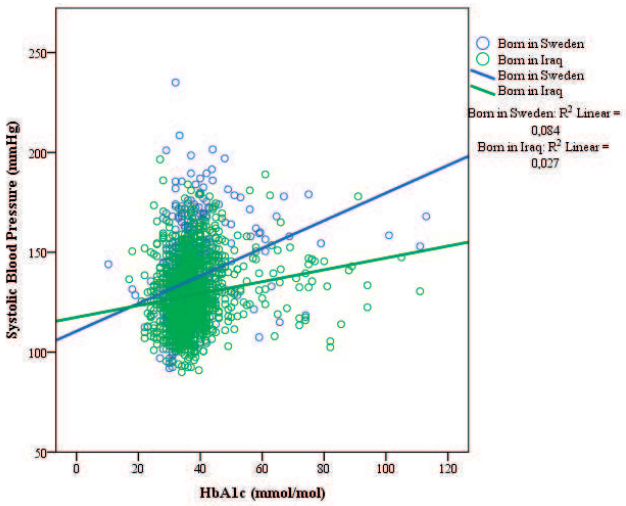
Objective: Immigrant populations from the Middle East are at high risk of obesity and diabetes, but paradoxically hypertension is reported to be less prevalent. Studies of risk factors for hypertension in these populations are scarce. The aim was to study the distribution of cardiovascular and metabolic risk factors in a Middle Eastern immigrant population compared with native Swedes.

Design and method: A population-based, cross-sectional study of men and women, aged 30–75 years, born in Iraq or Sweden, was conducted in 2010–2012 in Malmö, Sweden. A 75-g oral glucose tolerance test was performed and sociodemographic and lifestyle data were collected.

Results: In Iraqi (n=1311) versus Swedish participants (n=698), without a history of CVD, the metabolic syndrome (MetS) was more prevalent in the Iraqis (49.2 vs. 40.3%, p<0.001). Iraqis presented with higher prevalences of all but one MetS entity: hypertension (46.0 vs. 61.3%, p<0.001, data adjusted for age, sex and antihypertensive medication). Being born in Iraq independently decreased the risk of elevated systolic blood pressure (SBP) and diastolic blood pressure (DBP). Furthermore, higher BMI, waist circumference, pulse rate and HbA1c values presented weaker associations with SBP and DBP in Iraqis than in Swedes. These relationships were confirmed by interactions with country of birth. Systolic blood pressure in relation to HbA1c in Irais and Swedes are presented in Figure 1.



Conclusions: Our study presents novel data suggesting that blood pressure-regulating mechanisms differ in a Middle Eastern compared with a non-migrated native European population. Further studies are needed for a better understanding of the mechanisms contributing to CVD in populations of different ethnic origins.

PP.LB01.35 MAY SPECKLE TRACKING IMAGING BE USEFUL IN HYPERTENSIVE HEART DISEASE?

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Objective: Hypertension (HTN) is recognized to be leading cause of heart failure. Novel imaging modality techniques such as speckle tracking have allowed for early detection of both regional and global myocardial contractile dysfunction. We hypothesized that abnormalities in myocardial deformation might be present among hypertensive subjects in order to identify and manage patients at high risk for heart failure.

Design and method: Prospective study including 44 patients with asymptomatic HTN (G1) enrolled in department of cardiology of Sfax, Southern Tunisia. Exclusion criteria were history of diabetes, proved coronary heart disease or myocardial infarction, severe valvular heart diseases, and atrial fibrillation.

Results: Mean age was 55.9 years and sex ratio was 0.76.

Baseline echographic parameters were summarized in table1.

Variable	Mean value
LV* mass in men/ women (g/m²)	146.9 ± 53.3 / 105 ± 41.2
LV* Ejection fraction (%)	61.1 ± 8
LA** area (cm²)	17.2 ± 3
LA** biplan volume (ml/m²)	26.3 ± 7.8
Mean LV* GLS[1] (%)	-19 ± 3
PLAS[2] (%)	25.8 ± 8

* Left ventricle ** Left atrium [1: Global longitudinal strain 2: Peak systolic longitudinal left atrial strain

LV hypertrophy (LVH) was noted in 28 patients with predominantly eccentric phenotype in 75%. Only 3 patients had a normal LV geometry. Concentric remodeling was identified in 13 patients. Despite of preserved LVEF (>50%), 13 patients experienced impaired GLS below -18%. When LVH was eccentric, GLS was significantly more altered as compared to concentric remodeling (-17.4 vs. -20.3; p= 0.012) or concentric LVH (-17.4 vs. -20.1; p= 0.045). LA was larger in patients with LVH (18 cm² vs. 15.8 cm²; p= 0.035) and more LA was dilated more PLAS was altered. PALS was below 35% in 13 cases among patients with dilated LA. (59.1% vs. 90.9%; p= 0.034; OR = 6.9) PLAS was significantly lower in men (25.3% vs. 30.9%; p= 0.023) and LVH patients (26.5% vs. 31.8%; p= 0.038).There was a correlation between GLS and LV mass (p= 0.001; r= 0.477). PALS was correlated to LA volume (p=0.005; r=-0.42), LV mass (p= 0.02; r= -0.35) and LV EF (p=0.043; r= 0.32). A strong negative correlation was found between PALS and GLS (p= 0.0001; r= -0.7).

Conclusions: This study highlights the benefits of 2D strain imaging in the diagnosis of hypertensive heart disease because it participate to find out early changes of LV and LA structure and function.

PP.LB01.36 INSULIN RESPONSE TO ORAL GLUCOSE LOAD IN PATIENTS WITH ESSENTIAL HYPERTENSION

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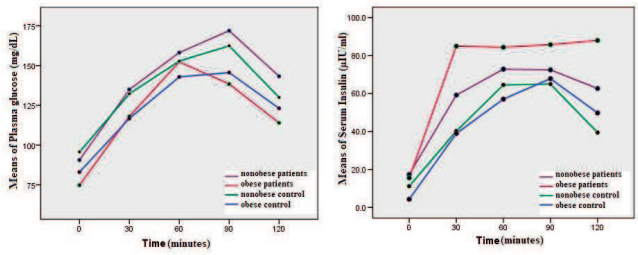
Objective: The aim of this study is to compare changes in blood pressure (BP), plasma glucose (PG) and insulin level after ingestion of an oral glucose load in obese and nonobese normotensive and hypertensive subjects.

Design and method: Standard oral glucose tolerance test was performed to 20 newly diagnosed untreated patients with essential hypertension and 15 normotenisve control subjects matched for age gender and BMI. Smokers and subjects with diabetes, hyperlipidemia, cardiac or renal disease or taking medications were excluded. Subjects were monitored for 2 hours. Half hourly BP, PG, serum electrolytes (Na+ and K+) and insulin were measured.

Results: Subjects were classified into obese (MBI> 30 Kg/m2) (11 patients, 8 normotensives) and nonobese (MBI< 30 Kg/m2) (9 patients, 7 normotensives).
Obese hypertensive patients showed significantly higher fasting (P=.02) and post load insulin response compared with obese normotensive subjects (P=.02); despite no significant difference in PG between them. The difference in serum insulin response between the obese and nonobese patients was not significant. Serum K decreased significantly in obese and nonobese normotensive and hypertensive subjects after intake of glucose, but it was significantly higher in obese normotensive than in obese hypertensive patients (P=.009).
In obese and nonobese hypertensive subjects glucose intake was associated with significant drop in diastolic BP (P< .005), (P< .05) and mean BP (P< .05), (P< .05) respectively. In normotensive subjects BP did not change significantly. However, PG in nonobese normotensive subjects correlated positively with systolic (P=.02), diastolic (P=.02) and mean BP (P=.009).



Conclusions: The higher insulin response in obese patients to OGTT and the positive correlation of PG with BP in nonobese normotensive subjects suggest that glucose homeostatic system may be involved in development of hypertension. The drop in BP in hypertensive patients following glucose ingestion suggests that disturbed balance between vasodilator and delayed vasoconstrictor sympathetic response caused by high insulin may play a role in pathophysiology of hypertension.