

## POSTER SESSION 4

Tuesday 20 May 2014 08:30–12:30

Location: Poster Area

## ACUTE HEART FAILURE – POSTER PRESENTED

## P1608

**Indices of vascular function in acute heart failure patients; comparison between patients with ischemic and non-ischemic etiology of heart failure**M Bougiakli<sup>1</sup>; S Giannitsi<sup>1</sup>; A Bechlioulis<sup>2</sup>; I Gkirdis<sup>2</sup>; A Kotsia<sup>1</sup>; L Lakkas<sup>2</sup>; S Antoniou<sup>1</sup>; CS Katsouras<sup>2</sup>; LK Michalis<sup>2</sup>; KK Naka<sup>2</sup><sup>1</sup>Michaelidion Cardiac Center, University of Ioannina, Ioannina, Greece;<sup>2</sup>Department of Cardiology, University of Ioannina, Ioannina, Greece

**Purpose:** Vascular function is known to be impaired in atherosclerosis. Its role in Heart Failure (HF) has been little studied and may differ depending on the etiology of HF. The aim of the study was to investigate indices of vascular function in consecutive patients hospitalized with acute heart failure (AHF) in relation to the presence of ischemic heart disease (IHD).

**Methods:** Consecutive patients admitted with AHF syndrome (new onset or decompensated chronic heart failure) were studied. A comprehensive medical history was taken to establish IHD etiology of HF. Standard demographic, clinical and laboratory parameters were recorded. A complete echocardiographic study, a 6-minute walking test (6MWT) and peripheral vascular studies were performed in all subjects 24-48 hours prior to discharge. Vascular studies included assessment of brachial artery flow mediated dilation (FMD), carotid-femoral pulse wave velocity (PWV), central augmentation index, estimated central aortic pressures, large and small vessel compliance using tonometry and ankle-brachial index (ABI). Patients with recent acute coronary syndromes, other severe chronic diseases and atrial fibrillation were excluded.

**Results:** We enrolled 73 patients (mean age 72 years, 78% males); 43 (59%) had HF due to IHD. The 2 groups (IHD vs nonIHD patients) did not differ significantly in age, gender, smoking habits or renal function. IHD patients had greater prevalence of diabetes, hypertension and dyslipidemia and received more aldosterone antagonists, beta-blockers, amiodarone and statins (all  $p < 0.05$ ). Left ventricular ejection fraction (LVEF) was  $35 \pm 13\%$  and  $41 \pm 18\%$  in IHD vs nonIHD respectively ( $p = 0.094$ ). Left atrium volume was lower in IHD patients ( $p = 0.022$ ). NYHA functional class and performance on 6MWT did not differ between the 2 groups. In IHD, ABI was lower ( $0.86 \pm 0.14$  vs  $0.93 \pm 0.15$ ,  $p = 0.039$ ) and there was a trend for higher PWV ( $12.7 \pm 4.4$  vs  $10.9 \pm 3.2$ ,  $p = 0.068$ ) compared to nonIHD patients. No statistically significant differences in hemodynamics or other vascular function indices were observed between the 2 groups.

**Conclusion:** In patients hospitalized with AHF, vascular function indices (with the exception of ABI) did not appear to differ depending on the presence of IHD despite a worse risk factor profile in IHD patients. ABI was found to be impaired in association with IHD. These findings indicate that the HF process may be associated with vascular changes independent of atherosclerosis.

## P1609

**Percentage reduction in serum potassium levels predicts 180-day mortality in patients hospitalised for acute decompensated heart failure**K Salah<sup>1</sup>; WEM Kok<sup>1</sup>; LWM Eurlings<sup>2</sup>; M Metra<sup>3</sup>; S Stienen<sup>1</sup>; JGP Tijssen<sup>1</sup>; YM Pinto<sup>1</sup>

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**Purpose:** There is still little known about the prognostic value of serum potassium changes during hospitalisation in patients hospitalised for acute decompensated heart failure (ADHF).

**Methods:** Our study is an individual patient data meta-analysis; assembled from three prospective cohorts comprising 754 patients hospitalized for ADHF. The

endpoints were all-cause mortality and the composite of all-cause mortality and/or readmission for a cardiovascular reason within 180 days after discharge.

**Results:** Of the study patients, 103 died of any cause within 180 days, which was equal to an all-cause mortality of 14% and 336 study patients reached the composite endpoint, which equals an event rate of 45%. In our study is the percentage decrease of more than 15% in serum potassium levels during hospitalisation for ADHF a predictor of poor outcome (Figure 1). Even after the addition of NT-proBNP level, renal function and other relevant clinical markers, the hazard ratios of serum potassium percentage reduction of more than 15% sustained as an independent predictor of 180-day all-cause mortality (HR 2.89, 95% CI 1.81-4.62).

**Conclusions:** The novelty of our study is that percentage serum potassium decline of >15% is an independent predictor of 180-day all-cause mortality on top of NT-proBNP and renal function as well as on top of relevant clinical markers. This suggest that patients hospitalised for ADHF with a drop of more than 15% in serum potassium levels are at risk and thus monitoring of serum potassium level decline during hospitalisation and treatment is advisable in these patients.

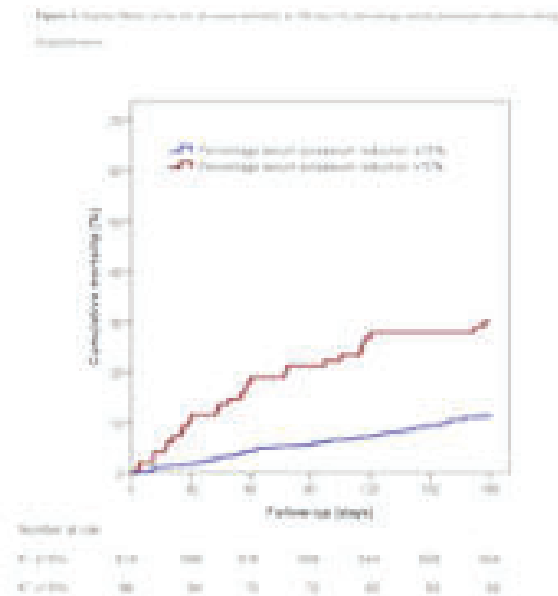


Figure1 KM-curve for all-cause mortality

## P1610

**Vascular function indices in acute heart failure patients; differences between heart failure with reduced and preserved ejection fraction**S Giannitsi<sup>1</sup>; M Bougiakli<sup>1</sup>; A Bechlioulis<sup>2</sup>; I Gkirdis<sup>2</sup>; A Kotsia<sup>1</sup>; L Lakkas<sup>2</sup>; S Antoniou<sup>1</sup>; K Pappas<sup>2</sup>; LK Michalis<sup>2</sup>; KK Naka<sup>2</sup><sup>1</sup>Michaelidion Cardiac Center, University of Ioannina, Ioannina, Greece;<sup>2</sup>Department of Cardiology, University of Ioannina, Ioannina, Greece

**Purpose:** The role of vascular parameters in Heart Failure (HF) remains unclear and may differ depending on the HF pathophysiology. The aim of the study was to compare vascular function indices between patients with heart failure and reduced ejection fraction (HFREF) and preserved ejection fraction (HFPEF) in consecutive patients hospitalized with acute heart failure (AHF).

**Methods:** We enrolled 73 patients (mean age 72 years, 78% males) who were admitted for AHF syndrome (new onset or decompensated chronic heart failure). Standard demographic, clinical and laboratory parameters were recorded. A complete echocardiographic (conventional and tissue Doppler parameters) study, a 6-minute walking test (6MWT) and peripheral vascular studies were performed in all subjects 24-48 hours prior to discharge. Vascular studies included assessment of brachial artery flow mediated dilation (FMD), carotid-femoral pulse wave velocity (PWV), central augmentation index, estimated central aortic pressures, large and small vessel compliance using tonometry and ankle-brachial index (ABI). Indices were compared between HFREF patients [left ventricular ejection fraction (LVEF) < 45%] and HFPEF (LVEF ≥ 45%). Patients with recent acute coronary syndromes, other severe chronic diseases and atrial fibrillation were excluded.

**Results:** Sixty (82%) patients had HFREF and 13 (18%) HFPEF. LVEF was 32 ± 10% and 63 ± 9% respectively (p < 0.001) and velocity-time-integral of LV outflow tract 17.8 ± 6.3 and 22.8 ± 6.1 cm respectively (p = 0.013). The 2 groups did not differ in any other echocardiographic indices. HFREF were more frequently smokers, males, and had more often HF of ischemic etiology. In HFREF vs HFPEF, performance on 6MWT was better (267 ± 155 vs 158 ± 145 respectively, p < 0.042) and GFR was greater (59 ± 19 vs 42 ± 13 ml/min/m<sup>2</sup>, p = 0.004). In HFREF brachial Systolic Blood Pressure (SBP), brachial Pulse Pressure (PP), central SBP and central PP were lower compared to HFPEF (all p < 0.01). No statistically significant differences in other indices of vascular function were observed between the 2 groups.

**Conclusion:** In patients hospitalized with AHF, HFREF demonstrated lower peripheral and central systolic and pulse pressure compared to HFPEF without differences in vascular indices of arterial compliance. This may indicate that differences in pulse pressure (peripheral or central) between groups may reflect differences in stroke volume rather than differences in arterial properties.

#### P1611

Withdrawn

#### P1612

**Clinical improvement in acute decompensate heart failure patients is associated with reduced lipolysis**

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**Background:** Congestion, fluid retention and weight gain are common characteristics of acute decompensated heart failure patients (ADHF). In addition to its better known cardiovascular effects, B-type natriuretic peptide (BNP), whose levels are increased in ADHF, has lesser known metabolic effects. The basis for reduction of symptoms and signs of fluid overload is diuretic treatment.

**Purpose:** Our study investigated the relationship between free fatty acid (FFA) and BNP levels during volume depletion obtained by diuretic treatment in ADHF.

**Methods:** Forty two consecutive non-diabetic ADHF patients (age 74 ± 8, ejection fraction 38 ± 8%, creatinine level 1.81 ± 0.6 mg/dl) were monitored clinically and trough blood sampling to assess BNP and other biochemical parameters at admission and every 24-48 hours until discharge (range of hospital stay: 6-24 days) during furosemide infusion (mean dose 185 ± 55 mg; alone or combined with a thiazide). Clinical time course of patients was divided in two phases: congestive/dyspnoic and non-congestive/eupnoic. The non-congestive/eupnoic phase was defined by the complete disappearance of dyspnea (clinical observation and Likert Scale).

**Results:** Table depicts clinical and biochemical parameters during the two phases. Data are expressed as mean ± SD.

FFA levels during congestion phase were markedly elevated and a significant reduction was observed after volume depletion. FFA levels were directly related to BNP during the congestion (R2% = 0.23, P < 0.01) but this correlation was lost during the euolemic phase (R2% = 0.07, P% = 0.09).

**Conclusion:** Congestion in ADHF is associated with increased lipolysis expressed by higher FFA levels and the clinical improvement is associated with their reduction. BNP may be active as a factor promoting lipolysis during congestion phase.

Table

Parameter	Congestion	vs	Non-congestion	P value
Mean % of body weight loss *	2,87 ± 0,71 (a)		6,85 ± 2,13	
BUN/creatinine ratio	49 ± 10		69 ± 11	P < .05
BNP (pg/mL)	1713 ± 584		789 ± 291	P < .01
Na (mEq/L)	138 ± 6		142 ± 5	NS
FFA (μmol/L)	1656 ± 557		1180 ± 467	P < .01
pH	7,33 ± 0,09		7,41 ± 0,11	P < .05

BUN% = Blood Urea Nitrogen, Na% = Sodium, \* versus body weight at admission; (a): mean body weight loss at disappearance of dyspnea.

#### P1613

**Positive High-sensitivity troponin I at emergency department is an independent predictor for in-hospital mortality in acute heart failure syndrome patients**

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**Purpose:** High-sensitivity troponin I (hs-TnI) can detect minor myocardial injury in acute heart failure syndrome (AHFS) patients. However, the prognostic utility of hs-TnI in AHFS is not well elucidated.

**Methods:** We retrospectively enrolled 271 AHFS patients who were admitted from emergency department (ED) with hs-TnI measurement in ED. Dialysis patients were excluded. We determined hs-TnI was positive if hs-TnI concentration was above 99<sup>th</sup> percentile cut-off value. Endpoint was in-hospital mortality.

**Results:** In this cohort (mean 78.4 years old, 48.7% male), hs-TnI was positive in 163 patients (60.2%). Median and Interquartile range of hs-TnI were (0.061 and 0.029-0.189 ng/ml). During hospitalization, 20 patients (7.4%) had died. Both in univariate and multivariate analysis, positive hs-TnI at admission was an independent predictor for in-hospital mortality in AHFS patients (HR: 4.08, 95% CI: 1.16-14.3, P% = 0.028, and HR 4.90, 95% CI: 1.26-19.0, P% = 0.022, respectively).

**Conclusion:** In AHFS patients, positive hs-TnI is an independent predictor for in-hospital mortality.

#### P1614

**Acute heart failure in patients admitted with acute myocardial infarction**

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**Purpose:** Acute heart failure (AHF) may complicate an acute myocardial infarction (AMI). There are appointed many HF long-term predicting factors in AMI, however we still have very poor knowledge about AHF during infarction episode. Therefore the aims of our study was to specify the high-risk patients group of developing AHF in the setting of AMI.

**Methods:** 305 consecutive patients (mean age: 68 ± 11 years, including 184 men) admitted to the Centre for Heart Diseases, Military Hospital in Wroclaw with diagnosis of AMI (STEMI or NSTEMI) from April to November 2012. In-hospital and 180-days outcome and prognosis were evaluated. Treatment of AMI were performed according to the current European guidelines depending on the type of AMI (STEMI or NSTEMI). AHF at admission was defined as the presence of symptoms (dyspnea) and signs (i.e. rales, hypotension, right ventricular heart failure) and lung congestion (Killip class II-IV).

**Results:** AHF at admission was present in 67 pts (22%) with AMI. In the group of pts with AHF was significantly more women (51% vs 27%; p% = 0.0002), more pts with diabetes mellitus (39% vs 26%; p% = 0.03), less current smokers (13% vs 30%; p% = 0.007), more pts with chronic obstructive pulmonary disease (16% vs 3%; p% = 0.0001), and chronic renal disease (28% vs 13%; p% = 0.002). Pts with AHF have higher level of NTproBNP (2695.5 [1671-6336] pg/ml vs 739.5 [259-2309] pg/ml; p% = 0.02), hsCRP (8 ± 4 mg/l vs 6 ± 4 mg/l; p% = 0.0004), glucose (180 ± 96 mg/dl vs 145 ± 76 mg/dl; p% = 0.002) and lower eGFR (64.77 ± 23.41 ml/min/1.73m<sup>2</sup> vs 77.82 ± 26.62 ml/min/1.73m<sup>2</sup>; p% = 0.003).

In multivariable model we identified the following prognosticators of increased risk of developing AHF in the course of AMI: the female sex (OR% = 2.6, CI 1.3-5.1), the presence of COPD (OR% = 5.40, CI 1.7-16.8, p% = 0.003), and chronic renal disease (OR% = 2.4, CI 1.1-5.2; all p < 0.05). Presence of arterial hypertension, diabetes mellitus, chronic heart failure was not associated with greater risk of developing AHF in AMI.

Mortality after discharge was significantly higher in pts with AHF (19% vs 8%; p% = 0.005), including cardiovascular mortality (11% vs 3%; p% = 0.02). Further decompensations (13% vs 4%; p% = 0.006) and urgent revascularizations (13% vs 10%; p% = 0.02) were more frequent in AHF pts.

#### Conclusions:

1. The demonstrated prognosticators of developing AHF in AMI were: female sex, coexisting COPD and chronic renal disease.
2. Pts with AHF in AMI more frequent were women, have coexisting diabetes mellitus, COPD and chronic renal disease.
3. Pts with AHF in AMI more frequent have further decompensations, urgent revascularizations and higher.

#### P1615

**Role of the multifocal atherosclerosis in the development of the chronic heart failure decompensation in patients with acute coronary syndromes without ST-segment elevation**

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**The Purpose:** to examine the relationship of multifocal atherosclerosis with the development the decompensation of chronic heart failure (CHF) in patients with acute coronary syndrome without ST elevation ST (nonST-ACS). Material and methods. 415 patients were included in this study. 358 patients were examined a year later. All patients underwent the color duplex scanning of brachiocephalic arteries (BCA) and lower limb arteries (LLA), stenosis of coronary artery (CA) estimated from the results of coronary angiography. Data processing was performed using the software package STATISTICA 6.0.

**Results:** the study sample of 182 (43.8%) patients had a history of chronic heart failure II-III NYHA class. These patients had a significantly higher value of the intima-media thickness (IMT) than in patients without a history of congestive heart failure (1.3 (1.2, 1.4) mm vs. 1.15 (1.1, 1.3) mm;  $p = 0.034$ ). After a year of observation 16 (4.5%) patients were hospitalized with heart failure decompensation (I Group). Patients without decompensation heart failure included Group II ( $n = 342$ ). Established that patients in the Group I were significantly different from patients without worsening heart failure on the several grounds of multifocal atherosclerosis: IMT in Group I was 1.3 (1.2, 1.4) mm, and in Group II - 1.15 (1.1, 1.3) mm ( $p = 0.031$ ); in Group I revealed stenosis BCA in 9 cases (56.2%), while in II - 29.4% ( $p = 0.049$ ); 7 patients (43.7%) in Group I had significant stenoses of the LLA, but in the Group II revealed 57 (16.7%) cases ( $p = 0.024$ ); atherosclerotic plaques in the three vascular regions (BCA + LLA + CA) were found in 9 patients of Group I (56.2%) while in Group II - 91 (26.6%) ( $p = 0.029$ ).

**Conclusion:** the study established that patients with acute coronary syndrome without ST elevation and decompensation of chronic heart failure had significantly more frequently signs of multifocal atherosclerosis, such as the intima-media thickness, stenosis of the brachiocephalic arteries and the lower limb arteries and also the joint vascular atherosclerosis of the three vascular regions.

#### P1616

##### Acute heart failure in acute coronary syndrome patients with glucose intolerance

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**Aim:** to evaluate quantity of acute heart failure in patients with acute coronary syndrome and glucose intolerance.

**Materials and Methods:** retrospective analysis of 2279 cases was performed. Patients were hospitalized in intensive cardiac care unit of city clinical hospital of Moscow in period from January 2010 to august 2012. Following parameters were analyzed: acute myocardial infarction (with Q-wave), acute myocardial infarction (without Q-wave), unstable angina pectoris, acute heart failure, diabetes mellitus type 2, glucose intolerance. Statistical Methods: with help of program OpenOffice Calc.

**Results:** from 2279 patients in 412 cases (18,07%) acute myocardial infarction (with Q-wave) was found, in 475 (20,84%) - acute myocardial infarction (without Q-wave), in 1392 (61,07%) - unstable angina pectoris. From 412 patients with acute myocardial infarction (with Q-wave) in 348 (73,26%) there was normal systolic volume, 127 (27,43%) - low systolic volume. In 22 (5,33%) - glucose intolerance and 113 (27,43%) - diabetes mellitus type 2. From 475 patients with acute myocardial infarction (without Q-wave) in 348 (73,26%) systolic volume was at a normal level, in 127 (26,74%) - low systolic volume. In 32 cases (6,73%) - glucose intolerance and in 95 (20,0%) - diabetes mellitus type 2. From 1392 patients with acute heart failure in 980 cases (70,4%) we find out normal systolic volume, and in 412 (29,59%) - low systolic volume. In 84 patients (6,03%) - glucose intolerance, in 328 (23,56%) - diabetes mellitus type 2. Thus low systolic volume was found in 674 (29,57%) from 2279 patients with acute coronary syndrome, in 536 (24,52%) of them there was diabetes mellitus type 2 and in 138 (6,05%) - glucose intolerance. Acute heart failure developed in 380 (16,67%) patients from 2279 patients with acute coronary syndrome, from these patients 215 had low systolic volume (168 - diabetes mellitus type 2, 47 - glucose intolerance) and 165 - normal systolic volume. Development of acute heart failure was in 165 (10,28%) from 1605 patients with normal systolic volume and in 215 (31,9%) from 647 patients with low systolic volume,  $p < 0,001$ . In 168 (31,34%) from 536 patients with diabetes mellitus and in 57 (34,05%) patients with glucose intolerance.

**Conclusions:** acute coronary syndrome with low systolic volume in high percentage of cases has such complication as acute heart failure, then in case of normal systolic volume.

#### P1617

##### Some prognostic markers for evaluation of outcome in acute myocardial infarction complicated with acute heart failure

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Determination of prognosis within first year after acute myocardial infarction (AMI) remains one of the most actual problems of cardiology.

368 patients were examined for development of a prognostic model of AMI complicated with acute left ventricular failure (ALVF) and observed for a year.

Transmural AMI occurred in 141 (38.32%), macrofocal AMI - in 166 (45.11%) and microfocal AMI - in 61 (16.57%) cases as established by results of complex clinical-instrumental examination. 123 (33.42%) subjects died throughout observation period, in particular, 94 (25.54%) - during 28-day staying in hospital; and 29 (7.88%) - during year.

All patients were divided into 2 groups: group 1 - with favorable AMI outcome, and group 2 - with fatal outcome.

Died subjects were averagely 9 years older comparing those with favorable outcome, with prevalence of males ( $p < 0,001$ ). Repeated AMI was more frequent in 2 group patients (79,6% vs 39,19%,  $p < 0,001$ ). Frequency of arterial hypertension (AH) and diabetes mellitus (DM) in anamnesis was higher in group 2 patients as well ( $p < 0,01$ ). Risk factors prevalence analysis among patients of both groups revealed high occurrence of active smoking ( $p < 0,01$ ) and obesity ( $p < 0,001$ ) in group 2 patients as well.

Single-factor regression analysis proved increase of risk of lethal event with age: by a factor of 1.5 follows each additional 5 years over 50. Risk of lethal event appearance raised 1.3 times more in patients with DM, 1.15 times more in case of obesity presence, three times more in patients with chronic heart failure (CHF), 1.2 times more in case of ejection fraction (EF) below 40% on 1-2 days of patient's admission, and 4.5 times more in case of anterior AMI localization.

IL-1  $\alpha$  content and IL-6 level were significantly increased in group 2 patients (48,94+7,05 vs 22,43+3,41 pg/ml (group 1),  $p < 0,014$ ; 51,63+7,86 vs 16,84+3,94 pg/ml,  $p < 0,01$  correspondently), and level of IL-10 was some less in group 2 comparing group 1 (2,45+0,51 vs 4,03+0,73 pg/ml,  $p > 0,05$ ).

Tumor-necrotizing factor (TNF) and neopterin (Np) levels analysis indicated higher levels of these values in group 2: 63,41+3,78 vs 43,1+2,62 pg/ml for TNF ( $p < 0,01$ ) and 24,28+4,32 vs 15,08+1,76 nmol/l for Np ( $p < 0,05$ ).

Elder age, presence of DM and CHF, anterior localization of AMI, smoking and obesity, EF below 40% are independent predictors of lethal outcome in patients with AMI and ALVF. Besides, increase in pro-inflammatory cytokines level (IL-1 $\alpha$ , IL-6, TNF and Np) in parallel with worsening of EchoKG EF results favor increase of lethal event onset probability in mentioned category of patients.

## HEART FAILURE DIAGNOSIS - POSTER PRESENTED

#### P1619

##### Cardiac involvement in Churg-Strauss syndrome and granulomatosis with polyangiitis (Wegeners)

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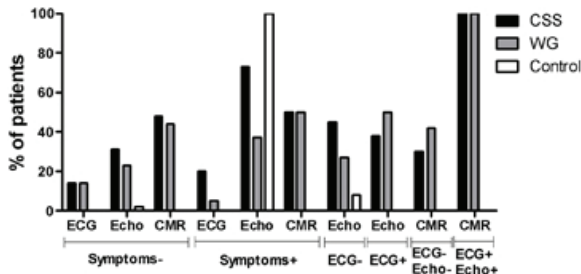
**Purpose:** To investigate the prevalence of cardiac involvement in a large population of ambulatory Churg-Strauss syndrome (CSS) and granulomatosis with polyangiitis (Wegener's) (WG) patients.

**Methods:** Prospective cohort study of 50 consecutive CSS patients (aged 59  $\pm$  11 years) and 41 consecutive WG patients (aged 60  $\pm$  11 years) all in sustained remission and without previous in-depth cardiac screening. Cardiac screening included clinical evaluation, electrocardiography (ECG), 24-hour Holter registration, echocardiography and cardiac magnetic resonance imaging (CMR). Fifty age- and sex-matched control subjects were randomly selected from a population study and were studied using ECG and echocardiography.

**Results:** Age, sex and CV risk factors showed no significant difference between the three groups. ECG and echocardiography demonstrated cardiac involvement in 54% CSS and 34% WG patients as compared to 8% controls (both  $P < 0.002$ ). Adding CMR as diagnostic modality increased prevalence of cardiac involvement to 66% in CSS and 61% in WG patients. CMR detected cardiac involvement in all CSS and WG patients demonstrating ECG and/or echocardiographic involvement. In patients without such abnormalities, CMR additionally demonstrated

cardiac involvement in 30% of CSS and 41% of WG. In 52% CSS and 44% WG patients without symptoms and with normal ECG, cardiac involvement was present. Endomyocardial biopsy performed in 11 CSS and 2 WG patients demonstrated chronic or acute myocarditis in all but one patient.

**Conclusion:** Cardiac involvement in CSS and WG patients with sustained remission is high, even if symptoms are absent and ECG is normal. Therefore, the use of imaging techniques, especially CMR, is recommended for cardiac evaluation.



Cardiac involvement in CSS, WG, controls

### P1620

#### Reasons of decompensated systolic heart failure

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**Purpose:** Heart failure has high morbidity and mortality rates, especially in older persons. Many conditions, such as coronary artery disease, hypertension, valvular heart disease, and diabetes mellitus, can cause or lead to decompensated heart failure (DHF). Our purpose was to understand the structure and the reasons of DHF.

**Materials and Methods:** Patients admitted to the hospital due to DHF during the period from 2012 to 2013 (left ventricular ejection fraction  $\leq 40\%$ ) were retrospectively analyzed. Patients with acute coronary syndrome were excluded. Patients were ranged on New York Heart Association (NYHA) functional classes from III through IV. The dietary and pharmacologic noncompliance, arrhythmias, uncontrolled blood pressure (hypertension), valvular heart disease, diabetes mellitus, pulmonary embolism, respiratory infections, different forms of anemia as the reasons of DHF were studied.

**Results:** 83 patients (71 males and 12 females) with DHF were enrolled. The age was generally 32 to 75 years old (mean age  $60.1 \pm 10.1$  years). 50,6% patients had at the time of hospitalization in NYHA class III and 49,4% patients had class IV respectively. The mean duration of HF at the time of hospital stay was  $6.6 \pm 3.4$  years. Mean left ventricular ejection fraction was  $32.8 \pm 4.9\%$ . The reasons of ADHF were: a permanent form of atrial fibrillation (AF) – 20,4%, hypertension – 16,8%, poor compliance – 12%, paroxysmal AF – 9,6%. The main reason of DHF in men was persistent AF – 20,5%, and in women – hypertension (25%).

**Conclusion:** So, the main reasons of DHF are arrhythmias and hypertension. The study of reasons of DHF can be useful for management and preventive measures of this condition.

### P1621

#### Soluble prorenin receptor (sPRR) in chronic heart failure patients

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**Background:** The prorenin receptor (PRR) is a transmembrane protein that binds prorenin and renin, leading to their activation and activation of the local renin-angiotensin system (tissue RAS). Furthermore, RAS independent functions, such as WNT activation and the regulation of pH in intracellular compartments and extracellular fluids have been described for PRR. Interestingly, cardiomyocyte-specific ablation of PRR resulted in lethal heart failure (HF), indicating an important role in this setting. A soluble form of the prorenin receptor (sPRR) is found in plasma that is able to bind and activate prorenin, the inactive proenzyme form of renin. Hence sPRR may be a useful pathophysiological marker of a RAS activity.

Aim of the present analysis was to determine distribution patterns of sPRR receptor plasma levels in the setting of HF.

**Methods and Results:** An ELISA to detect sPRR was developed by CellTrend. The sPRR receptor was measured in the CIBIS-ELD trial population ( $n=556, 72.2 \pm 5.4$  years, 66% male). The CIBIS-ELD trial was an investigator-initiated multi-centre randomised trial with patients with moderate to severe diastolic or systolic chronic HF. 198 healthy volunteers without relevant cardiovascular diseases served as controls ( $58.5 \pm 7.4$  years, 33% male). Levels of sPRR were log-transformed before analysis and are reported as log(Units). The plasma levels of sPRR in patients with ejection fraction  $< 55\%$  ( $0.42 \pm 0.41$ ) or LVEDD  $> 55$  mm ( $0.45 \pm 0.42$ ) were statistically significant higher compared to the control group levels ( $0.32 \pm 0.38$ ) ( $p < 0.01$ ). This difference remained significant in a multivariate analysis. sPRR levels negatively correlated with 6 minute walk test distance  $r = -0.08$  ( $p = 0.003$ ). Statistically higher concentrations of soluble PRR were found in patients with a left ventricular end diastolic diameter (LVEDD)  $> 55$ mm in comparison to those with a normal LVEDD ( $p < 0.001$ ). Patients with signs of renal impairment (creatinine  $> 1.2$  mg/dl) demonstrated statistically significant higher levels of sPRR compared to healthy volunteers ( $p < 0.001$ ).

**Conclusion:** sPRR, as a novel diagnostic tool, should be further evaluated as a possible diagnostic biomarker of heart failure.

### P1622

#### Arterial wall stiffness and compliance to therapy of patients with chronic heart failure

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Background is to reveal specific features of arterial wall stiffness, clinical state and prognosis in management of patients with chronic heart failure (CHF) during three years of follow-up. Methods. 211 patients with CHF developed after Q-myocardial infarction, were included in the study. On admission to the in-patient department the patients were randomly divided into two groups: group I ( $n=106$ ) received active treatment, group II ( $n=105$ ) received standard treatment. The study of arterial wall stiffness was carried out once a year. Arteriograph "TensioClinic" was used. Results. During the three years of follow-up the patients of group I were more compliant to the therapy in comparison to the patients of group II. In CHF patients aortic pulse wave velocity (APWV), brachial and aortic augmentation index, and area of systolic component of pulse wave (PW) increased while timing of reverse flow of PW, and area of diastolic component of PW diminished as compared to indices of the patients of the control ( $p < 0.05$ ). In patients who received standard treatment APWV ( $12.1 \pm 3.1$  m/s and  $10.5 \pm 2.9$   $\mu$ c;  $p < 0.05$ ) beginning with the first year, and augmentation index in the brachial artery ( $7.5 \pm 20.9\%$  and  $-3.6 \pm 25.2\%$ ;  $p < 0.05$ ) after the three years were higher in comparison to indices of the patients who received active treatment. Conclusions. Progression of the arterial wall stiffness in non-compliant patients with CHF was one of the factors which had an impact on the worsening of the left ventricular systolic function as well as on the prognosis.

### P1623

#### The relationship between depression and heart failure: findings from TIME-CHF

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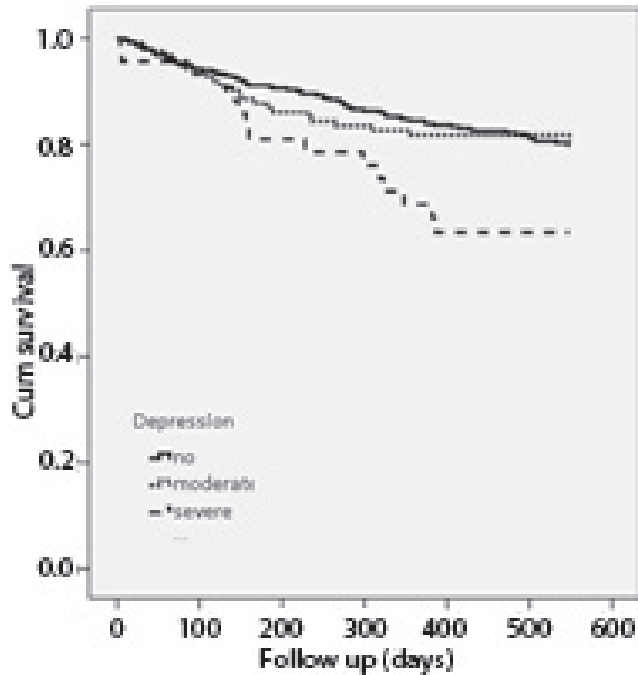
**Purpose:** There is an increased risk of depression in patients (pts) who suffer from heart failure (HF). However, risk factors for depression and effects of HF on depression over time are not well known. Thus, we examined prevalence and risk factors of depression in HF pts and analyzed the impact of HF on depression over time.

**Methods:** A post-hoc analysis of the TIME-CHF data was done. The 15-item Geriatric Depression Scale (GDS-15) was used to identify depression in HF pts.

**Results:** 593 pts (age  $77 \pm 8$ y) completed the GDS-15 at baseline, 382 pts at 18 months. At baseline, moderate depression (GDS-15 score 6-9) was found in 21% and severe depression (score  $\geq 10$ ) in 8%, respectively. Little factors influenced depression. Thus, fatigue ( $p = 0.001$ ), exercise intolerance ( $p = 0.001$ ) and orthopnea ( $p < 0.03$ ) were the only independent factors, but many other factors such as age, gender, co-morbidities, aetiology of HF, NYHA-class, NT-proBNP and LVEF were not. In patients with depression, mortality was higher (figure,  $p < 0.04$ ) and quality of life (QoL) was lower (Minnesota questionnaire) than in those without (median [IQR] 56 [41-67] vs 34 [22-47],  $p < 0.001$ ).

Over time, patients with decline in depression were older, had a higher BMI and Charlson score (all  $p < 0.05$ ) than those with improvement of depression. Severity of HF and its changes had no influence.

**Conclusion:** Depression is common in HF pts, affecting both outcome and QoL. HF itself and its changes over time had little influence on depression in this elderly HF cohort.



Survival functions

**P1624**

**Heart failure and stroke: Evidence of bidirectional risk and incidence from a prospective population study**

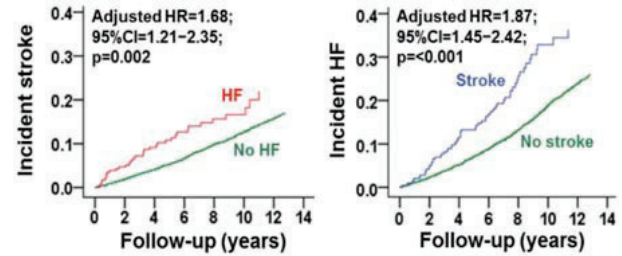
CChrisostomos Adamopoulos<sup>1</sup>; W Doehner<sup>2</sup>; S Parvataneni<sup>3</sup>; CJ Morgan<sup>3</sup>; K Karatzidou<sup>4</sup>; P Deedwania<sup>5</sup>; G Fonarow<sup>6</sup>; W Aronow<sup>7</sup>; S Anker<sup>8</sup>; A Ahmed<sup>3</sup>  
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**Purpose:** HF and stroke are common comorbidities in older adults. We examined the impact of heart failure (HF) on incident stroke and the impact of stroke on the incident HF in community-dwelling older adults.

**Methods:** The Cardiovascular Health Study (CHS) is a NHLBI-funded prospective, population-based study cardiovascular disease in older adults. Using a public-use copy of CHS data (N = 5795) obtained from NHLBI, we assembled two separate cohorts: (1) without baseline (BL) stroke (n = 5448) and (2) without BL HF (n = 5521) to examine incidence rates and risk for stroke and HF, respectively, at 1, 3 and 13 yrs of follow-up (FU).

**Results:** Participants in both cohorts had a mean age 73 years, 58% were women and 15% African American. In the cohort free of BL stroke, during 13 yrs of FU, incident stroke occurred in 16% and 14% of those with and without BL HF (adjusted HR, 1.68; 95% CI, 1.21–2.35; Figure). During the same FU, among those without BL HF, incident HF occurred in 29% and 20% of those with and without BL stroke (adjusted HR, 1.87; 95% CI, 1.45–2.42; Figure). Adjusted HR (95% CI) for incident stroke associated with HF at 1 and 3 yrs were 4.35 (2.18–8.66) and 2.43 (1.51–3.93), and respective HR (95% CI) for incident HF associated with stroke were 1.93 (0.83–4.48) and 2.12 (1.35–3.34).

**Conclusion:** In community-dwelling older adults, the presence of HF and stroke is associated with a mutual bidirectional higher risk of incident disease for both comorbidities, which remained high during over a decade of follow-up.



Age-sex-race-adjusted incidence

**P1625**

**A novel non-invasive method of assessing right atrial pressure. A report from the SICA- HF study**

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**Background:** Increased jugular venous pressure (JVP) reflects increased hydrostatic pressure in the right atrium (RA) and is a classical clinical sign in heart failure; however its clinical evaluation is subjective and often difficult.

**Methods:** Out-patients with heart failure enrolled in the "Studies Investigating Co-morbidities Aggravating Heart Failure" (SICA-HF) were studied. With the patient semi-recumbent at 45°, RA pressures were measured non-invasively using near-infrared spectroscopy (NIRS) over the external jugular vein (Venus 1000, Mespere LifeSciences, Canada). The internal jugular vein diameter (JVD) at rest was also measured using a linear high frequency probe (10 MHz).

**Results:** Altogether, 135 patients with HF (median age 72 years; mean left ventricular ejection fraction (LVEF) 45%, median NTproBNP 966 (432-1980) ng/l) and 45 controls with diabetes and/or hypertension (median age 71 years; mean LVEF 59%, median NTproBNP 141 (71-218) ng/l) were evaluated. Compared to controls, JVD at rest was greater in HF patients (0.15 (0.12-0.18) vs 0.19 (0.15-0.27) cm;  $p = 0.004$  respectively) and RA pressures higher (6.0 (4.0-9.0) vs 8.0 (5.0-11.0) mmHg,  $p = 0.003$ ). In HF patients, JVD and RA pressure were correlated ( $r = 0.472$ ,  $p < 0.001$ ). JVD and RA pressures did not correlate with LVEF or mitral E/E', but they were related to left atrial volume (LAVI,  $r = 0.325$  and  $r = 0.367$  respectively,  $p < 0.001$  for both), to other echocardiographic measurements of RV overload (IVC diameter:  $r = 0.539$ ,  $p < 0.001$  and  $r = 0.592$ ,  $p < 0.001$  respectively; TR gradient:  $r = 0.411$ ,  $p < 0.001$  and  $r = 0.473$ ,  $p < 0.001$  respectively) and logNT-proBNP plasma levels ( $r = 0.284$ ,  $p = 0.001$  and  $r = 0.447$ ,  $p = < 0.001$ , respectively).

**Conclusions:** In out-patients with chronic heart failure, novel measures of RA pressure identify patients with more severe cardiac dysfunction. The utility of these simple measures for guiding treatment and prognosis requires further investigation.

HEART FAILURE DIAGNOSIS – POSTER DISPLAY

**P1626**

**A case of familial occurrence of pericarditis**

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**Introduction:** Pericarditis is characterized by the inflammation of the pericardium, often with an infectious etiology. Often it is not identified a cause of pericarditis, being designated as idiopathic.

**Purpose:** This work presents a clinical case of pericarditis of occurrence almost simultaneous in two members of a couple, a situation rarely seen nowadays.

**Case Presentation:** A 55 years old man, with no past medical history of significance, was admitted to a Cardiology Department complaining of pleuritic chest pain, radiating to the trapezius and upper extremities, with about 3 weeks of evolution. In the initial phase, the patient had concomitant complaints of cough and fever and was treated with various antibiotics for suspected respiratory infection. On physical examination was noted only the presence of abolition of breath sounds on the right pulmonary base and the presence of peripheral edema. There were performed diagnostic procedures including ECG (sinus rhythm, with normalization

of the ST segment, previously elevated with superior concavity), chest x-ray (which showed the presence of bilateral interstitial infiltrate) and transthoracic echocardiography (which revealed the presence of a slight circumferential pericardial effusion). The patient had a good clinical outcome with anti-inflammatory therapy. However, during hospitalization of the patient, his wife also develops fatigue on minimal exertion, associated with chest discomfort, having been also diagnosed with a pericarditis. The analytical evaluation performed to both didn't identify any positive infectious serology of acute phase.

**Conclusions:** We report two cases of pericarditis of occurrence almost simultaneous in two members of a couple, a situation rarely seen nowadays, indicating a probable infectious etiology, but with no causal agent identified on the tests.

#### P1627

##### B-type natriuretic peptide level over 1,000 pg/ml as a new prognostic factor in patients without preceding cardiac failure

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**Background:** High levels of plasma B-type natriuretic peptide (BNP) indicate patient's risk of clinically overt heart failure, and predict serious and mortality. We investigated the levels of BNP >1,000 pg/mL as a risk factor in patients without heart failure.

**Methods & Results:** We investigated 103 patients (Group A), whose BNP levels were over 1,000 pg/ml with preceding heart failure (A1, n=55) and without preceding heart failure (A2, n=48). The major cause of Group A1 includes pneumonia (n=21) and dehydration (n=13). These data were compared with those whose BNP levels were among 200 to 1,000 pg/ml (Group B, n=50), and with whose BNP lower than 200 pg/ml (Group C). The age and sex were not different among three Groups. The ages in Group A, B and C were 84 ± 10, 80 ± 9 and 78 ± 9, respectively. One year survival was significantly (P < 0.001) higher in patients of Group A than those in Group B and C. Within the Group A, one year survival in Group A2 was significantly lower than those in Group A1 (46% vs 20%, P < 0.05). The levels of BNP were significantly (P% = 0.0017) lower in Group A1 than those in Group A2 (2022 ± 1048 pg/mL vs. 2388 ± 1418 pg/mL). Multivariate statistics were estimated. Circulating creatinine was significantly (P < 0.001) higher in patients of Group A than those of Group B and C (1.89 ± 1.58 mg/dL vs. 1.03 ± 0.52 mg/dL, 0.88 ± 0.61 mg/dL, of each). The estimated glomerular filtration rate in Group A was significantly (P < 0.01) decreased more than that in Group B and C (33.0 ± 23.8 ml/min vs. 57.9 ± 25.6 ml/min, 60.0 ± 17.1 ml/min, respectively). Total cholesterol levels were significantly (P < 0.01) lower in patients of Group A than those of Group B and C (153 ± 37.5 mg/dL vs. 174.3 ± 44.7 mg/dL and 181 ± 52.8 mg/dL, of each), and serum albumin was significantly (P < 0.01) lower in Group A and B than that in Group C (3.35 ± 0.62 g/dL vs. 3.51 ± 0.79 g/dL and 3.94 ± 0.49 g/dL, of each). Moreover, c-reactive protein levels in Group A and B were significantly elevated more than that in Group C (3.63 ± 5.28 mg/dL, 3.00 ± 3.90 mg/dL vs. 0.16 ± 0.21 mg/dL, respectively). Cardiac ejection fraction and ventricular wall thickness by echocardiography were not significantly different among these three groups.

**Conclusion:** The BNP level over 1,000 pg/ml can be a poor prognostic indicator even in patients without preceding heart failure. Renal dysfunction and malnutrition are related with the elevation of plasma BNP over 1,000 pg/mL.

#### P1628

##### Diabetes mellitus has the prognostic impact in chronic heart failure patients with chronic kidney disease but not without chronic kidney disease

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Y Iwasaki; M Kawasaki; A Kikuchi; T Kondoh

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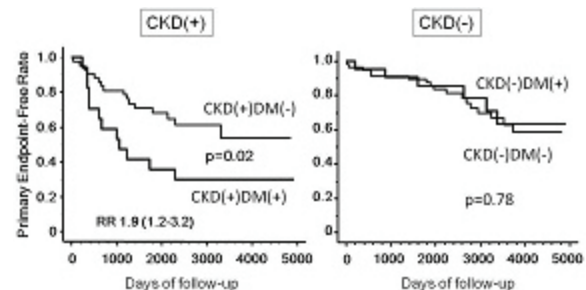
**Purpose:** Although diabetes mellitus (DM) has been reported as a predictor of mortality and morbidity in patients (pts) with chronic heart failure (CHF), there is little information available on the long-term prognostic impact of DM from the view of chronic kidney disease (CKD) in CHF pts. We prospectively investigated the prognostic impact of the association between CKD and DM in CHF pts, relating to the progression of CKD.

**Methods:** We studied 141 CHF pts with left ventricular ejection fraction < 40% (29 ± 7%). At the entry, according to the presence of CKD and DM, these pts were divided to 4 groups; with CKD and DM (n = 17: CKD(+)DM(+)), with CKD without DM (n = 44: CKD(+)DM(-)), without DM with CKD (n = 22: CKD(-)DM(+)) and with none of CKD and DM (n = 58: CKD(-)DM(-)). They were prospectively followed up and the measurement of eGFR was repeated every year. The primary endpoint was heart failure hospitalization and sudden death.

**Results:** The baseline clinical characteristics including eGFR in pts with DM was similar to that in those without DM, irrespective of the presence or absence of CKD. During a follow-up period of 7.0 ± 3.6 years, pts with CKD(+)DM(+) had higher risk

of the primary endpoint than those with CKD(+)DM(-) (75% vs 36%, p% = 0.02), while there was no difference in the incidence of the primary endpoint between pts with CKD(-)DM(+) and CKD(-)DM(-). Furthermore, annual depression rate of eGFR in pts of CKD(+)DM(+) was significantly greater than those of CKD(+)DM(-) (10.6 ± 8.3 vs 3.9 ± 5.7%/year, p% = 0.0005), while there was no significant difference in the eGFR depression rate between pts with CKD(-)DM(+) and CKD(-)DM(-).

**Conclusion:** The presence of DM had the long-term prognostic impact in CHF patients with CKD, although the prognostic impact disappeared in patients without CKD.



Prognosis of CHF patients with DM

#### P1629

##### Prognostic value of the combination of red cell and platelet distribution widths and the neutrophil to lymphocyte ratio for prediction of cardiovascular death in patients with chronic heart failure

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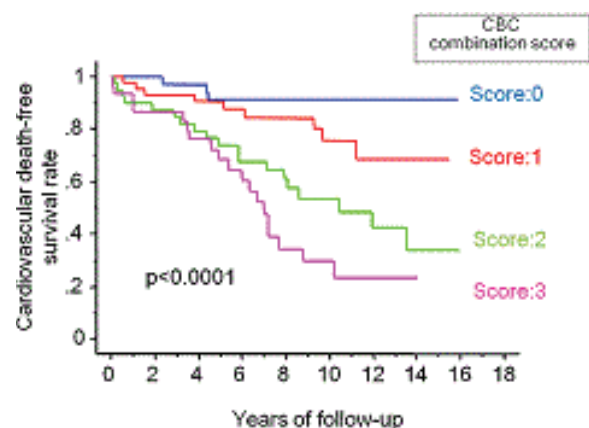
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**Backgrounds:** Red cell distribution width (RDW), which is obtained routinely by complete blood count (CBC) test, has been shown to predict cardiovascular death (CVD) in patients with chronic heart failure (CHF). Recently, as other markers of CBC, platelet distribution width (PDW) and the neutrophil to lymphocyte ratio (NLR) have been associated with poor outcome in CHF pts. However, there is no information available on the prognostic impact of the combination of RDW, PDW and NLR for predicting CVD in CHF pts.

**Methods and Results:** We studied 153 consecutive CHF outpatients with LVEF < 40% in our prospective cohort study. We measured RDW, PDW, NLR, Hb and mean platelet volume (MPV) at baseline. During a follow up period of 7.6 ± 4.3 yrs, 50 pts had CVD. Pts with CVD had significantly higher RDW, PDW, and NLR than those without CVD, while there were no significant differences in Hb or MPV. RDW, PDW and NLR were independently associated with CVD. We defined the CBC combination score as the number of positive (> a median value) parameters of RDW, PDW and NLR and classified study patients into four groups; score 0, 1, 2, 3. As the CBC combination score increased, the incidence of CVD significantly increased; score 0:8%, score 1:20%, score 2:48%, score 3:63%. The adjusted HRs were 2.7 (0.7-10.1) in score 1, 6.3 (1.8-22.8) in score 2, and 10.3 (2.9-36.5) in score 3, compared with score 0 group.

**Conclusion:** The combination of RDW, PDW and NLR has incremental prognostic value to each parameter in CHF pts.



CBC combination score and CHF prognosis

## P1630

**Incidence of cardiomyopathy in haemochromatosis; are we cautious enough?**

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Hereditary haemochromatosis is a remarkably common condition with approximately 10% to 12% of people of European background being heterozygous for the condition. It occurs secondary to a fractional increase in dietary iron absorption resulting in abnormal accumulation of iron in parenchymal organs, leading to organ toxicity. Cardiomyopathy is a major cause of morbidity and mortality in this population.

**Objective:** The aim of our study was to compare the current local practice protocols to the European Association for the study of Liver (EASL) guidelines and identify the incidence of cardiomyopathy in an Irish population.

**Methods:** We retrospectively analysed data of all patients enrolled in the Haemochromatosis clinic of a regional medical centre between 2001 and 2010. We recorded demographics, co-morbidities, organ damage secondary to iron overload, frequency and control of body iron levels and adherence to international best practice guidelines in the diagnosis and subsequent management of this patient population.

**Results:** Data of 101 patients was included in the study. 68 (67.32%) were males. An average period of 11.08 months was taken to achieve the recommended body levels of ferritin. 16 (15.8%) patients developed Diabetes while 15 (14.8%) patients developed arthritis during their followup. After multivariate analysis, 34 (33.66%) of patients were found to have developed dilated cardiomyopathy secondary to haemochromatosis. Only 18 (17.8%) had serial echos done as per the guidelines.

**Conclusion:** Hemochromatosis is a frequently encountered condition which needs improved understanding and knowledge of the current guidelines. Adherence to international guidelines can result in early detection and appropriate management of cardiomyopathy in patients with Haemochromatosis.

## P1631

**Gender differences in management of heart failure in Albania**

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**Background:** Heart failure has become the most important public problem in cardiovascular medicine. There are gender differences in management of heart failure, although the evidence is scarce.

**Purpose:** To study the gender differences with regard to epidemiology, aetiology, treatment, hospitalizations and mortality rate in patients with heart failure.

**Methods:** Data were collected on retrospective heart failure patients admitted to the clinic of cardiology in the University Hospital Centre, from January to August 2013. All available demographic and medical data, including clinical profile, risk factors, co-morbidity, echocardiographic examination, management, and mortality rate were recorded.

**Results:** A total of 468 patients (pts) with heart failure (HF), 290 men (61.97%) with mean age 62.69 years and 178 women (38.03%) with mean age 65.85 years ( $p = 0.007$ ) were reviewed. Ischemic and dilated cardiomyopathy etiologies were significantly higher in male pts (45.90 vs 33.70%,  $p = 0.006$ ) and (7.60 vs 1.7%,  $p = 0.003$ ), respectively. Atrial fibrillation was significantly higher in women pts (41.00 vs 24.80%,  $p = 0.001$ ), renal failure was higher in male pts (13.80 vs 7.90%,  $p = 0.034$ ). Acquired valvular heart disease was higher in women pts (29.20% vs 22.10%,  $p = 0.052$ ). Smoking was significantly higher in male pts (53.80 vs 9.00%,  $p = 0.001$ ). Fatigue and palpitations were significantly higher in women pts (89.90 vs 80.30%,  $p = 0.004$  and 36.00 vs 23.80%,  $p = 0.002$ ), respectively. There were not significant differences in NYHA class. HF with preserved ejection fraction (EF) was significantly higher in women pts (60.70 vs 38.00%,  $p = 0.001$ ) and HF with low EF was higher in male pts (61.40 vs 39.3%,  $p = 0.001$ ). There were not significant differences in the prescription of the beta-blockers, diuretics, while ACE inhibitors were prescribed significantly less to women pts (50.90 vs 59.70%,  $p = 0.02$ ) and digoxin was prescribed significantly less to male pts (20.00 vs 33.70%,  $p = 0.001$ ), respectively. Rehospitalizations were higher in women pts (3.37 vs 0.69%,  $p = 0.025$ ). No significant difference in the mortality rate (2.20% in women pts vs 0.69% in male pts,  $p = 0.9$ ).

**Conclusions:** There are gender differences in the management of HF. Women pts with HF were older, had less ischemic and dilated cardiomyopathy etiology, smoking, and renal failure, but more atrial fibrillation, acquired valvular heart disease. More women pts had HF with preserved EF. Women pts were under-treated by ACE inhibitors, while male pts were under-treated by digoxin. There was not significant difference in the mortality rate.

## P1632

**Association of functional class with social perspectives of heart failure**

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**Introduction:** Heart failure is a complex syndrome with several dimensions one of which is social perspectives. TREAT-HF network has created a questionnaire recently in order to investigate to several aspects of HF outpatients.

**Methods:** Turkish Research Team-HF (TREAT-HF) is a network which undertakes multicentric observational studies in HF among HF centers. Herein, data including initial 175 HFREF patients out of eight HF centers were presented. Herein, stable HFREF patients with mild symptoms (NYHA Class I-II, Group 1) were compared with patients with NYHA Class III-IV symptoms (Group 2).

**Results:** Mean age of those with NYHA Class I-II were younger than those with NYHA Class III-IV ( $54.7 \pm 14.5$  vs  $64.7 \pm 13.2$  years,  $p < 0.001$ ). Gender distribution was similar in both groups (female/male ratio, 79/27, 42/18,  $p = 0.528$ ). Mean EF was  $31 \pm 9\%$  and  $26 \pm 13\%$  in group 1 and 2 respectively ( $p = 0.0180$ ). Last graduated school was high school in 17.9% of those in group 1 whereas it was high school in 28.3% of those in group 0 ( $p = 0.172$ ). 81% of those in group 1 versus 55% of those in group 2 stated that they keep regular visits to their doctors ( $p = 0.001$ ). 59% of those in group 1 versus 31.7% of those in group 2 stated that they measure their weight regularly for follow up ( $p = 0.001$ ). 34% of those in group 1 versus 11.7% of those in group 2 stated that they engage in regular physical activity ( $p = 0.002$ ). 56.7% of those in group 1 versus 38.3% of those in group 2 stated that they keep up the advice related to salt restriction ( $p = 0.0023$ ). 88.7% of those in group 1 versus 78.3% of those in group 2 stated that they take their guideline directed medical therapy regularly ( $p = 0.118$ ). 17% of those in group 1 versus 41.7% of those in group 2 think that some of the drugs which they are supposed to take regularly, are not useful ( $p < 0.001$ ). Although similar percent of patients utilize alternative medicine (13.5% vs 10%,  $p = 0.749$ ) in both groups, 100% those in group 2 versus 80% of those in group 1 do not consult their doctors for such activity (0.022).

**Conclusion:** Different functional classes of HFREF seem to have different perspectives with regard to their disease status, therapeutic choices.

## CANCER/CARDIOTOXICITY – POSTER PRESENTED

## P1634

**An aggressive rare lung cancer type with rapid invasion of the heart cavities**

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A 59-year-old male patient was admitted to our hospital due to a syncopal event. The patient had a history of lung cancer – a rare histological type, spindle cell – and had undergone partial pneumonectomy of the left lung 7 months earlier. His ECG showed complete atrioventricular block with escape rhythm 45 bpm. The echocardiogram showed good function of left ventricle, Ejection Fraction 60%. An immobile mass in contact with basal segment of intraventricular septum of right ventricle was found, caused a moderate 2+/4+ tricuspid valve regurgitation without pulmonary hypertension. A permanent pacemaker was implanted. No surgical therapy was suggested by specialists.

Two months later the patient was readmitted due to shortness of breath and orthopnea. New echocardiogram showed a new endocardial mass in contact with inferior-lateral wall of left ventricle which through mitral valve was prolapsed to left atrium, and caused a subacute moderate mitral regurgitation (2+/4+). The basic and middle inferior-lateral wall of left ventricle was hypokinetic and the ejection fraction was 45-50%. ( $e/a$  15,  $\beta$  vP increased). The patient received therapy for congestive heart failure and respiratory failure.

The interesting about this case consists in the rapid invasion of a rare cancer type from the right to the left cavities within 2 months, which caused subacute mitral regurgitation and moderate left ventricle failure – in combination with respiratory failure this led to the patient's death.

**P1635****Usefulness of cardiac biomarkers monitoring and echocardiographic evaluation in detecting early myocardial function changes after antiradical treatment**

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**Purpose:** To assess the usefulness of serial measurements of Cardiac Troponin I (cTnI) and N-terminal pro-brain natriuretic peptide (NT-proBNP) combined with echocardiography (Echo) in predicting early myocardial function changes in patients (pts) with non-metastatic breast cancer (BC) treated with Antiradical (ANT). Methods. The presence of known heart disease and previous treatment with ANT or exposure to mediastinal irradiation are the key exclusion criteria. Eligible pts undergo baseline cardiac evaluation (T0) and scheduled follow-up visits during and after ANT treatment (Epirubicin 90 mg/m<sup>2</sup> for 3 or 4 cycles every 21 days). Research of genetic markers of individual susceptibility for the development of cardiotoxicity is also carried out. For analyzing NT-proBNP behavior during ANT treatment, we calculated the critical difference (CD) between baseline and peak value using the following formula:  $CD\% = K \cdot \sqrt{CVa^2 + CVi^2}$ ; CVa is the coefficient of analytical variation (in our Lab% = 1.65%), CVi is the coefficient of within subject variation (for NT-proBNP% = 35%) and K is a factor dependent on the probability level selected (for  $p < .05$   $K = 2.77$ ). Thus we considered significant only an increase in NT-proBNP plasma level  $\geq 96\%$  relative to baseline concentration. Results. This analysis includes 65 pts (mean age  $50.97 \pm 11.06$ ), 23% with hypertension, 15% hyperlipidemic and only 17% with more than 3 cardiovascular (CV) risk factors. During ANT treatment cTnI is abnormal only in one patient; conversely, according to NT-proBNP behavior we identify two groups: group A (n=17; 26%) with a significant increase in NT-proBNP plasma level, and group B (n=48; 74%) with no significant increase. Comparing clinical, laboratory, ECG and Echo parameters collected at T0 we didn't find any significant differences between the two groups. At the end of ANT treatment, Echo tissue Doppler images revealed a significant reduction in the peak of early diastolic velocity ( $E'm\% = 9.69 \pm 2.5$  vs  $7.79 \pm 2.33$ ;  $p < .05$ ) with a trend of increase in the early diastolic velocity ratio ( $E/E'm$ ) in group A. In this group we also find a significant QT interval prolongation at the ECG ( $419.37 \pm 21.56$  vs  $436.16 \pm 21.59$ ;  $p = .02$ ) after ANT treatment. No significant changes in Echo and ECG parameters were found in group B. Conclusion. In pts with low CV risk profile, treatment with ANT can induce significant changes in NT-proBNP plasma level that are related with early alteration of diastolic myocardial function. The meaning of these abnormalities in predicting delayed heart failure development might be elucidated at the end of follow-up.

**P1636****Prevention of heart failure in patients after regression of diffuse large B-cell lymphoma: response to zofenopril**

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**Purpose:** The aim of this study was to determine the protective effect of zofenopril in patients after regression of diffuse large B-cell lymphoma. The natural history of cardiovascular events in patients with oncohematological diseases, as well as its response to cardiovascular therapy, remains poorly defined. Hence, evidence-based recommendations for prevention of heart failure in this group of patients are still lacking. Zofenopril proved to be effective in patients with coronary artery disease and myocardial infarction, thanks to its unique effective mechanism of action for improving blood pressure control, left ventricular function and myocardial ischemia burden, as well as angiotensin-converting enzyme inhibition. Rituximab is a monoclonal antibody to CD20 that has activity in lymphoma. This study aims to describe the complications and outcomes of a subset of patients after regression of diffuse large B-cell lymphoma who were treated with immunochemotherapy.

**Methods:** Patients who were treated with rituximab, doxorubicin, cyclophosphamide, vincristine, and prednisolone therapy and reached regression diffuse large B-cell lymphoma was planned were enrolled in the study. We included in the study 27 patients in zofenopril and 10 patients in control groups. In the zofenopril group, 7.5 mg twice-daily oral zofenopril was given during 12 months. The patients were evaluated with echocardiography before and after chemotherapy. Left ventricular ejection fraction (EF) and systolic and diastolic diameters were calculated.

**Results:** At the end of 12 months of follow-up, 3 patient in the zofenopril group and 3 in the control group had died. Control EF was below 50% in 2 patient in the zofenopril group and in 4 in the control group. The mean EF of the zofenopril group was similar at baseline and control echocardiography (62.8 vs. 59.8, respectively;  $p = 0.3$ ), in the control group the mean EF at control echocardiography was significantly lower (62.7 vs. 47.2;  $p < 0.001$ ). Both systolic and diastolic diameters were significantly increased compared with basal measures in the control group. In

Doppler study, whereas E velocities in the zofenopril group decreased, E velocities and E/A ratios were significantly reduced in the control group.

**Conclusions:** Prophylactic use of zofenopril in patients with diffuse large B-cell lymphoma receiving immunochemotherapy may protect both systolic and diastolic functions of the left ventricle.

**CARDIOMYOPATHY – POSTER PRESENTED****P1638****Indirect markers of diastolic dysfunction predict poor exercise capacity in non-obstructive hypertrophic cardiomyopathy**

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**Background:** hypertrophic cardiomyopathy (HCM), implies altered exercise capacity (EC) and diastolic dysfunction (DD). There is no definite relationship between EC and echocardiographic indices of DD in HCM, nor has the link between EC and symptomatic status been confirmed. Aim of the study is to investigate the relationship between DD and EC in HCM.

**Methods:** 41 HCM patients (pts) (NYHA class II or III) were selected. Serum NT-proBNP assay, 2D transthoracic echocardiography and cardiopulmonary exercise test (CPX) by 25 W/2 minutes ramp protocol on a bicycle ergometer were performed. Minnesota Living with Heart Failure Questionnaire was also administered. Pts with rest left ventricular outflow tract obstruction (i.e. peak gradient  $\geq 30$  mmHg) or end-stage phase (ejection fraction  $< 50\%$ ) were excluded.

**Results:** pts (26 males; mean age  $56 \pm 13$  yy) were divided into "good" performers (GP, n=11) if showing a peak VO<sub>2</sub> ( $pVO_2$ )  $\geq 75\%$  of predicted value (PV), and "bad" performers (BaP, n=30) if showing a  $pVO_2 < 75\%$  of PV. Basal heart rate (HR) was found significantly lower in GP ( $54.8 \pm 10.3$  vs.  $62.8 \pm 9.9$  bpm;  $p < 0.05$ ). LogNT-proBNP was found higher in BaP ( $2.84 \pm 0.40$  pg/ml vs.  $2.35 \pm 0.46$  pg/ml;  $p < 0.05$ ). 26 pts out of 41 had left atrial indexed volume (LAIV)  $\geq 33$  ml/m<sup>2</sup> and lower pVO<sub>2</sub>, anaerobic threshold, LogNT-proBNP levels and higher VE/VC02 levels.

Of all potential predictors of EC, only age ( $r = -0.341$ ,  $p = 0.03$ ), BMI ( $r = -0.413$ ,  $p = 0.007$ ), Basal HR ( $r = -0.357$ ,  $p = 0.02$ ), A wave velocity ( $r = 0.342$ ,  $p = 0.03$ ) and LogNT-proBNP ( $r = -0.382$ ,  $p = 0.018$ ) correlated with pVO<sub>2</sub>.

At multivariate analysis, basal HR retained a correlation with pVO<sub>2</sub> providing an Odds Ratio of 1.12 (CI: 1.00–1.25) at determining a poor CPX performance ( $pVO_2 < 75\%$  of predicted value).

**DISCUSSION:** although our pts' performance could not be distinguished on the basis of their echocardiographic parameters, we believe that DD is a key pathophysiological mechanism in HCM: in particular, if such dysfunction may not be properly investigated with typical Echo Doppler parameters, we tend to believe that a greater role should be given to other measures, potentially able to indirectly identify it. A possible solution is the use of indirect markers of DD, such as LAIV, NT-proBNP and basal HR.

**P1639****Sexual dysfunction in male adults with hypertrophic cardiomyopathy: A descriptive pilot study**

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**Purpose:** Hypertrophic cardiomyopathy (HCM) may affect negatively the everyday activities, including Quality of Life and sexual life. Erectile Dysfunction (ED) is defined as the inability to achieve and/or maintain a penile erection sufficient enough to participate in satisfactory sexual activity. Aim of this study was to explore the sexual dysfunction in male adults with HCM and the variables that affect it, as there is lack of evidence in this population.

**Methods:** We conducted a descriptive study, in a sample of 33 consecutive male patients with known HCM followed at a single referral center. The International Index of Erectile Function (IIEF), a widely used multi-dimensional self report instrument for the evaluation of male sexual function was used, along with a demographic data sheet.

**Results:** 32 patients (mean age  $54 \pm 16$  years) accomplished to fill in all the parameters of the questionnaire (response rate 97%). 18 % were asymptomatic (NYHA I) while the rest had dyspnoea on exertion (NYHA II-III) and 79% were married. 50% had normal erection function, while 28% mentioned severe ED, and the rest 22% reported mild and mild to moderate ED. Regarding the 5 domains of sexual



function, the erectile function had a mean value of  $19.5 \pm 11$ , the orgasmic function  $7 \pm 4$ , the sexual desire  $7 \pm 3$ , the intercourse satisfaction  $9 \pm 5.3$  and the overall satisfaction  $7 \pm 2.5$ . There was a statistical significant correlation between age and all the ED domains, while the NYHA class affected only the sexual desire ( $p = 0.034$ ) and the overall satisfaction ( $p = 0.029$ ) and the symptom duration had no impact on sexual activity or dysfunction. **Conclusions:** Male adults with HCM seem to have impaired erectile function. Further research to elucidate the incidence and the mechanisms associated with erectile dysfunction in HCM is warranted.

#### P1640

##### Effectiveness of angiotensin-converting enzyme inhibitors in combine therapy with beta-blockers in patients with nonobstructive hypertrophic cardiomyopathy

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The usefulness of ACE inhibitors in the treatment of symptoms in patients with hypertrophic cardiomyopathy (HCM) with preserved systolic function is not well established (IIbC). Single studies demonstrate positive effects of ACE inhibitors on clinical status, systolic and diastolic left ventricle (LV) function in absence of consensus of opinion about it effectiveness.

**Purpose:** to assess the effect of ACE inhibitor perindopril in combine therapy with beta-blockers (BB) on regional longitudinal systolic and diastolic LV and right ventricle (RV) function in nonobstructive HCM patients.

**Methods:** We examined 20 patients with nonobstructive HCM (15 women, average age  $57.0 \pm 12.9$  years) treated with BB (bisoprolol  $6.5 \pm 2.17$  mg) using tissue Doppler imaging (TDI) before and after 6 months of perindopril administration. Patients were divided in 2 groups: I ( $n = 14$ ) – treated with BB and perindopril ( $2.67 \pm 1.13$  mg); II ( $n = 6$ ) – control group treated with BB. Two groups were comparable in gender and age ( $p = 0.2$ ), clinical status and hypertension level ( $p = 0.5$ ), BB doses ( $p = 0.7$ ) and TDI parameters (index Tei LV ( $p = 0.5$ ), index Tei RV ( $p = 0.73$ ), septal systolic mitral annulus velocity ( $s'$ ) ( $p = 0.9$ ), septal early diastolic annular velocity ( $e'$ ) ( $p = 0.8$ ), septal late diastolic annular velocity ( $a'$ ) ( $p = 0.2$ ), lateral mitral annulus  $s'$  ( $p = 0.5$ ),  $e'$  ( $p = 0.6$ ) and  $a'$  ( $p = 0.4$ ), lateral tricuspid annulus  $s'$  ( $p = 0.9$ ),  $e'$  ( $p = 0.4$ ) and  $a'$  ( $p = 0.6$ )).

**Results:** After 6 months of therapy with perindopril systolic (SBP  $122.5 \pm 14.3$  and  $145.0 \pm 16.1$ ,  $p = 0.04$ ) and diastolic (DBP  $70.0 \pm 3.1$  and  $75.0 \pm 4.8$ ,  $p = 0.05$ ) blood pressure were lower in group I in comparison with II. Significant increase of lateral mitral annulus  $s'$  (from  $7.4 \pm 1.3$  to  $9.4 \pm 0.6$  cm/s,  $p = 0.02$ ), decrease of lateral mitral annulus ivrt (from  $106.2 \pm 14.3$  to  $89.7 \pm 17.1$  ms,  $p = 0.04$ ), decrease of index Tei RV (from  $0.7 \pm 0.2$  to  $0.4 \pm 0.1$ ,  $p = 0.03$ ) were observed in group I. There were no significant changes of TDI parameters in control group ( $p < 0.05$ ). Significant BNP decrease was revealed in group I (from  $449.0 \pm 334.0$  to  $161.5 \pm 175.6$ ,  $p = 0.017$ ) whereas in group II BNP level was slightly increased ( $p = 0.28$ ).

**Conclusions:** Therapy with perindopril ( $2.67 \pm 1.13$  mg) for 6 months in patient with nonobstructive HCM followed by decrease of BP level, longitudinal systolic and diastolic function improvement in nonhypertrophic segments of heart (lateral mitral annulus parameters and RV function). These changes confirmed by significant BNP decrease.

#### P1641

##### MiR-126: a valuable predictor for hypertensive heart failure

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**Purpose:** Plasma microRNAs (miRNAs) have been recently reported to be sensitive and specific biomarkers of various tissue injuries and pathological conditions. MiR-126 plays an important role in maintaining endothelial cell homeostasis and vascular integrity. The goal of this study was to assess whether MiR-126 is good tool for the prognostication of hypertension and hypertensive heart failure.

**Methods:** The plasma concentrations of miR-126 and miR-499 were assessed among patients with hypertension and hypertensive heart failure by a real-time reverse transcription-polymerase chain reaction using an artificial small RNA as an internal.

**Results:** Plasma concentrations of miR-126 in patients either with hypertension ( $n = 25$ ) or with hypertensive heart failure ( $n = 38$ ) were significantly lower than those in healthy controls ( $n = 15$ ) ( $P < 0.01$ ). However, there was no difference in plasma concentrations of miR-499 among the study groups. Importantly, plasma concentration of miR-126 was negatively correlated with brain natriuretic peptide ( $P = 0.005$ ) and cardiac function ( $P = 0.008$ ) in 38 patients with hypertensive heart failure. **Conclusions:** These findings suggest that miR-126 may be a useful biomarker for hypertension and hypertensive heart failure.

#### P1642

##### Contribution of novel diagnostic modalities in the differential diagnosis of hypertrophic cardiomyopathy

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Estimation of myocardial deformation by two-dimensional (2D) speckle tracking echocardiography (STE) is a relatively new method for evaluating regional function of the cardiac chambers. The aim of this study was to assess left ventricular (LV) and left atrial (LA) functions with 2DSTE in patients with hypertrophy of LV (LVH) and to investigate relation between strain analysis and the possible cause of hypertrophy.

**Methods:** We studied 82 consecutive patients (pts) (42 men, mean age:  $67 \pm 13$ ) with LVH and 20 controls (11 men, mean age:  $39 \pm 11$ ). From the pts with LVH, we proved by the appropriate diagnostic work up that 36 had hypertensive cardiomyopathy (Group A), 31 LVH because of aortic stenosis (Group B) and 15 had idiopathic hypertrophic cardiomyopathy (HCM) (Group C). All pts underwent transthoracic echocardiography for evaluation of LV and LA function with 2DSTE.

**Results:** Left ventricular and left atrial global longitudinal strain (LVGLS) and (LAGLS) were significantly lower in patients with LVH compared with controls ( $-11.94 \pm 4.80$  vs  $-19.77 \pm 1.90\%$ ,  $p < 0.001$  and  $15.35 \pm 10.54$  vs  $35.61 \pm 10.41\%$ ,  $p < 0.001$ , respectively). LVGLS and LAGLS of pts with LVH according to their underlying factor are presented in Table 1. Pts of group C had significantly decreased LVGLS ( $p = 0.002$ ) and especially lateral wall strain ( $p = 0.009$ ) compared to pts of Group A, while pts of Group A had higher LAGLS and better strain of the lateral wall compared to Group B ( $p = 0.027$  and  $p = 0.033$ , respectively). Groups B and C presented no difference in longitudinal strain.

**Conclusion:** LV and LA functions are impaired in patients with LVH. 2DSTE is useful in assessing the impairment of myocardial mechanics due to hypertrophy and may help to determine the underlying cause by the chamber and the myocardial wall that is mostly affected.

Table 1

	Group A	Group B	Group C	P value
LVGLS (%)	-13.49±5.27	-11.44±4.13	-9.26±3.62	0.011
LAGLS (%)	17.99±10.21	11.94±11.26	15.67±9.09	0.070
Lateral wall (%)	-9.23±9.31	-5.00±6.46	-4.20±3.82	< 0.001
Septal wall (%)	-11.65±10.12	-11.84±9.79	-10.40±4.39	< 0.001

#### P1643

##### Can conventional ECG predict hypertrophy in hypertrophic cardiomyopathy

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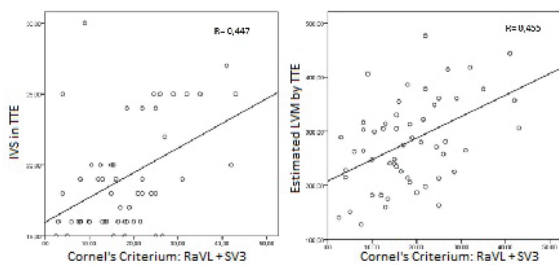
**Introduction:** Electrocardiogram (ECG) remains a first-line test in evaluating patients with hypertrophic cardiomyopathy (HCM). Voltage criteria (VC) are most often used for diagnosing left ventricular hypertrophy (LVH).

**Objectives:** To assess which ECG VC best correlate with interventricular septum thickness (IVS) in patients with HCM.

**Methods:** We evaluated ECG and echocardiogram (TTE) of 64 patients with HCM. Manual measurement of QRS interval and wave voltages in all leads was made. TTE was evaluated for IVS and estimated left ventricular mass (LVM). Seven patients were excluded due to complete right or left branch blockage or pacemaker rhythm.

**Results:** The study population was made up of 57 patients with HCM, 68.4% male, mean age  $51.8 \pm 15.4$ , 14% in atrial fibrillation. Sokolov's criterium was positive in 15.8%. Additionally, another 10.5% met Lyon's criterium. Sokolov's criterium did not correlate with the LVM nor IVS. Lyon's criterium correlated with IVS ( $R = 0.314$ ,  $p = 0.021$ ). Murphy's criterium ( $S V_{1,2} + R V_{5,6}$ ) was more sensitive than Sokolov's, being positive in 31.6% of patients. It also had a linear correlation with IVS ( $R = 0.355$ ,  $p = 0.008$ ). Cornel's criterium was positive in 11 patients (19%). This has shown to have a linear correlation with both LVM ( $R = 0.455$ ,  $p = 0.000$ ) and SIV ( $R = 0.447$ ,  $p = 0.001$ ). No other criterium was superior to Cornel's. In total, 32 patients (56.1%) were not diagnosed by any VC for LVH.

**Conclusions:** In patients with HCM, Cornel's criterium are more sensitive than Sokolov-Lyon's, better correlating with TTE parameters. Murphy's criterium significantly improves diagnostic sensitivity, better correlating with IVS. The ECG VC did not show sufficient sensitivity in this population, thereby screening MCH only with ECG VC is not recommended.



Correlations of Cornell's Criterion

## CARDIOMYOPATHY – POSTER DISPLAY

## P1644

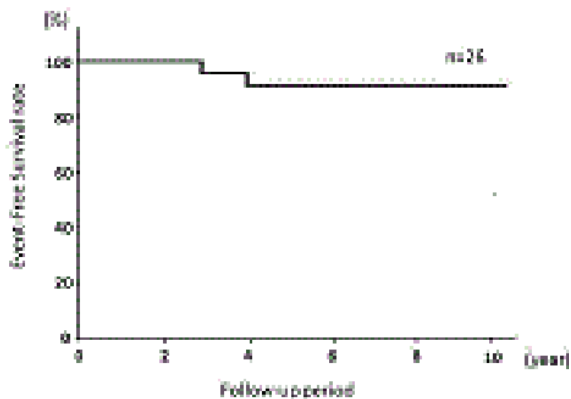
## Long-term outcome of patients with obstructive hypertrophic cardiomyopathy with dual-chamber pacing

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Dual-chamber pacing reduced left ventricular outflow tract pressure-gradient (LVOT-PG) in obstructive hypertrophic cardiomyopathy (HOCM) patients, but its long term effect is still unclear. The aim of this study is to evaluate the effect of dual-chamber pacing on hypertrophic cardiomyopathy (HCM) related death (sudden death, heart failure related death, stroke related death) in HOCM patients. We retrospectively studied 26 patients with HOCM ( $61 \pm 13$  years) who underwent dual-chamber pacemaker implantation because of the persistent high LVOT-PG during medical therapy. After the implantation, LVOT-PG was significantly reduced ( $88 \pm 33$  mmHg  $\rightarrow$   $23 \pm 23$  mmHg,  $p < 0.01$ ). During a mean follow-up of  $10.0 \pm 6.8$  years, Kaplan-Meier estimates of HCM related death were 92% at 10 years (Figure). There is low incidence of HCM related death in HOCM patients receiving dual-chamber pacing.

Figure. Kaplan-Meier Estimates of the free rates of HCM-related death HOCM Patients with dual-chamber pacemaker



## CYTOKINES AND INFLAMMATION – POSTER PRESENTED

## P1646

## Interleukin 33 serum levels, left ventricular remodeling and diastolic filling in patients with hypertension and obesity

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**Purpose:** To investigate interrelations between interleukin 33 (IL-33) and  $1\beta$  (IL- $1\beta$ ) serum levels, left ventricular (LV) structural and functional remodeling in hypertensive patients with obesity.

**Method:** 80 hypertensive patients (34 male, 46 female), aged  $59.2 \pm 8.2$  years, with preserved LV systolic function had been observed, including 51 obese patients. Transthoracic echocardiography was performed with estimation of LV geometric pattern by A.Ganau, E/A and E/E' ratios, pulmonary wedge pressure (PWP) by S.Nagueh. IL-33 and IL- $1\beta$  serum levels were estimated using ELISA.

Results. Both levels of IL-33 and IL- $1\beta$  were elevated in all groups of hypertensive patients ( $p < 0.001$ ), independently of BMI. Cluster analysis revealed 4 clusters of IL-33 and IL- $1\beta$  values ( $p = 0.128$ ). Prominent increase of both cytokines (IL-33  $> 73$  pg/ml, IL- $1\beta$   $> 25$  pg/ml) was associated with the highest LV myocardial mass index (MMI) ( $160.5$  ( $142.8$ ;  $185.8$ )  $g/m^2$ ,  $p < 0.05$ ), highest prevalence of LV hypertrophy (LVH) (100.0%, 90.0% of concentric LVH), moderate decrease in E' velocity ( $9.95$  ( $8.32$ ;  $10.60$ ) cm/sec), relatively low PWP ( $9.23$  ( $8.83$ ;  $13.03$ ) mm Hg) and 70.0% prevalence of LV DD (60.0% of type I). Prevalent increase in IL- $1\beta$  ( $> 20$  pg/ml with IL-33  $< 71$  pg/ml) was characterized by relatively low LV MMI ( $116.9$  ( $104.4$ ;  $163.1$ )  $g/m^2$ ), 55.0% prevalence of LVH plus 30.0% of concentric remodeling, lowest E' ( $7.68$  ( $6.50$ ;  $9.67$ ) cm/sec,  $p < 0.01$ ), highest PWP ( $12.26$  ( $10.72$ ;  $13.12$ ) mm Hg,  $p < 0.05$ ) and highest rate of DD (85.0%, 70.0% of type I). Prevalent increase in IL-33 ( $> 71$  pg/ml with IL- $1\beta$   $< 25$  pg/ml) was associated with MMI of  $121.4$  ( $111.7$ ;  $140.5$ )  $g/m^2$ , 66.7% rate of LVH (equal for concentric and eccentric variants), highest values of E' ( $11.04$  ( $9.49$ ;  $12.00$ ) cm/sec), lowest PWP ( $9.07$  ( $7.04$ ;  $11.51$ ) mm Hg) and lowest prevalence of LV DD (66.7%, 50.0% of type I). Cluster with no differences vs control group (IL-33  $< 71$  pg/ml, IL- $1\beta$   $< 20$  pg/ml) had intermediate characteristics: LV MMI of  $137.4$  ( $121.3$ ;  $157.8$ )  $g/m^2$ , 78.9% prevalence of LVH (50.0% of concentric variant), E' of  $9.95$  ( $8.30$ ;  $12.20$ ) cm/sec, PWP of  $11.20$  ( $9.55$ ;  $12.33$ ) mm Hg, and 71.1% rate of DD (50.0% of type I).

**Conclusion:** Significant increase in IL-33 and IL- $1\beta$  serum levels in patients with hypertension has been revealed independently of presence of obesity. A pronounced increase in both cytokines' levels was associated with the highest rates of LVH and DD. Prevalent increase in IL- $1\beta$  was connected to the worst state of diastolic function despite low rates of hypertrophy. Prevalent increase in IL-33 had the most favorable influence on the severity of LVH as well as diastolic filling.

## P1647

## Galactin-3 serum levels are independently associated to diastolic but non to systolic dysfunction

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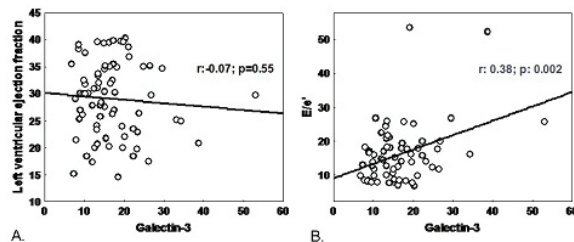
Galactin-3 (Gal-3) is a novel biomarker which has been demonstrated to be related to inflammation status and fibrosis in patients affected by chronic heart failure (CHF). The aim of this study was to evaluate the relationship among Gal-3 serum levels and systolic and diastolic dysfunction in a group of CHF outpatients.

We enrolled 72 outpatients (88% males,  $65 \pm 13$  years, NYHA class  $2.5 \pm 0.5$ , left ventricular ejection fraction, LVEF,  $29 \pm 7\%$ ) with CHF (ESC criteria) due to left ventricular systolic dysfunction, in stable clinical conditions ( $> 1$  month) and in conventional therapy. All patients underwent a clinical evaluation, a routine chemistry and an echocardiogram. Systolic function was assessed by the assessment of LVEF, whereas the ratio between early peak velocity at mitral pulsed Doppler (E) and the early septal-lateral mitral peak velocity at Tissue Doppler (e') was used to evaluate diastolic function.

Gal-3 was significantly and positively correlated with E/E' ( $r: 0.38$ ;  $p: 0.002$ ) but not with LVEF ( $r: -0.07$ ;  $p\% = 0.55$ ). Moreover a significant correlation was found with age ( $r: 0.46$ ;  $p < 0.001$ ), GFR-EPI ( $r: -0.71$ ;  $p < 0.001$ ), haemoglobin ( $r: -0.32$ ;  $p\% = .007$ ) and logarithm of NT-proBNP ( $r: 0.50$ ;  $p < 0.001$ ). At multivariate Cox regression analysis only GFR-EPI and E/E', but not age, haemoglobin and NT-proBNP remained significantly correlated to Gal-3 serum levels.

Figure shows the linear correlation between Gal-3 and E/E' (panel A) and Gal3 and LVEF (panel B).

In conclusion, our findings demonstrate the independent association between Gal-3 serum levels and an echocardiographic marker reflecting filling pressure. This suggests the possible relationship between the fibrosis induced by Gal-3 and abnormalities of diastolic but not of systolic function in CHF outpatients.



Figure

## CYTOKINES AND INFLAMMATION – POSTER DISPLAY

## P1648

**Relationship between hemodynamic and cytokines disorders depending of endogenous insulin levels in hypertensives with diastolic heart failure**

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**Purpose:** to study relationship between the blood pressure (BP) parameters and cytokines activation depending on the endogenous insulin (EI) levels in hypertensives with diastolic heart failure (HF).

**Materials and methods.** 114 hypertensives with diastolic HF II-III NYHA (45 male, 69 female), aged 59 ± 12 years, were examined. The patients were divided into 3 groups according to the plasma EI levels: 67 patients with the normal EI levels (group 1), 27 patients with 2hr postloading hyperinsulinemia (group 2), 20 patients with fasting (spontaneous) hyperinsulinemia (group 3). Office and ambulatory blood pressure monitoring (ABPM), oral glucose-tolerant test with investigation of plasma glucose and EI levels before and 2hr after glucose loading, plasma TNF- $\alpha$ , IL-6, IL-10 levels (ELISA) were measured. A control group included 20 people.

**Results.** Parameters of ABPM systolic/diastolic BP daily were increased and were the highest levels in range 142.37 ± 6.12/84.31 ± 7.85 mmHg in group 3 with HF III vs. control 119.50 ± 5.28/68.10 ± 5.53 mmHg. In group 1 patients with HF III cytokine TNF- $\alpha$  have tendency to increase and ranged 61.25 ± 6.31 pg/ml vs. HF II – 50.53 ± 6.03 pg/ml ( $p \leq 0.1$ ). Plasma IL-10 levels were increased by 3 times and ranged 16.58 ± 2.92 pg/ml vs. control – 4.61 ± 1.78 pg/ml ( $p \leq 0.05$ ) and HF II 12.17 ± 2.32 pg/ml ( $p \leq 0.1$ ). In group 2 patients with HF III are characterized by a tendency to increasing of TNF- $\alpha$ , IL-6 levels to 68.38 ± 4.84 pg/ml, 19.1 ± 1.44 pg/ml and IL-10 levels to 30.21 ± 7.45 pg/ml vs. group 1 – 61.25 ± 6.31 pg/ml, 15.19 ± 2.78 pg/ml and 16.58 ± 2.92 pg/ml ( $p \leq 0.1$ ). The highest plasma TNF- $\alpha$ , IL-6 and IL-10 levels were revealed in group 3 with HF III – 85.2 ± 7.64 pg/ml, 25.42 ± 2.45 pg/ml and 63.88 ± 7.75 pg/ml accordingly vs. group 2 ( $p \leq 0.05$ ). **Conclusions.** The 2hr postloading and spontaneous hyperinsulinemia presence in hypertensives with diastolic HF leads to more severe disease with increasing of ABPM parameters. Hyperinsulinemia and diastolic HF progression accompanied by formation of cytokine disbalance with overproduction of proinflammatory cytokines TNF- $\alpha$  and IL-6 and antiinflammatory cytokine IL-10 levels different degrees in hypertensives with different HF classes.

## P1649

**Methylation of proinflammatory gene Rel $\alpha$ /NF $\kappa$ B/p65 in mononuclear leukocytes may predict response to CRT therapy, a pilot study**

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Chronic heart failure (CHF) is associated with an abnormal inflammatory response. Previous attempts to modulate it in order to affect the outcome did not bring satisfactory results, so there is an urgent need for investigation of novel regulatory mechanisms. In this pilot study we hypothesized that methylation of inflammatory genes in peripheral blood mononuclear leukocytes (PBML) may be associated with the presence of CHF or the response to CRT.

We enrolled 20 patients (age 65.3 ± 11.3) in sinus rhythm who were candidates for CRT and 10 age (age 60.4 ± 6.8), sex and comorbidities matched controls. Blood samples (EDTA as anticoagulant) were obtained before and 6 months after implantation of the device. PBML were isolated by centrifugation in Ficoll gradient. During the same visits detailed history was taken, echocardiography, ergospirometry and 6 minute walk test were performed. From 20 enrolled patients we chose 5 with the clear response to the therapy, judged by unambiguous improvement in all abovementioned tests (responders group) and 5 with deterioration in all analyses (non-responders group). 1  $\mu$ g of DNA from each patient isolated from PBML in Responder, Nonresponder (before and after CRT) and Control groups was pooled into five samples respectively. DNA methylation pattern of 94 inflammatory genes was assessed using SABiosciences EpiTect Methyl II PCR Array that employed enzymatic cleavage and subsequent PCR yielding the percent of gene copies that were methylated.

The initial methylation level was similar in all groups with CD14, Furin, Inh(a) being heavily (>90%) methylated, Rel-a moderately (30-50%), Cxcl14 and IL4R at approximately 5%, whereas the rest of genes had only low methylation level. The differences in methylation at baseline between controls, responder and nonresponder were the extent of Rel-a/NF $\kappa$ B/p65 (50.7%, 50% and 37.7% respectively) and IL-1R type 1 gene methylation (3%, 0%, 12.2% respectively). In responder group 6 months after the implantation of the device the methylation of Rel-a/NF $\kappa$ B/p65 increased to 62.6% whereas in non-responder group further decreased to 31.9%.

**Conclusion.** General pattern of methylation of inflammatory genes in CHF patients is similar to control subjects. The level of methylation of Rel-a/NF $\kappa$ B/p65 gene may affect the biologic effects of this important pro-inflammatory factor and thus may predict or even affect the response of patients to the CRT. Further study is necessary to investigate this phenomenon.

## VALVULAR HEART DISEASE (DIAGNOSIS, MANAGEMENT AND INTERVENTIONAL THERAPIES) – POSTER PRESENTED

## P1651

**Long-term follow-up of percutaneous mitral valvuloplasty with single balloon (Balt) versus Inoue balloon techniques**

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**Objective:** This study aimed to demonstrate that mitral balloon valvuloplasty (MBV) with the Balt single balloon (BSB) has similar outcome and long-term follow-up (FU) than MBV performed with the Inoue worldwide accepted technique.

**Methods:** From 1987 to 2010 a total of 526 procedures were performed, being 312 with a FU, 56 (17,9%) with Inoue balloon (IB) and 256 (82,1%) with BSB. The mean FU in IB group was 33 ± 27 (2 to 118) and 55 ± 33 (1 to 198) months,  $p < 0.0001$ . Univariate analysis (UA) and multivariate Cox analysis (MVA) were utilized to determine independent predict variables of survival and event free survival (EFS) in both techniques groups. The major events (ME) were death, cardiac surgery and new MBV.

**Results:** In IB and BSB groups there were, respectively: female 42 (75.0%) and 222 (86.7%); mean age 37.3 ± 10.0 (19 to 63) and 38.0 ± 12.6 (13 to 83) years,  $p = 0.7138$ ; sinus rhythm 51 (91.1%) and 215 (84.0%),  $p = 0.1754$ ; echo score (ES) 7.6 ± 1.3 (5 to 10) and 7.2 ± 1.5 (4 to 14) points,  $p = 0.0528$ ; echo mitral valve area (MVA) pre-MBV 0.96 ± 0.18 and 0.93 ± 0.21 cm<sup>2</sup>,  $p = 0.2265$ ; post-MBV mean MVA (Gorlin) were 2.00 ± 0.52 and 2.02 ± 0.37 cm<sup>2</sup>,  $p = 0.9554$ . At the end of the FU, there were in IB and BSB groups, respectively: echo MVA 1.71 ± 0.41 and 1.54 ± 0.51 cm<sup>2</sup>,  $p = 0.0552$ ; new severe mitral regurgitation in 5 (8.9%) and 17 (6.6%) patients,  $p = 0.5633$ ; new MBV in 1 (1.8%) and 13 (5.1%),  $p = 0.4779$ ; mitral valve surgery in 3 (5.4%) and 27 (10.4%),  $p = 0.3456$ ; deaths 2 (3.6%) and 11 (4.3%),  $p = 1.000$ ; cardiac deaths 1 (1.8%) and 9 (3.5%),  $p = 1.000$ ; ME 5 (8.9%) and 46 (18.0%),  $p = 0.1449$ . In UA and MCA the BSB or IB technique do not predict survival or EFS. The independent risk factors to survival (MCA with 2 models with 5 and 6 variables) were: age < 50 years ( $p = 0.016$ , HR% = 0.233, 95% IC 0.071 - 0.764), ES  $\leq 8$  ( $p < 0.001$ , HR% = 0.105, 95% IC 0.34 - 0.327), MBV dilatation area ( $p < 0.001$ , HR 16.838, 95% IC 3.353 - 84.580) and mitral valve surgery in the FU ( $p = 0.001$ , HR 0.152, 95% IC 0.050 - 0.459). Independent risk factors to EFS: prior commissurotomy ( $p = 0.012$ , HR% = 0.390, 95% IC 0.187 - 0.813) and post-MBV MVA  $\geq 1.50$  cm<sup>2</sup> ( $p = 0.001$ , HR% = 7.969, 95% IC 3.413 - 18.608).

**Conclusions:** MBV with BSB and IB were equally efficient, there were similar survival and EFS in the FU. Independent predictors of survival were: age < 50 years, ES  $\leq 8$  points, MBV dilatation area and mitral valve surgery in the FU. Independent risk factors of EFS were prior commissurotomy and post-MBV MVA  $\geq 1.50$  cm<sup>2</sup>.

## P1652

**Long-term follow-up of 25 years after percutaneous mitral balloon valvotomy. echocardiographic score, assessment of risk factors for death and major events.**

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**Introduction:** Percutaneous mitral balloon valvotomy (PMBV) has emerged as an alternative to surgical treatment of mitral stenosis.

**Objectives:** To identify the independent predictors of death and combined events (death, new mitral balloon valvotomy, or mitral valve surgery) in long-term follow-up of patients undergoing PMBV.

**Methods:** From 1987 to 2012 a total of 312 patients were followed-up 54.0 ± 31.0 (1 to 126) months. The techniques were the single-balloon (84.4%), Inoue-balloon (13.8%), and double-balloon techniques (1.7%). The total group was divided in two: echocardiographic score >8 and  $\leq 8$  points groups. Multivariate Cox regression analysis was performed to identify independent risk factors of long-term survival and event free survival.

**Results:** The mean age were 38.0 ± 12.6 years old (range, 13 to 83). Before the procedure, 84.42% patients had echo score  $\leq 8$ , and 15.57% score > 8. Females comprised 85%, and 84% patients were in sinus rhythm. During follow-up, survival of the total group was 95.5%, echo score group  $\leq 8$  was 98.0% and echo score > 8 was 82.2% ( $p < 0.0001$ ), whereas combined event-free survival was 83.4%, 86.1%, and 68.9%, respectively ( $p < 0.0001$ ). In multivariate analysis, independent risk factors of death were

pre procedure echo score > 8 and the presence of severe mitral valve regurgitation during the procedure. The predictors of combined events were a previous history of mitral valvular commissurotomy, atrial fibrillation, the presence of severe mitral valve regurgitation during the procedure and post procedure mitral valve area < 1.5 cm<sup>2</sup>.

**Conclusion:** PMBV is an effective procedure. Survival was high, even higher in the

group with lower echocardiographic scores. Over 2/3 of the patients were event-free at the end of follow-up. Independent predictors of survival were pre procedure echo score  $\leq 8$  and the absence of severe mitral valve regurgitation during the procedure.

#### P1653

##### Transcatheter valve therapy: post procedural monitoring and therapeutic strategies in aortic and mitral valve interventions

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**Background:** Transcatheter valve interventions for aortic valve stenosis and mitral valve regurgitation are increasing in number. These procedures realize a unique physio-pathological model of valvulopathy correction with beating heart. Post-procedural monitoring and management pose different issues and need different protocols.

**Methods:** From January 2012 to December 2013, 145 patients underwent transcatheter valve therapies. 85 underwent TAVI: 56% males; mean age  $82 \pm 7$  y.o.; logistic EuroSCORE (LES)  $37 \pm 14\%$ ; mean transaortic gradient 55 mmHg; mean left ventricle ejection fraction (LVEF)  $50 \pm 10\%$ ; glomerular filtration rate  $39 \pm 16$  ml/min. Sixty patients underwent mitra clip procedures: 72% males; mean age  $73 \pm 9$  y.o.; LES  $22 \pm 20\%$ ; 78% had functional mitral regurgitation (MR) with a mean LVEF of  $30 \pm 10\%$ ; 22% had degenerative MR with a LVEF of  $56 \pm 8\%$  ( $p < 0.0001$ ). After procedures all patients had a standardized protocol of vital parameters monitoring, and administration of pre-specified therapy regimen consisting in antibiotic prophylaxis, strict control of fluid balance, maintaining of optimal blood pressure, according to the valvulopathy treated.

**Results.** In TAVI group, 83 patients were treated with Medtronic CoreValve and 2 patients with Direct Flow prosthesis using transfemoral approach in 95% of cases. All the procedures were performed in deep sedation and spontaneous breathing, except of two cases in which general anaesthesia and oro-tracheal intubation were required. Procedural and revalving time were  $62 \pm 17$  and  $4 \pm 3$  minutes, respectively. The hospitalization in intensive care unit (ICU) was  $3,2 \pm 1,3$  days and the mean in hospital stay  $6,1 \pm 1,6$  days. 23% received permanent pacemaker, 5% had vascular complications, and 2% life-threatening bleeding requiring more than 2 units of blood. Only 1 patient worsened renal function. No infective complications related to the procedure were observed. In the mitral group 40% were treated under general anaesthesia with orotracheal intubation and 60% with analogo-sedation protocol; 23 (38%), 36 (60%) and 1 (2%) received one, two and three clips, respectively, in a mean device time of  $42 \pm 26$  minutes. The mean ICU stay was  $4 \pm 2$  days, and time of hospitalization  $7 \pm 3$  days. No cases of intraprocedural death, myocardial infarction, stroke, bleeding or renal failure occurred. 3 in-hospital deaths and 1 new onset of atrial fibrillation was observed after 24 hours of the procedure.

**Conclusions:** Clinical outcomes of transcatheter procedures can improve adopting customized management according to the valvulopathy treated.

#### P1654

##### Clinical spectrum, presentation, and risk factors for mortality in infective endocarditis: a review of 300 cases at a tertiary care center in Tunisia.

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**Objectives:** This study was designed to evaluate clinical, laboratory, microbiological, and echocardiographic characteristics of infective endocarditis (IE) at a tertiary care center in Tunisia and to identify predictors of in-hospital mortality.

**Study design:** Based on a systematic retrospective review of clinical records covering 1997 to 2012, we analyzed data and outcomes of 300 patients (278 males, 122 females; mean age  $46.7 \pm 16.8$  years) with definite or possible IE according to the modified Duke criteria.

**Results:** Native valve endocarditis (NVE) was seen in 208 patients (69.33%), and prosthetic valve endocarditis (PVE) was seen in 92 patients (30.66%). Pacemaker endocarditis (PE) was observed in only 13 patients (4.33%). 36 patients (12%) had nosocomial IE. The most frequent predisposing factor for NVE was rheumatic heart disease ( $n = 132$ ; 44%). Echocardiography failed to show any signs of involvement in 20 patients (21.74%) with PVE. Blood cultures were positive in only 108 (36%). The most common causative microorganisms of NVE, PVE, and PE were staphylococci ( $n = 68$ ; 22.66%). At least one complication developed in 172 patients (57.66%), congestive heart failure being the most common ( $n = 94$ ; 54.65%). 142 patients (47.33%) underwent combined medical and surgical treatment. In-hospital mortality occurred in 54 patients (18%). Mortality rates were 24.6%, 19.2%, and 11.8% for early and late PVE and NVE, respectively. Mortality was significantly higher with nosocomial IE (33.33%) compared to 15.9% in the remaining patients. In multivariate analysis, septic shock ( $p = 0.0001$ ) and vegetation size  $>15$  mm ( $p = 0.002$ ) were independently associated with in-hospital mortality.

**Conclusion:** Compared to the European series, IE in our cohort occurred in a relatively younger population, with rheumatic heart disease as the most common underlying heart disease. The rates of PVE, nosocomial IE, and surgical treatment were about the same

#### P1655

##### Survival of patients with ICD: influence of tricuspid regurgitation

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**Purpose.** The aim of this task is to determinate if the presence of tricuspid regurgitation (TR) previous to ICD implantation change the survival of the patients.

**Methods.** We followed up all the patients with ICD implantation between 1997 and 2011. We considered different events: death, revascularization, endocarditis and transplantation.

**Results.** One hundred and fifteen patients were considered (99 men), with an age of  $69 \pm 12$  years old. The causes of the cardiopathy were: 44% ischemic, 30% myocardiopathy, 12% valvular, 9% mixed and 5% others.

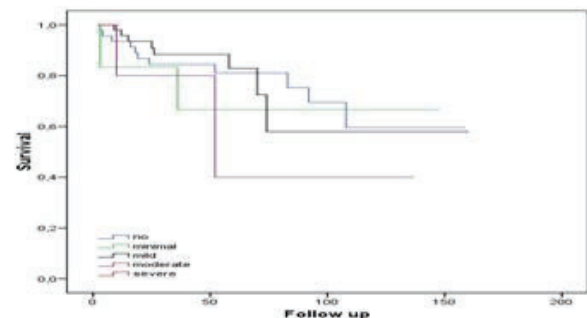
Prior to the implantation, 61 patients (53%) had mild RT, 6 patients (5%) moderate RT and one of them severe RT.

69 of the implanted ICD were tricameral, 17 bicameral, 16 monocameral and 13 biventricular. Seventy seven per cent of the patients had permanent left ventricular stimulation (70% biventricular and 7% right one). The number of leads in right atrium were: none (26%), one (72%), and two (2%). In the right ventricle, 85% had one lead, 14% two and 1% three.

The mean follow up was  $51 \pm 38$  months, dying 24 patients. In this period, 33 patients required PCI, one tricuspid endocarditis and seven were transplanted.

In the survival analysis, according to the presence of previous RT, there were no significant differences (Breslow y Tarone-Ware,  $p > 0.05$ ), with a survival median of  $59 \pm 7$  months. Also, there were no differences in survival according to the severity of previous RT (graph 1); comparison by pairs: Breslow and Tarone-Ware,  $p > 0.05$ .

**Conclusions.** According to these results, there were no statistically significant differences in the survival of patients with tricuspid regurgitation previous to ICD implantation. Also, in patients with previous RT, there were no significant differences in survival according to the severity of the regurgitation.



#### P1656

##### One left ventricle, but two normally functioning mitral valves

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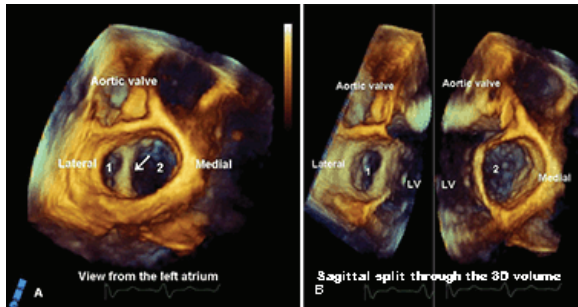
A-60-year-old man was referred for elective triple CABG procedure. He had no other cardiac pathology mentioned in his records.

Intraoperative two-dimensional transesophageal echocardiography (2D-TEE) using a matriceal X7-2t probe suggested the patient had two mitral valves (MV), with no significant mitral stenosis or regurgitation. Real time 3D-TEE was used and "en face" view of the MV was readily available. 3D images revealed the patient had two distinct mitral annuli, each having its normally functioning leaflets (Fig. A). The 3D dataset was quickly manipulated to obtain a sagittal split of the 3D volume that enabled the view of two distinct pairs of leaflets and annuli (Fig. B). Thus, the unusual anatomy of the LV inflow became more obvious and easier to understand. Acknowledgement of this normally functional double MV did not change the surgical approach or the patient prognosis at this time. However, closer follow-up with serial 3D transthoracic studies may be necessary, as little is known about the occurrence of valve dysfunction in such patients.

RT 3D-TEE provides incremental value over 2D-TEE for the noninvasive assessment of the MV. Up to now, there are very few cases reported in which RT 3D-TEE is used

for a double MV assessment, most of the data deriving from 2D-TTE, intraoperative or postmortem findings.

This is a very rare case of two isolated mitral valves in a patient undergoing CABG, an incidental finding during routine TEE examination. 2D-TEE suggested the diagnosis, but RT 3D-TEE confirmed it and allowed for a more comprehensive assessment of the valves and the surrounding structures. Equally important, RT 3D-TEE provided all the information needed to re-evaluate the surgical strategy in the very short pre by-pass period of time.



3D-TEE of the two mitral valves (1,2)

#### P1657

##### Clinical use of the Cardiovascular Medicine Heart Failure (CVM-HF) index in mitral clip population

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**Purpose:** The Cardiovascular Medicine Heart Failure (CVM-HF) index is a prognostic model to predict outcomes in stable heart failure patients. Aim of our study is to validate the feasibility of the score in HF patients undergoing mitral clip procedure.

**Methods:** We performed a prospective study in 47 consecutive patients (mean age  $73 \pm 9$  y.o., males 76%) with left ventricle dysfunction and functional mitral regurgitation, who underwent mitral clip procedure in our institute from January 2012 to December 2013. The CVM-HF index is the sum of the scores assigned by 13 parameters, 7 not cardiac scores (age, anaemia, hypertension, chronic obstructive pulmonary disease, diabetes mellitus, moderate to severe kidney dysfunction, cancer and metastatic cancer) and 6 cardiac score (no  $\beta$  blockers, no ACE -I, NYHA III or IV, left ventricular ejection fraction  $\leq 20\%$ , severe valvular heart disease, atrial fibrillation). Our population was divided into 4 categories of risk: low risk if the score is  $< 6$  (group A), medium risk if the score is from 6 to 11 (group B), high risk if the score is from 12 to 16 (group C) and very high risk if the score is  $\geq 17$  (group D).

**Results:** The evaluation of CVM-HF showed that 3 patients (6%) were included in low risk category (group A); 30 patients (64%) were included in medium risk category (group B) and 14 patients (30%) in high-risk category (group C); no patients had very high risk score (group D). At 6-months all patients in group A were in NYHA functional class I-II (100%) and no adverse events were observed; in group B one patient died for HF (3%) and one patient was admitted in hospital (3%) for percutaneous closure of the residual interatrial communication after mitral clip intervention; in group C two patients were in NYHA III (14%) and two re-hospitalization valve-related were observed (14%); 2 no-cardiac (14%) and two cardiac-deaths were observed. Although the incidence of adverse event was not statistically significant between the three groups, the Logistic EuroSCORE was significantly higher in group C, when compared to group A ( $37.7 \pm 25.1$  vs.  $5.1 \pm 2.9$ ,  $p = .044$ ) and group B ( $37.7 \pm 25.1$  vs.  $17.1 \pm 14.8$ ,  $p = .001$ ).

**Conclusions:** CVM-HF index is a not invasive and practical tool, which can be easily used to assess the clinical risk of HF patients undergoing mitral clip procedure. Poor 6-months outcomes have been observed in patients belonging to the high-risk group.

#### P1658

##### Balloon aortic valvuloplasty in TAVI era - a merited return?

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**Purpose:** Until recently the use of balloon aortic valvuloplasty was limited due to high rate of complications and early valve restenosis. Transcatheter aortic valve implantation (TAVI) has revitalized the interest in the use of balloon aortic valvuloplasty as a bridge procedure in clinically unstable patients. We aim to

ascertain the indications, success and complications of balloon aortic valvuloplasty in a single-center.

**Methods:** Prospective 12-months registry of patients undergoing balloon aortic valvuloplasty in a University Hospital. Clinical and hemodynamic data were collected at baseline and follow-up.

**Results:** Six patients underwent balloon aortic valvuloplasty, mean age  $74 \pm 7$  years, maximum pressure gradient  $68 \pm 8$  mmHg, mean pressure gradient  $44 \pm 15$  mmHg, aortic valve area  $0.78 \pm 0.21$  cm<sup>2</sup>, EuroSCORE  $19 \pm 18$ . Four patients were in heart failure NYHA class IV, 3 of which undergoing invasive mechanical ventilation. Two patients needed an urgent non-cardiac surgery. Femoral artery access was used with 12-14F sheaths. Aortic valvuloplasty was performed with balloons sizes of 20-25 mm, under fast ventricular pacing. Vascular closure devices (Periclose ProGlideTM, AbbottCorp.) were used without complications. The peak gradient fell from  $66 \pm 19$  to  $27 \pm 7$  mmHg. There were no intra-procedural complications, related to vascular access or stroke. One patient died from septic shock. Ventilated patients were weaning from mechanical ventilation soon after the procedure and the 2 patients undergoing non-cardiac surgery showed no postoperative complications. At hospital discharge, patients were in NYHA class I/II. During follow-up 2 patients underwent successfully TAVI implantation and 1 surgical valve replacement. The remaining patients are waiting to perform TAVI. No hospital admissions for cardiac causes occurred.

**Conclusion:** Currently, balloon aortic valvuloplasty is a safe and effective procedure and may be considered in selected cases as a bridge to transcatheter aortic valve implantation.

#### P1659

##### Subacute heart failure due to bioprosthetic valve thrombosis associated to a giant thrombus in the left atrium

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Bioprosthetic valve thrombosis is a rare but serious complication of valve replacement. It is usually diagnosed in the early postoperative period and it is more often associated with porcine prosthesis. We present a case of subacute heart failure due to thrombosis of a pericardial valve in the aortic position, 6 months after surgery.

A 62 year-old male patient presented to the emergency department with progressive dyspnea, orthopnea and paroxysmal nocturnal dyspnea with 15 days of evolution. Six months earlier, he had undergone successful aortic and mitral valve replacement with bioprosthesis (Sorin Mitroflow 21 and St.Jude 29), and his symptoms improved. He was discharged under warfarin (3 months), aspirin, bisoprolol, pravastatin and furosemide. He also had history of ischaemic heart disease with mildly depressed left ventricular systolic function, large B-cell non-Hodgkin lymphoma in 2008 and epilepsy.

On admission his vitals were: BP 110/90 mmHg, pulse 110 bpm, respiratory rate 25 breaths per minute, temperature 38°C. He had diminished pulmonary sounds and crackles in the bases, inflammatory signs of the left leg and foot typical of erysipela as well as punctiform necrosis of the 4<sup>th</sup> and 5<sup>th</sup> toes. The electrocardiogram showed sinus tachycardia, 120 bpm, T wave inversion on V5-V6, DI and aVL. Laboratory investigation results were: CRP 4.2 mg/dL, pro-BNP 13576 pg/mL, troponin T 0.005 ng/mL, D-dimers 8  $\mu$ g/mL. The thorax contrast-enhanced CT revealed a 3 cm mass in the left atrium (LA), suspected to be a thrombus. During Cardiology evaluation a transthoracic echocardiogram (TTE) was performed showing severe aortic prosthesis obstruction, severe biventricular systolic dysfunction, spontaneous contrast in the left chambers and a thrombus look like image in the postero-inferior wall of the LA. He was admitted to the Coronary Unit where he began anticoagulation, antibiotherapy and IV diuretics, and his condition improved. Transesophageal echocardiogram revealed aortic prosthesis thrombosis causing severe obstruction and a massive thrombus in the LA. The coronary angiogram was similar to the one performed before surgery.

The patient was transferred to Cardiac Surgery and the LA and aortic prosthesis thrombi were successfully removed. During the post-operative period he transiently presented altered mental status without head-CT relevant abnormalities. There were no further complications during the rest of the hospitalization. The last TTE showed normal function of the aortic prosthesis and severe biventricular systolic dysfunction. He was discharged under oral anticoagulation and he is doing well.

#### P1660

##### Heart failure and infective endocarditis. a clinical review

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**Purpose:** Our aim is to assess the frequency, etiology, demography, clinical profile, comorbidities, predisposing conditions, and main echocardiographical parameters in a selected group of patients with a definite diagnosis of infective endocarditis (IE)

who developed symptomatic heart failure (HF) not previously present, as well as their clinical outcome.

**Methods:** We analyzed a cohort of 35 patients with a diagnosis of bacterial IE during a 5 years span (from 2008 to 2013). We excluded patients who had suffered a previous event of IE, and those who had exhibited clinically overt, stage C HF -whether acute or chronic- irrespective of the type of the current structural cardiomyopathy or valvular heart disease. Variables under study were then recorded as stated above.

**Results:** We found that 51% of patients developed symptomatic HF; surgical repair was performed in 70% of patients, and only 30% of them died after a 3-years of follow-up. We also observed that the vast majority of patients were known to have valvular heart disease and other comorbidities (75%), such as diabetes mellitus, high blood pressure, atherogenic dyslipidemia or bronchopneumopathy. The aortic valve was strikingly involved in 80% of cases. Regarding microbiological aspects, we found 60% of positive blood cultures in which *Staphylococcus* spp. were isolated, 35% with *Streptococcus* spp., and only 5% with other germs. Most patients that survived IE returned to an asymptomatic clinical situation without need of additional medication.

**Conclusions:** Acute, non-previously symptomatic HF frequently complicates IE, being staphylococcal involvement of the aortic valve the most important subyacent specific abnormality. A surgical procedure was needed with broad frequency, and survival without further chronic impairment of heart function was the rule.

#### P1661

##### Transcatheter aortic valve implantation in pure native aortic valve regurgitation with the CoreValve prosthesis

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Currently TAVI has become an alternative to surgical treatment in patients with severe aortic stenosis and high surgical risk, however, treatment options in patients with native and inoperable severe aortic regurgitation remains limited.

The aim this study was to evaluate the use of TAVI in patients with pure native aortic valve regurgitation and comparing them with patients with aortic stenosis.

**Methods:** From April 2008 to December 2013, the CoreValve prosthesis was implanted in 9 consecutive high-risk surgical patients with symptomatic severe aortic regurgitation (AR) and in 363 patients with aortic stenosis (AS).

**Results:** The mean age and logistic EuroSCORE were similar in both groups (AR vs. AS) 79 ± 5 vs. 79.5 ± 6 years,  $p = 0.896$  and 16.4 ± 8% vs. 18.2 ± 12,  $p = 0.664$  respectively. There were significant differences in measurement of annulus and ascending aortic size (24.5 ± 1.8 vs. 22.1 ± 1.8 mm,  $p < 0.001$  and 35 ± 4 vs. 30.9 ± 4.5 mm,  $p = 0.011$ , respectively). Implantation of a TAVI was performed successfully in all patients with AR and the post-procedure aortic regurgitation grade was: absent in 4 patients, middle-moderate in 4 patients, and moderate-severe in one patient. The NYHA functional class improved from 3.2 ± 0.6 to 1.6 ± 0.5 and remained stable at one year. The mortality at 30 days was 11.1 % in patients with AR compared to 4.1% in patients with AS,  $p = 0.308$  and there was a slight more late mortality in patients with AS (0% vs. 14.4%,  $p = 0.247$ ) after a mean follow-up of 26 ± 17 months. The patients with AR had more acute kidney injury after procedure and lower occurrence new onset left bundle branch block than patients with AS (44.4% vs. 14.9%,  $p = 0.016$  and 12.5% vs. 48.4%,  $p = 0.047$ , respectively).

**Conclusions:** TAVI with the CoreValve prosthesis for patients with aortic regurgitation and a high surgical risk is a safe and efficient option resulting in a medium-term clinical improvement

#### P1662

##### Echocardiographic study of tricuspid valve involvement in rheumatic heart disease

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**Background:** Right sided valve diseases are usually missed and considered secondary in rheumatic heart disease (RHD).

**Objective:** To assess the organic involvement of tricuspid valve (TV) in RHD patients by using echocardiographic criteria in association with the involvement of other valves.

**Methods:** We studied the prevalence of rheumatic tricuspid valve disease (RTVD) by echocardiography in 6612 consecutive patients with RHD over a period of one year. Organic TV involvement was defined as the presence of TV thickening with restricted mobility of leaflets, diastolic doming of tricuspid leaflets, reduced EF slope, and subvalvular apparatus involvement. Tricuspid stenosis (TS) was diagnosed when mean TV gradient on continuous wave Doppler was > 2 mm Hg and organic TR was diagnosed in the presence of moderate or severe tricuspid regurgitation (TR) with

pulmonary artery systolic pressure (PASP) ≤ 40 mmHg.

**Results:** A total of 6052 patients with RHD were evaluated. Their age ranged between 12 and 80 years (mean age, 37.06 ± 14.7 years). 4466 (73.8%) patients were females and 1586 (26.2%) patients were males. Mitral stenosis (MS), mitral regurgitation (MR), aortic stenosis (AS) and aortic regurgitation (AR) were present in 4460 (73.68%), 3977 (65.71%), 1135 (18.76%) and 2884 (47.65%) patients respectively. 483 (07.98%) patients had organic TV disease. 46 (0.76%) patients had isolated TS without TR. TS with TR was found in 117 (01.94 %) patients. Isolated TR was the most common lesion, present in 320 (5.28%) patients. All the patients with organic TV involvement had concomitant mitral valve (MV) disease. 30 of these patients had only echocardiographic evidence of MV involvement without hemodynamically significant lesion. Calcification of the TV was found in 7 patients.

**Conclusion:** The prevalence of organic involvement of the TV in RHD in this study is 07.98%. All cases of RTVD are invariably associated with MV disease.

#### P1663

##### Mitral valve reconstruction after giant atrial myxoma mechanical damages

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**Objectives:** Mechanical trauma of mitral valve caused by giant atrial myxoma may cause symptoms of left-sided heart failure. We studied surgical conservative approach for mitral regurgitation treatment, after complete resection of primary cardiac tumors.

**Methods:** A selected group of 23 patients (mean age 38 ± 17, 11 were male) underwent mitral valve reconstruction after excision of giant atrial myxoma. The surgical examinations demonstrated severe mitral regurgitation due to mechanical damage by the movement of the tumor through the mitral valve apparatus. There was large central regurgitant jet through poorly coapted mitral leaflets. The tumors were excised together with the majority of interatrial septum. The mitral valves were repaired performing a reductive ring anuloplasty, with a posterior C-shaped semi-rigid prosthesis. All patients were enrolled in a follow-up period and perform echocardiographic controls at 1<sup>st</sup> month, 3<sup>rd</sup> month and 12<sup>th</sup> month after surgery to control the mitral valve continence.

**Results:** Freedom from reoperation. The examination program during the follow-up period shows:

no residual mass or recurrence of myxoma, no systemic embolic phenomena, mild residual mitral valve regurgitation.

**Conclusions:** Midterm results in our patients show satisfactory outcomes. Wide surgical excision of atrial myxoma associated with mitral valve repair gives excellent short-term and long-term results.

#### P1664

##### Left ventricular recovery after transcatheter aortic valve implantation

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**Purpose:** Transcatheter aortic valve implantation (TAVI) is an emerging treatment option for inoperable or high risk patients. After TAVI, some patients transiently decline left ventricular (LV) function and others may elevate the levels of CRP and white blood cells (WBC). Thus, elevated CRP has been associated with declined LV function, we hypothesized that inflammatory parameters may influence LV recovery after TAVI.

**Methods:** Consecutive patients who underwent TAVI were evaluated from an existed database. Blood samples (WBC, CRP) and transthoracic echocardiograms were obtained before TAVI and daily for 5 days after the procedure. Patients were separated into three groups according to left ventricle improvement (improved, unaffected, declined).

**Results:** Data from 152 patients (80.5 ± 5.5 years, 80 males) were analyzed. Out of them, in 67 patients LVEF improved (Group I), in 14 patients it declined (Group II) and in 68 patients it remained unaffected (Group III). We found significant differences between groups for CRPmax ( $p < 0.01$ ) and WBC1<sup>st</sup> day after TAVI ( $p < 0.01$ ). In particular, higher levels of CRPmax in Group I comparing to Group II (48.11 ± 37.16 vs. 81.21 ± 55.15,  $p < 0.01$ ) or Group III (48.11 ± 37.16 vs. 75.89 ± 59.16,  $p < 0.01$ ) were recorded respectively. Similarly, greater value of WBC1<sup>st</sup> day after TAVI in Group II comparing to Group I (15400 ± 4763 vs. 11586 ± 3238,  $p < 0.01$ ) or Group III (15400 ± 4763 vs. 11427 ± 3177,  $p < 0.01$ ). Moreover, we found correlation among WBC1<sup>st</sup> day after TAVI and maximum values of CPK ( $p < 0.01$ ), CK-MB ( $p = 0.02$ ) and troponin I ( $p = 0.02$ ).

**Conclusions:** In conclusion, the pathophysiology that influences LV function after TAVI is not clear.

## P1665

**Transcatheter aortic valve implantation induces changes in patients with impaired left ventricular function and pulmonary hypertension**

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**Purpose:** Over the last few years, the use of transcatheter aortic valve implantation (TAVI) has been established as an alternative therapeutic modality to standard surgical aortic valve replacement for the treatment of severe symptomatic aortic stenosis. TAVI has emerged as a treatment for inoperable and high risk patients. Reduction in left ventricular function results as a consequence of severe aortic valve stenosis. The aim of this study was to evaluate left ventricular function and right ventricular systolic pressure (RVSP), after TAVI on patients with moderately impaired LVEF.

**Methods:** Consecutive patients who underwent TAVI were recorded. Preoperative and postoperative left ventricular function and RVSP were evaluated in 197 patients who underwent TAVI with self-expandable CoreValve system. Patients with moderately affected left ventricular function (LVEF >30% AND < 50%) and moderate RVSP (31-55mmHg) were finally evaluated for the changes in LVEF and RVSP. Patients with moderate or severe mitral stenosis, moderate to severe or severe mitral valve regurgitation, severe COPD and connective tissue disease, were excluded.

**Results:** Overall 200 patients were evaluated. Out of them one hundred seven patients (53,5%) were found to have moderately affected left ventricular function (LVEF:  $50 \pm 7,5\%$ ). Among them, both RVSP and LVEF differed significantly when compared pre- and post-operatively. In particular, LVEF increased from  $52 \pm 8\%$  to  $55 \pm 8\%$  ( $p < 0.01$ ) while RVSP decreased from  $49 \pm 12,5\text{mmHg}$  to  $40 \pm 14,5$  ( $p < 0.01$ ).

**Conclusions:** TAVI in patients with impaired LVEF and pulmonary hypertension improved both LVEF and RVSP after TAVI.

## P1666

**Infective endocarditis: is heart failure predictable?**

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**Purpose:** Despite advances in diagnosis and surgical management, infective endocarditis (IE) is still associated with a high in-hospital mortality rate. Congestive heart failure (CHF) has been reported as the most common cause of death in IE, and the main indication for surgery in IE. The aim of the study was to analyse CHF predictors in patients hospitalized for IE and the impact of this complication.

**Methods:** Epidemiologic, clinical and laboratorial data were retrospectively reviewed in consecutive patients hospitalized between January 2003 and December 2012, who fulfilled the Modified Duke criteria for IE, in order to find predictors of CHF, and its prognosis impact.

**Results:** One hundred and six patients were reviewed (mean age  $56,7 \pm 14,8$  years; 64% males). CHF was reported in 45.1% of patients. The mean age was significant higher in this group ( $62,0 \pm 12,5$  vs  $51,9 \pm 16,4$ ,  $p = 0.001$ ). Serious valvular dysfunction (57.1 vs 34.0,  $p = 0.015$ ), left ventricle systolic dysfunction (92.3% vs 38.2%,  $p < 0.001$ ) were more frequent, and serum creatinine at admission ( $1,53 \pm 0,8$  vs  $1,16 \pm 0,8$ ,  $p < 0.03$ ) was higher in CHF patients. In multivariate analyse, age (OR 1.04 CI 95 1.0-1.1,  $p = 0.023$ ), serious valvular dysfunction (OR 3.2, CI 95 1.2-8.7;  $p = 0.022$ ) and left ventricle dysfunction (OR 9.3, CI 95 1.1-80.7,  $p = 0.043$ ) were identified as independent predictors of heart failure, but association with serum creatinine was lost.

There was also no difference between patients with and without CHF in what concerns the affected valve, the presence of prosthesis valve and previous diagnosed valve disease. The prevalence of identified microbiologic agent, and high risk agent was similar between the groups. There was no difference in C reactive protein maximum value during hospitalization.

The group with CHF had worse prognosis, with higher in-hospital mortality (30.4% vs 8.9%,  $P = 0.006$ ) and 1-year mortality (37.0% vs 12.5%,  $p = 0.004$ ). This group has also a higher probability to need surgery (57.1% vs 34.0%,  $p = 0.015$ ).

**Conclusions:** CHF is a common complication of IE, and is associated with higher in-hospital and 1-year mortality. In this study, older patients, with serious valve dysfunction and left ventricle dysfunction were found to be significant more likely to have HF during hospitalization. However no other risk factors supposed to increase CHF risk were found in this study.

## HEART TRANSPLANTATION – POSTER PRESENTED

## P1668

**Survival analysis of basiliximab as induction therapy in heart transplantation**

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**Purpose:** Heart transplantation (HT) is the gold standard treatment for refractory heart failure. Induction therapy, using antagonists of IL2 and polyclonal antibodies (basiliximab), could be considered to reduce the risk of rejection and enable the delay of the beginning of calcineurin inhibitor. However the evidence for this approach has been subject of debate.

**Objective:** to evaluate the survival in patients treated with basiliximab as induction therapy in comparison to control group which did not receive the treatment.

**Methods:** Retrospective analysis of patients undergoing HT from 2004 to 2013. In this cohort were compared the survival of patients who received basiliximab to those who did not receive during 30 and 60 days and at 1 year after HT. The criteria for use of basiliximab included: HLA-sensitized patients (anti- HLA class I and II > 10%) and impaired renal function.

**Results:** We performed 211 HT. The average age was 47 years and the main etiologies were chagasic cardiomyopathy in 81 patients (38%), idiopathic in 60 (28%), ischemic in 33 (15%) and valvular in 9 (4%). Eight-seven patients (41%) received basiliximab. Patients who received basiliximab had higher mortality rates in 30 days (22 vs 35,  $p = 0.024$ , figure), and 60 days (35 vs 39,  $p = 0.015$ ). In the basiliximab group there was higher mortality related to infection in the first year (26 vs 11,  $p = 0.014$ ). However, there was no difference in overall 1 year mortality ( $p = 0.279$ ).

**Conclusion:** Use of basiliximab is indicated to patients with higher risk and is associated with poor survival in the early period after HT and significantly increases mortality related to infection in 1 year after

## P1669

**Heart transplantation for advanced heart failure due to cardiac sarcoidosis**

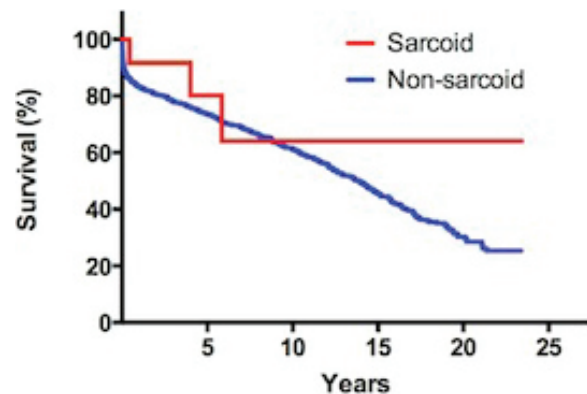
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**Purpose:** Patients with advanced heart failure due to cardiac sarcoidosis may undergo heart transplantation. However, there is concern about the possibility of recurrent cardiac sarcoidosis in the transplanted heart and progressive extra-cardiac sarcoidosis.

**Methods:** We conducted a retrospective study of consecutive patients that underwent heart transplantation at Papworth Hospital from 1990-2012. Cases of cardiac sarcoidosis were identified through pathological records. The control group comprised all patients who underwent transplantation for an alternate diagnosis during the same period. Baseline characteristics, operative details and post-transplant outcomes were recorded for each patient.

**Results:** 901 patients underwent heart transplantation, of whom 12 patients had cardiac sarcoidosis. Baseline characteristics were similar between groups. Post-transplant survival for cardiac sarcoidosis patients was 100% at 30 days, 92% at one year and 83% at five years. In comparison, post-transplant survival for patients with an alternate diagnosis was 91% at 30 days, 83% at one year and 64% at five years. There was no difference in observed survival between patients with and without cardiac sarcoidosis by Kaplan-Meier analysis (Figure, log rank test  $P = 0.3741$ ). No recurrence of the sarcoidosis in the allograft was seen during 1015 months of follow up. No patients developed de novo extra-cardiac sarcoidosis or progressive extra-cardiac sarcoidosis.

**Conclusions:** In our series, patients with cardiac sarcoidosis had similar post-transplant survival to those with an alternate diagnosis. Recurrent sarcoidosis in the transplanted heart and progression of extra-cardiac sarcoidosis were not encountered. Heart transplantation is a treatment option for carefully selected patients with cardiac sarcoidosis.



Post-transplant survival

## HAEMODYNAMICS/CORONARY AND PERIPHERAL CIRCULATION – POSTER PRESENTED

### P1671

#### RETICARD Study: hypertensive retinopathy as predictor of coronary circulation

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**Purpose:** Relationship between retinopathy and cardiovascular disease has been described. Anatomical correlation between retinal lesions and coronary artery disease (CAD) has been less studied. We evaluate the relationship between hypertensive and atherosclerotic retinopathy degrees with the CAD.

**Methods:** Prospective observational study of 50 patients admitted for coronary angiography. Retinoscopy and coronary angiography were evaluated.

**Results:** Multivariate analysis showed the presence of grade II hypertensive retinopathy (HR) increases (OR% = 4; 95% CI, 1,05 - 15,21; p% = 0,043) the risk having significant CAD.

**Conclusions:** A high degree of HR is associated with CAD, this finding allows us to contemplate the possibility of adding the study of the retina to the battery of screening tests for CAD.

#### Univariate and multivariate analysis

Hypertensive Retinopathy	Total (n = 39)	SYNTAX Score % = 0 (n = 21)	SYNTAX Score ≥ 1 (n = 18)	p	Multivariate Analysis OR (95% CI)	p
Grade I	20	14 (36)	6 (15)	0.038	-	-
Grade II	19	7 (18)	12 (31)	0.038	4 (1.05-15.21)	0.04

Hypertensive retinopathy Grade I of the Keith-Wagener-Barker classification: vasoconstriction arterial; Hypertensive retinopathy Grade II of the Keith-Wagener-Barker classification severe signs of vascular constriction and Gunns' signs in the arteriovenous crossing, concealment of the vein blood column by compression of the sclerotic arteriole in an arteriovenous cross, dilated venules and arteries in "silver thread", 95% CI: 95% confidence interval. Data are expressed as number of cases (n) and the total proportion of the sample (%).

### P1672

#### Ultrasound-guided venous access for pmks and icds-randomized trial

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**Introduction:** Following recommendations of anesthesiology and intensive care units to use vascular eco-guided approaches, we wanted to evaluate the safety and efficacy of this approach for the axillary vein during pmk and icd implants. Technique: After disinfection of the skin in the region clavicular and preparation of the sterile field, was used a sterile cover for cardiac probe, previously coated with sterile gel. To improve the visualization of the images and reduce air at the interface between skin and probe cover, was used saline. Not sterile gel was used to reduce costs. The right-handed operator was wielding the probe with the left hand and the syringe with the needle with the right one. It was identified the anatomical region extrathoracic axillary vein to prick after local anesthesia in the area of interest, with Seldinger technique. The progression of the needle was guided by ultrasonography. The puncture was carried out two or three times depending on the implant type.

**Methods:** After a learning period of the echo-guided technique, were enrolled 90 patients in which consecutive, randomly 1:1, was chosen the initial approach (echo-subclavian). If in a maximum time of 5 minutes the first approach failed in the cannulation, is passed to the second approach.

**Results:** In the learning period of about three months the frequency of failure was lower than 30%. In the period of enlistment randomized, the frequency of success at the first attempt of the approach echo is comparable with that for subclavian (42/45, 93.3% vs. 43/45, 95.6%). Are not reported to the system and major events in the postoperative period. Are registered minor events, as dislodgment, during the procedure and/or raising the threshold post-procedure to be comparable in the two groups (Eco: 2.2% vs 6.7% Subclavian).

**Conclusions:** The proposed technique appears to be effective and safe as the classical technique for subclavian, also presents the advantage of being free from pneumothorax risk and breaking of leads. Ratings on a follow-up in the medium and long term are in place to assess their reliability. Studies with an adequate number of patients would be desirable to confirm our preliminary results.

### P1673

#### High cardiac output heart failure in patients with congenital arterio-venous malformations

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**Background:** high cardiac output (CO) heart failure (HF) occurs in the conditions when heart chambers are overloaded with blood volume. Ineffective blood volume and pressure overload gradually cause ventricular enlargement, remodeling, and HF. One of the possible causes of volume and pressure overload may be congenital arterio-venous malformations.

**Aim:** we hypothesize that congenital arterio-venous malformations in some patients can cause high cardiac output state, thus inducing either systolic or diastolic heart failure.

**Methods:** we examined consecutive patients with arterio-venous malformations clinically and performed hemodynamic measurements by transthoracic echocardiography.

**Results:** 7 patients with congenital arterio-venous malformations were referred to our clinic during 2013 year. All patients underwent transthoracic echocardiographic evaluation (Vivid 9, GE Healthcare). In 3 patients (42.86%) high cardiac output was observed. The mean CO of these 3 patients was 7.63 L/min. Two of three patients presented enlarged right ventricle with mean diastolic diameter of 3.9 cm (in M-mode?), no right ventricle systolic dysfunction was found. One of three patients had symptomatic heart failure with reduced ejection fraction, left ventricle EF was 45% (age . Left and right ventricle diastolic diameters in M-mode were 6.1 and 4.4 cm, respectively. Tricuspid annular plane systolic excursion was 2.1 cm. Left ventricle hypertrophy, pulmonary hypertension and tricuspid valve insufficiency were also documented in this patient. Cardiac output was 8.5 L/min. The other finding in this patient was permanent atrial fibrillation due to heart chambers overload (left and right atrial dimensions were respectively 6.6 x 5.0 and 6.5 x 6.2 cm). The treatment with diuretics, ACE inhibitors, aldosterone antagonists, beta-blockers and anticoagulants was initiated.

**Conclusions:** heart failure is not common in patients with congenital arterio-venous malformations but is important finding for the further patient care. These patients need regular cardiovascular follow up and some of them require heart failure treatment. We state that all patients with congenital arterio-venous malformations should undergo transthoracic echocardiography with hemodynamic measurements.

### P1674

#### A conservative choice treatment in a rare case of multiple coronary artery fistulas

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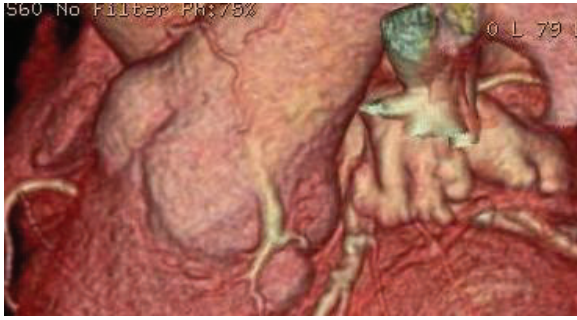
**Purpose:** congenital coronary artery fistula (CAF) is a direct communication between a coronary artery and another vascular structure.

**Methods:** we present the case of a 52 years old man with history of hypertension, dyslipidemia, lungs silicosis and surgical kidney resection for neoplasia. He was admitted to our hospital for chest pain.

**Results:** ECG didn't show significant alteration but Troponin I was elevated (3,13 ng/ml, n.v < 0,06 ng/ml). Treated with DAPT, sc LMWH and iv nitrate. Coronary angiography showed no evidence of significant lesions of the coronary tree, exception for a very thin septal branch atheromasia. It found a complex morphology fistula, originated from the proximal left anterior descending artery determining communication with the pulmonary artery. To understand the fistula anatomy a cardiac CT was performed and shown thin branches that originate from the coronary ostium, from a tortuous right coronary artery, from the first acute marginal and from proximal segment of the left anterior descending artery that anastomose on the common trunk of the pulmonary artery. Due to the absence of systolic dysfunction signs and of overload of pulmonary and systemic circulation at the 2D echocardiography we decided to not submit the patient to any surgery or percutaneous treatment. We treated him with active coronary drugs and in the next six months, he has remained completely asymptomatic, resuming an active life.

**Conclusions:** CAF represent a rare cause of myocardial ischemia, the current literature agrees upon the surgical or percutaneous closure in symptomatic patients according the favourable anatomy and to avoid future fluid overload and recurrent ischemia. In our brief follow-up, we demonstrate the efficacy of a coronary medical therapy for complex coronary fistula.





coronary CT

**P1675****Factors of orthostatic insufficiency in patients with chronic heart failure**

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Inpatients with chronic heart failure (CHF) occurs frequently orthostatic hypotension (OH), leading to syncope. Reasons for its development are studied insufficiently. Objective. Evaluate factors of OH in patients with severe CHF.

Patients. We examined 76 patients with CHF functional class 2-4 NYHA, ejection fraction (EF) less than 40%, mean age  $56.7 \pm 7.8$  years. 49 patients had sinus rhythm (SR), 27 - atrial fibrillation (AF). Control groups consisted of 80 healthy, 80 patients with essential hypertension (EH) without coronary heart disease (CHD) and 80 patients with coronary artery disease, age-matched.

Method. In all patients was calculated hemodynamic parameters, registered by mean beat-to-beat blood pressure monitor Finometer-PRO (Amsterdam) at rest and during tilt-test performs a shortened protocol (10 min rest, 20 min orthostasis). OH was verified with a decrease of systolic blood pressure (BP) greater than 20 and/or diastolic BP than 10 mm Hg. In patients with sinus rhythm assessed arterial baroreflex (BRS). In 46 patients with CHF was performed coronary angiography.

Results. It was established that during the tilt-test, maximum frequency of OH is found in patients with CHF: 21 (28%), which was more often than among healthy 6 (8%);  $\chi^2 = 15.5$ ;  $p < 0.005$  and AH patients: 7 (9%),  $\chi^2 = 16.2$ ;  $p < 0.001$ , and a comparable with group of IHD patients: 20 (25%);  $p > 0.05$ .

In patients with CHF and AF tended to have more frequent occurrence of OH than in patients with SR: 12 (44%) and 10 (20%),  $\chi^2 = 3.5$ ;  $p = 0.06$ .

The degree of BP reduction in orthostasis was connected with systolic BP at rest:  $r = 0.31$ ;  $p < 0.05$ , with BRS:  $r = 0.30$   $p < 0.05$ , with diastolic diameter of the left ventricle:  $r = 0.39$ ;  $p < 0.005$ , with EF:  $r = -0.28$ ;  $p < 0.05$ , the presence of AF:  $r = -0.33$ ;  $p < 0.05$ , with total peripheral vascular resistance:  $r = 0.46$ ;  $p < 0.001$ , and a lesion of the left anterior descending artery (LAD) according to coronary:  $r = 0.45$ ;  $p < 0.001$ . At the same time, in a group of CHD OH more frequently detected in patients with postinfarction atherosclerosis in the regions of LAD:  $\chi^2 = 5.2$ ;  $p < 0.05$ .

Conclusions. OH in CHF is associated with AF, size and contractility of left ventricular, autonomic regulation of circulation and myocardial dysfunction in the region of LAD, which is important for the formation of OH before the appearance of severe heart failure.

**P1677****Acute effects of aquatic immersion on hemodynamics variables in heart failure patients through cardi thoracic bioimpedance**

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**Purpose:** Aquatic immersions of the body determine different physical effects that produce in consequence physiological adaptations that aroused like hydrotherapy. The hemodynamics effects of water immersion in patients with heart failure is poor know. The aim of this present study was to evaluate the acute hemodynamics effects of aquatic immersion in patients with heart failure through cardi thoracic bioimpedance.

**Methods:** Following a prospective, controlled protocol, 10 patients with HF, ejection fraction  $< 45\%$ , (6 males,  $59 \pm 14$  years,  $B 26 \pm 5$  kg/cm<sup>2</sup>), were submitted in a immersion in water (tree different levels: knee (K), pelvis (P) and Louis angle (LA) and remains 5 minutes in each level. Variable of contractility, flow, resistance and thoracic volume were registered and recorded. Cardiothoracic bioimpedance (CB) before and after and compared with a control group with 9 volunteers without HF and hypertension. Statistical analysis was performed by student-t test and ANOVA.

**Results:** Results showed significant changes in hemodynamics parameters when compared before and after moments of immersion. Thoracic fluid increased in HF group ( $31 \pm 10$  pré vs  $35 \pm 11$  kohn pós  $p < 0.05$ ), pré-ejection period increased (pré:  $123 \pm 28$  ms vs pós:  $134 \pm 33$  ms  $p < 0.05$ ), beside significant increasing in the systemic vascular resistance. (SVR) ( $1762 \pm 550$  vs  $1969 \pm 721$  dynas  $p < 0.05$ ). In the control group SVR and PEP decreasing and thoracic fluid was not changed. The time of ventricular ejection increase in control group  $299 \pm 34$  vs  $338 \pm 33$ ;  $p < 0.05$ .

**Conclusion:** This pilot study showed that significant differences occurred in acute hemodynamics effects from immersion in patients with HF. The increase in SVR suggests an effect of the hydrostatic pressure on vascular system. A greatest sample is necessary to analyze the magnitude of this study.

**P1678****Heart rate, arterial stiffness and wave reflections in patients with heart failure of ischemic etiology**

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**Purpose.** Recent reports have indicated that increased arterial stiffness has important clinical consequences in patients (pts) with cardiovascular diseases (CVD). However, the role of arterial stiffness in pathogenesis of heart failure (HF), especially in situations with increased heart rate (HR), remains unclear. The aim of our study was to investigate the relationship between HR and arterial stiffness and wave reflections in pts with HF of ischemic etiology.

**Methods.** 90 pts (mean age  $55.4 \pm 0.8$  years) with HF of ischemic etiology, NYHA II-III (mean  $2.4 \pm 0.1$ ), left ventricular ejection fraction (LVEF)  $< 40\%$  (mean  $29.9 \pm 0.7\%$ ), mean systolic/diastolic blood pressure  $120.7 \pm 1.9/76.3 \pm 0.9$  mm Hg and mean HR  $64.7 \pm 1.2$  bpm were enrolled into this study. Arterial stiffness and wave reflections were quantified noninvasively using applanation tonometry of the radial artery.

**Results.** Negative relationships between time to return reflected wave (Tr) and augmentation index (Alx) normalized for HR of 75 bpm (Alx@75) and augmented pressure (AP) were found:  $r = -0.41$ ,  $p < 0.05$  and  $r = -0.31$ ,  $p < 0.05$ , respectively. HR was associated with Buckberg index (ratio of endocardial myocardial viability):  $r = -0.69$ ,  $p < 0.01$ . Significantly higher values of Alx [26.5% (12.1 – 31.7) vs. 10.1; (1.2 – 24.1),  $p < 0.001$ ], but not Alx@75, AP and Buckberg index were noted in pts with NYHA III compared to NYHA II. After dividing pts with HF into two groups (HR  $> 60$  bpm and HR  $< 60$  bpm) significantly higher values of AI [24.2%; (7.3 – 31.1) vs. 14.5%; (13 – 25.2),  $p < 0.03$ ], AP [11.1 mm Hg (8.1 – 15.9) vs. 6.3 mm Hg (3.1 – 10.2),  $p < 0.001$ ] and Buckberg index [214.4  $\pm$  5.4% vs. 172.5  $\pm$  4.2,  $p < 0.001$ ] were noted in pts with HF and HR  $< 60$  bpm than in pts with HR  $> 60$  bpm. Interestingly, 3 months therapy with HR lowering agent ivabradine therapy (on top of guideline-based therapy) resulted in a pronounced HR reduction (-16.3%,  $p < 0.0001$ ) as well as in an increase in Buckberg index by 12.0%,  $p < 0.0001$  without significant changes in Alx, Alx@75 or AP.

**Conclusions:** HR can be considered as one of the determinants of aortic blood pressure parameters in patients with heart failure of ischemic etiology. If inhibitor ivabradine does not cause deterioration of the parameters of central aortic pressure, which can be seen as a positive characteristic of this agent.

**P1679****Conducting and damping (shock-absorbing) function of arterial wall in patients with chronic heart failure in the setting of 2 type diabetes mellitus**

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**Objectives:** to evaluate condition of conductive and damping (shock-absorbing) function of arterial wall in patients with chronic heart failure (CHF) in the setting of 2 type diabetes mellitus.

**Methods and materials:** 40 patients with CHF and preserved LV EF were examined. Patients were divided into two groups. The 1<sup>st</sup> group included patients with CHF and 2 type diabetes mellitus, and the 2<sup>nd</sup> group included CHF patients without diabetes mellitus. Average age was  $62.1 \pm 6.6$  years. Average functional class (FC) of stable angina was 2,5+0,5, and FC of CHF was 2,6+0,5. Average level of HbA1c was  $7.6 \pm 1.2\%$ . CHF diagnosis had been confirmed by clinical symptoms, echocardiography signs of myocardial dysfunction and/or NT-proBNP increase. To estimate arterial damping function volume sphygmography was done with VaSera VS-1000 device (Fucuda, Japan). The following parameters had been evaluated: pulse wave velocity (PWV) in brachial-ankle segments in right and left sides (R-PWV and L-PWV); cardiac ankle vascular index (CAVI-1), PWV in carotid femoral segment (PWVcf), PWV in aorta (PWV Ao) and carotid PWV (C-PWV); augmentation indices R-AI and L-AI.

**Results:** L-PWV and R-PWV in 1<sup>st</sup> group were significantly higher than in 2<sup>nd</sup>: 95%CI% = 12.8-15,3 and 95%CI% = 9,0-12,2 m/sec; 95% CI% = 12,4-14,9 and 95%CI% = 9,9-12,0 m/sec, respectively. C-PWV, PWV Ao did not differ between the groups. PWVcf was reliably higher in 1<sup>st</sup> group and made up 95%CI% = 11,4-13,2 m/sec, in compare with 2<sup>nd</sup> - 95%CI% = 9,3-11,1 m/sec. R-AI

and L-AI were significantly higher in 1<sup>st</sup> group than in 2<sup>nd</sup>: 95%CI% = 1,45-1,91 and 95%CI% = 0,96-1,37; 95%CI% = 1,29-1,86 and 95%CI% = 1,00-1,18, respectively. Also, there was reliable difference between the groups in CAVI1 ( $p = 0,003$ ).

**Conclusions:** In patients with ischemic CHF and preserved LV EF in the setting of 2 type diabetes mellitus there were found more evident increase of arterial wall stiffness, decrease of its elasticity and flexibility, particularly in brachial-ankle and carotid-femoral segments, and independently of BP changes according to CAVI1.

#### P1680

##### Acute hemodynamics effects of an electrical muscle stimulation in patients with Chronic Heart Failure

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**Purpose:** Neuromuscular electrical stimulation (NMES) in patients with heart failure (HF) results improvements on muscle strength, resistance and consequently in exercise tolerance. Poor is know about the hemodynamic performance in this patients submitted in NMES. The purpose of this present study was to evaluate the acute hemodynamic effect of a session of electrical muscle stimulation (EMS) in patients with HF, monitored by impedance cardiography (ICG).

**Methods:** The study followed a cross-protocol at two moments (before vs. post EMS). The study included 15 patients with HF (7 women, age  $68 \pm 11$  years, BMI  $27.2 \pm 2.0$  kg / m<sup>2</sup>, ejection fraction < 50% (Simpson, NYHA III/IV). Patients were monitored by ICG and hemodynamic parameters were recorded before, during and after the EMS. The study was approved by the ethics committee and university research. Student's t-test and Pearson coefficient was applied and p value  $\leq 0.05$  was considered significant.

**Results:** As compared before vs. post moments with EMS, there was an increase in heart rate (pre.:  $77 \pm 16$  vs  $81 \pm 17$  bpm, 35 min,  $p = 0.03$ ), systemic vascular resistance (pre.:  $2279 \pm 1667$  vs  $2885 \pm 1832$  dyne 35 min;  $p = 0.02$ ), the systemic vascular resistance index (pre.:  $3615 \pm 1256$  vs  $6123 \pm 1441$  dynes / m<sup>2</sup> 35 min,  $p = 0.05$ ), and decreased of stroke volume (pre.:  $54 \pm 26$  vs  $46 \pm 14$  mL,  $p = 0.03$ ) and systolic volume index (pre.:  $31 \pm 15$  vs.  $26 \pm 14$  ml / m<sup>2</sup>,  $p = 0.03$ ). Also there were a significant negative correlation between sistemic vascular resistance and stroke volume ( $-0,76$ ;  $p = 0,001$ ).

**Conclusion:** In this present study, significant changes in hemodynamic parameters occurred during the EMS. This result suggests that this method can lead to overload hemodynamic response equivalent to exercise with moderated intensity in patients with HF. A negative correlation between SV and SVR suggest that the decrease of SV was associated with the increase of the SVR.

## HAEMODYNAMICS/CORONARY AND PERIPHERAL CIRCULATION – POSTER DISPLAY

#### P1681

##### Hemodynamic characteristics by impedance cardiography according to different etiologies in chronic heart failure - GENIUS-HF substudy

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**Purpose:** Hemodynamic profiles are able to predict outcomes in heart failure patients and the influence of etiology in determining the hemodynamic characteristics is poorly understood. This sub-study aims to determine whether hemodynamic parameters obtained by impedance cardiography vary according to different etiologies in heart failure.

**Methods:** GENIUS-HF is prospective cohort study and aims to assess events in patients with chronic HF from genetic data and electronic medical record. In this sub-study we analyzed 104 patients. The eligibility criteria were patients between 18 and 80 years old with chronic heart failure of different etiologies and left ventricular ejection fraction < or % = 50% enrolled at the Heart Institute, University of Sao Paulo. After consent, patients were submitted to clinical baseline evaluation and cardiography impedance. The variables of contractility, flow, systemic vascular resistance and thoracic fluid content were analyzed. For the statistical analysis we used ANOVA test for analysis of variance.

**Results:** The distribution of heart failure etiologies in the study group were: 26 (25%) hypertensive, 40 (38.5%) ischemic, 23 (22.1%) Chagas disease and 15

(14.4%) idiopathic. The analysis of hemodynamic parameters showed that the mean arterial pressure ( $p = 0.015$ ), pulse pressure ( $p = 0.020$ ) and indexed cardiac work ( $p = 0.001$ ) differed between etiologies, with higher values, as expected, in hypertensive etiology. Moreover, changes in contractility parameters prevailed in idiopathic etiology, with higher pre-ejection period and systolic time ratio ( $p = 0.007$ ). There were no significant differences among the groups for systemic vascular resistance, cardiac index, systolic volume and thoracic fluid content.

**Conclusions:** This study is an exploratory analysis, but allows us to observe which parameters could differ according to the etiology. Furthermore, it could be a step to better determine the therapeutic optimization and prognosis in this syndrome.

#### P1682

##### High incidence of transient systolic hypotension in patients with chronic heart failure with history of myocardial infarction

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**Purpose:** to determine incidence and severity of transient arterial hypotension in patients with chronic heart failure (CHF).

**Methods:** 192 patients with CHF (males 114, mean age was  $57.4 \pm 10.5$  years) were studied. 23 patients had NYHA class I of CHF, 87 - Class II, 81 - Class III, 1 - NYHA Class IV. The main cause of CHF was coronary artery disease - 162 (86.5%) patients. 52 patients had history of myocardial infarction (MI). Left ventricular ejection fraction (LVEF) was  $56.8 \pm 10.2\%$ . 37 (19.3%) patients had LVEF < 50%. Patients were treated according to ESC Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure, 2012. 24-hour Ambulatory Blood Pressure Monitoring (ABPM) was performed using MnSDP-2 and MnSDP-3 BPLab devices. During ABPM arterial hypotension (AH) was diagnosed according to criteria P.E. Owens and E.T. O'Brien (2000). The time index (TI) of hypotension, also was taken into account.

**Results:** Office systolic blood pressure (BP)  $\leq 105$  mmHg was diagnosed in 10 patients, diastolic BP  $\leq 65$  mmHg in 8 patients. Transient systolic arterial hypotension (TSAH) during ABPM was detected in 77 (40.1%) patients, transient diastolic arterial hypotension (TDAH) - in 117 (60.9%). TSAH during ABPM was revealed in 27 patients with the history of MI and in 50 patients without history of MI ( $\chi^2 = 4.15$ ,  $p = 0.04$ ), TDAH - in 36 and 81 patients, respectively ( $\chi^2 = 2.06$ ,  $p = 0.2$ ). In nighttime TSAH was revealed in 7 patients with the history of MI and in 5 patients without history of MI ( $\chi^2 = 4.75$ ,  $p = 0.03$ ), TDAH - in 13 and 32 patients, respectively ( $\chi^2 = 0.1$ ,  $p = 0.8$ ). Relative risk of TSAH in patients with CHF after AMI was increased by 1.45 (95% CI 1.04-2.01) in daytime and by 3.7 (95% CI 1.23 - 11.1) in nighttime. In daytime TI of systolic arterial hypotension (SAH) was  $10.0 \pm 15.9\%$  in patients with history of MI and  $3.3 \pm 9.0\%$  in patients without history of MI ( $p = 0.0003$ ), TI of diastolic arterial hypotension (DAH) was  $16.0 \pm 21.6\%$  and  $9.0 \pm 14.9\%$ , respectively ( $p = 0.01$ ). In nighttime TI of SAH was  $2.1 \pm 7.7\%$  in patients with history of MI and  $0.3 \pm 2.1\%$  in patients without history of MI ( $p = 0.0003$ ), TI of DAH -  $9.0 \pm 18.5\%$  and  $6.4 \pm 16.5\%$ , respectively ( $p = 0.4$ ). Association between the incidence and severity of TAH and LVEF was not detected.

**Conclusions:** High incidence of arterial hypotension in patients with chronic heart failure was detected. Risk of transient arterial hypotension is higher in patients with chronic heart failure with history of myocardial infarction.

#### P1683

##### Cardiovascular accidents during acute carbon monoxide poisoning

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**Purpose:** to determine the incidence of the cardiovascular complications during severe carbon monoxide poisonings and to estimate their prognosis.

**Methods:** Retrospective study over a period of 7 years between january 2006 to december 2012, including all patients admitted for severe carbon monoxide poisoning. Criteria of poisoning and cardiovascular complications are of orders clinical (exposure, neurological and cardiovascular exam), biological (HBCO for carbone moxyde confirmation, and serial electrocardiograms and repeat measurements of markers of myocardial necrosis troponin preferred or CK-MB).

**Results:** 51 old patients aged of  $35 \pm 14$ -year with a prior IGSII score of  $44,8 \pm 19$  were included. The source of exhibition was a water heater gaz in 70,6 %, and a brasero in 19,6 %. The found cardiovascular risk factors were arterial high blood pressure in 11 % of cases (n = 6), diabetes in 10 % of cases (n = 5), coronary insufficiency in two cases and the dyslipidémie in one case.

23 patients (45 %) presented a shock with vasoplegia in 17 cases requiring norepinephrine for a duration of 56 hours.

Eight patients presented chest pain with ECG abnormalities suggesting acute ischaemic heart disease: ST-elevation Myocardial Infarction in one case, ST segment elevation in 3 cases in anteroseptal chest leads, ST segment depression in anterior chest leads in 3 others cases, and deep symmetrical inversion of the T waves in the

anterior chest leads in a case. Nine patients, presented ischaemic ECG abnormalities but without symptoms (silent ischaemia).

Fibrinolytic agent by streptokinase was indicated in one patient who exhibits myocardial infarction ECG, and low-molecular-weight heparin at the rest of cases; three patients died among these patients with mortality rate of 37 %. Coronary angiography was realized at THE 5 survivor's and ended in a localized myocarditis in one case and the presence of heavily calcified lesions in the others.

**Conclusion:** Cardiovascular abnormalities associated with neurological disorders during carbon monoxide poisoning represent an important risk factor for morbidity. Majors efforts must be stressed to prevent these fatal accidents.

## HORMONES/NEUROHUMORAL REGULATION – POSTER PRESENTED

### P1685

#### Deficiencies in gonadal and adrenal androgens and depression in men with systolic heart failure: are they linked?

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**Purpose:** Both gonadal and adrenal androgens (testosterone [TT] and dehydroepiandrosterone sulphate [DHEAS]) are neurosteroids, and their deficiencies may increase the risk of premature development of depression in elderly otherwise healthy men. We investigated the associations between androgen deficiencies and the severity of depressive symptoms in men with systolic heart failure (HF).

**Methods:** We examined 226 men aged 40-80 years (LVEF: 30 ± 8%, NYHA class III-IV: 28%, ischaemic aetiology: 69%) and 379 healthy peers. The severity of depressive symptoms was assessed using the Polish long version of Geriatric Depression Scale, and severe depression was defined with a score ≥ 21 points. Androgen deficiency was defined as a serum hormone level ≤ 10<sup>th</sup> percentile of reference values for age-matched healthy men.

**Results:** The prevalence of androgen deficiencies was greater in men with HF compared to healthy peers (TT: 28 vs 10 % in men aged 40-59 years and 27 vs 10% in men aged 60-80 years, p ≤ 0.004; DHEAS: 66 vs 10% and 54 vs 10%, p < 0.001, respectively). The prevalence of severe depression was higher in men with HF as compared to a reference group (men aged 40-59 years: 7 vs 0.3%, p < 0.001, men aged 60-80 years: 6 vs 0%, p = 0.02). In men aged 40-59 years, the severity of depressive symptoms was the greatest in men in NYHA class III-IV as compared to those in NYHA class I-II and controls (13 ± 6 vs 9 ± 6 vs 7 ± 4 points, all p ≤ 0.001). In men aged 60-80 years, depressive symptoms were more severe in men in NYHA class III-IV as compared to controls (12 ± 5 vs 10 ± 3 points, p < 0.001), but did not differ from those in NYHA class I-II (p = 0.2). In univariable logistic regression models, in men with HF aged 40-59 years, the higher prevalence of depression was observed in those in advanced NYHA class (OR% = 3.68, 95% CI 1.03- 13.14, p = 0.04), with previous stroke and/or transient ischaemic attack (TIA) (OR% = 10.65, 95% CI 1.8- 62.95, p < 0.01), with chronic obstructive pulmonary disease (COPD) (OR% = 14.4, 95% CI 2.23- 93.16, p = 0.01), low serum TT (OR% = 0.49, 95% CI 0.25- 0.93, p = 0.03) and TT deficiency (OR% = 7.66, 95% CI 1.31-44.71, p = 0.02). In a multivariable regression model, COPD remained the only independent variable associated with the presence of depression. There were no associations between clinical variables and depressive symptoms in men aged 60-80 years.

**Conclusion:** Depressive disorders and androgen deficiencies are common disturbances in men with HF. TT deficiency, advanced NYHA class, previous stroke or/and TIA, COPD may favour the development of depressive symptoms in men aged 40-59 years with systolic HF.

### P1686

#### The effect of vitamin D supplementation in vitamin D deficient men with heart failure. A randomized controlled trial.

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**Purpose:** To investigate the effect of vitamin D supplementation in vitamin D deficient subjects with heart failure. The primary end-point was Left Ventricular Ejection

Fraction (LVEF) assessed by isotope cardiography; secondary outcome measures were NT-proBNP, 6-minutes walk test and quality of life evaluated by MLHFQ.

**Methods:** A randomized, double-blinded placebo controlled trial where subjects with heart failure (LVEF > 0.40) and vitamin D below 50nmol/l were randomized to 6 months of vitamin D substitution with 30 µg cholecalciferol, 1 µg calcitriol or placebo for 6 months. All participants received 1.2 g calcium per day.

**Results:** Thirty-two men completed the study. Levels of vitamin D increased and the level of parathyroid hormone decreased in the treatment group, but not in the placebo group. Most subjects (73%) in the treatment group reached sufficient levels of vitamin D. In the total study population LVEF increased by 0.03 (0.005-0.06, p% = 0.022) but was no different between the two groups. Furthermore there was no effect on levels of NT-proBNP nor on quality of life.

**Conclusions:** Supplementation with 30 µg D3, 1200 mg calcium and 1 µg activated vitamin D raised se-25-OHD to sufficient levels in vitamin D deficient men with heart failure. This did not result in improved LVEF or reductions in NT-proBNP during a 6 months trial.

Figure 1: Blue lines represent placebo group; Green lines treatment group. Vertical bars represent 95% CI.

Left: Serum-25-hydroxy vitamin D (nmol/l on vertical axis). Dotted horizontal lines at levels of sufficiency (75 nmol/l) and deficiency (50nmol/l). Right: LVEF

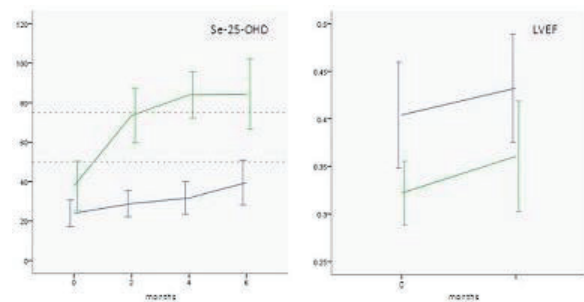


Figure1

### P1687

#### Copeptin concentrations in plasma predict cardiac output and pulmonary vascular resistance in patients with advanced chronic heart failure

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**Purpose:** Vasopressin is a potent vasoconstrictor peptide hormone and up-regulated in patients with heart failure (HF). It is unknown if copeptin, a C-terminal fragment of pro-vasopressin and a stable surrogate vasopressin marker in plasma, is related to hemodynamic measures in patients with advanced HF.

**Methods:** Right heart catheterization (RHC) was performed in patients with chronic HF with a left ventricular ejection fraction (LVEF) < 45 % referred for heart transplantation or left ventricular assist device (LVAD) evaluation. Copeptin in plasma was measured prior to the RHC after an overnight fast.

**Results:** Forty five consecutive patients (mean age 53 ± 13 years, 82 % male) were included in the study. All patients were in NYHA II-IV with a mean LVEF 18.3 ± 8.3 %. The mean copeptin concentration was 25.2 ± 21.7 pmol/L and proBNP 575.7 ± 808.8 pmol/L. Mean plasma sodium (P-Na) concentration was 136 ± 5 mmol/L and 49 % of patients had hyponatremia (plasma sodium < 137 mmol/L).

In a univariate regression analysis, log(copeptin) was associated with reduced cardiac output (CO) (p% = 0.0007, r<sup>2</sup>% = 0.24), increased pulmonary capillary wedge pressure (PCWP) (p% = 0.0052, r<sup>2</sup>% = 0.17) and increased central venous pressure (CVP) (p% = 0.0031, r<sup>2</sup>% = 0.19). When adjusted for age, gender, log(proBNP), normo- vs. hyponatremia, renal function (eGFR), BMI and LVEF, log(copeptin) remained a significant predictor of CO (p% = 0.04, r<sup>2</sup>% = 0.49), but not of PCWP (p% = 0.90, r<sup>2</sup>% = 0.37) or CVP (p% = 0.30, r<sup>2</sup>% = 0.30). Copeptin was an excellent marker of increased pulmonary vascular resistance (PVR, defined as > 2.5 Wood Units) with ROC area under the curve of 0.90, p < 0.0001.

**Conclusion:** Increased copeptin levels in plasma are associated with invasive hemodynamic parameters obtained at RHC in patients with HF, in particular with reduced CO. Patients with elevated PVR could be accurately identified using copeptin. Copeptin might be useful as a screening marker for elevated PVR and could potentially reduce, for instance, the need for surveillance RHC in HF patients awaiting cardiac transplantation.

## HORMONES/NEUROHUMORAL REGULATION – POSTER DISPLAY

### P1688

#### Comparison of NT-proBNP levels in hemodialysis versus peritoneal dialysis patients

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**Background:** Plasma N-terminal fragment of pro brain natriuretic peptide (NT-proBNP) concentration is elevated in cardiovascular diseases such as congestive heart failure, where increased levels of NT-proBNP indicate cardiac dysfunction, hypervolemia, and higher risk of hospitalization and death. These associations apply also to patients with severe impairment of kidney function. Little is known about differences in plasma level of NT-proBNP in patients receiving hemodialysis (HD) versus those receiving continuous ambulatory peritoneal dialysis (CAPD).

**Aim:** To evaluate differences in plasma NT-proBNP concentration between HD and CAPD patients.

**Methods:** Plasma NT-proBNP concentration was prospectively measured in consecutive patients receiving either HD or CAPD at our hospital center. All other standard clinical parameters were recorded. The correlation between plasma NT-proBNP concentration and the type of dialysis was then examined.

**Results:** We studied 99 consecutive patients on HD (age  $62 \pm 15$  years, 66% male) and 18 consecutive patients on CAPD (age  $56 \pm 18$  years, 67% male). Both groups had similar baseline characteristics including duration of dialysis, left ventricular function and mass, and cardiothoracic ratio. Significantly more patients on HD had abnormal NT-proBNP levels compared to patients on CAPD (97% vs 44%;  $p < 0.0001$ ), and this difference remained highly significant when using various NT-proBNP cut off values. A subgroup analysis revealed that the lower NT-proBNP levels of CAPD patients are most pronounced in patients with preserved left ventricular ejection function. As expected, NT-proBNP levels correlated negatively with left ventricular function and positively with cardiothoracic ratio, and this applied to both HD and CAPD groups.

**Conclusion:** The lower concentration of NT-proBNP in patients on CAPD compared to those on HD suggests that CAPD produces lesser hemodynamic stress, especially in patients with preserved left ventricular systolic function. Even though increased NT-proBNP levels have been shown to predict increased morbidity and mortality, further studies are necessary to assess the long term benefit of CAPD compared to HD.

### P1689

#### Age, bloodpressure, catecholamines in normotensive and hypertensive Patients. Is there a correlation?

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**Question:** 1. Is there a correlation between elevated blood pressure, norepinephrine (NA) and age?

2. Differ NA levels in normotensive and hypertensive patients at rest?

3. Depend NA levels on antihypertensive therapy?

4. Are NA levels gender-dependent?

#### **Methods:**

collective: 1075 patients, 506 men, 569 women aged 18-92 years.

Hypertension apply with RR > 140mmHg sys.

Treatment: 21.6% beta-blockers, 19.3% ACE/AT1-Blocker, 5% Ca-antagonists.

Age groups: 18-29J (n = 128), 30-39J (n = 103), 40-49J (n = 129), 50-59J (n = 186), 60-69J (n = 215); 70-79j; (n = 241), 80-89J (n = 90) 90-92 (n = 4).

**Investigation:**

Installation of an arterial-4F-sheath, 20 minute restperiod. Systolic and diastolic bloodpressure measured invasively and was averaged over 3 minutes, blood samples for determination of NA were taken.

**Parameters:**

RR systolic, diastolic, NA from arterial bloodplasma, determination by HPLC. Heart rate and rhythm of 6-lead-ECG.

**Statistics:**

Analysis using t-test, values of  $< 0.05$  is significantly heterogeneous

#### **Results:**

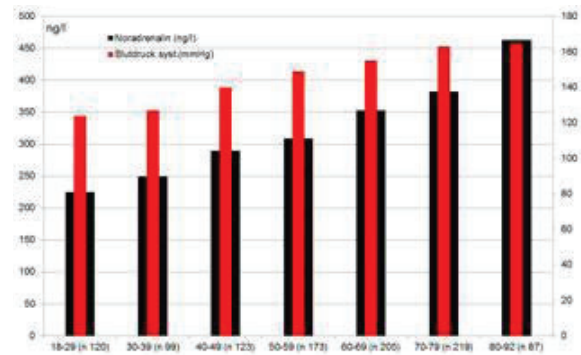
1. Patients with elevated blood pressures at rest have significant ( $p < 0.0001$ ) increased NA

2. The NA and RR increase with each decade of life

3. There are no significant gender differences in NA-values

4. Different antihypertensive monotherapies reduce NA-levels not in normal range

5. Various multiple antihypertensive therapies reduce NA-levels not in normal range



RR and NA age dependent

## BIOMARKERS – POSTER PRESENTED

### P1691

#### Relation between the mean platelet value and development of heart failure in patients with pulmonary embolism

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**Introduction:** Pulmonary embolism (PE) has high morbidity and mortality. The mean platelet value (MPV) is an easily available platelet index related with mortality in PE. Until today no relations was established considering the development of acute heart failure (AHF) and MPV in patients (P) with PE.

**Objective:** Evaluate the relation between MPV and AHF in PE P.

**Methods:** Retrospective study with 270 P admitted with PE between March 2006 and June 2011. Two groups were created according with the development of AHF: group AHF -, without AHF, 243P, 90% and group AHF +, with AHF, 27P, 10%. The groups were compared according to age, sex, cardiovascular risk factors (RF), predisposing factors for PE and laboratory data.

**Results:** No significant differences were found between groups regarding sex ( $p = 0,522$ ), age ( $p = 0,655$ ), cardiovascular risk factors and predisposing factor for PE (recent surgery  $p = 0,251$ , tumor  $p = 0,167$ , immobilization  $p = 0,854$ , previous PE  $p = 0,463$ ).

The MPV was related with the development of AHF ( $p = 0,005$ ). There was also a relation in univariate analysis between AHF and the admission value of troponin ( $p0,047$ ) and Nt-proBNP ( $p0 = ,045$ ).

In multivariate analysis predictors of AHF were the troponin ( $p 0,088$  OR 1,2 CI 95%) and MPV ( $p 0,027$  OR 16,5 CI 95%). Nt pro BNP and d-dimers were not

**Conclusion:** MPV was related with the development of AHF in patients with P and may help us to stratify these patients.

### P1692

#### Relationship between neurohumoral activation and right ventricular remodeling in patients with congestive heart failure

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**Purpose:** Neurohumoral activation plays a pathogenetic role in the progression of myocardial remodeling and fibrosis in congestive heart failure (CHF). However prediction of right ventricular remodeling and failure remains difficult. The aim of this study was to evaluate biohumoral activation and progression of right ventricular dysfunction in patients with CHF.

**Methods:** We examined 80 patients with compensated heart failure II to III class by NYHA classification (mean age 68 years; 33% women) who underwent routine echocardiography and measurement of nitric oxide (NO) and tumor necrosis factor-alpha (TNF-A) levels. The patients were assessed clinically and the diagnosis of chronic heart failure was made according to NYHA parameters. Outpatients and inpatients with compensated heart failure were included in the study. The patients were on conventional therapy for heart failure. Biomarker levels were determined by the following Methods: NO by microdiffusion method, TNF alpha by ELISA (Enzyme-linked immunosorbent assay). Right ventricular end-diastolic diameter (RV EDD) was measured from apical four chamber view according to the ASE guidelines for echocardiography.

Regression and correlation analyses were performed to examine the clinical and echocardiographic correlates of biomarker levels. Correlation was significant at the 0.05 level.

**Results:** There was a significant correlation between plasma NO and TNF-A levels with right ventricular end-diastolic diameter ( $P=0.003$ ,  $R\%=0.33$  and  $P\%=0.011$ ,  $R\%=0.3$  respectively).

**Conclusions:** We found significant correlation between structural marker of RV remodeling i.e. RVEDD and levels of NO and TNF-A in patients with CHF. It may indicate that these markers overactivity may contribute to the progression of CHF and particularly RV failure.

#### P1693

##### Biomarkers in heart failure: a never-ending story

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**Introduction.** Use of biomarkers is of great importance for diagnosis and prognosis in heart failure (HF) patients. However we are still far from an ideal biomarker in this clinical setting where they provide useful but only additional information in chronic and acute HF.

**Aims and methods.** We prospectively evaluated whether the combination of admission measurements of a marker for myocardial cell injury (troponin I-TnI) and a marker for left ventricular overload (brain natriuretic peptide-BNP) would effectively risk stratify patients with acutely decompensated HF. We correlated TnI and BNP levels with the New York Heart Association (NYHA) functional class and ejection fraction of the left ventricle (EFLF) in patients hospitalized with congestive HF.

**Results.** The prospective study included 201 patients with acute decompensation of chronic HF, mean age  $71.5 \pm 10.3$  years of whom 60.7 % were male. 55 patients were in NYHA II class (BNP% =  $618.6 \pm 334.8$  pg/mL, TnI% =  $4.02 \pm 10.3$  ng/mL, LVEF% =  $49.4 \pm 12.6\%$ ), 108 patients were in NYHA III class (BNP% =  $1524.6 \pm 971.6$  pg/mL, TnI% =  $1.66 \pm 6.5$  ng/mL, LVEF% =  $34.9 \pm 11.4\%$ ), and 38 patients had NYHA IV class (BNP% =  $2992.03 \pm 1426.8$  pg/mL, TnI% =  $53.9 \pm 228.1$  ng/mL, LVEF% =  $26.9 \pm 9.9\%$ ). We found significant correlation between NYHA class and BNP levels ( $F\%=68.8$ ,  $p < 0.001$ ) and between NYHA class and LVEF ( $F\%=50.9$ ,  $p < 0.001$ ), while we found no correlation between NYHA class and TnI. However TnI positively correlated with the BNP levels ( $r\%=0.324$ ,  $p < 0.01$ ). One year mortality rate was 42.8% and in binary logistic analysis only NYHA class (OR% = 0.105,  $p\%=0.048$ ), LVEF (OR% = 0.82,  $p < 0.001$ ) and female gender (OR% = 0.115,  $p\%=0.003$ ) had significant prognostic value.

**Conclusion.** Cardiovascular biomarkers have the potential to augment clinical risk stratification by aiding in screening, diagnosis and assessment of prognosis in HF. However, most current biomarkers have only modest predictive value, and there is a need to identify additional biomarkers from new biological pathways.

#### P1694

##### New approaches to short-term prognosis of the stratification of heart failure in clinical practice Russian cardiologist.

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**Purpose:** Existing prognostic scale SHFM and Heywood's model for Russian patients are not adapted. Need identification and structuring the flow markers of heart failure in Russia.

**Methods:** A prospective observation of 95 patients with heart failure by cardiologists-specialists in heart failure within 1 year. Inclusion in the study was carried out after the maximum stabilization of patient status in a specialized department. The database were made objective indicators of the patient, laboratory parameters (including NT-proBNP, RDW), echocardiography parameters, the results of CRT. Inclusion criteria were the followings: patients with CHF II-IV FC and EF less than 30 % under the age of 60 years. Statistical processing has been done using STATISTICA7. Comparison of two groups of quantitative traits were analyzed using the Mann-Whitney U-test. Comparison of quantitative traits in more than three groups was carried the ANOVA. Survival analysis is to construct a mathematical model using the Cox regression model.

**Results:** 95 patients were studied, 86 % ( $n=82$ ) of them were male, 14 % - female ( $n=13$ ). Severity of chronic heart failure at hospital discharge was  $2.8 \pm 0.7$  FC, FC distribution of CHF (II: III: IV) - 34%:48%:13 %; EF by Simpson was  $23.6 \pm 7.0\%$ . Ischemic etiology of chronic heart failure was diagnosed in 48% of patients, 35% ( $n=28$ ) had a remote history of myocardial infarction. 9 patients died during the 1 year, system EXCOR was implanted to 3 of them, TC was made to 12 of the patients. Statistically significant criteria according to gender was the concentration of c-reactive protein (CRP) ( $p\%=0.03$ ), albumin ( $p\%=0.019$ ) in the blood plasma; indicators CRT - V'O2 ( $p\%=0.04$ ) and V'CO2 ( $p\%=0.03$ ). Given the etiology of the disease, patients differed in age ( $p\%=0.0001$ ), RDW ( $p\%=0.02$ ), fibrinogen ( $p\%=0.01$ ), NT-proBNP ( $p\%=0.01$ ) in plasma, the index CDV ( $p\%=0.02$ ), O2/HR ( $p\%=0.02$ ). With increasing FC CHF patients were differentiated by heart rate ( $p\%=0.02$ ), CRP concentration ( $p\%=0.001$ ) and total bilirubin ( $p\%=0.01$ ). Family

history reflected CRP levels ( $p\%=0.03$ ), NT-proBNP ( $p\%=0.0004$ ), the index of LA ( $p\%=0.04$ ), index of CDV ( $p\%=0.04$ ), the index of CSV ( $p\%=0.01$ ), Ve/VCO2 peak ( $p\%=0.04$ ). Deceased patients differed in CRP ( $p\%=0.001$ ), creatinine ( $p\%=0.04$ ), NT-proBNP ( $p\%=0.001$ ), the index of LA ( $p\%=0.04$ ). Survival times in days% =  $(0.014 * CRP (mg / l)) + (0.000007 * NT-proBNP (pg / ml)) + (-0.069 * VO2 peak (ml / min / kg)) + (0.0056 * Ve/VCO2 peak) - (p\%=0.002)$ .

**Conclusion:** It is necessary to create local scales prediction of CHF based on etiology and ethnicity.

#### P1695

##### Mean platelet value and intra-hospital mortality in acute coronary syndromes

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**Introduction:** Platelets have a crucial role in the atherothrombosis which is the base of acute coronary syndrome (ACS). The mean platelet value (MPV) is recognized as a cardiovascular risk marker. It also associated with the mortality due to coronary heart disease (CHD), although its prognostic value is not yet well defined.

**Objective:** In this study, we will investigate the relationship between platelet volume and the prognosis of ACS in patients.

**Methods:** MPV was determined in 425 patients, consecutively admitted during a 4-year period in our Coronary Acute Syndrome Unit. The population was divided into quartiles according to the value of MPV at admission: Q1: MPV < 8.4; Q2: MPV 8.4 - 9.0; Q3: MPV 9.0 - 9.7; Q4: MPV > 9.7. Two groups were formed - group A (Q4: VPM > 9.7 - 114 P - 27,1%) and group B (Q1 - Q3 - 311 P - 73,1%).

The groups were compared according to age, gender, cardiovascular risk factors (RF), MPV and it's relation with intra-hospital mortality (IHM).

**Results:** The population's mean age was  $68 \pm 13$  years, where 153 (36,3%) were females. Clinical and demographical characteristics as well as Killip class at admission showed no statistically significant differences in both groups.

IHM was significantly higher in group A (20,2% vs 7,8%,  $p\%=0.001$ ). The same affirmation isn't true for the mortality in the follow-up (47,1% vs 38,6%,  $p < 0.110$ ). IHM wasn't related with other factors like age, ( $p < 0.915$ ), hypertension ( $p < 0.520$ ), diabetes ( $p < 0.643$ ), dislipidemia ( $p < 0.403$ ), smoking ( $p < 0.561$ ).

In a multivariate analysis, MPV was an independent predictor of IHM ( $p < 0.001$ ; OR3,25 CI95% 1,7 - 6,2).

**Conclusions:** MPV > 9,7 was predictor of IHM. As it is a simple and inexpensive laboratory measurement, it may be useful in the assessing the risk factor in patients who suffered a coronary event.

#### P1696

##### Predicted value of circulating mononuclear proangiogenic progenitor cells in patients ischemic chronic heart failure

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**Background:** Circulating endothelial progenitor cells (EPC) ensure reparative processes including endothelialization of fragments of vascular lesion, as well as remodeling of extracellular matrix and neoangiogenesis. EPC of hemopoetic origin may decrease in patients with subclinical atherosclerosis, stable coronary artery disease (CAD) and chronic heart failure (CHF).

The study objective was to assess counts of CD45+CD34+, CD45-CD34+, CD14+CD309+, and CD14+CD309+Tie2+ phenotyped circulating EPC of various subpopulations in patients with ischemia-induced CHF.

**Methods:** The study evolved 153 patients (86 males), aged 48 to 62 years, with angiographically proven CAD with stenotic lesion of at least one coronary artery > 50%, and 25 healthy volunteers. CHF was diagnosed in 109 patients (71.2%) with angiographically proven coronary artery disease by means of conventional criteria according to current clinical guidelines. Mononuclear cells populations were phenotyped by flow cytometry by means of monoclonal antibodies labeled with fluorochromes. Proangiogenic circulating endothelial progenitor cells (EPC) were identified as CD45-CD34+. CD133, CD309 (VEGFR2), and Tie-2 antigens were also determined to identify subpopulations of EPC coexpressing CD14 antigen.

**Results:** Upon a long-term follow-up, conventional cardiovascular risk factors, such as type 2 diabetes mellitus, hyperlipidemia, arterial hypertension, and adherence to smoking, negatively effects circulating EPCs count of both hematopoietic and nonhematopoietic origin in patients with documented CAD regardless the presence of CHF. At the same time, the depletion of CD14+CD309+ and CD14+CD309+Tie2+ phenotyped circulating EPCs counts is associated with the severity of left ventricular contractile and relaxation myocardial dysfunction, while CD45+CD34+ and CD45-CD34+ phenotyped mononuclear counts are more representative for the incidence and the severity of atherosclerotic lesion of the coronary arteries.

**Conclusion:** The following are factors that have the greatest prognostic value in terms of the depletion of the circulating EPCs count in the cohort of patients

with ischemia-induced CHF: NYHA functional class of CHF; reduced left ventricular ejection fraction to < 42%, an increased NT-pro-BNP level > 554 pg/mL; elevation of galectin-3 > 17.9 ng/mL, an increase in E/Em ratio to > 15 units.

#### P1697

##### Mortality risk stratification in patients with suspected heart failure using decision trees

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**Background:** Chi-square automatic interaction detector (CHAID) decision trees are an attractive method of assigning risk as they are concise, do not rely on model assumptions, are easily understood by clinicians and can be incorporated into software applications.

**Methods:** Demographic measurements, symptoms and signs and blood tests including amino-terminal pro-brain natriuretic peptide (NT-proBNP) were collected routinely from patients referred with suspected heart failure from the local community between 2000 and 2013. CHAID decision trees were constructed using 2681 randomly selected patients as a training dataset and another 1864 patients as a validation set to stratify patients into those with a low, medium or high mortality (all-cause) at 2-year. Seventeen clinical variables were considered including age, sex and data obtained from the clinical history and examination and standard laboratory measurements. The CHAID decision trees were compared with logistic regression (LR) models using ROC curves.

**Results:** In the training and validation data-sets, the median (IQR) age was 73 (65-79)/73 (64-79) years, 61%/62% were men and 16.7%/17.0% had died by 2-years. In the CHAID decision tree, NT-proBNP was the strongest predictor of mortality. NYHA class (III-IV/I-II) added more information, with further contributions from haemoglobin, age, dose of loop diuretic, creatinine and heart rate. Similar predictors were found in LR-models. Using CHAID, 19% of patients with a plasma NT-proBNP > 2,816 pg/ml had a two-year mortality of 40.8%, 33% with plasma NT-proBNP between 716 and 2,816 pg/ml had two-year mortality of 18.5% and 58% of those with a plasma NT-proBNP < 716 pg/ml had a two-year mortality of 6.3%. The CHAID performed similarly to LR-models for predicting mortality (training dataset: ROC area with 95% CI, 0.786 (0.764-0.808) for CHAID and 0.784 (0.762-0.806) for LR-model; validation dataset: 0.768 (0.741-0.795) for CHAID and 0.781 (0.754-0.808) for LR).

**Conclusions:** CHAID decision-tree analysis suggests that NT-proBNP is a useful predictor of outcome in patients with suspected heart failure. Few other variables add clinically useful prognostic information. This could greatly simplify prognostic assessment in this population.

#### P1698

##### Exercise dynamics of new biomarkers in patients with systolic heart failure

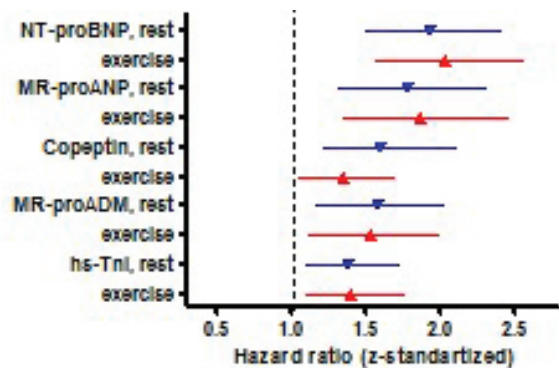
JJan Benes<sup>1</sup>; M Kotrc<sup>1</sup>; P Jarolim<sup>2</sup>; J Kautzner<sup>1</sup>; V Melenovsky<sup>1</sup>  
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**Background:** New biomarkers including high-sensitivity troponin I (hs-TnI), MR-proANP, NT-proBNP, proadrenomedullin (MR-proADM) and copeptin give prognostic information about patients with chronic heart failure (HF). However, exercise dynamics of these biomarkers, clinical predictors of this dynamics and the question whether exercise values provide better prognostic information remains unknown.

**Methods:** Hs-TnI, MR-proANP, NT-proBNP, MR-proADM and copeptin were studied in 108 HF patients and 25 controls undergoing exercise test. Blood samples were collected before and immediately after exercise. Patients were prospectively followed 507 days (IQR 281 and 761 days).

**Results:** Exercise induced a significant increase of NT-proBNP, MR-proANP and copeptin in controls and all biomarkers in HF patients. Following clinical factors determined exercise-induced increase in biomarker concentration: HF etiology for NT-proBNP and MR-proANP (+70%/+40% in non-CAD vs. CAD,  $p < 0.05$ ), sex for MR-proANP (+347% in males vs. females,  $p = 0.0008$ ), heart rhythm for MR-proADM (+314% for the non-sinus rhythm vs. the sinus rhythm,  $p = 0.03$ ) and renal insufficiency (RI) for copeptin (+232% for pts. with RI,  $p = 0.007$ ). No relation was found for anemia, diabetes, HF severity, obesity and age. Exercise induced a slight but significant hemoconcentration (+1.1 g.dl<sup>-1</sup> in controls, +0.5 g.dl<sup>-1</sup> in HF) but this was unrelated to the increase in biomarkers. During follow-up, 35 patients experienced an adverse event. All biomarkers (both at rest and after exercise) had a statistically significant predictive power, but exercise-induced values were not significantly better.

**Conclusion:** Despite significant exercise-induced increase, biomarker level obtained after exercise does not improve prognostic stratification for HF patients.



#### P1699

##### Cut-off red cell distribution width value in mortality risk assessment in patients with chronic heart failure

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**Purpose:** Previous studies have shown red cell distribution width (RDW) to be associated with all-cause and cardiovascular mortality in patients with chronic heart failure (CHF). In order for it to be used reliably in risk stratification we aimed to establish precise cut-off RDW value distinguishing CHF patients with high and low mortality risk and to evaluate the significance of elevated RDW in comparison with other prognostic factors.

**Methods:** This study was conducted on 351 hospitalised CHF patients (46% male, mean age 72 ± 11 years old, 56% with preserved left ventricular ejection fraction [LVEF]) with at least one RDW measurement performed. All laboratory and clinical data obtained during their hospitalisation was also collected. Patients were followed up with phone interviews for the end-point of all-cause mortality at 1.1 ± 0.1 years after discharge. The cut-off point was calculated using the ROC curve analysis. Relative risk (RR) of having elevated RDW was calculated using crosstabulation tables, confirming the risk homogeneity and independence of other factors with the use of Breslow-Day and Mantel-Haenszel criteria, respectively. Uni- and multivariate logistic regression was also performed.

**Results:** The proportions of patients with NYHA class II, III and IV heart failure was 34%, 50% and 16%, respectively. In ROC curve analysis an RDW value of 14.43 had 72.9% sensitivity and 64.9% specificity for predicting all-cause mortality (area under curve 0.691, 95% confidence interval [CI] 0.597-0.785,  $p < 0.05$ ). The risk of death was significantly higher for patients with RDW above the cut-off point (RR = 3.58, 95% CI 2.12-6.07,  $p < 0.001$ ). The risk conferred by elevated RDW was highly homogenous ( $p > 0.05$  in Breslow-Day test) and independent of other prognostic factors ( $p = 0.004$  in Mantel-Haenszel test). In multivariate analysis after adjustment for anemia, mean corpuscular volume and mean cell hemoglobin the risk remained statistically significant (odds ratio [OR] = 4.18, 95% CI 2.02-8.67,  $p < 0.001$ ). That same risk persisted in another multivariate analysis with inclusion of hypo- and hypernatremia, glomerular filtration rate, systolic blood pressure, CHF severity, LVEF and pulmonary hypertension (OR = 6.10, 95% CI 2.00-18.53,  $p = 0.001$ ).

**Conclusions:** CHF patients with RDW values above 14.43% have a significantly higher risk of all-cause death than patients with lower RDWs, independent of other prognostic markers. The discovered cut-off value needs to be replicated in a verification cohort before it can be used in risk stratification.

#### P1700

##### Prognostic value of circulating osteopontin for recurrent hospitalization in patients with ischemic symptomatic chronic heart failure.

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**Background:** Traditionally, proinflammatory activation around chronic heart failure patients is considered as an independent predictor of rehospitalizations as well as numerous cardiovascular events such as sudden death, atherothrombosis, newly onset acute and decompensated chronic heart failure (CHF).

**Aim:** To evaluate the prognostic value of circulating osteopontin for recurrent hospitalization in patients with ischemic CHF.

**Methods:** A total of 154 patients with ischemic symptomatic moderate-to-severe CHF were enrolled in the study on discharge from the hospital. Observation period was up to 3 years. Blood samples for biomarkers measurements were collected. ELISA methods for measurements of circulating level of all biomarkers were used. Osteopontin (OPN) combined with galectin-3 (Gal-3) and NT-pro-brain natriuretic peptide (NT-pro-BNP) in comparison with NT-pro-BNP or Gal-3 alone for recurrent

hospitalization cases due to advanced CHF was tested. Additionally, all-cause mortality, and CHF-related death were tested.

**Results:** During a median follow-up of 2.18 years, 21 participants died and 106 subjects were hospitalized repetitively. OPN had independently predicted CHF-related rehospitalisation (odds ratio [OR] = 1.86; 95% confidence interval [CI] = 1.24 – 2.23;  $P < 0.001$ ), CHF-related death (OR = 1.32; 95% CI 1.18–1.50;  $P < 0.001$ ), and all-cause mortality (OR = 1.17; 95% CI = 1.05–1.22;  $P < 0.001$ ) within 3 years of observation period. Compared with NT-pro- BNP and Gal-3, OPN was of superior prognostic value in CHF patients for recurrent hospitalization (OR = 1.36; 95% CI = 1.16 – 2.54;  $P < 0.001$  and OR = 1.21; 95% CI = 1.02–1.44;  $P < 0.001$  respectively), but not with CHF-related death (OR = 1.02; 95% CI 0.80–1.20;  $P = 0.42$  and OR = 1.03; 95% CI 0.86–1.15;  $P = 0.46$  respectively) and all-cause mortality (OR = 1.01; 95% CI 0.76–1.11;  $P = 0.63$  and OR = 1.04; 95% CI 0.86–1.13;  $P = 0.60$  respectively).

Adding OPN to NT-pro- BNP and Gal-3 in a prediction model suggesting that three biomarkers when compared with each alone were subtle improved discrimination for recurrent hospitalization (OR = 2.16; 95% CI 1.77–2.64;  $P < 0.001$ ), CHF-related death (OR = 1.95; 95% CI 1.88–2.32;  $P < 0.001$ ), and all-cause mortality (OR = 1.88; 95% CI = 1.72–2.21;  $P < 0.001$ ).

**Conclusion:** Increased circulating OPN was associated with greater risk for recurrent hospitalization due to advanced CHF, but not with CHF-related death and all-cause mortality. OPN identified CHF patients with high 3-year all-cause mortality and CHF-related death, and added prognostic value to combined NT-pro-BNP and Gal-3.

## P1701

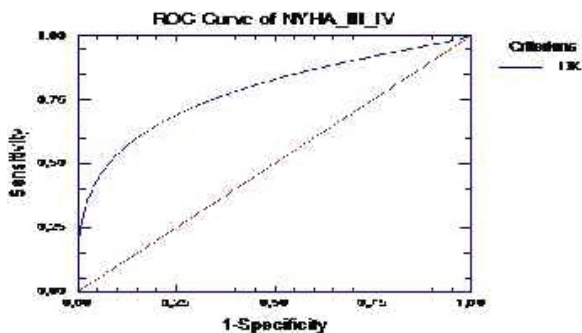
### Factors affecting the prognosis of heart failure at 1 month in patients with acute myocardial infarction

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The aim of this study was to define the utility of the measurement clinical and biochemical markers to predict heart failure (III-IV NYHA class) at 1 month in patients with AMI.

**Methods and results:** We included 156 consecutive patients admitted in hospital for both Q-positive and Q-negative acute myocardial infarction. After 1 month of follow-up, 24 patients (15.4%) had heart failure (III-IV NYHA class). Growth differentiation factor 15, troponin I and heart-type fatty acid binding protein were determined at admission with other routine markers. The following parameters with significant differences in patients with and without heart failure were taken for analysis: age, levels of troponin I and creatinine at admission. Curves of sensitivity and specificity were used based on the method of ROC analysis and cut-off values were chosen for each variable. Ball scoring was performed for each parameter regard to the cut-off value and a scale for calculating the summarized diagnostic coefficient by the method of Gubler was offered. Positive value of diagnostic coefficient was associated with developing heart failure in AMI patients. The summarized diagnostic coefficient has a sensitivity of 70.8% and specificity of 77.8% (negative predictive value 0.94) for the prediction of heart failure in patients with AMI within 1 month of follow-up.

**Conclusion:** A complex approach included on levels of troponin I and creatinine at admission and age and the summation of balls based on offered scale and calculating diagnostic coefficient provides information about heart failure prognosis in terms of AMI at 1 month, with a worse outcome for those with diagnostic coefficient has positive value.



Sensitivity and specificity of DK

## P1702

### Use of biomarkers in risk stratification in acute pulmonary thromboembolism in the short and long term

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**Purpose:** Despite the growing interest in the application of biomarkers for assessing the risk of adverse events in PE, there are limited data from other analytical parameters and their simultaneous application.

**Aims:** Assessing whether a score for risk stratification of in-hospital mortality (MIH) of PE is predictive of events at 24 months (defined endpoint death and / or readmission for Heart Failure-HF).

**Methods:** A retrospective study of 107 patients (P) admitted for PE (intermediate / high risk) in departement Cardiology (Jan. 2007 to Sept. 2011).

We identified clinical, analytical (on admission) and echocardiographic variables associated with higher MIH and assigned to 1 or 2 points (p.) according to the OR obtained ( $p < 0.05$ ) in univariate and established cut-off by ROC curve: troponin I > 0.10 pg / ml (2p), BNP > 100 ng / ml (2p), creatinine > 1.2 mg / dl (1 p.), age > 70 years (1 p.) ratio and RV / LV > 1 (1 p.). We constitute a score with cut-off: 2.5 p. determined by the ROC curve.

It was found that if the score is predictor of events at 2 years follow-up (survival analysis-Kaplan - Meier)

Finally, different characteristics were evaluated in both groups (G) of patients with (PWE) and without (POE) events at 2 years.

**Results:** At endpoint at 24 M a score > 2.5 p. proved to be an independent predictor of M / R (OR 2.2; [CI 1.0.4 to 3, 4],  $p < 0.01$ ), translated linearly in the survival curves (Kaplan - Meier Log rank :  $p < 0, 01$ ).

The event rate at 2 years is 16 %.

Regarding symptoms upon admission, PWE at 24M revealed higher prevalence of syncope at admission ( $p < 0.01$ ).

As for the analytical parameters PWE presented a higher creatinine (> 1.05 mg / dl) and troponin (> 0.18 pg / ml) (with cut- off defined by ROC curves, : AUC - 0.883,  $p = 0.003$ ; AUC - 0.782,  $p = 0.007$  respectively).

Regarding the imaging parameters, in TTE the presence of RV dilation (as a marker of RV dysfunction) is higher in the PWE ( $p = 0.03$ ).

In angioTC, PWE showed ratio RV / LV top (with cut- off by ROC curve 1.41 : AUC - 0.752,  $p = 0.032$ ).

After Cox regression analysis, it was found that troponin is associated with a higher event rate in the medium - long term.

**Conclusions:** In patients with intermediate-high risk PE the biomarker of myocardial injury proved to be the best predictor of events in the medium-long term. The inclusion of echocardiographic data adds long-term prognosis value, as previous studies have shown.

This score proved to be a simple method to stratify the severity of PE, strengthening the link between clinical, analytical and echocardiographic factors.

## P1703

### Chronic heart failure syndrome in adults with congenital heart disease; prognosis as a key to management

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**Purpose:** Patients with congenital heart disease (CHD) share common characteristics with patients with heart failure (HF) due to other causes. Therefore, the degree of HF in these patients could also be defined in terms of exercise intolerance, ventricular dysfunction and neurohormonal activation. Aim of this study is to assess the clinical and neurohormonal characteristics, shared by a heterogeneous population of patients with CHD, and identify their prognostic implications.

**Methods:** This is a prospective study of 60 consecutive clinical stable patients, of mean age  $28.9 \pm 11.4$  years old, 53% male, with various forms of CHD. Patients' neurohormonal status, exercise capacity and cardiac function were assessed through plasma B-type brain natriuretic peptide (BNP) and interleukin 6 (IL-6) measurements, cardiopulmonary exercise test (CPX) and transthoracic echocardiography respectively. Patients were followed for major cardiovascular events (MACE), including death or hospitalization for  $5.1 \pm 1.1$  years.

**Results:** Most patients were symptomatic (48.3% with NYHA II and 36.7% with NYHA III), 17 (28.3%) of them were cyanotic at rest and 16 (26.6%) had ventricular dysfunction. Mean plasma concentrations of BNP and IL-6 were  $106.6 \pm 98.6$  pg/ml and  $2.4 \pm 2.6$  pg/ml respectively. 22 patients (36.6%) experienced a MACE, among them 8 patients (13.3%) died. BNP, IL-6, peak V02, VE/VCO2 were proved to be strong predictors of survival; BNP value > 241 pg/ml predicted MACE with a sensitivity of 65.38% and a specificity of 73.53% (Area Under the ROC Curve, i.e. AUC = 0.693,  $p < 0.0001$ ), IL-6 value > 1.54 pg/ml predicted MACE with a sensitivity of 61.53% and a specificity of 73.53% (AUC = 0.627,  $p < 0.0001$ ), VE/VCO2

value > 38 predicted MACE with a sensitivity of 73.08% and a specificity of 76.47% (AUC% = 0.808,  $p < 0.0001$ ) and peak VO<sub>2</sub> value  $\leq 21.4$  ml/Kg/min predicted MACE with a sensitivity of 76.92% and a specificity of 70.59% (AUC% = 0.794,  $p < 0.0001$ ) respectively.

**Conclusions:** BNP, IL-6 levels and cardiopulmonary exercise parameters strongly predicted MACE in symptomatic, ambulatory patients with CHD during mid-term follow up and could be used as simple clinical markers for risk stratification in this population.

#### P1704

##### Acute Heart Failure syndrome: a new multi-biomarker strategy for long-term prognostic stratification

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**Introduction:** Recently, multiple biomarkers have emerged as new prognostic predictors in acute heart failure (AHF), namely neurohormonal biomarkers, like adrenomedullin (MRproADM), NTproBNP and copeptin (COP), and biomarkers of fibrosis [galectin(GAL)-3]. However, the value of a multi-biomarker strategy has never been studied.

**Aim:** To assess the value of a multi-biomarker strategy on prognostic stratification of patients (pts) admitted with AHF.

**Methods:** Prospective study of consecutive pts admitted to a tertiary hospital with the diagnosis of systolic and/or diastolic AHF [Framingham plus echocardiographic (echo) criteria], with a mean follow-up (Fup) of  $8 \pm 6$  months. At admission, clinical, biochemical (including MRproADM, COP, GAL-3 and NTproBNP plasma levels determination) and echo evaluation were performed. Primary endpoints: 1) death; 2) death or rehospitalization for AHF. Univariate Cox regression analysis was performed to determine the hazard ratio (HR) of the association between the 3rd tertile of each biomarker with the study endpoints. Subsequently, a multi-biomarker score was constituted allocating to each significant variables a value numerically equal to its HR (GAL-3% = 2.47; COP% = 2.28, MRproADM% = 1.57). The value of the score was calculated as the sum of the partial scores, ranging from 0 to 6.32 and subcategorized in low (<3), moderate (3-6) and high (> 6) risk.

**Results:** Seventy pts were included ( $71 \pm 14$  years old, 40 men), 59% in NYHA class III, 46% with ischemic cardiomyopathy and 92% with systolic dysfunction. During the Fup, 25 pts (36%) died and 38 (54%) suffered death or rehospitalization. Baseline NTproBNP value has not prognostic value and it was not included in our score. Mean score was 1.6 and it was significantly higher in patients that evolved unfavorably ( $p < 0.001$ ). Sixty seven percent of patients were categorized by the score as low risk, 18.8% as moderate risk and 14.5% as high risk. The higher de score, the higher the risk of death (HR: 1.23; CI95% 1.02-1.47;  $P\% = 0.02$ ) and death or re-hospitalization (HR: 1.22; CI95% 1.02-1.46;  $P\% = 0.02$ ). In relation to low risk patients, the probability of death or re-hospitalization was two times higher in moderate risk patients (HR: 2.23; CI95% 0.8-6.6;  $P\% = 0.05$ ) and three times higher in high risk patients (HR: 3.55; CI95% 1.18-10.67;  $P\% = 0.02$ ).

**Conclusion:** In acute heart failure, a multi-biomarker strategy, including MRproADM, COP e GAL-3, has an important value on long-term prognostic stratification.

## BIOMARKERS – POSTER DISPLAY

#### P1705

##### Association of elevated red cell distribution width values with clinical outcomes in patients with chronic heart failure

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**Background:** Red cell distribution width (RDW) was shown to be a promising prognostic biomarker in chronic heart failure (CHF). However, its use in clinical practice requires a more detailed and comprehensive assessment of its role, and in Russian Federation few studies have been undertaken to date.

**Purpose:** To evaluate the prognostic influence of higher RDW values on clinical outcomes in hospitalised CHF patients

**Methods:** Patients hospitalised with CHF ( $n = 351$ ) who had their RDW measured at least once during their inpatient stay were included in our study. All routinely measured laboratory and clinical parameters were analysed. The follow-up at a mean time of  $1.1 \pm 0.1$  years included phone interviews with assessment of all-cause mortality (primary end point) and all-cause hospitalisations (secondary end point). In statistical analysis patients were divided into RDW quartiles and compared using logistic regression. A multivariate analysis was then conducted with adjustment for all individually significant prognostic factors.

**Results:** Of all participants, 162 (46%) were male, 44% had reduced left ventricular ejection fraction (LVEF), mean age was 72 years old. The majority of participants had NYHA class II (34%) or class III (50%) heart failure. In univariate analysis patients in the highest RDW quartile (RDW > 15.65%) had significantly higher risk of death than those in the lowest quartile (RDW < 13.15%) (odds ratio [OR]% = 10.67,

95% confidence interval [CI] 3.51-32.39,  $p < 0.001$ ;  $p$  for trend < 0.001). The risk persisted after adjustment for the presence of anemia, mean corpuscular volume and mean cell hemoglobin (OR% = 9.30, 95% CI 2.67-20.22,  $p < 0.001$ ). The risk also remained elevated after including other factors (i.e., electrolyte disturbances, glomerular filtration rate, systolic blood pressure, NYHA class, LVEF and the presence of pulmonary hypertension) in the multivariate analysis (OR% = 24.46, 95% CI 2.58-242.3,  $p\% = 0.001$ ). RDW values did not predict all-cause hospitalisations with OR% = 1.90 (95% CI 0.95-3.78,  $p > 0.05$ ) for patients in the highest vs. lowest RDW quartile; the trend was also negative ( $p\% = 0.065$ ).

**Conclusions:** Higher RDW values in patients hospitalized with CHF help predict all-cause mortality, but they are not associated with subsequent hospitalisations.

#### P1706

##### Apelin-12, Galektin-3, High-sensitivity cardiac troponin-T, and NT-proBNP. Which biomarker is most strong in HF risk stratification

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**Aim:** To compare the prognostic value of Apelin-12, Galektin-3, High-sensitivity cardiac troponin-T (hs-cTnT), and NT-proBNP as the potential biomarkers of worse outcomes in patients with HF.

**Methods:** 92 patients (69 men and 23 women) with HF due to DCM ( $n = 37$ ) or CAD ( $n = 55$ ) were studied. They included all NYHA functional classes: I ( $n = 19$ ), II ( $n = 28$ ), III ( $n = 29$ ), and IV ( $n = 16$ ). The average ejection fraction was  $32 \pm 8.6\%$ . Blood samples in these patients were collected at the time of hospitalization before starting the therapy. The primary endpoints were all-cause mortality or urgent hospitalization due to HF decompensation. The follow-up period was 12 months. In order to compare the prognostics value of the biomarkers, the ROC-analysis was used. The statistical comparison of ROC-curves was performed according to DeLongi.

**Results:** 42 endpoints including 15 deaths were registered during the one-year follow-up period. ROC-analysis showed that the most prognostically significant markers were NT-proBNP (AUC% = 0.729) and hs-cTnT (AUC% = 0.657). Both Apelin-12 and Galektin-3 manifested rather low AUC (0.573 and 0.573, respectively) indicating their weak prognostic potential. The differences between the NT-proBNP and Apelin-12 ROC-curves or NT-proBNP and Galektin-3 ROC-curves were found to be statistically significant ( $p \leq 0.05$ ), while the difference between AUCs for NT-proBNP and hs-cTnT was insignificant ( $p \geq 0.05$ ).

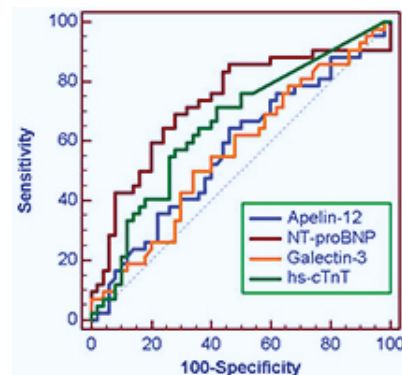
**Conclusion:** Our findings suggest that among the studied biomarkers NT-proBNP was the most strong predictor of the worse outcome. The second best biomarker was hs-cTnT, while Apelin-12 and Galektin-3 demonstrated the weakest prognostic value in HF patients.

#### P1707

##### Plasma N-terminal protachykinin-A 1-37 (pro-SP) as a new prognostic marker for cardiovascular death and hospitalization in patients with dyspnea and elevated estimated glomerular filtration rate

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**Purpose:** Protachykinin-A (PTA) is the precursor peptide to Substance P, a neuropeptide involved in inflammation and platelet aggregation. It has been shown to contribute to coronary vasodilation and negative inotropy. This is first clinical study to investigate the prognostic utility of a stable fragment of N-terminal PTA 1-37 (pro-SP), in predicting 30 to 90 day cardiovascular related hospital admission (CRHA) or cardiovascular related death (CRD) in patients with dyspnea.



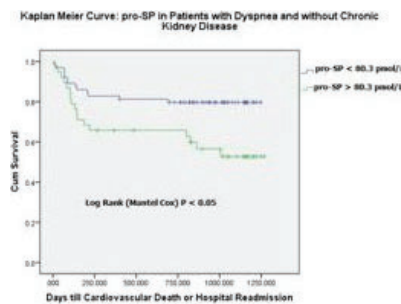
Abstract 60688 Figure



**Methods:** Our study was a 4 year single center prospective cohort study of 200 patients presenting to cardiology clinic for evaluation of dyspnea. EDTA-blood samples were obtained to analyze levels of pro-SP with repeat comparisons done at 6 months. Participants were monitored at 30 and 90 day points for CRHA and CRD.

**Results:** Cox survival analyses yielded a regression coefficient of 1.6 ( $P < 0.05$ ) with regards to the prognostic utility of pro-SP in predicting CRHA and CRD. This increased to 60.2 ( $P < 0.05$ ) among patients with elevated estimated glomerular filtration rate (EGFR) and no chronic kidney disease (CKD). Receiver operating characteristic analyses identified 80.3 pmol/L as the diagnostic cutoff of maximum sensitivity/specificity. Kaplan Meier survival curves comparing patients with dyspnea, elevated EGFR, and no CKD to those without these variables were statistically different (Log Rank  $P < 0.05$ ).

**Conclusion:** pro-SP demonstrates prognostic utility in predicting 30 to 90 day cardiovascular related hospital admission as well as cardiovascular related death in heart failure patients who do not have underlying chronic kidney disease. Its utility in a clinic setting allows for earlier outpatient interventions on patients who are still stable but very high risk for subsequent inpatient hospitalization.



Kaplan Meier Curve: pro-SP

#### P1708

##### Increased concentrations of circulating lysyl oxidase (cLOX) show lack of accuracy to predict clinical outcome in patients with stage C HFpEF

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**Purpose:** To assess whether patients with stage C HFpEF exhibit abnormal cLOX concentrations with outcome predictive significance.

**Methods:** 77 patients with stage C HFpEF were prospectively studied. Circulating LOX, Gal-3, sST2, TGF  $\beta$ -1, ALDO, PICP, ICTP, PIIINP, MMP-2, MMP-9, TIMP-1, GDF-15, BNP and titin, as well as NorA24-huc were determined at baseline. Survival was estimated by the Kaplan-Meier method after 36 months of follow up, and comparison between tertiles of cLOX concentrations by the log-rank test was made. Logistic Cox regression analysis was also performed with all variables under study, which were dichotomized at the median value for model adjustment; the combined end point was all-cause mortality or hospitalization due to HF decompensation. ROC analysis was also carried out to evaluate sensitivity and specificity of cLOX to predict the combined endpoint.

**Results:** cLOX and all the rest hormones, cytokines and biomarkers proved to be significantly elevated in our patients. Non significant differences in mortality rates were found among patients separated into tertiles of cLOX concentrations within our cohort (log-rank coefficient 0.0032,  $p = 0.859$ , at 36 months) (Fig. 1). Likewise ROC curve plotting evidenced very poor precision of cLOX for prognostic purposes (AUC: 0.531; 95% IC: 0.367-0.695;  $p = 0.711$ ). Further multivariate analysis accordingly showed that cLOX failed to improve prognostic accuracy provided by an optimized model that included BNP, GDF-15 and intact titin [c LOX hazard rate(HR)% = 1.057; 95% CI% = 0.756-1.478;  $p = 0.744$ . BNP HR% = 2.692; 95% IC: 1.136-6.378;  $p = 0.024$ . GDF-15 HR% = 2.216; 95% IC% = 1.184-5.552;  $p = 0.036$ . Intact titin HR% = 2.139; 95% CI% = 0.943-4.854;  $p = 0.069$ ].

**Conclusion:** Even though patients with stage C HFpEF show cLOX increased levels, these fail to demonstrate prognostic value once symptomatic HFpEF is established.

#### P1709

##### Sodium quartiles predict cardiovascular mortality in patients with heart failure

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**Introduction:** Hyponatremia at hospital admission is a well-known risk factor of morbidity and mortality in patients with heart failure(HF). However, there are a very few data about the effect of quartiles of sodium on mortality. The present study compares quartiles of sodium in HF patients with respect to cardiovascular mortality.

**Methods:** 580 patients with HF were enrolled into retrospective cohort study. Follow up data for cardiovascular mortality were available in 564 patients, who had available sodium measurement during index visit in three different HF centers. Quartiles of sodium was obtained for survival analysis.

**Results:** Median follow up period was 19 months (8-35 months, 25-75<sup>th</sup> percentiles). Patients in this cohort had 18 months of previous history of HF (9-35 months). Median left ventricular ejection fraction was 25% (20-35%) with a median age of 57 years (45-73 years.) There were 410 males, 154 females in this cohort. Median sodium was 138 mEq/L (135-140 mEq/L) in the whole cohort. Survival curves of quartiles of sodium diverged from each other significantly ( $p = 0.01$ ) with the third quartile (mean 140 mEq/L) having the best prognosis, the first and the second quartiles (means 132 and 137 mEq/L respectively) having the worst prognosis and the fourth quartile lying in between (mean 142 mEq/L) (Figure 1).

**Conclusion:** It is important to understand the prognostically normal range of sodium, which seems to be significantly different from healthy range.

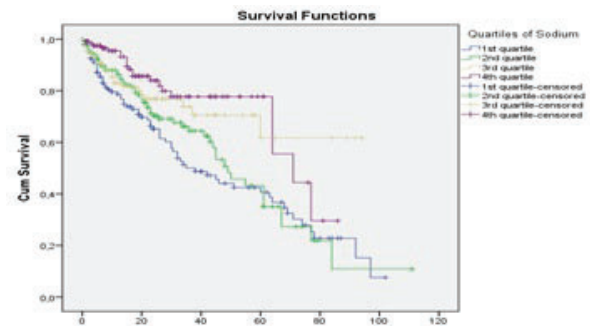


Figure 1. Survival curves

#### P1710

##### Liver dysfunction assessed by model for end-stage liver disease excluding INR (MELD-XI) scoring system predicts adverse prognosis in heart failure

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**Background:** Liver dysfunction due to heart failure (HF) is often referred to as cardiac or congestive hepatopathy. The composite Model for End-Stage Liver Disease excluding INR (MELD-XI) is a robust scoring system of liver function, and a high score is associated with poor prognosis in advanced HF patients with a heart transplantation and/or ventricular assist device. However, the impact of MELD-XI on the prognosis of HF patients in general remains unclear.

**Methods and Results:** We analyzed 562 patients who were admitted to our hospital for the treatment of decompensated HF. A MELD-XI score was graded, and patients were divided into two groups based on the median MELD-XI score: Group L (MELD-XI  $< 10$ ,  $n = 289$ ) and Group H (MELD-XI  $> 10$ ,  $n = 273$ ). We compared all-cause mortality and echocardiographic findings between the two groups. In the follow-up period (mean 471 days), 104 deaths (62 cardiac deaths and 42 non-cardiac deaths) were observed. The event (cardiac death, non-cardiac death, and all-cause death)-free rate was significantly higher in group L than in group H (log-rank  $P < 0.05$ , respectively). With respect to cardiac death in HF patients, Cox proportional hazard analyses demonstrated that reduced left ventricular ejection fraction (HR 2.234, 95% CI 1.142-4.371,  $P = 0.019$ ), aspartate aminotransferase (HR 1.856, 95% CI 1.021-3.375,  $P = 0.043$ ), and MELD-XI (HR 2.052, 95% CI 1.085-3.879,  $P = 0.027$ ) were independent predictors. With respect to non-cardiac death in HF patients, MELD-XI was a predictor in univariable analysis, however, MELD-XI was not an independent predictor in multivariable analysis. Age was an independent predictor for non-cardiac death (HR 1.065, 95% CI 1.030-1.101,  $P < 0.001$ ). With respect to all-cause mortality in HF patients, age (HR 1.029, 95% CI 1.008-1.049,  $P = 0.005$ ), reduced left ventricular ejection fraction (HR 1.625, 95% CI 1.009-2.617,  $P = 0.046$ ) and MELD-XI (HR 1.650, 95% CI 1.025-2.654,  $P = 0.036$ ) were independent predictors. Taken together, a high MELD-XI score was an independent predictor of cardiac death and all-cause mortality. Regarding echocardiographic parameters, right atrial and ventricular areas, inferior vena cava diameter, and systolic pulmonary artery pressure were higher in group H than in group L ( $P < 0.05$ , respectively).

**Conclusions:** A high MELD-XI score was an independent predictor of not only cardiac death but also all-cause mortality in general HF patients. The MELD-XI scoring system, a marker of liver function, can identify high-risk patients with right heart volume and pressure overload in HF.

## P1711

**Plasma proenkephalin (pro-ENK) in the prediction of cardiovascular death and hospitalization in patients with dyspnea and chronic kidney disease**

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**Purpose:** Proenkephalin (pro-ENK; amino acids 119-159 of proenkephalin A) is a surrogate marker of labile enkephalins that has been shown to reflect renal dysfunction in acute cardiac disease. This is the first study to evaluate its prognostic utility in predicting 30 to 90 day cardiovascular related hospital admission (CRHA) or cardiovascular related death (CRD) in patients in clinic with dyspnea and chronic kidney disease (CKD).

**Methods:** We conducted a 4 year single center prospective cohort study of 200 patients presenting to cardiology clinic for routine evaluation of dyspnea. EDTA-blood samples were obtained to analyze levels of pro-ENK with repeat samples at 6 months for comparison. Participants were monitored at 30 and 90 day points for CRHA and CRD.

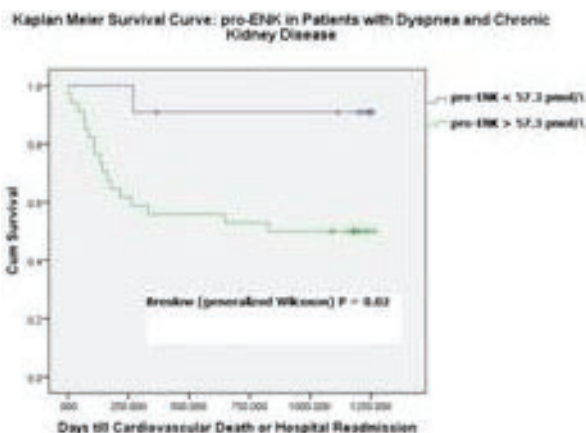
**Results:** Cox regression analyses in determining pro-ENK's prognostic utility in predicting 30 to 90 day CRHA or CRD yielded a regression coefficient of 4.4 ( $P < 0.05$ ) that increased to 23.7 ( $P < 0.05$ ) among patients with the highest quartile of serum creatinine. Receiver operating characteristic analyses identified 57.3 pmol/L as a diagnostic cutoff of maximum sensitivity/specificity. Kaplan Meier survival curves demonstrated statistically significant numbers of primary events in patients with elevated pro-ENK, especially in those with CKD (Breslow  $P < 0.05$ ).

**Conclusion:** pro-ENK demonstrates statistically significant prognostic utility in predicting 30 to 90 day cardiovascular related hospital admission or cardiovascular related death in patients with dyspnea, especially in those with CKD. Utilizing pro-ENK as a prognostic marker allows for stratification of patients with possible congestive heart failure by renal function to identify high risk patients with dyspnea in need of further treatment and diagnostics.

## P1712

**Long-term prognostic value of plasma neutrophil gelatinase-associated lipocalin (NGAL) in adult patients with congenital heart disease.**AAlexandra Frogoudaki<sup>1</sup>; C Andreou<sup>2</sup>; J Parisis<sup>1</sup>; C Maniotis<sup>2</sup>; G Vamvakou<sup>1</sup>; M Nikolaou<sup>1</sup>; I Rizos<sup>1</sup>; G Filippatos<sup>1</sup>; M Anastasiou-Nana<sup>1</sup><sup>1</sup>Second Cardiology Department, Athens University, ATTIKON University Hospital, Athens, Greece; <sup>2</sup>Red Cross Hospital, Department of Cardiology, Athens, Greece

**Purpose:** Neutrophil gelatinase-associated lipocalin (NGAL or lipocalin-2) is a glycoprotein that recognizes renal dysfunction and injury earlier than traditional biomarkers such as serum creatinine. Growing evidence suggests that plasma NGAL is elevated in clinical and experimental heart failure. However, no efficient data exist



Abstract 60618 Figure Kaplan Meier Curve – pro-ENK

regarding the relationship of plasma NGAL levels and long-term outcomes in adult patients with congenital heart disease. The present study investigates the long term prognostic value of plasma NGAL in this patient population.

**Methods:** Plasma levels of NGAL were measured in 53 consecutive adult patients (22 men, mean age  $34.8 \pm 13.7$  yrs) with congenital heart disease and normal values of serum creatinine. Patients were divided according their diagnosis in three groups: A: simple cardiac lesions, B: complex cardiac lesions and C: cyanotic lesions. Patients were also monitored for long-term major cardiovascular events:

death, hospitalization, NYHA class worsening, new onset of arrhythmias, surgical or percutaneous intervention.

**Results:** NGAL value was significantly different between groups: In group A mean NGAL value was  $64.5 \pm 36.7$  ng/ml, in group B mean NGAL value was  $88.77 \pm 36.17$  ng/ml and in group C mean NGAL value was  $121 \pm 40$  ng/ml (group A vs. group B:  $p = 0.048$ , group B vs. group C:  $p = 0.037$ , group A vs. group C:  $p = 0.003$ ).

Patients were followed for  $1144 \pm 353$  days. During the follow up period, 4 patients died due to cardiovascular causes, 8 underwent intervention, 5 were hospitalized for cardiovascular reasons, 3 deteriorated clinically and 6 presented with ventricular or supra-ventricular arrhythmias. during the follow-up period. Plasma NGAL was predictor of cardiovascular death ( $p = 0.014$ ) with an increase of risk 1.020 times per 1 NGAL unit increase.

**Conclusion:** Plasma NGAL levels were lower in patients with simple congenital disease compared to patients with complex congenital heart disease and cyanotic patients with congenital heart disease. Plasma NGAL seems to be strong predictor of cardiovascular mortality in patients with congenital heart disease and normal serum creatinine values.

## P1713

**Do plasma concentrations of apelin predict prognosis in patients with advanced heart failure?**J R Dalzell<sup>1</sup>; CE Jackson<sup>1</sup>; KS Chong<sup>2</sup>; TA Mcdonagh<sup>3</sup>; RS Gardner<sup>1</sup><sup>1</sup>Scottish National Advanced Heart Failure Unit, Golden Jubilee National Hospital, Glasgow, United Kingdom; <sup>2</sup>University Hospital Crosshouse, Kilmarnock, United Kingdom; <sup>3</sup>King's College London, London, United Kingdom

**Purpose:** Apelin is a novel endogenous vasodilator and inotrope, plasma concentrations of which are reduced in advanced heart failure. However, it is not known if plasma apelin concentrations provide prognostic information in these patients. We determined the prognostic significance of plasma concentrations of apelin in patients advanced heart failure secondary to left ventricular systolic dysfunction (LVSD).

**Methods:** Plasma concentrations of apelin were measured in 182 patients with advanced heart failure secondary to LVSD. The predictive value of apelin for the primary endpoint of all-cause mortality and the secondary composite endpoint of death or urgent transplantation were assessed over a median follow up period of 544 (IQR 196-923) days. To compare the predictive value of apelin, NT-proBNP, peak VO<sub>2</sub> and LV ejection fraction (LVEF), receiver operating characteristic (ROC) analysis was performed and the area under the curves (AUC) calculated. To identify predictors of death, Cox proportional hazards analysis was used and variables achieving  $p < 0.10$  on univariate analysis were then tested in a stepwise (forward) multiple Cox regression survival model to determine the independent predictors of both the primary and secondary endpoints. A probability value of  $p < 0.05$  was considered significant for all analyses.

**Results:** Thirty patients (17%) reached the primary endpoint, and a further 4 were transplanted urgently. Of those patients with a plasma apelin concentration above the median, 14 (16%) reached the primary endpoint whilst 16 (18%) reached the secondary endpoint. The corresponding figures for those with plasma apelin levels below the median were 16 (17%) and 18 (20%) ( $p = ns$ ). Apelin was not predictive of mortality when analysed as a continuous variable, or when dichotomized at the median. Significant univariate predictors of the primary endpoint included heart rate, systolic blood pressure, plasma NT-proBNP, LVEF, peak VO<sub>2</sub>, QRS duration, heart failure survival score, and plasma sodium and creatinine concentrations. Multivariable analysis was performed using the significant univariate predictors and forcing apelin into the model. NT-proBNP was the sole multivariable predictor of the primary ( $\chi^2 11.1$ ,  $p = 0.001$ ) and secondary endpoints ( $\chi^2 18.6$  ( $p = 0.001$ )).

**Conclusions:** Plasma apelin concentrations do not predict medium to long term prognosis in patients with advanced heart failure secondary to LVSD.

## P1714

**Prognostic utility of bioactive adrenomedullin (bio-ADM) as a marker for cardiovascular death in patients without congestive heart failure or kidney disease**

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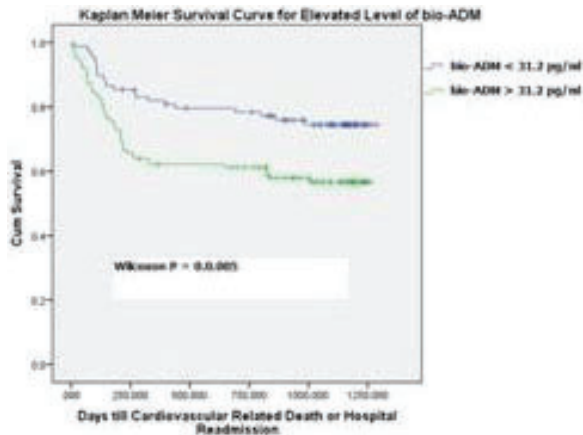
**Purpose:** Adrenomedullin is a 52-amino acid peptide that has been shown to be elevated in disease states such as renal failure and congestive heart failure (CHF). It has also been shown to produce nitric oxide dependent relaxation and inhibit endothelin 1 and angiotensin 2 release. This is the first study employing an immunoassay for bioactive ADM (bio-ADM) to evaluate its prognostic utility in predicting 30 to 90 day cardiovascular related hospital admission (CRHA) or cardiovascular related death (CRD).

**Methods:** We conducted a 4 year single center prospective cohort study of 200 patients presenting as outpatients to cardiology clinic for evaluation of dyspnea.

EDTA-blood samples were obtained to analyze levels of bio-ADM. Follow-up samples were obtained at 6 months for comparison and patients were monitored at 30 and 90 day points for CRHA or CRD.

**Results:** Cox regression survival analyses in predicting 30 to 90 day CRHA or CRD yielded a prognostic coefficient of 14.3 ( $P < 0.05$ ) when bio-ADM was utilized as a continuous variable. Receiver operating characteristic analyses identified 31.2pg/ml as a diagnostic cutoff for maximum sensitivity/specificity. Kaplan Meier survival curves demonstrated statistically significant differences in the number of cardiovascular events in those with elevated levels of bio-ADM (Wilcoxon  $p < 0.05$ ). Survival difference was most profound in patients with the lowest quartile of serum creatinine and without CHF (Wilcoxon  $P < 0.01$ ).

**Conclusion:** bio-ADM demonstrates significant prognostic utility in predicting 30 to 90 day CRHA and CRD, especially in those with low serum creatinine and without CHF. Obtaining bio-ADM levels in outpatient settings holds the potential for risk stratification and earlier targeted treatment for high risk individuals.



Kaplan Meier Curve for bio-ADM

POPULATION  
STUDIES/EPIDEMIOLOGY/PSYCHOSOCIAL/ETHICAL  
CONCEPTS/EDUCATION – POSTER PRESENTED

**P1716**

**Relation between chronic periodontitis and central blood pressure, peripheral resistance and pulse wave velocity in patients after myocardial infarction.**

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**Purpose:** To assess the association between chronic periodontal disease and central BP, PR and pulse wave velocity (PWV) in patients after myocardial infarction.

**Methods:** We enrolled 90 patients (68 men and 22 women, mean age  $60.2 \pm 8.9$  years) 6–18 months after myocardial infarction. All participants were prescribed at least one BP-lowering drug. Periodontal condition was assessed using the community periodontal index of treatment needs (CPITN). Subjects were grouped according to CPITN grade from 1 to 4. Peripheral and central pressure, PR and pulse wave velocity were measured non-invasively using the Mobil-O-Graph device. Multivariate analysis of variance was used to assess the relations between CPITN and central BP, PR and PWV.

**Results:** Central and peripheral BP increased continuously with CPITN grade. Central systolic BP in patients with CPITN 1, CPITN 2, CPITN 3, CPITN 4 was  $111.3 \pm 15.1$  mmHg,  $116.8 \pm 12.6$  mmHg,  $126.9 \pm 16.4$  mmHg,  $131.1 \pm 14.8$  mmHg ( $p < 0.001$ ), central diastolic BP  $74.2 \pm 10.1$  mmHg,  $83.3 \pm 7.7$  mmHg,  $90.0 \pm 10.2$  mmHg,  $96.4 \pm 9.2$  mmHg ( $p < 0.001$ ), peripheral systolic BP  $121.9 \pm 16.7$  mmHg,  $130.5 \pm 13.5$  mmHg,  $140.0 \pm 17.4$  mmHg,  $148.0 \pm 15.6$  mmHg ( $p < 0.001$ ), peripheral diastolic BP  $74.4 \pm 9.4$  mmHg,  $80.4 \pm 7.5$  mmHg,  $85.1 \pm 10.0$  mmHg,  $89.7 \pm 9.2$  mmHg ( $p < 0.001$ ) respectively. PR and PWV did not differ between CPITN groups. After adjustment for age, sex, diabetes, number of teeth, BP lowering drugs all studied variables: central and peripheral SBP and DBP, PR and PWV significantly increased with CPITN grade.

**Conclusion:** Severe forms of periodontal disease are associated with increased central and peripheral BP, PR and PWV which may partially explain the relation between CVD risk and chronic periodontal disease.

**P1717**

**Resting heart rate obtained from ECG or measured by arterial pulse palpation during physical exam show a good correlation: Results from REALITY HF**

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**Purpose:** Elevated resting heart rate (HR) is known to be a risk factor for death, cardiovascular death or rehospitalization in patient with chronic heart failure (HF) and HR reduction is associated with improved outcomes. Although, in clinical practice, resting HR is sometimes obtained from ECG and sometimes measured by arterial pulse palpation during physical examination, it is not clear which method should be used in determining resting HR. REALITY HF (Resting Heart Rate and Real Life Treatment Modality in Outpatients with Left Ventricular Systolic Dysfunction) data were analyzed to evaluate whether there is a correlation or any difference between the resting HR measured on ECG and the resting HR obtained from arterial pulse palpation.

**Methods:** REALITY HF was a multicenter, prospective, national registry designed to evaluate HF patient's clinical characteristics and the effects of current treatment modalities on resting heart rate (HR) and other clinical variables, and enrolled 1054 patients (mean age  $61 \pm 12$  years, 76% male) from 16 centers who were admitted to the outpatient clinic with the diagnosis of chronic HF, LVEF  $< 40\%$  and  $> 18$  years of age. 665 patients in sinus rhythm who have both ECG-based HR and pulse palpation-measured HR estimated after 5 minutes rest in a sitting position were included in this analysis. Patients with recent acute coronary syndromes, severe hepatic or renal dysfunction, severe chronic obstructive pulmonary disease, severe anemia, hyper-/hypothyroidism and pregnant women were excluded from the study.

**Results:** At the time of enrollment, out of 1054 patients, 791 patients (75%) were in sinus rhythm and 263 patients (25%) showed a rhythm disturbance of atrial fibrillation or flutter. In patients with sinus rhythm, mean resting HR was found to be  $76 \pm 14$  bpm and 67.9% of the patients had a resting HR  $\geq 70$  bpm. In 665 patients in sinus rhythm who have both ECG-based HR value and pulse palpation-measured HR value, mean resting HR obtained from ECG was  $76.4 \pm 14$  bpm and mean resting HR measured by arterial pulse palpation during physical exam was  $76.6 \pm 12$  bpm. There was a statistically significant correlation between two methods in determining resting HR ( $r = 0.758$ ,  $p < 0.001$ ).

**Conclusions:** These results showed a significant correlation between ECG-based HR and pulse palpation-measured HR, suggesting that one of these methods can be used in determining resting HR in everyday clinical practice.

**P1718**

**Periodontitis in chronic heart failure**

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**Purpose:** Periodontal disease (PD) has been associated with an increased risk of cardiovascular and cerebrovascular events. The correlation of periodontitis and chronic heart failure (CHF) with respect to underlying aetiology has not been studied.

**Methods:** 71 patients with stable systolic CHF attending a heart failure outpatients' university clinic in Germany, underwent complete cardiological and dental work-up. The periodontal screening index (PSI) was determined for each sextant of the denture in order to quantify the degree of PD. The prevalence of periodontitis found in this CHF population was compared to that of the general population using data from the fourth German dental survey.

**Results:** 28 patients (39%) suffered from ischemic cardiomyopathy (ICM), 43 patients (61%) from dilated cardiomyopathy (DCM). Gingivitis, moderate periodontitis, and severe periodontitis were present in 17 (24%), 16 (23%), and 38 (54%) patients, respectively. None of the included patients had healthy gum tissue. The prevalence of severe periodontitis among CHF patients was higher as compared with the general population. In contrast, moderate periodontitis was mainly prevalent in the general population ( $p < 0.00001$ ). Prevalence of severe periodontitis was significantly higher in the ICM group ( $p < 0.05$ ), while gingivitis was predominantly diagnosed in DCM patients ( $p < 0.05$ ).

**Conclusion:** PD is highly prevalent in CHF patients, and patients with an ischemic aetiology of CHF suffer from more severe periodontitis than DCM patients. Prospective trials are warranted to clarify the causal relationship between both diseases.

**P1719****Prevalence and clinical characteristics of heart failure medical treatment non-responders**M Liu<sup>1</sup>; PW Lee<sup>1</sup>; A Richards<sup>2</sup>; Q Zhang<sup>3</sup>; F Fang<sup>1</sup>; R Renneberg<sup>4</sup>; A Coats<sup>5</sup>; CM Yu<sup>1</sup><sup>1</sup>IVM, Div of Cardiology, Dept of M&T, PWH, The Chinese University of Hong Kong, Hong Kong, Hong Kong SAR, People's Republic of China; <sup>2</sup>University of Otago, Department of Medicine, Dunedin, New Zealand; <sup>3</sup>West China Hospital Sichuan University, Department of Cardiology, Chengdu, China, People's Republic of; <sup>4</sup>Hong Kong University of Science and Technology, Department of Chemistry, Hong Kong, China, People's Republic of; <sup>5</sup>University of East Anglia, Norwich Research Park Professor at Large, Norwich, United Kingdom**Purpose:** Although large scale clinical trials have demonstrated the efficacy and safety of pharmacological treatment for systolic heart failure (HF), it is a common clinical observation that not all patients respond equally. We would like to identify the prevalence and clinical characteristics of HF treatment "non-responders" in our clinical practice.**Methods:** The participating sites from 3 centers have recruited a total of 646 patients with systolic HF, of which 299 patients have completed 6 months' follow-up. HF treatment "non-responders" was defined as death, re-hospitalization for HF, and/or reduction of left ventricular end-systolic volume of <10% in 6 months despite standard HF medication therapy.**Results:** Of the 299 patients enrolled during the reporting period, 169 (53.5%) were HF treatment "non-responders" while 130 (46.5%) were "responders". "Non-responders" were older (71 ± 15 vs. 66 ± 14 years, p = 0.01), had higher New York Heart Association (NYHA) class (III/IV: 70% vs. 58%, p = 0.04) when compared with "responders". There was also no difference in anti-HF therapy (including Angiotensin-converting enzyme inhibitor or Angiotensin II receptor blockers, Beta-blockers, Aldosterone antagonist and Digoxin) within 6 months between the "Non-responders" and "Responders". Multivariate analysis found that age was an independent predictor of HF non-response in our cohort, but its predictive value was only modest (odds ratio 1.02, 95% confidence interval 1.003-1.04, p = 0.02)**Conclusions:** We found that over 50% of HF patients do not respond to optimal pharmacological treatment on mid-term follow-up. Non-responders had similar clinical characteristics when compared with Responders. Therefore, clinical assessment alone is not sufficient to identify patients who will not benefit from medical treatment.**P1720****Comparative study of in vivo and post-mortem diagnosis in patients with heart failure**

LKRLyna Kyria Rodrigues de Almeida; LF Lipari; TS Barbosa; VS Issa; EA Bocchi; SMA Ferreira; LA Bocchi

*Heart Institute of the University of Sao Paulo (InCor), Sao Paulo, Brazil***Introduction:** Necropsies are important tools in confirming diagnoses in vivo. However, few studies have examined autopsy findings if patients with heart failure, as compared to clinical data.**Methods:** We analyzed reports of autopsies performed between January 2000 and November 2002 in our institution. Patients with diagnosis heart failure, cardiogenic shock, or cardiomyopathy at autopsy were included. Congenital heart diseases, pericardial diseases and postoperative shock were excluded. Clinical and autopsy diagnosis were analyzed and categorized according to the presence of diagnostic discrepancies: type 1 – major disagreement larger, related cause of death, whose detection would have led to therapeutic change; type 2 – major disagreement, related to the cause of death, whose detection would not have led to therapeutic change; type 3 – minor disagreement, related to the primary disease, but unrelated to the cause of death; type 4 – minor disagreement unrelated to the principal diagnosis or the cause of death; type 5 – no disagreement.**Results:** We analyzed 666 autopsy findings and in 97 cases both clinical and autopsy data could be retrieved. Among these, 59 patients (60.8%) were men and the mean age was 61.4 ± 14.2 years. Heart failure etiology was ischemic disease in 40 (41.2%) patients, Chagas disease in 19 (19.6%), hypertension in 19 (19.6%) and idiopathic in 11 (11.3%). According to autopsy the main causes of death were cardiogenic shock in 39 cases (39.4%), septic shock in 22 (22.2%) and pulmonary embolism in 15 (15.2%). Diagnostic discrepancies were found in 54 cases (55.7%), and 28 (28.9%) were categorized as type 1 and 21 (21.6%) as type 2; had minor discrepancies occurred in 5 (5.2%) patients and 43 (44.3%) had no disagreement (type 5).**Conclusion:** The high frequency of diagnostic discrepancies in patients with heart failure underscores the importance of autopsies in this setting.**P1721****Heart failure in Argentina: progresses and regressions after two decades of surveys and over 19,000 patients included**E REduardo Perna<sup>1</sup>; ML Coronel<sup>1</sup>; JP Cimbaro Canella<sup>1</sup>; D Echazarreta<sup>2</sup><sup>1</sup>J.F. Cabral Cardiology Institute, Corrientes, Argentina; <sup>2</sup>Hospital "San Juan de Dios", La Plata, Argentina

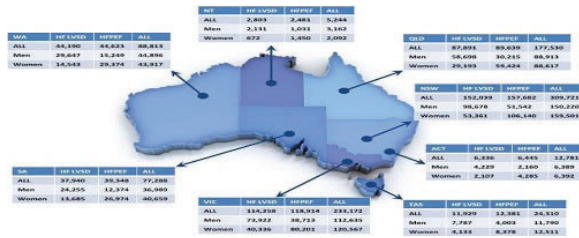
Despite heart failure is a worldwide epidemic, regional differences might influence its epidemiology. Several surveys including acute heart failure syndromes (AHFS) as well as chronic heart failure (CHF) have been conducted in Argentina during the last two decades. Our aim was to review the available information about clinical profile, management and outcome of AHFS and CHF in our country.

**Method:** Comprehensive review of data obtained from studies published in national and international journals, as well as abstracts presented in national meetings, that included subjects with AHFS and CHF, in the period 1992 to 2011.**Results:** Eighteen studies were identified, which recruited 19727 subjects, 12 in AHFS, N = 10679 and 6 in CHF, N = 9048. Median age was 67.6 (25,75% interquartile interval% = 65.4-70) years. The proportion of patients included from central region of the country was 100 to 0%, with 0 to 64% of public centers. In average, there was a 39% of females, 69% with arterial hypertension, 25% of diabetes, 36% of ischemic etiology, 4.4% of Chagas cardiomyopathy and 15% of valvular heart disease. In AHFS, in-hospital mortality in the period 1992-2002 was 7.6% vs 6.5% in 2003-2011, relative risk 0.83 (95%CI% = 0.71-0.98, p% = 0.033). In-hospital mortality significantly decreased during the first decade, from 12.1% in 1992 to 3.2% in 2002 (p for tendency% = 0.005), in comparison with a significant rise in the last decade, from 4.7% in 2003 to 11% in 2011 (p for tendency < 0.0001). Drug use is presented in the table. More frequent co-morbidities were anemia (20%), renal failure (10%) and atrial fibrillation (28%), with a prevalence of preserved LV ejection fraction of 27%.**Conclusions:** The clinical profile of AHFS and CHF in Argentina should be carefully considered when extrapolating data from other regions. After two decades, its management shows an optimistic improvement, but no significant impact on evolution. Therefore, there is a place for new options, not only in terms of drug but also strategies to reduce the risk.

Table 1

Drug	Before 2002 Median (range)	After 2002 Median (range)	P (Mann-Whitney)
ACE-I/ARB	76 (48-95) %	73 (63-91) %	NS
Betablockers	28 (3-62) %	57 (40-81) %	0.046
Aldosterone antagonists	50 (31-78) %	33 (31-52) %	NS
Digoxin	51 (41-56) %	25 (15-34) %	0.001

**P1722****Population prevalence of heart failure in Australia: an under-estimated burden of disease**SSimon Stewart; T Gerber; YK Chan; C Tuttle; MJ Carrington  
*Baker IDI Heart and Diabetes Institute, Melbourne, Australia***Background:** Current estimates of the prevalence of heart failure (HF) in Australia (>20 million people) are now >10 years old and based on non-Australian studies. Recently completed Australian studies, an ageing population and more contemporary definitions of HF that encompass HF with preserved ejection fraction (HFPEF) point to a population burden that is far greater than the current estimate of 350,000 cases of HF per annum.**Methods:** We used sex and age-specific data from Australian studies (including the Canberra Heart Study and the Heart of the Heart Study in Central Australia) and equivalent international studies to estimate the population prevalence of men and women aged 45 years or more with clinical signs and symptoms of HF (Framingham criteria) associated with underlying left ventricular systolic dysfunction (HF with LVSD) of with preserved systolic function (HFPEF cases). Age and sex-specific population data for each region of Australia (State and Territories and major populace centres) were derived from the most recent census of the Australian population published by the Australian Bureau of Statistics.**Results:** The figure below shows the distribution of HF cases across Australia. In total, we estimate there are around 930,000 cases of HF per annum in the country (4.3% of the population); comprising around 460,000 cases of HF with LVSD (49%) and 472,000 cases of HFPEF. The majority (65%) of cases with LVSD are men (299,000). Conversely, women predominate (67%) among those with HFPEF. Reflecting typical patterns of HF hospitalisations in high-income countries, there are slightly more women (51%) with HF and they are older (27% versus 24% aged ≥ 75 years).**Summary:** These contemporary data confirm a higher than expected (4.3% of adults aged >45 years) prevalence of HF in Australia.



Distribution of HF Cases in Australia

## P1723

**Predictors of In-Hospital mortality in patients with heart failure and testing of GWTG-HF risk score in our own cohort of patients**

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**Aim of the study:** to identify predictors of in-hospital mortality in HF, and to validate GWTG-HF score (Get with The Guidelines Program of AHA).

**Methods:** 232 randomly selected patients admitted to ICCU with HF were retrospectively analyzed. Variables: gender, age, risk factors: HTA, HLP, DM, COPD, IHD, PVD, CVD, depression, anemia, renal failure. Measured variables: heart rate, systolic and diastolic BP, Hgb, sodium, BUN, creatinine, ejection fraction (based on which patients were divided in PEF (preserved) and REF (reduced) ejection fraction). Length of stay and GWTG-HF score was calculated. Comparison was between pts. with in-hospital mortality (IHM) and non IHM, and as a function of EF (PEF vs. REF). Statistical analyze: descriptive and comparative analyze, t-test, Chi square, uni and multivariate regression analyze and ROC Curve.

**Results:** mean age  $69.6 \pm 11.4$ , 102 (44%) f and 130 (56%) m. Females were older  $72 \pm 12$  vs.  $67 \pm 10$  ( $p = 0.002$ ), with higher SBD, DBP and sodium level ( $p = 0.003$ ;  $0.002$  and  $0.028$  respectively). Mean hospital stay was  $6.8 \pm 5.8$  days, with significant difference between IHD and non IHD group ( $7.9 \pm 4.5$  vs.  $3.8 \pm 7.9$ ;  $p = 0.000$ ), with the highest mortality during the first (37.3%) and second hospital day (44.1%). Univariate predictors of IHM: HLP (6.37;  $p = 0.012$ ), PVD (5.64;  $p = 0.017$ ), CAD (5.10;  $p = 0.024$ ), cerebrovasc. dis. (5.54;  $p = 0.019$ ), DBP (-0.246;  $p = 0.000$ ), SBP (-0.235;  $p = 0.000$ ), Hgb (-1.116;  $p = 0.079$ ), creatinine (-1.180;  $p = 0.006$ ), BUN (-1.184;  $p = 0.005$ ), EF (-2.262;  $p = 0.000$ ). Multivariate logistic regression (R Square .223;  $p = 0.000$ ) identified seven independent predictors: SBP (-1.183;  $p = 0.007$ ), creatinine (.220;  $p = 0.000$ ), EF (-1.159;  $p = 0.020$ ), CVD (OR 2.59, beta.150;  $p = 0.010$ ), CAD (OR 1.92; beta .125;  $p = 0.055$ ). HLP (OR -2.5; beta -.156;  $p = 0.012$ ) and PVD (OR -2.5; beta -.151;  $p = 0.014$ ) were negative predictors. Same model was applied to PEF cohort, only SBP (.235;  $p = 0.014$ ) and CVD (.352;  $p = 0.000$ ) were identified as independent predictors. Mean GWTG-HF score was  $42.4 \pm 9.9$ , with excellent discriminate function (ROC Curve: Area Under the Curve  $0.92$ ;  $p < 0.000$ ) in IHM vs. non IHM pts. ( $40.6 \pm 9.4$  vs.  $47.7 \pm 9.5$ ;  $p = 0.000$ ); R Square  $0.097$ ;  $p = 0.007$ ,  $0.312$ , with very good fit of the score in the REF cohort (R Square  $0.104$ ;  $p = 0.000$ , Beta  $0.323$ ), but not for PEF cohort (R Square  $0.036$ ;  $p = 0.068$ , Beta  $0.189$ ). Mean EF -  $41.8 \pm 10.5\%$ , 42% had PEF and 58% REF, which was a significant univariate predictor of IHM ( $p = 0.000$ , OR = 3.0;  $p = 0.017$ ).

**Conclusion:** GWTG-HF score was proven to be a good predictor of IHM, but it seems it fit better in PEF patients. REF per se is an independent predictor of IHM.

## P1724

**Association and predictability of the novel ASCVD risk score in the establishment of heart failure in patients with type 2 diabetes: data from a 10-year prospective study**

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**Purpose:** Diabetes is associated with an increased risk of heart failure (HF). The purpose of this prospective study is to examine the association and the possible predictability of the new ASCVD risk score (ACC/AHA2013) in the establishment of HF in patients with type2 diabetes (T2DM).

**Methods:** This prospective study was conducted in the Diabetes Center during the period 1998-2001. Study population included 1084 Caucasian diabetic patients (46% males) free from overt cardiovascular disease or HF at study initiation. Patients have been observed for 10 years regarding HF end point. The initial data were retrospectively collected and inputted individually in the ASCVD risk engine in order to be associated with the real outcome data after the 10-year follow up period. Moreover, statistical analysis performed in order to confirm the association of ASCVD score with the parameters included in the score, additionally to examine possible associations with other anthropometric and cardiometabolic parameters. ROC curves were

used to identify the predictability of the model, regarding HF in patients with T2DM. AUC (Area Under roc Curve) was used to assess the discriminatory ability. Calibration of the model was assessed by Hosmer-Lemeshow goodness-of fit statistic ( $p > 0.05$  indicates acceptable calibration).

**Results:** 22.7% of the patients developed HF during the 10-year follow up period. Analysis revealed a significant positive association of ASCVD score with the onset of HF. Increase of the score by 1unit increases the possibility of HF by 2% (OR = 1.02, 95%CI:1.01-1.03,  $p < 0.0001$ ). Variables significantly associated with ASCVD score in patients with HF were age ( $p < 0.0001$ ), duration of diabetes ( $p = 0.048$ ), smoking ( $p < 0.0001$ ), systolic blood pressure ( $p < 0.0001$ ), antihypertensive drugs ( $p < 0.0001$ ), hdl ( $p < 0.0001$ ) and sex ( $p < 0.0001$ ). Predictability was also estimated by gender. For females ASCVD was significantly associated with HF (OR = 1.02, 95%CI:1.008-1.05,  $p = 0.007$ ) while for males a trend was observed between ASCVD and HF (OR = 1.01, 95%CI:0.99-1.03,  $p = 0.054$ ). Using ROC curves, AUC was 0.621 for the whole study sample with poor calibration ( $p < 0.0001$ ). Regarding females AUC was 0.627 (95%CI:0.544-0.710) with good calibration ( $p = 0.19$ ).

**Conclusions:** We found a positive association of the novel ASCVD risk score with the establishment of HF in a large sample of diabetic patients after 10 years follow up. We noted that the prediction ability of the model was better for females. Larger prospective studies are needed in order to examine the possible predictive ability of ASCVD score regarding HF in patients with T2DM.

## P1725

**The burden of heart failure in low- and middle-income countries: a systematic review**

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**Background:** Heart failure places a significant burden on patients and health systems in high-income countries. However, few systematic data exist about its burden in low- and middle-income countries (LMIC).

**Methods:** We searched multiple databases for published studies that provided information on the burden of heart failure, its causes, management, and outcomes in LMIC. Additional unpublished data were requested from investigators and international heart failure experts.

**Results:** We identified 44 studies and datasets that contained relevant information from 31 LMIC and 235,308 cases of heart failure. The mean age of patients ranged from 42 years in Cameroon and Ghana to 75 years in Argentina, largely correlating with the human development index of the country ( $R^2 = 0.60$ ,  $p = 0.000006$ ). Ischaemic heart disease was the main cause of heart failure in all regions except Africa and the Americas, where hypertension was predominant. 56% of heart failure patients (95% CI: 49-64%) were managed with angiotensin converting enzyme inhibitors, 39% (31-48%) beta-blockers and 37% (29-45%) mineralocorticoid receptor antagonists. Mean length of stay in hospital was 10 days, ranging from 3 days in India to 23 days in China. Acute heart failure accounted for 2.2% (1.3-3.2%) of total hospital admissions and mean in-hospital mortality was 14% (13-15%).

**Conclusions:** The burden of heart failure varies substantially across LMIC. Non-communicable diseases dominate the causes of heart failure worldwide, although infectious valvulopathies and cardiomyopathies remain significant. Together this suggests a double burden of communicable and non-communicable diseases for countries in the midst of epidemiological transition. Overall, the use of evidence-based medications tends to be suboptimal and outcomes are generally poor. Better strategies for heart failure surveillance and management in LMIC are needed.

## P1726

**Effect of cognitive-behavioral psychological intervention on functional capacity of with heart failure: preliminary results**

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**Background:** Heart failure is one of the leading causes of death with a reduced five-year survival, 25% in men and 38% in women. The six-minute walk or exercise test is a simple, easy to implement and inexpensive method, it is designed to objectively assess functional limitations and prognosis of heart failure patients, as well as positively associated with quality of life.

**Objective:** To research effect of cognitive-behavioral psychological intervention on functional capacity of heart failure patients.

**Methods:** The psychological intervention program included psycho-education, diaphragmatic breathing, progressive muscle relaxation and problem solving training, in four weekly sessions of 90 minutes each. In a longitudinal study that included

distance traveled, time spent and level of effort in Borg scale, 21 patients attended to the Heart Failure Clinic with chronic and stable heart failure were evaluated at the beginning and end of the program: 10 in control group and 11 in experimental group.

**Results:** 1) Control group: a) Socio-demographic characteristics: age  $52.50 \pm 14.49$  years, gender female 60%; b) functional class (NYHA): I 60% and II 40%; c) effect of intervention (pre-evaluation/post-evaluation): distance traveled 216.24 m/215.85 m, time spent 5 m 42 s/5 m 32 s, level of effort 10% nothing, 30% very very light, 20% very light, 30% light, 10% little heavy/ 40% nothing, 10% very very light, 20% very light, 10% light, 20% moderate.

2) Experimental group: a) Socio-demographic characteristics: age  $60.36 \pm 17.93$  years, gender female 63.6%; b) functional class (NYHA): I 63.6% and II 36.4%; c) effect of intervention (pre-evaluation/post-evaluation): distance traveled 199.19 m/225.74 m, time spent 5 m 42 s/5 m 46 s, level of effort 18.2% nothing, 18.2% very, very light, 9.10% very light, 27.3% light, 18.2% moderate, 9.10% little heavy/ 27.3% nothing, 63.6% very, very light, 9.10% very light.

**Conclusions:** Preliminary results show a tendency to increase the functional capacity of patients: an increase in the time spent and distance traveled, as well as a decrease in the level of effort expended. Therefore an integrated multidisciplinary teams that include psychology intervention programs aimed at improving cardiovascular health and quality of life of patients are needed.

#### P1727

##### Relationship between modes of coping and acceptance to the device in patients with implantable cardioverter defibrillator

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Inpatients with ventricular arrhythmias or patients in risk to suffer one the Implantable Cardioverter Defibrillator (ICD) has proven useful to prolong the life, but the patients which have an inadequate device acceptance may have psychological distress and poor quality of life. Coping modes are an important variable mediating the patient's devices acceptance. The purpose of this study has asses the coping modes in patients with ICD and the relationship with psychological acceptance device. This was a non-experimental, descriptive correlational cross-study type. Was attended 20 patients with ICD which was chosen no- probabilistically. The evaluation of the study variables was performed in a 50-minute session, using the Coping Responses Inventory Adult Questionnaire and the Device Acceptance Survey. The analysis of the responses shows that the most used ways of coping by patients with DAI are the Positive Reappraisal and the Pursuit of Rewards which showed a significant positive correlation with the Device Acceptance ( $\alpha = 0.003$  and  $0.004$  respectively). The low acceptance device is associated with psychological conditions such as anxiety and depression that affect quality of life, assess which methods of coping that favor acceptance the device may help improve psychological well-being of these patients are.

#### P1728

##### Education program for heart failure patients

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Newmedications, new methods, new recommendations – but no real effect. What can we do? One of possible ways to solve this problem – education of patients and their relatives.

**Aim:** to analyze usefulness of education program to patients with chronic heart failure and their relatives in different groups divided by: education, social level, living with relatives, occupancy.

**Methods:** Study included 135 patients with CHF II-III NYHA of ischemic genesis educated for heart failure education program for patients and their relatives in City Clinical Hospital from 01.2012 to 01.2013. All patients had pre-test on problem of heart failure (to evaluate a level of knowledge and compliance to recommendations of doctors) 2 of 2 hours lessons, post-test, follow up for a year (monthly telephone contacts), and at the end of the year one more test and 2 of 2 hours lessons. In all cases we ask patients to visit our lessons with relatives (in case they have any relatives).

**Results:** 90 patients were male, 45 – female. Mean age was  $67 \pm 5.2$ . 120 of our patient had high education, 35 of them were still occupied, social level in all cases was not very high. All patient have as a recommendation from their doctors at least 5 medications and some recommendations in physical activity and diet. Results of pre-test show, that our patients poor educated in problem of their disease, complications, medications and so on, I case they have some information they didn't understand what for and how to use it. Compliance at the beginning was low then 80% in most of cases. 121 of our patients visit lessons with relatives, but only in 80 of cases relatives show their motivation in health of our patients. Pos-test was at most of cases well done. One-year follow up shows, that compliance was at very

high level and we have no re-hospitalizations in 32 of our patients, all of them had high education, were still occupied, have well-motivated relatives. 3 more patients with such characteristic were re-hospitalized: 1 – myocardial infarction, 1 – pneumonia, 1 – trauma. In other 100 patients compliance falls from telephone call to call. We find out some main causes of this: non-motivated relatives, depression of patients, low motivation of patients. It is interesting, that after a year all our patients (35 (100%)) with good compliance and no re-hospitalizations want to participate in a new educational course of 2 lessons, and only 76 of others (76%) want to learn more about their disease.

**Conclusions:** well educated patients with chronic heart failure have best compliance, best motivation in following education and best prognosis.

#### P1729

##### Social perspectives of heart failure: flu vaccine or not?

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Heart failure is a complex syndrome with several dimensions one of which is social perspectives. TREAT-HF network has created a questionnaire recently in order investigate to several aspects of HF outpatients. Vaccination against flu has been recommended in the guidelines.

**Methods:** Turkish Research Team-HF (TREAT-HF) is a network which undertakes multicentric observational studies in HF among HF centers. Herein, data including initial 175 HFREF patients out of eight HF centers were presented. Herein, stable HFREF patients who had flu vaccine (Group 1) were compared with those who did not (Group 0).

**Results:** Mean age of those who were vaccinated against flu were slightly younger than those who were not ( $55.5 \pm 16.1$  vs  $59.6 \pm 14.4$  years,  $p = 0.075$ ). Gender distribution was similar in both groups (female/male ratio, 14/55, 31/74,  $p = 0.174$ ). NYHA distribution in the form of I-II/III-IV was 43/21 in group 1, 63/38 in group 0 ( $p = 0.53$ ). Mean EF was  $28 \pm 11\%$  and  $30 \pm 11\%$  in group 1 and 0 respectively ( $p = 0.360$ ).

Last graduated school was high school in 33.3% of those in group 1 whereas it was high school in 15.2% of those in group 0 ( $p = 0.005$ ). 58% of those in group 1 stated that they had enough medical information with regard to their HF disease, whereas 34% of those in group 0 stated that they had such ( $p = 0.003$ ). 50.7% of those in group 1 stated that their belief that HF can be healed compared to 66.3% of those in group 0 ( $p = 0.04$ ). 78% of those in group 1 versus 50.6% of those in group 0 stated that they followed therapeutic life style modifications, proposed by their doctors ( $p = 0.001$ ). 71% of those in group 1 versus 37.5% of those in group 0 stated that they regularly measure weight ( $p < 0.001$ ). 44.9% of those in group 1 versus 14.3% of those in group 0 stated that they engaged in weekly physical activity ( $p < 0.001$ ). 58% of those in group 1 versus 38.5% of those in group 0 stated that they keep dietary advices ( $p = 0.012$ ). 69.6% of those in group 1 versus 51.5% of those in group 0 stated that they had social support during their disease ( $p = 0.019$ ). 62.3% of those in group 1 versus 34.6% of those in group 0 stated that their relatives know what to do in case of an emergency situation ( $p < 0.001$ ).

**Conclusion:** Flu vaccination seems to identify a group of HFREF patients with self-consciousness, literacy, social harmony and good compliance. It is important to pay attention to those who do not have flu vaccine.

#### P1730

##### Heart failure hospitalization cost in a Greek public tertiary hospital

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**Purpose:** Heart failure (HF) is the first reason for hospitalization in individuals aged 65 years or older, representing a significant financial burden. Hospitalization-related cost, in particular, accounts for the major part of the total HF healthcare expenditure. As such a cost analysis has not yet been performed in Greece, we sought to analyze the current HF hospitalization-related expenditure according to patients' baseline characteristics in a Greek public tertiary hospital.

**Methods:** Total hospitalization cost was analyzed in 200 consecutive patients, aged  $56 \pm 16$  years, 80% male, with mean left ventricular ejection fraction (LVEF) of  $29 \pm 10\%$ , admitted for acutely decompensated HF. Patients underwent interventional procedures (PCI/CABG) or device implantations (ICD/CRTs) were excluded from the present analysis.

**Results:** Patients were hospitalized for a median of 7 days (range, 1-37 days) with a mean total cost per patient of €3177 ± 3240. Cost increased significantly in patients in pre-hospitalization New York Heart Association class IV (€6489 ± 6569) compared to lower NYHA classes (NYHA I, €2235 ± 2058,  $p < 0.001$ ; NYHA II, €2599 ± 2164,  $p < 0.001$ ; NYHA III, €3505 ± 3134,  $p = 0.003$ ). Cost was also significantly higher in patients with low LVEF ( $< 30\%$ , €3672 ± 3657;  $\geq 30\%$ , €2618 ± 2535,  $p = 0.031$ ) and in those with increased levels of N-terminal B-type natriuretic pro-peptide on admission (NT-proBNP;  $\geq 400$  pg/mL, €3975 ± 3722,  $< 400$  pg/mL €2216 ± 1764;  $p = 0.038$ ).

**Conclusions:** Hospitalization cost for HF is high, particularly in patients with advanced disease before hospitalization. Strategies to lower hospitalization rates are warranted, given the current financial constraints in several European countries.

### P1731

#### Seasonal variation in inpatient mortality among 949,907 heart failure patients is driven by variation in temperature but not air pollution indicators

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**Purpose:** An increase in heart failure (HF) hospitalization and mortality during winter months has been observed throughout the world in both northern and southern hemispheres, but the mechanism for this seasonal variation is not fully understood. The objective of this study was to determine the contributions of temperature and air pollutants to seasonal variation in HF outcomes.

**Methods:** Deidentified hospital discharge data was obtained for the state of New York (NY) for the years 1994-2007. Patients with a primary discharge diagnosis of HF (ICD9-CM code 428.xx) were included in the analysis. Monthly mean temperature data were obtained US National Weather Service data. Monthly data regarding ozone, carbon monoxide (CO), and airborne particulate matter  $\leq 10$  (P10) and  $\leq 25$   $\mu\text{m}$  (P25) were obtained from the US Environmental Protection Agency Air Quality System. The nearest weather and air-quality monitoring stations for each admitting hospital were determined based on longitude and latitude, and the corresponding values for the month of admission were assigned to each hospital record. Associations between mortality, temperature and air quality measures were determined using logistic regression via a step-forward approach. Month and year of admission were included in multivariate analysis along with significant environmental predictors.

**Results:** Overall, 54395/949907 (5.7%) patients hospitalized for HF died during the course of the study. Mortality decreased significantly over time (OR 0.95/year,  $p < 0.001$ ), and admission during winter was associated with a significantly higher unadjusted risk of mortality than summer (January vs. July odds ratio 1.24 [ $p < 0.001$ ]). Multiple air pollution indicators decreased over the study period, and multivariate analysis including year of hospitalization revealed only temperature (temperature (OR 0.98/ degrees C,  $p < 0.001$ ), and CO (OR 0.96/ppm,  $p < 0.001$ ) were significantly associated with in-hospital mortality. When adjusted temperature, CO, and year of hospitalization, the previously observed winter peak in mortality reversed, with the highest risk of mortality in the summer (July vs. January OR 1.45,  $p < 0.001$ ), and CO was no longer significantly associated with mortality ( $p = 0.09$ ).

**Conclusion:** Temperature is a primary contributor to seasonal variation in inpatient HF mortality, whereas measures of air pollution were not. Further investigation into the mechanisms by which cold weather affects HF outcomes may identify potential interventions to mitigate associated risk.

### P1732

#### Initial experience of a dedicated heart failure clinic in Malaysia.

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Heart failure is a common cause of admission to hospital in Malaysia. Currently, a hospital is the only government hospital with a dedicated heart failure clinic. We undertook an audit to look at the initial experience of our dedicated heart failure clinic.

**Method:** We enrolled 32 consecutive patients who was referred and attended the heart failure clinic. Patient's demography, clinical status, aetiology and medication per guidelines were included in the audit questionnaire.

**Results:** 84% (n=27) of our patients were more than 50 years of age. Median age is 58. There was a male preponderance Male 81% (n=26); female 19% (n=6). Most of the patients were of Malay ethnic origin 56 % (n=18), {25% (n=8), 19% (n=6)} were of Chinese and Indian origin respectively. The main aetiology is ischaemia 66% (n=21). Hypertension was the commonest risk factor 75% (n=24) and about 53% (n=17) has diabetes. 63% (n=20) had reduced ejection fraction and 37% (n=12) had heart failure with preserved ejection fraction. Percentages of NYHA class are as following, NYHA I- 19%, (n=6), NYHA II -38% (n=12), NYHA III- 40% (n=13), NYHA IV- 3 % (n=1).

Median heart rate was 74 beats per minute. 97 % (n=31) has heart rate above 60bpm. 69% (n=22) of patients had a QRS duration of more than 120ms. 84% (n=27) of patients was on antifailure medication either ACE inhibitor or ARB, 100% was on heart rate control medication (beta blocker, ivabradine or combination) and 47% (n=15) was on mineralcorticoid antagonist. 88% (n=28) of patients was on cholesterol lowering agent. 3% (n=1) had a hospitalization within the first 3 months.

**Conclusions:** In and Asian cohort heart failure mainly affects the moderate age group with ischaemia as the main aetiology similar to the west. In our experience in establishing a dedicated heart failure clinic has lead to a high adherence to the treatment per international guidelines with good short term outcome.

### P1733

#### Health-related quality of life in chronic heart failure patients in Sweden: results from the Swedish Heart Failure Registry

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**Purpose:** While many studies have used disease-specific health related quality-of-life (HRQoL) instruments in chronic heart failure (CHF), data on HRQoL and generic HRQoL weights (i.e. utilities) from large populations in clinical practice is needed to analyse the effect of treatments and to provide evidence for payer decisions on cost-effectiveness. Our objectives were to analyse HRQoL and utilities in a large national sample of CHF patients and to analyse the impact of different parameters on utilities. We here report HRQoL and utilities for inpatients and outpatients, by NYHA class, and by left ventricular ejection fraction (LVEF).

**Methods:** We analysed data for all 5334 patients in the Swedish Heart Failure Registry during 2003-2010 with completed assessment of HRQoL (by EQ-5D, measuring mobility, self-care, usual activities, pain/discomfort and anxiety/depression) at inclusion (discharge/end of visit). Descriptive analyses were performed at baseline, and include comparisons to published data for the Swedish general population. EQ-5D responses were translated to utility weights between 0 and 1, where 1 is equivalent to perfect health and 0 to death.

**Results:** Mean age was 73 ± 11 years, 79% inpatients, 65% men, NYHA I/II/III/IV 11/49/36/4%, and 17% had an LVEF  $\geq 50\%$  (i.e. HFPEF).

Compared to the general Swedish population aged 70-79 years, HRQoL at inclusion was negatively affected in the EQ-5D domains of mobility (inpatients/outpatients: 54/44% reported no problems vs. 73%), self-care (82/83% vs. 98%), and anxiety/depression (56/56% vs. 83%). In addition to mobility, outpatients more frequently reported problems with pain/discomfort than inpatients (61% vs. 48%). HFPEF patients had a lower utility at 0.65 ± 0.30 than those with HFREF (i.e. LVEF  $< 40\%$ ; range 0.72-0.73), partly due to a higher mean age (76 vs. 69-72 years). Utilities were clearly tied to NYHA class, with utilities of 0.83 ± 0.24 in class I, 0.77 ± 0.25 in II, 0.62 ± 0.31 in III and 0.33 ± 0.41 in IV.

**Conclusions:** In a large sample of Swedish patients from clinical practice, CHF has a negative impact on HRQoL, with lower ratings in outpatients than inpatients for mobility and pain/discomfort. Patients with HFPEF have a lower utility than those with HFREF, partly due to a higher age. Utilities and HRQoL markedly decrease with worse NYHA class, irrespective of point of care. These data provide new insights into potential drivers of HRQoL and utilities for clinical and economic evaluations. Further research on drivers of utilities and changes over time is in progress.

### P1734

#### Long-term effects of 2011 Japan earthquake and tsunami on the incidence of heart failure: a population-based study

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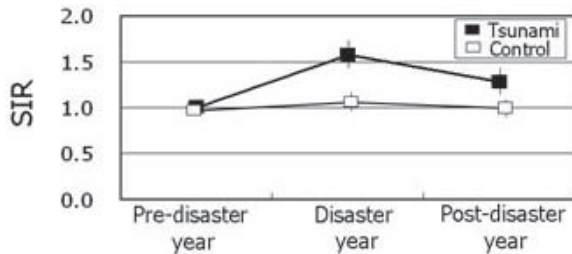
**Background:** No reports have described the long-term effects on the incidence of acute decompensated heart failure (ADHF) after natural disaster.

**Methods:** We conducted a population-based ADHF registration study in the Iwate prefecture 2 years before and 2 years after the northeast Japan earthquake and tsunami which occurred on March 11, 2011. Clinical records were reviewed at all hospitals located within the district, and cases were then registered according to the Framingham definition.

**Results:** During the 4 year survey period, a total of 2,690 ADHF cases (mean age = 81) were identified. The standardized incidence ratio (SIR) and 95% CI for ADHF during the disaster year of 2011 and the post disaster year of 2012

were determined from the number of observed cases relative to the number of expected cases calculated by age-adjusted incidence rates for two pre-disaster years (2009-2010). SIR increased during the disaster year of 2011 (1.15; 95% CI 1.07 – 1.24) and returned to pre-disaster levels during the post-disaster year of 2012 (0.98; 95% CI 0.91 – 1.06). When the SIR of ADHF was compared between the control area and the tsunami stricken area (Figure), the rate in the tsunami stricken area was significantly increased in the disaster year (1.58; 95% CI 1.43 – 1.74), and was remained higher in the post-disaster year (1.28; 95% CI 1.15 – 1.43). However, in the control area with no significant tsunami effects, no such increase was apparent during the disaster year (1.11; 95% CI 0.99 – 1.24) or the post-disaster year (1.02, 95% CI 0.90 – 1.14).

**Conclusion:** The incidence of ADHF increased significantly and this increase was sustained for more than a year after the devastating tsunami. However, the earthquake had minimal impact on the incidence of this condition.



SIR in tsunami and control areas

#### P1735

##### Epidemiology and treatment of chronic heart failure in a real world setting in southwestern Ontario

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**Objective:** There is limited evidence for burden of chronic heart failure (CHF) in terms of reduced and preserved ejection fraction (HF<sub>r</sub>EF vs. HF<sub>p</sub>EF) and New York Heart Association (NYHA) classification. This study aims to determine prevalence, patient characteristics and treatment patterns associated with CHF, both for HF<sub>r</sub>EF ( $\geq 45\%$ ) and HF<sub>p</sub>EF ( $< 40\%$ ) and according to NYHA class (class II-IV) in a real world Canadian setting.

**Methods:** Retrospective analysis conducted using a longitudinal population-based medical records database collected from 85 physicians in southwestern Ontario. These records contain chart-abstracted information such as diagnosis, physician visits and consultation notes. Data of adult patients with a diagnosis of CHF (ICD-10 code I50, text mention in the chart, and presence of a chest x-ray or echocardiogram indicative of CHF) established between Jan 1<sup>st</sup>, 2005 and Sept 31<sup>st</sup> was included. Demographic data, clinical characteristics and treatment patterns were analysed.

**Results:** From the medical records of 333,281 patients, 8,983 patients (2.6%) with CHF were identified: 3,515 (39%) with HF<sub>r</sub>EF, 4,394 (49%) with HF<sub>p</sub>EF and 1,074 (12%) with ejection fraction between 40-45%. More than half the patients were either in NYHA class II (30%) or class III (34%) followed by class I (22%) and class IV (14%). Among patients in class II-IV (N = 7,006), the mean age at diagnosis was  $63 \pm 11.3$  years, 57% were male, 63% were employed, majority were Caucasians (83%) and 69% had BMI  $> 25$ . Most patients were hypertensive (45%); other comorbidities included myocardial infarction (33%), atrial fibrillation (28%) and COPD (23%). Type 2 diabetes, dyslipidemia and stroke were reported in similar proportions (13%, 12% and 11%, respectively). Among HF<sub>r</sub>EF and HF<sub>p</sub>EF cohorts, more patients in the HF<sub>r</sub>EF group compared to the HF<sub>p</sub>EF group were prescribed ACEIs (79% vs. 69%), ARBs (51% vs. 33%) and beta blockers (43% vs. 27%). ACEIs were the frequently prescribed treatment among NYHA classes II (56%) and IV (88%), BBs were more prescribed in class III (41%). Diuretics were also frequently prescribed (II:51%, III:66%, IV:88%).

**Conclusions:** HF prevalence rates in this study are in line with the existing literature. Moreover, the distribution of patients among NYHA classes follows a previously described trend. Treatment pattern in HF<sub>r</sub>EF patients showed a commonly known rate for ACEIs, a higher rate for ARBs and a lower rate for BBs. Despite being commonly underdiagnosed, HF<sub>p</sub>EF patients were well characterized in the database and reported lower treatment levels than HF<sub>r</sub>EF patients.

## PATHOPHYSIOLOGY – POSTER PRESENTED

#### P1737

##### Comparing serum copper and zinc in heart failure patients with reduced versus those with preserved left ventricular systolic function

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**Purpose:** Despite the growing prevalence of heart failure with preserved ejection fraction (HFPEF), the pathophysiology of the syndrome is still under investigation. Emerging evidence underscores the role of micronutrient dyshomeostasis in adverse remodeling and clinical deterioration of heart failure syndrome. In the current study, we compared serum levels of copper (Cu) and zinc (Zn) levels in heart failure patients with reduced left ventricular ejection fraction (HFREF) versus those with HFPEF.

**Methods:** We studied 125 patients, 71% male, aged  $69 \pm 11$  years, including 63% with HFREF (LVEF  $< 40\%$ ) and 37% with HFPEF (LVEF  $\geq 40\%$ ); 21 healthy volunteers served as controls. Serum Cu and Zn levels were determined using air-acetylene flame atomic absorption spectrophotometry.

**Results:** Serum Cu differed significantly between HFREF vs. HFPEF vs. controls ( $126.72 \pm 33.30$  vs.  $106.84 \pm 33.74$  vs.  $92.71 \pm 16.97$   $\mu\text{g/dl}$ ,  $p < 0.001$ ). Serum Cu levels were significantly higher in HFREF patients (HFREF vs. control, B: 34.220, 95%CI: 18.320 – 50.121,  $p < 0.001$ ) compared to controls after adjusting for age, gender, hypertension, diabetes, smoking, chronic obstructive pulmonary disease, coronary artery disease and atrial fibrillation whereas they did not differ between HFPEF and control ( $p = 0.150$ ). In addition serum Cu were significantly higher in HFREF compared to HFPEF (HFREF vs. HFPEF, B: 21.747, 95%CI: 7.720 – 35.773,  $p = 0.003$ ). Serum Zn differed significantly between HFREF vs. HFPEF vs. controls ( $77.59 \pm 16.69$  vs.  $76.38 \pm 18.76$  vs.  $87.90 \pm 17.85$   $\mu\text{g/dl}$ ,  $p = 0.041$ ). Serum Zn concentrations were significantly lower in HFREF (HFREF vs. control, B: -14.872, 95%CI: -23.802 – -5.942,  $p = 0.001$ ) and HFPEF (HFPEF vs. control, B: -10.400, 95%CI: -20.544 – -0.256,  $p = 0.045$ ) patients compared to controls after adjusting for the above mentioned variables. On the other hand serum Zn did not differ between HFREF and HFPEF ( $p = 0.525$ ). In multiple linear regression, LVEF ( $p = 0.034$ ) and E/e ratio ( $p = 0.024$ ) were independent predictors of serum Cu in total heart failure population, while NYHA class ( $p < 0.001$ ) and E/e ratio ( $p = 0.020$ ) were independent predictors of serum Zn.

**Conclusions:** Serum Cu was increased in HFREF both vs. controls and vs. HFPEF and correlated with LV systolic and diastolic function. Serum Zn, in contrast, was decreased both in HFREF and HFPEF and independently correlated with clinical status and LV diastolic function.

#### P1738

##### Reduced left ventricular preload as a possible cause of left ventricular subclinical dysfunction pattern in patients with chronic cor pulmonale. A case-control study.

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**Background:** According to some authors, changes in right ventricular afterload and left ventricular preload would consistently be present in chronic obstructive pulmonary disease (COPD). Besides, they per se were able to generate the Doppler echocardiographic findings of diastolic asymptomatic left ventricular dysfunction (ALVD) frequently seen in COPD.

**Aims:** Identifying the predictors of ALVD in COPD patients using a case control study.

**Methods:** Patients with COPD and ALVD were enrolled as cases, while patients affected by COPD without ALVD were assumed as controls. The measurements of left ventricular function were acquired using conventional Doppler echocardiography adequately complemented by Tissue Doppler Imaging and speckle tracking. Left ventricular systolic dysfunction was defined by left ventricular ejection fraction  $< 50\%$ . Diastolic left ventricular dysfunction was defined according to guidelines of the European Association of Cardiovascular Imaging. A logistic regression model was built taking left ventricular dysfunction as outcome variable. A number of anamnestic, clinical and echocardiographical exposure variables were included in the model.

**Results:** 35 cases and 26 controls were recruited. Diastolic ALVD was found in all of 35 cases: 27 patients with grade I and 8 patients with grade II diastolic ALVD. Markers of increased risk of ALVD were tricuspid annular plane systolic excursion (TAPSE)  $< 17$  mm (OR% = 17.18; 95% CI: 1.89 – 155.62  $p = 0.0114$ ) and systolic pulmonary artery pressure (sPAP)  $> 40$  mmHg (OR% = 33.08; 95% CI: 1.26 – 864.28



$p = 0.0356$ ). Furthermore, sPAP estimate was demonstrated to be related to ratio of E flow velocity divided by early (e') LV basal longitudinal myocardial lengthening velocity (E/E' ratio) by a very significant negative correlation, while the left ventricular isovolumic relaxation time (LV IVRT) was not affected by elevated pulmonary pressure.

**Conclusions:** ALVD was predicted by a reduced TAPSE and an increased sPAP, i.e. an index of RV function and a surrogate marker of ventilatory function, respectively. However, the inverse linear correlation found between E/E' ratio and sPAP, in the presence of a LV IVRT unaffected by increased sPAP, would suggest that a LV reduced preload is present in COPD. Thus mitral Doppler data may indicate that LV diastolic dysfunction in COPD patients is not related to increase in left ventricular stiffness and/or intrinsic impairment in left ventricular relaxation/compliance but rather it arises from a reduced left ventricular preload, pulmonary hypertension-related.

#### P1739

##### Mitochondrial structural abnormalities are common features in the myocardium of patients with various types of cardiomyopathy

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**Purpose:** Mitochondria play pivotal roles in heart failure in terms of energy production and cell signaling and are dynamic organelles able to vary their morphology and numbers. We aimed to assess mitochondrial structural abnormalities in patients with dilated cardiomyopathy or other cardiomyopathies using electron microscopy.

**Methods:** We examined 36 patients who underwent endomyocardial biopsy of the right ventricle to elucidate the etiology of the cardiac dysfunction; informed consent was obtained in all cases. Sampling failures were noted in 6 patients due to endomyocardial fibrosis. Structural abnormalities and numbers of mitochondria were graded as: grade 3, very severe abnormalities or marked increase in numbers, equivalent to that observed in mitochondrial cardiomyopathy; grade 2, severe to moderate abnormalities and increase; grade 1, mild abnormalities and increase; and grade 0, no abnormalities.

**Results:** Of the 30 patients analyzed, 19 patients had DCM, 3 had hypertrophic cardiomyopathy, 2 had cardiomyopathy related to myasthenia gravis, 2 had mitochondrial cardiomyopathy, 2 had cardiac sarcoidosis, 1 had hypertensive heart disease and 1 had drug-induced cardiomyopathy. Three patients had grade 3 abnormality, 14 had grade 2 abnormality, 9 had grade 1 abnormality in structure, and 27 patients had at least grade 1 abnormality in numbers, excluding the 2 patients with mitochondrial cardiomyopathy. Along with mitochondrial abnormalities, marked accumulation of lipofuscin were also observed in 63% of patients despite the average of their age was 58 years. No association was noted between the current mitochondrial grades and indicators of cardiac function, including ejection fraction on echocardiography or dp/dt calculated from cardiac catheterization.

**Conclusions:** Abnormalities of mitochondrial structure and numbers, along with lipofuscin accumulation, were common in the myocardium of patients with dilated cardiomyopathy or other types of cardiomyopathies, suggesting the mitochondria is one of the therapeutic targets not related to hemodynamics of various types of cardiomyopathy.

## PATHOPHYSIOLOGY – POSTER DISPLAY

#### P1740

##### Clinical impact of left ventricular fibrosis on cardiac function and reverse remodeling

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**Purpose:** left ventricular (LV) fibrosis is known to be a hallmark of cardiac remodeling. LV endomyocardial biopsy (EMB) enables direct evaluation of fibrosis. However, its clinical impact on cardiac function and reverse remodeling remain unknown. **Methods:** 113 patients of non-ischemic cardiomyopathy who underwent LV endomyocardial biopsy (EMB) were included. Patients were divided into three groups; mild fibrosis, moderate fibrosis and severe fibrosis groups, according to the %fibrosis area determined as the whole fibrosis area divided by all tissue area. Comparative analyses were performed between three groups.

**Results:** %fibrosis area ranged from 0 to 11% in the mild fibrosis group, 12 to 30% in the moderate fibrosis group and 30 to 99% in the severe fibrosis group. Ejection fraction (EF) was significantly lower in the severe fibrosis group compared with the mild fibrosis group ( $43.8 \pm 13.4\%$  vs.  $33.7 \pm 14.0\%$ ,  $P < 0.01$ ). LV end-diastolic volume index (LVEDVI) and LV end-systolic volume index (LVESVI) were significantly larger in the severe fibrosis group compared with the moderate fibrosis

group ( $128.5 \pm 43.9\text{ml/m}^2$  vs.  $107.3 \pm 42.1\text{ml/m}^2$ ,  $p < 0.001$ ,  $87.5 \pm 41.2\text{ml/m}^2$  vs.  $67.3 \pm 35.3\text{ml/m}^2$ ,  $p < 0.05$ , respectively). Absolute increase of EF at 1 year was negatively correlated with %fibrosis ( $r = -0.311$ ,  $P < 0.05$ ). Reverse remodeling defined as an absolute increase of EF  $\geq 10\%$  to a final value of  $>45\%$  at 1 year was observed in 35.0% patients in the severe fibrosis group, in 42.9% patients in the moderate fibrosis group, in 71.4% patients in the mild fibrosis group (mild vs. severe;  $p < 0.05$ ).

**Conclusion:** Cardiac fibrosis in LVEMB is associated with worsening hemodynamic parameters and reverse remodeling. It may provide the incremental information about the prediction of LV functional prognosis.

## GENE AND CELL

### THERAPY/ISCHEMIA/REPERFUSION/PRECONDITIONING/POSTCONDITIONING/MOLECULAR BIOLOGY/GENETICS – POSTER PRESENTED

#### P1742

##### Functional and structural benefits after therapy with autologous GCSF-mobilized peripheral blood progenitor cells in subacute myocardial infarction: a prospective, randomized, controlled study

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**Purpose:** We aimed to assess the feasibility, safety and efficacy of intracoronary infusion of GCSF-mobilized autologous peripheral blood progenitor cells (PBPCs) in the subacute phase of large anterior myocardial infarction (MI).

**Methods:** This prospective, randomized, single-center study enrolled 37 consecutive patients with successfully reperfused anterior MI and left ventricular (LV) dysfunction (LVEF  $< 45\%$ ). Patients were randomized to receive intracoronary infusion of GCSF-mobilized autologous PBPCs at 15 days post-MI ( $n = 19$ ), or optimal medical treatment ( $n = 18$ ). LV function and structure were assessed at baseline and after 1 year of follow-up by echo and cardiac MRI. Data analyzers were masked to group assignment.

**Results:** On day  $15 \pm 1.7$  post-MI, patients assigned to the PBPC group received intracoronary infusion of  $2.2 \pm 1.1 \times 10^9$  GCSF-mobilized autologous peripheral blood mononuclear cells, containing  $9.9 \pm 0.1 \times 10^6$  CD34+ cells. No significant safety concerns were detected with regard to GCSF administration or infusion of PBPCs over 1 year of follow-up, except for a numerically higher incidence of target vessel restenosis in treated patients implanted with bare metal stents (5 PBPC-treated vs 2 control patients). Over 1 year of follow-up, LVEF measured by echo remained unchanged in the control group but increased significantly in the PBPC group compared to baseline, resulting in significantly increased LVEF in PBPC-treated patients compared to controls ( $45.2 \pm 8\%$  vs  $38.0 \pm 7\%$ ,  $p = 0.02$ ) at 1 year. LV end systolic diameter (ESD) increased significantly in the control group over 1 year but remained unchanged in the PBPC group compared to baseline, resulting in decreased LVESD in PBPC-treated patients compared to controls at 1 year ( $38.4 \pm 7\text{mm}$  vs  $44.2 \pm 7\text{mm}$ ,  $p = 0.05$ ). At 1 year of follow-up, cardiac MRI revealed significantly increased LVEF ( $50.6 \pm 11\%$  vs  $39.9 \pm 8\%$ ,  $p = 0.03$ ) and significantly decreased end-systolic volume index ( $44.0 \pm 18\text{ml/m}^2$  vs  $64.8 \pm 20\text{ml/m}^2$ ,  $p = 0.02$ ) in PBPC-treated patients compared to controls.

**Conclusion:** Intracoronary infusion of autologous G-CSF-mobilized PBPCs in subacute large anterior MI improved cardiac function and attenuated remodeling, despite an increased rate of target vessel restenosis in treated patients implanted with bare-metal stents. The wide availability of the employed methods in conjunction with the intriguing hints of efficacy which were observed justify further investigation of this therapeutic approach in patients implanted with drug-eluting stents.

#### P1743

##### Angiotensinogen gene m235T polymorphism association with the diagnosis and long term prognosis of acute heart failure

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**Purpose:** Activity of the renin-angiotensin-aldosterone system is increased in patients with heart failure (HF). The angiotensinogen gene and specifically m235T polymorphism has been linked to the risk of HF but its role in the long term prognosis of acute HF (AHF) was not documented. The aim of the present study was to

assess the association between m235T polymorphism and AHF and whether this association has any prognostic value.

**Methods:** We included 160 patients >20 years admitted to the emergency department for acute dyspnea. Epidemiological characteristics, clinical and biological parameters were collected at admission. The diagnosis of AHF was determined by two independent physicians based on clinical findings and the result of the B-type natriuretic peptide (BNP level). Patients were divided into two groups: AHF group and non-AHF group. A control group was recruited among healthy blood donors (n = 100). DNA study was performed for all subjects and their genotypes were identified either TT, CT or CC. Mortality was recorded one year after ED admission.

**Results:** The diagnosis of AHF was found in 73 patients (45%). Frequency of the T allele was higher in AHF group than in non-AHF group (69% vs 33%,  $p < 0.01$ ). Patients carrying the TT and CT genotypes had a higher proportion of AHF than those carrying the CC genotype (53% and 31% and 15% respectively,  $p < 0.01$ ). Multivariate analysis showed that TT genotype presented the highest association with AHF (OR% = 4.9 95% CI 2.1-9.1) and the highest risk of death (OR% = 6.45 95% CI 3.6-16.4) compared to the other two genotypes. There was no significant difference between non-AHF patients and control patients with regard to m235T polymorphism distribution (table).

**Conclusion:** The current study suggests that m235T polymorphism is significantly associated with AHF and its long term prognosis.

#### Demographic and genetic characteristics

	Control group n% = 100	Non-AHF group n% = 87	AHF group n% = 73
Sex (M/F)	46/54	33/54	47/26
Age mean(SD)	35 (14)	60 (14)	52(18) <sup>†</sup>
BNP pg/ml, mean (SD)	53 (22)	74(21)	2547(477) <sup>€</sup>
Genotypes n (%)			
TT	10 (10)	11 (12)	39 (53) <sup>€</sup>
CT	42 (42)	36 (41)	23 (31)
CC	48 (48)	40 (46)	11 (15) <sup>€</sup>
One year mortalityn (%)	0	0	15 (20) <sup>€</sup>

<sup>†</sup>P < .01 between AHF and non-AHF groups. <sup>€</sup> P < .01 between AHF and control groups.

#### P1744

##### Early powerful predictors of short and midterm survival and heart failure after acute myocardial infarction: a prospective study.

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**Background and Aim:** Left ventricular (LV) diastolic function is an important predictor of morbidity and mortality after ST-elevation myocardial infarction (STEMI). We evaluated the role of diastolic function in predicting in-hospital events and LV ejection fraction (EF) 48 months after a first AMI.

**Methods:** We prospectively enrolled 55 consecutive patients who were 60.3 +/- 12.46 years of age (51 men), presented at our institution with their first STEMI. Patients underwent 2-dimensional and Doppler echocardiography, including tissue Doppler imaging of mitral annular regions within 24 hours after admission and were followed until discharge. Clinical and echocardiographic variables at index STEMI were compared with a combined end point of cardiac death, congestive heart failure. Follow-up echocardiographic assessment was performed in 21 patients.

**Results:** During hospitalization, 1 patient died, 8 developed congestive heart failure and 3 had ventricular tachycardia. Stepwise logistic regression analysis showed that early diastolic/late diastolic wave velocity of mitral inflow  $E/A > 1.0$  ( $p = 0.01$ ), early transmitral flow velocity (E) divided by early diastolic velocity of the mitral valve annulus (e') ( $p = 0.005$ ) and the ratio of peak E-wave velocity to flow propagation velocity (E/Vp) measured with color M-mode Doppler echocardiography ( $p = 0.02$ ) to be independent predictors of in-hospital cardiac events. During follow up, cardiac death occurred in 5 patients, and heart failure developed in 11. In a stepwise multiple linear regression model, independent predictors of cardiac death and readmission for heart failure at 48-month follow-up were baseline LVEF ( $p = 0.04$ ), early transmitral flow velocity divided by early diastolic velocity of the mitral valve annulus (E/E') ( $p = 0.005$ ) and the ratio of peak E-wave velocity to flow propagation velocity (E/Vp) ( $p = 0.01$ ).

**Conclusion:** In conclusion, in patients with first STEMI, E/E' velocity ratio and the ratio of peak E-wave velocity to flow propagation velocity E/Vp are strong predictors of in-hospital cardiac events and of cardiac death or readmission for heart failure at 48-month follow-up.

#### P1745

##### Heart failure as complication of myocardial infarction among women of different age

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Research included 344 women with a myocardial infarction (MI) aged from 30 till 75 years. All women were divided into age groups: young till 44 years, middle age of 45-59 years, elderly – 60 years are more senior.

In women older than 60 years were significantly more compared to middle-aged women have severe AHF ( $p < 0.05$ ), among younger patients this complication has not been fixed. The detection rate of LV aneurysm according echocardiogram was significantly increased with age, heart failure were also more likely, though not certain, was noted among older patients. In conducting the correlation analysis of the observed regularities significant ( $p < 0.0001$ ) link such complications as heart failure with the presence and duration of a history of CHD, both stable angina and myocardial infarction earlier, also found significant ( $p < 0.001$ ) CHF with the presence and duration of diabetes. In assessing such a measure as NT-proBNP, determined on the 5<sup>th</sup> day of MI, no significant differences according to age was not, however, drew the attention of higher average value of this indicator in all age groups: a group of young women in  $1036.9 \pm 15.1$  pg/ml, medium -  $1053.9 \pm 8.1$  pg/ml and the elderly -  $1082.3 \pm 12.9$  pg/ml, respectively. In all age groups was detected significantly higher levels of neutrophils in the development of congestive heart failure (Killip's I  $4.55 \pm 0.2 \times 10^9$  / l Killip's IV  $7.74 \pm 0.5 \times 10^9$  / l). NT-proBNP level was significantly higher ( $p = 0.03$ ) in patients with angina to the presence of myocardial infarction. Also found a positive relationship between the level of NT-proBNP and CK MB ( $r = 0.64$   $p = 0.03$ ), the absolute number of monocytes in the first day of MI ( $r = 0.46$   $p = 0.02$ ), CRP levels ( $p = 0.01$ ), as well as the development of left ventricular aneurysms ( $p = 0.02$ ) and a negative - the level of erythrocytes on the first day of MI ( $r = -0.58$   $p = 0.02$ ). Development AHF associated with higher levels of glucose ( $p = 0.02$ ) and creatinine ( $p = 0.01$ ) in the first day of the disease, and the presence of anemia ( $p = 0.003$ ). The findings suggest that NT-proBNP, hyperglycemia and anemia is directly related to the vastness of myocardial lesion, one adverse remodeling in the development of acute myocardial infarction and congestive heart failure, which are more common in older women with myocardial infarction.

#### P1746

##### Two years evolution of a patient with chronic heart failure after subacute stent thrombosis, recurrent embolism, clopidogrel resistance and high bleeding risk

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**Background:** Recent studies in patients with coronary heart disease and suspected or confirmed Clopidogrel resistance provided new evidences for the treatment with novel antiplatelet agents, concerning benefits on reducing the risk of recurrent events and developing ischemic heart failure. However, there are also concerns about the hemorrhagic risks; the experience of triple or double antithrombotic therapy (including novel agents), in clinical settings that would require this association, is still very limited, especially on long term use.

We report the case of a 72 years old male patient, followed since February 2012 when he was admitted with a postero-inferior STEMI and had an elective 2 stents revascularisation, re-admitted after 2 weeks with subacute BM stent thrombosis, non-sustained episodes of ventricular tachycardia, severe mitral regurgitation and acute heart failure. Suspected and then confirmed Clopidogrel intermediate genetic resistance and ultrasonographic detection of a massive LV aneurysm with thrombosis led to switching Clopidogrel with Prasugrel in association with Aspirin and acenocumarol. In evolution the patient had successively hemorrhagic, thrombo-embolic and mechanical complications (minor GI bleeding, ischemic stroke, thrombosed pseudo-aneurysm on the inferior wall). After 3 months, a second minor stroke, judged as cardio-embolic, led to switch again Prasugrel (as formally contraindicated) with Clopidogrel and to reintroduce oral anticoagulation in association with standard heart failure therapy and amiodarone for arrhythmic secondary prevention. Our judgment, along with patient's option after complete information, considered any interventional or surgical treatment as having an unacceptable high risk. He was followed every three months thereafter and 2 years after the index event he was free of symptoms, ischemic, arrhythmic or bleeding events, with II grade mitral regurgitation and in NYHA II class.

In conclusion, in patients at high risk of developing severe heart failure by recurrent ischemic events and high interventional/surgical risk, the antithrombotic therapy is of utmost importance. Testing the clopidogrel genetic resistance is probably essential in such cases, for considering an alternative strategy (platelets function testing, ticagrelor or the association of a new type of oral anticoagulant). Double or triple therapy is not formally contraindicated but the individual risk should be carefully assessed.

## P1747

**Controlled physical rehabilitation based on ischemic preconditioning phenomenon in patients with ischemic heart disease with diastolic dysfunction**

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**Purpose:** to develop a strategy for physical rehabilitation in ischemic heart disease (IHD) patients with diastolic dysfunction (DD) based on the phenomenon of ischemic preconditioning (IP).

**Methods:** Patients with stable IHD and DD, ejection fraction >40% and NYHA functional class < 2, age 48-65 y.o., incomplete revascularization after transcatheter coronary angioplasty, and positive results of a diagnostic exercise stress test were studied. The IP group (56.7 ± 6.4 y; n = 17) performed 10 treadmill exercise sessions at 70-80% of diagnostic intensity with a 48 h interval between sessions. Each training session continued until non-fatal ischemia signs (15-25 min initially, 30-50 min up to 10 session). The control (C) group (55.3 ± 5.2 y, n = 15) performed 10 standard 30-min rehabilitation exercise training sessions at 50-60% of diagnostic intensity for 30 min each, with a 48 h interval between sessions. During controlled physical rehabilitation monitored ECG, blood pressure, heart rate, and myocardial injury markers, brain natriuretic peptide, were within reference ranges in both groups, except for ST depression and/or angina, and ischemia-modified albumin (IMA) in the IP group.

**Results:** IMA increased after the first rehabilitation session in the IP group, but by session 10 it was significantly lower than in the C group. In post-rehabilitation exercise stress tests, maximum ST depression was decreased by 46.3 ± 6.8% in the IP group vs 9.8 ± 1.6% in the C group (p < 0.001). Also, diagnostic exercise duration increased by 17.5 ± 3.6% vs 4.1 ± 1.2% (p < 0.05); MET by 9.3 ± 2.6% vs 2.4 ± 1.1% (p < 0.05); double product by 6.5 ± 2.9% vs 2.1 ± 1.0% (p = 0.021).

**Conclusion:** Physical rehabilitation based on the IP phenomenon resulted in adaptation to ischemia, increased resistance to myocardial oxygen supply/demand imbalance and also more effectively improves exercise tolerance than moderate exercise training in patients and improves status of patients in IHD and diastolic function.

## P1748

**Relations between the perception of acute coronary syndrome, time delay for medical care seeking and clinical outcomes**

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**Background:** A significant number of patients delay in seeking for medical care, because of their inability to recognise typical symptoms and signs of acute coronary syndrome (ACS). Long pre-hospital delay relates to lost opportunities for early risk stratification and management, leading to increased mortality and morbidity. We decide to explore correlation between illness perception, time delay for medical help seeking and clinical outcomes.

**Methods:** We conducted a retrospective analysis of all consecutive patients admitted at a Cardiology department with ACS and typical constrictive chest pain, during one year. Patient's perception of the symptoms and time delay for decision to medical care seeking was recorded by telephonic interview and clinical registries.

**Results:** One hundred and eighty six patients (mean age 64 ± 12 years; 70% male) with ACS were included; 61% with non-ST segment elevation ACS and 39% with ST-segment elevation ACS.

The majority (63%) of patients did not have perception of ACS until the doctor's information. Only 29% of patients decided to seek for medical care in the first thirty minutes of symptoms. Perception of ACS was significantly related to early call for medical help; within ACS perception group 42% seek medical help in the first thirty minutes of symptoms versus 21% in non ACS perception group (p = 0.04; OR = 2.68; 95% CI 0.20-0.72).

Correlation between ACS perception and clinical outcomes showed that recognition of cardiac symptoms was associated with inferior peak troponin level (34.30 ng/mL vs 60.68 ng/mL; p = 0.04) and a better left ventricular (LV) systolic function. LV ejection fraction (EF) was superior to 50% in 67% of patients with ACS perception and 50% in non ACS perception group (p = 0.03). Perception of ACS reduced the risk of having EF < 50% by half (OR = 0.51; 95% CI: 0.27-0.94).

ACS perception also seemed to influence in-hospital complications. New atrial fibrillation and post-myocardial infarction pericarditis were more frequent in the group without ACS perception (13% vs 4%; p = 0.05).

**Conclusion:** Mistake in ACS symptom interpretation was found to be associated with significant delay in treatment seeking and worst clinical outcomes translated by greater infarct expansion (higher troponin level and lower LV EF) and superior incidence of pericarditis/new-atrial fibrillation. These results reinforce the need for a better public information program, to minimize the medical burden of morbidities after an ACS.

## P1749

**Left ventricular non-compaction with end-stage heart failure caused by mutations in sarcomeric genes**

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**Introduction:** Left ventricular non-compaction (LVNC) is a relatively new clinical entity. Condition characterized by prominent trabeculations and deep inter-trabecular recesses ('spongy' myocardium). There are at least 10 genes (DNTA, LDB3, ACTC1, MYH7, TNNT2, MIB1, PRDM16, TPM1, MYBPC3, and TAZ) known to be causative for LVNC.

**Material and Methods:** We have screened the coding sequence and adjacent intronic areas of genes referred to LVNC in 6 patients with progressive LVNC and heart failure required heart transplantation. Study was performed by IonTorrent NGS sequencer with following Sanger sequencing. New rare genetic variants were qualified as 'probably pathogenic' when they were absent in control group (100 healthy volunteers, 200 chromosomes), and were predicted 'damaging' with PolyPhen2.0 and SIFT software.

**Results and discussion:** Clinical evaluation was performed for 6 patients (4 males and 2 females, the mean age is 42 ± 12, range 18-55) with advanced stages of non-ischemic heart failure and left ventricular non-compaction. Only one of them (LVNC\_G) had positive familial history of LVNC. For 5 of them heart transplantation was performed, and one is still in the waiting list. Presence of LVNC was confirmed by Echo-CG, MRI, and for those who underwent heart transplantation, by patho-morphological examination of explanted hearts. In all cases signs of valves dysplasia, papillary muscles dislocation were found.

We did find 3 probably pathogenic genetic variants in 3 unrelated patients (Table 1). Additional structural alterations associated with LVNC may reflect importance of those genes in cardiac morphogenesis at the early stages of heart development.

**Conclusion:** Three of six patients (50%) with advanced-stage of heart failure carry mutations in MYH7 and MyBPC3 genes. No mutations in other genes referred to LVNC was found. Further investigation is needed to reveal representation of different genetic forms of LVNC in Russian group of HF patients.

## Genetic variants found in LVNC patients

Patient	Age	Gender	Cardiac Remodelling	Gene	Mutation	Outcome
LVNC_G	21	M	HCM+LVNC	MYH7	c.del5754-5756	HT
LVNC_P	37	F	HCM+LVNC	MYBPC3	p.Arg1048His	HT
LVNC_R	25	M	DCM+LVNC	MYH7	p.Gly181Arg	waiting list

DCM - dilated cardiomyopathy, LVNC - left ventricular non-compaction, HCM - hypertrophic cardiomyopathy, HT-heart transplantation

## P1750

**First-in-man experience with transendocardial injections of bone marrow-derived mesenchymal stem cells in idiopathic dilated cardiomyopathy. The MYOCYTE trial.**

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**Background:** Idiopathic dilated cardiomyopathy (IDC) represents one of the main causes of systolic ventricular dysfunction and heart failure (HF). In patients with ventricular dysfunction, stem cell therapy has been studied mainly in the subset of ischemic heart disease. Here we present the rationale and the first results of the first-in-man stem cell therapy trial in IDC.

**Methods:** The MYOCYTE trial is a randomized, multicenter, double blind and placebo-controlled trial that will enroll 70 patients with IDC, left ventricular ejection fraction (LVEF) < 45%, II-III NYHA functional class and MVO2 ≥ 12 and ≤ 21 ml/Kg/min. In a first pilot phase (phase I trial), 10 patients will be all treated with bone marrow-derived mesenchymal stem cells (BM-MSC) through 15 transendocardial injections (NOGA XP) in the anterior wall of the left ventricle. In a second phase (phase II trial), 60 patients will be randomized in a 3:1 ratio to receive BM-MSC or placebo. MSC are obtained after BM harvesting and 3-4 weeks of culture in GMP facilities (mean target dose: 30-40 million MSC). Primary endpoints include MACE, adverse events, NYHA functional class, Holter monitoring, laboratory parameters and incidence of complications with the use of NOGA XP catheters. Secondary endpoints include MVO2 and functional capacity, quality of life questionnaires, extension of perfusion defects by MRI/SPECT, LVEF, ventricular volumes and wall motion score index by echocardiography/MRI/SPECT/left ventriculogram, and electromechanical mapping parameters by NOGA XP. Follow-up is scheduled for two years and independent core-labs are included.

**Results:** So far, four patients have been included in the trial, mean age was  $56.7 \pm 8.6$  years and 3 patients were male (75%). 75% had hypertension and 50% had diabetes mellitus, dyslipidemia or were smokers, respectively. Baseline LVEF was  $32.0 \pm 9.2\%$  by echocardiography and  $40.8 \pm 5.5\%$  by MRI. Baseline MVO<sub>2</sub> was  $18.6 \pm 2.2$  mL/kg/min, and all patients were in II NYHA functional class. No MACE, adverse and arrhythmic events or procedure-related complications have been observed so far. Echocardiographic follow-up at 3 months is available for all patients, showing a LVEF of  $41.7 \pm 5.8\%$ .

**Conclusions:** Although NOGA technology has been used in IDC patients before, to the best of our knowledge this is the first randomized trial with transcatheter injection of MSC in these scenario. These are the very early results of the trial, but MSC transcatheter injections appear to be safe, and could be potentially beneficial.

### P1751

#### Clinical and genetic aspects of the initial manifestations of chronic heart failure in patients with type 2 diabetes

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CHF and type 2 diabetes are common progressive diseases having a poor prognosis, representing a serious public health problem worldwide. The combination of genetic testing with traditional risk factors can significantly improve the prognostic significance of coronary risk assessment.

**Purpose:** explore the clinical-genetic aspects of initial manifestations of CHF in patients with type 2 diabetes.

**Methods and Results:** The study included 146 patients with the following criteria: patients of both sexes with type 2 diabetes treated with standard glucose-lowering therapy. Exclusion criteria were: acute coronary syndrome, severe kidney failure, cancer, severe COPD.

The study involved patients aged 50 to 79 years (mean age 62.9).

All patients, except for general clinical examination was carried out a special set of studies: lipid, HbA<sub>1c</sub>, microalbuminuria. Among all that we have studied a group is selected diabetic patients with CHF: 125 people - the main group. Comparison group (diabetics without CHF) - 21 people. All patients also examined markers of CHF - natriuretic peptide, serum aldosterone. Functional class in patients was determined by the test 6-minute walk, clinical condition was assessed on a scale of V.Y. Mareev. Quality of life assessment was performed using the Minnesota questionnaire. For the study of central hemodynamics patients underwent echocardiography. We analyzed the patients by polymorphisms of genes associated with cardiovascular disease.

When comparing the genotype frequencies was found significantly greater incidence of potentially unfavorable TT genotype AGT m235T angiotensinogen gene in the main group compared with the comparison group ( $P = 0.006$ ). Also frequency of favorable genotype MM in the main group were significantly lower than in the comparison group ( $P = 0.003$ ).

When comparing the genotype frequencies of  $\beta 2$  adrenoceptor gene polymorphisms ADRB2 81C>G showed a significant reduction in the frequency of favorable CC genotype ( $P < 0.001$ ) and a significant increase in the frequency of heterozygous polymorphism CG ( $P = 0.004$ ) in the main group compared with the comparison group.

#### Conclusions:

1. Angiotensinogen gene polymorphism (AGTm235T) as unfavorable TT genotype and gene polymorphism  $\beta 2$ -adrenoceptor (ADRB 81C>G) in the form of a heterozygous polymorphism CG associated with CHF in patients with type 2 diabetes.
2. Angiotensinogen gene polymorphism (AGTm235T) as a favorable MM genotype and gene polymorphism  $\beta 2$ -adrenoceptor (ADRB 81C>G) in the form of favorable CC genotype is associated with absence of clinical and paraclinical signs of CHF in patients with type 2 diabetes.

### P1752

#### Long-term results of autologous bone marrow mononuclear cell transplantation in STEMI patients

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**Aim:** to study the long-term results of ABMMC transplantation in STEMI pts.

**Methods:** from 2003 to 2006 a total of 62 pts with primary STEMI were included in an open randomized study registered under the title ESTABOMA. All pts were assigned to two groups: 1<sup>st</sup> - included pts underwent PCTI and ABMMC transplantation on day 7 to day 21 after STEMI (n=28); 2 - pts with only PCTI (n=34). Both groups were comparable in regard to initial parameters. Follow-up study was performed 8.23  $\pm$  0.72 years after STEMI and consisted in physical examination, 6-min walking test, Echo exam (VIVID 7, GE), and BNP test (Triage Meter, Biosite, USA). End points included death, recurrent myocardial infarction (RMI), unstable angina, CHF class I and higher, and acute cerebrovascular event (ACE). Data are presented as n (%), M  $\pm$  SD, or Me (25;75).

**Results:** vital status information of 58 (93%) out of 62 pts was obtained; 44 pts (70%) underwent follow-up exam; 14 pts (22%) died. During the entire period of the follow-up study, frequencies of clinically significant cardiac arrhythmias were equal in both groups (5% vs. 5%); no life-threatening arrhythmias were documented. Frequencies of new oncology diseases did not differ between the groups (5% vs. 5%). Analysis of RMI and ACE incidence rates and exercise tolerance parameters did not show significant differences between groups. Total mortality in group 1 was higher (35% (n=10) vs. 12% (n=4),  $p = 0.01$ ). Cardiac deaths occurred in 4 cases (14%) in group 1 vs. 1 case (3%) in group 2. Non-cardiac deaths occurred in 2 cases in both group 1 (7%) and group 2 (6%). Causes of death in 4 patients (14%) from group 1 and 1 patient (3%) from group 2 were unidentified. During the entire period of the follow-up study, control group had higher frequency of hospitalizations due to unstable angina: 37.5% (n=12) vs. 19% (n=5),  $p = 0.035$ . Analysis of Echo parameters did not show significant differences between groups: EDVI of LV  $61.7 \pm 11.7$  mL/m<sup>2</sup> vs.  $67 \pm 22.2$  mL/m<sup>2</sup>, ESVI of LV was  $28.9 \pm 9.2$  mL/m<sup>2</sup> vs.  $33.25 \pm 16.9$  mL/m<sup>2</sup>, and EF LV  $51 \pm 5.6\%$  vs.  $51.5 \pm 12.9\%$  in 1<sup>st</sup> and 2<sup>nd</sup> groups, respectively. Four pts with initial progressive postinfarction cardiac remodeling were excluded from the analysis. No significant differences in levels of BNP was found between groups 148 pg/mL (65.7; 173) vs. 169 pg/mL (39.4; 252.5). **Conclusion:** Data of the study did not show positive effects of ABMMC transplantation on the long-term clinical results and postinfarction remodeling.

### P1753

#### Impact of clopidogrel genotyping on ventricular function in acute coronary syndrome

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**Introduction:** The choice of antiplatelet therapy guided by genotyping of CYP2C19 and ABCB1 polymorphisms, can prevent the loss of effect of clopidogrel and improve prognosis after percutaneous coronary intervention with stent (PCIs) in acute coronary syndrome (ACS). Our goal is to analyze the impact of this strategy on the left ventricular function measured by ejection fraction (LVEF).

**Material and Methods:** Patients with ACS undergoing PCIs were selected. Genetic study was conducted, choosing clopidogrel in the absence of alleles with loss of function (sensible group: CYP2C19 \* 2 1/1 and ABCB13534 CC or CT) and prasugrel / ticagrelor for the rest (resistant group: CYP2C19 \* 2 1/2 or 2 / 2 or ABCB13534 TT). LVEF was determined at discharge and was used as the dependent variable for analysis using a multivariate linear regression model using the genotype as an independent variable.

**Results:** 244 patients were included, of whom 145 (59.4%) were considered sensitive and received clopidogrel, and 99 (40.6%) were resistant to clopidogrel (95 received prasugrel and 4 ticagrelor). The baseline characteristics of both groups were similar except for a shorter time to genetic diagnosis, and a greater number and length of stents per patient in the sensitive group. On average LVEF decreased 15.6% with a history of CHF (95% CI -23.3 to -7.9%,  $p < 0.00009$ ), 5.5% with AMI (95% CI -8.5 to -2.5%,  $p 0.0004$ ), 2.5% with coronary artery disease or 3-vessel (95% CI -5.3% to 0.43,  $p 0.09$ ) and 3.9% if received Prasugrel / Ticagrelor prior to genotyping (95% CI -7.4 to -0.4,  $p 0.03$ ). The genotype was not a determinant of LVEF (resistant group had a 1.9% lower, 95% CI -4.3 to 0.5,  $p 0.12$ ).

**Conclusions:** The choice of genotype-guided antiplatelet therapy had no effect on left ventricular function after ACS with ICs. This may suggest that in genetically sensitive patients, treatment with clopidogrel offers similar prognosis to other more potent antiplatelet.

#### Baseline characteristics

	Sensible group (n 145)	Resistant (n 99)	p
Age (años) Sex	64,4 $\pm$ 1,4 110 (76%)	64,7 $\pm$ 1,5 76(76,8%)	0,9 0,8 0,12
(man) HBP Diabetes	92(63,4%) 46(31,7%)	53(53,5%)	0,4 0,3 0,7
Hospital stay(days)	6,5 $\pm$ 0,33 2,05 $\pm$ 0,2 2	37(37,4%) 6,3 $\pm$ 0,31	0,3 0,007
CCU stay (days)	3,3 $\pm$ 0,2	1,85 $\pm$ 0,2 1,8 4,6 $\pm$ 0,5	
Time to PCI (days)			
And to genetic test			
-STEMI/LBBB	67 (46,2%) 48 (33,1%)	50 (50,5%) 30	0,8
-NSTEMI -Unstable Angina	30 (20,7%)	(30,3%) 19 (19,2%)	
1 o 2 vessel	115(79%) 97(66,9%)	76 (76,8%) 67	0,9 0,7 0,07
Complete revascul.	2 $\pm$ 0,14 39,9 $\pm$ 3,13	(67,7%) 1,79 $\pm$ 1,15	0,048 0,089
N° stent/patient	1(0,7%) 25(17,2%)	35 $\pm$ 3 4(4%) 14(14%)	0,5 0,4
Long stent (mm)	21(14,5%)	11 (11,1%)	
Stent restenosis MI periPCI			
Prasugrel/Ticagrelor before genotyping			

**P1754****Abilities of multimodality heart imaging in patients with no-reflow phenomena**

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Early endovascular coronary reperfusion in patients with acute myocardial infarction (AMI) is still a first-choice method of treatment. Nevertheless some patients demonstrated low efficiency of invasive reperfusion therapy with the progression of myocardial dysfunction and worsening of prognosis in spite of TIMI grade improving.

Investigation of intracardiac hemodynamics and myocardial perfusion by using combined myocardial imaging (cardiac ultrasound and MRI) as well as coronary imaging (TIMI grade, coronary angiography (CA) was aimed for estimation of no-reflow phenomena assessment.

**Material and methods.** Twenty patients with acute myocardial infarction (AMI) were undergone CA emergency after hospital admission. All patients were treated with anticoagulants, antiplatelet agents, morphine and nitrates since first medical contact. There is no diabetes mellitus or acute myocardial inflammation. Transthoracic ultrasound in emergency room was performed after coronary reperfusion with estimation of chambers size, function and myocardial deformation, cardiac valve competence in all patients. Patients with TIMI 2 or less after CA were excluded. MRI was performed in selected 5 patients with unstable hemodynamics and in 5 patients with LVEF < 35%.

**Results.** New hypokinetic and/or akinetic segments (mean 4,2 segments) in the bed of coronary thrombotic occlusion were found in 40% of patients with depressed left ventricular contractility (LVEF 38,4%). Gadolinium enhanced MRI showed multiple LV scars. Four patients (20%) had no history of previous echo exam, but had local systolic dysfunction in the bed of right coronary artery (3 patients) and Cx (1 patients), LVEF 52,1%. Eight patients (40%) had poor echo window (overweight in 6 pts of them), but unstable hemodynamics in 5 pts (inotropic support for 2-4 days after CA): severe myocardial oedema was revealed in 3 pts, MRI diagnosed scar - 2 pts.

**Conclusion.** Combined myocardial imaging provides to estimate the anatomical substrate of myocardial hypoperfusion in patients with AMI. Myocardial scar found as a main reason of low or no reflow phenomena in patients after endovascular coronary reperfusion, whom can be redirected for cell therapy.

**P1755****Characteristics of patients hospitalized for acute coronary syndrome complicated with acute heart failure in tunisian patients**

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**Purpose:** The purpose of this study was to determine predictors of heart failure in patients hospitalized for acute coronary syndrome (ACS).

**Methods:** We studied all patients hospitalized for acute coronary syndrome over a period (15) fifteen month from (1 October 2010) to (31 December 2011). We compared baseline clinical characteristics and all interventions of patients who have experienced heart failure at admission or during hospitalization to the remaining patients.

**Results:** In this 15 months, 507 patients were admitted because of an ACS. Among those patients, 69 (13,6%) developed an acute heart failure at presentation or during hospitalization. In this group, patients were older ( $p = 0,007$ ), more often male ( $p = 0,008$ ), have more smoke habits ( $p = 0,008$ ) and history of diabetes ( $p = 0,000$ ).

The acceleration of heart rate ( $p = 0,05$ ), anemia ( $p = 0,000$ ), renal failure ( $p = 0,000$ ) and stenosis of the anterior interventricular artery ( $p = 0,004$ ) are also significantly associated with the occurrence of heart failure in patients hospitalized for ACS.

**Conclusion:** A better understanding of the characteristics and predictors of heart failure could help us to provide a better care for patients hospitalized for ACS.

**P1756****Spontaneous coronary dissection in acute coronary syndromes: presentation and outcomes**

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**Introduction:** Spontaneous coronary dissection (SCD) is a rare cause of acute coronary syndromes (ACS). This diagnosis has increased with the expansion of coronary angiography, however clinical features and prognosis remain insufficiently characterized.

**Methods:** We retrospectively analyzed all patients (pts) admitted for ACS in our institution, between 2008 and 2013, with angiographically confirmed SCD. Incidence, clinical presentation, treatment, short and long-term outcomes were evaluated.

**Results:** We found 15 cases of SCD (0.39%) in 3832 pts admitted for ACS. Mean

age was  $52 \pm 9$  years. The majority were female (60%), in a postmenopausal status (60%) or taking oral contraception (14%). Dyslipidemia was the most prevalent cardiovascular risk factor (53%), followed by hypertension (40%) and smoking (40%), and in a minority of cases diabetes mellitus (7%). Presentation was ST-elevation myocardial infarction in 53% of cases. Killip I class was found in all pts, with a mean TnI peak of 29.7 ng/ml. Only 20% of the total population had left ventricular systolic dysfunction. The left main artery was involved in one case and the left circumflex artery was the culprit vessel in 4 cases (27%). The remaining cases equally involved the left anterior descending (33%) or right coronary artery (33%). In-hospital stay was  $11 \pm 5$  days and all patients underwent an initially conservative strategy except three (2 of them treated with percutaneous coronary intervention and 1 with surgical revascularization) for atherosclerotic disease associated. Complications occurred in 3 pts (20%; 3 cases of SCD progression with reinfarction, 1 with pericarditis and 1 with atrial fibrillation). During a median follow-up of 25 months only one patient experienced recurrent ACS. The majority of the population had a negative stress test. There were no deaths.

**Conclusion:** Our study reinforces the need for considering SCD in middle-age woman presenting with ST-elevation myocardial infarction. Although the recurrence rate of SCD should not be neglected, the long-term prognosis of this population seems to be favorable.

**P1757****Chronotropic incompetence: a changing concept**

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**Abstract:** Chronotropic incompetence (CI) is an independent predictor of cardiovascular events and mortality. It is essential for accurate assessment of functional capacity and exercise prescription patients with coronary artery disease and treated with beta-blocker (BB) to obtain reliable predictors of CI.

**Objective:** To compare predictors of CI when using conventional (220bpm - age) or Branner's ( $164 - 0.7x$  age) equations to estimate maximal age-predicted heart rate (APHR) and identify those with CI, before and after cardiac rehabilitation (CR)

**Methods:** Retrospective study of 310 patients enrolled in CR after acute coronary syndrome treated with BB, between 2009 and 2013. The chronotropic index (IXC) was calculated [(maximal HR at baseline exercise testing - rest HR / APHR - resting HR] x 100) and CI was defined as  $IXC \leq 62\%$  and  $IXC < 80\%$ , whether using conventional or Branner's equations, respectively.

**Results:** Average age was 53.1 years (SD 9.7) and 87.1% were male. Acute myocardial infarction (AMI) with ST-segment elevation occurred in 51% of cases, 40.6% were admitted with AMI without ST-segment elevation. The majority of patients had one vessel coronary disease (64.2%), with 21.3% having 2-vessel disease, and most underwent percutaneous (89%) revascularization. Most had preserved left ventricular function (66.1%). The average resting heart rate before the CRP was 71.24 bpm (SD 11.83) and after 69.4 bpm (SD 11.88). Using 220bpm-age, we found a 36.8% prevalence of CI before CR lowering to 25.2% after CR completion. With Branner's equation only 11.3% before and 6.8% after CR had CI. Predictors of CI were only identified when using conventional CI definition and included diabetes mellitus ( $p = 0.009$ ) and gender ( $p = 0.001$ )

**Conclusion:** The gap in the characterization of CI when using different equations demonstrates the relevance of careful evaluation in this patient population. Further studies are needed to compare diagnostic accuracy of either formula on CI definition and clarification of clinical predictors that might be involved, and possibly minimized, on the development of CI.

**P1758****Impact of heart failure on in-hospital outcomes of acute coronary syndrome patients**

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**Purpose:** The purpose of this study was to determine the prognostic value of heart failure in patients hospitalized for acute coronary syndrome (ACS).

**Methods:** We studied all patients hospitalized for acute coronary syndrome over a period (15) fifteen month from (1 October 2010) to (31 December 2011). We compared the frequency of occurrence of complications during hospitalization and at follow-up of patients who have experienced heart failure to the remaining patients.

**Results:** In this 15 months, 507 patients were admitted because of an ACS. Among those patients, 69 (13,6%) developed an acute heart failure at presentation or during hospitalization. The rates of in-hospital mortality and cardiogenic shock of acute HF patients were significantly higher than patients without HF (respectively 4.43% vs 0.45%,  $p = 0.002$  and 10.14% vs 0%,  $p = 0.000$ ). Regarding the average length of hospitalization, a significant prolongation was noted in patients with acute heart failure ( $12.46$  days  $\pm 11.22$  vs  $6.9$  days  $\pm 5.3$ ,  $p = 0.000$ ). During follow-up of our

patients, we also found a higher mortality (1.38% vs 5.79%,  $p = 0.014$ ) and higher rate of postoperative death (0.45% vs 2.89%,  $p = 0.033$ ).

**Conclusion:** The occurrence of heart failure is a predictor of a higher rate of in-hospital and after discharge mortality in the studies patients hospitalized for acute coronary syndrome.

## CLINICAL AND TRANSLATIONAL RESEARCH – POSTER PRESENTED

### P1760

#### Diastolic function in patients with coronary artery disease with left ventricular hypertrophy and preserved ejection in one of the regions of Azerbaijan Republic

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**Objective:** To evaluate left ventricular diastolic function according to the transmitral blood flow in patients with coronary artery disease and preserved ejection fraction in a population-epidemiological study of the male population in one of the mountainous areas of the Azerbaijan Republic.

**Material and Methods:** 1295 men aged 20-59 years in the mountainous region of Azerbaijan were surveyed. On the first stage of the study completed questionnaires to identify major chronic non-communicable diseases, to determine the degree of physical activity, presences of a habit of smoking and alcohol consumption, calculation of body mass index, an electrocardiogram-research in 12 leads, measurement of blood pressure, determination of plasma cholesterol, triglycerides and cholesterol of high density concentrations. At the second stage of the study to all persons with coronary artery disease was performed doppler-echocardiographic research with the assessment systolic, diastolic function and determine hypertrophy and the types of left ventricular remodeling.

**Results:** At the first stage of the study were identified 93 people with coronary artery disease. It was found that out of 93 respondents who had coronary artery disease 48 people had left ventricular hypertrophy and  $EF \geq 45\%$  (51.65%). Next, we analyzed diastolic function of left ventricle in patients with preserved ejection fraction.

With  $EF \geq 45\%$ , normal diastolic function was present in 4 persons (2.3%), relaxative type diastolic dysfunction (DD) in 22 persons with coronary artery disease (23.55%), pseudonormal type of DD in 13 people (8.03%) and restrictive type with 7 people (7.52%). In this group atrial fibrillation was in 2 patients (2.15%).

**Conclusion:** The results indicate high prevalence of diastolic dysfunction in patients with coronary artery disease. This fact requires greater attention and measures of secondary prevention. Timely and adequate treatment of DD will reduce the frequency of fatal cardiovascular events.

### P1761

#### Assessing patient preferences in heart failure (HF) using conjoint methodology

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**Background:** Heart Failure (HF) is among the most frequent and cost intensive chronic diseases (1). The course of the disease is characterized by frequent hospitalizations and high mortality rate (2). To optimize disease management strategies and to support development of drugs meeting patients' needs, understanding of patient preferences is crucial.

**Purpose:** To assess patient preferences using conjoint methodology (3) and health related quality of life (HRQOL) in patients with HF.

**Methods:** Two modules were applied: an initial qualitative module, consisting of interviews with 12 patients diagnosed with HF, served to assess patients' health state in-depth (attitudes towards HF, symptomatology, unmet needs, and preferences for HF drugs to be developed).

In the main quantitative research module, 300 patients with HF (NYHA stage II-IV) from across Germany participated:  $n = 100$  post-acute patients having experienced a hospitalization within the last 3 months,  $n = 100$  chronic patients (no hospitalization experienced), and  $n = 100$  chronic patients having experienced at least one hospitalization (> 3 months). Each patient was presented with 10 different scenarios during the conjoint exercise. Additionally, patients completed the generic HRQOL instrument EQ-5D.

**Results:** According to the participants, the attribute with the highest relative importance was (the absence of) dyspnea (44%), followed by physical capacity in daily activities (18%). Of similar importance were reported to be: exhaustion during mental activities (13%), fear due to HF (13%), and autonomy (12%). The

most burdening HRQOL dimensions according to the EQ-5D questionnaire were anxiety/depression (23% with severe problems), pain / discomfort (19%), and usual activities (15%). The overall average EQ-5D-score was 0.39: patients with chronic HF had a significantly better health state (0.51) vs. post-acute patients (0.31) and chronic patients with at least 1 hospitalization (0.36).

**Conclusions:** Absence of dyspnea and physical capacity during daily activities had the highest impact on patient preference in HF. Moreover, the EQ-5D data indicate poor HRQOL in patients with acute and chronic HF. Detailed results about part-worth utilities within the conjoint analysis will be discussed.

### P1762

#### Growth differentiation factor 15 in patients with acute coronary syndrome with reduced kidney function

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Known for the high prognostic significance of a new biomarker of Growth Differentiation Factor 15 (GDF 15) in patients with acute coronary syndrome (ACS). Its increasing is related to the progression of heart failure (HF) and mortality after suffering a coronary event. As in pathogenesis of HF, when important role is played by the kidneys function, the interest to dynamics of the level of GDF 15 in patients with renal failure is constantly growing.

**Purpose:** to examine the levels of GDF 15 in patients with ACS and reduced kidney function.

**Methods:** we examined 70 patients with different forms of ACS: 54 men and 16 women, mean age  $61, 8 \pm 1, 3$  years. Among them, 38 patients with Q-wave myocardial infarction (Q-wave MI), 14 - with non-Q-wave myocardial infarction (non-Q-wave MI), 18 - unstable angina (UA). All patients were made to undergo a baseline investigation. The glomerular filtration rate (GFR) was estimated by Cockcroft-Gault formula. In addition, the level of GDF 15 was determined during the first day of hospitalization via ELISA test (BioVendor set, Czech Republic).

**Results:** statistical analysis shows the mean value of GDF 15 for various patients. Patients with UA -  $2421 \pm 406$  pg/ml, non-Q-wave MI -  $2923 \pm 473$  pg/ml. Whereas the group of patients with Q-wave MI GDF 15 level was  $5443 \pm 877$  pg/ml. After comparison of the levels of serum creatinine and GDF 15, the rank of correlation coefficient was identified ( $r = 0.5$ ;  $p = 0.00001$ ), that corresponds to the communication of medium strength. We calculated the GFR, the average was  $73.7 \pm 5.7$  ml/min. Correlation analysis of the studied parameters showed significant negative correlation between the level of GFR and GDF 15 ( $r = -0.44$ ;  $p < 0.05$ ). The most expressed relationship between GFR and the level of GDF 15 ( $r = -0.9$ ;  $p = 0.01$ ) was detected in patients with severely and moderately reduced kidney function ( $< 45$  ml/min/1.73 m<sup>2</sup>).

**Conclusions:** the highest level of GDF 15 has been detected in patients with ACS and severely and moderately reduced kidney function, which is an additional marker of adverse outcomes that suggests the involvement of a biomarker in other pathophysiological mechanism underlying the worse prognosis in patients with ACS.

### P1763

#### The role of fibronectin in the renal dysfunction in patients with chronic heart failure and preserved systolic function

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The accumulation of fibronectin (FN) fragments could contribute to the progression of renal injury however the role of FN in the renal dysfunction in patients (pts) with chronic heart failure (CHF) and preserved systolic function remains debatable.

**Objectives:** We aimed to evaluate the role of FN in the renal dysfunction in patients with chronic heart failure and preserved systolic function.

**Methods:** 56 pts (27 M, 29 F, mean age -  $60, 16 \pm 3, 54$  years) with CHF NYHA I-III functional class (FC) and preserved systolic function (LVEF >45%) were enrolled. Pts were divided into two groups: 35 (62,5%) pts (1 group) with glomerular filtration rate (GFR) 60-90 ml/min and 21 (37,5%) pts (2 group) with GFR >90 ml/min. GFR was calculated by Cockcroft-Gault formula. Urinary fibronectin was analyzed qualitatively by protein blotting.

**Results:** The urinary FN levels was higher in 1 group (0,1168[0,0440; 0,1623]) compared with 2 group (0,0568[0,0235; 0,1005]) ( $p < 0,05$ ). Urinary FN levels associated also to higher NYHA FC ( $p = 0,001$ ). The urinary FN levels correlated to GFR ( $r = -0,26$ ;  $p < 0,05$ ). The duration of disease correlated to urinary FN levels ( $r = -0,29$ ;  $p < 0,05$ ).

**Conclusion:** Our results provide suggestive evidence that urinary FN levels is not only a predictor of early renal dysfunction but also progression of CHF and preserved systolic function.

## P1764

**Economic evaluation of ferric carboxymaltose in patients with chronic heart failure and iron deficiency: an analysis for Greece based on FAIR-HF trial**

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**Purpose:** To evaluate the cost-effectiveness of iron repletion with ferric carboxymaltose (FCM) versus the standard strategy of no iron treatment, in iron-deficient heart failure (HF) patients in Greece.

**Method:** A decision tree model was locally adapted to evaluate the alternative strategies over a time horizon of 24 weeks corresponding to the duration of the FAIR-HF trial. The efficacy of each treatment in the analysis was evaluated by two relative outcomes: the clinical response to treatment; and the number of QALYs per patient accrued during the study. Only direct medical costs (drug acquisition, administration and hospitalization costs) were incorporated in the model, as the analysis was conducted from a third-party payer perspective. With respect to administration cost, two alternative scenarios were considered in the base case analysis: (i) scenario A: administration in day-case unit (€80/administration); (ii) scenario B: administration in the outpatient department of hospital and as such administration cost was set at zero, as the outpatient visit is not reimbursed by third-party payer. The drug acquisition costs of FCM were calculated combining the drug dosing schedules with the corresponding reimbursed drug cost (hospital price plus 5%). The hospitalization cost was calculated by combining the length of stay, as provided by the local clinical expert, and the reimbursed cost per diem, as obtained from the Diagnostic Related Groups (DRGs) tariffs. Probabilistic sensitivity analysis was conducted. Primary outcomes were quality adjusted life years (QALYs) and incremental cost-effectiveness ratios (ICER).

**Results:** In the base case analysis, QALYs of FCM treated patients were higher compared to no iron treated patients by 0.04 QALYs. The total 24-week cost of FCM was higher by €969 and €204, at the scenarios A and B, respectively. This difference was mainly attributed to the administration cost and drug acquisition cost related to FCM, in scenarios A and B, respectively. Incremental cost effectiveness analysis showed that treatment with FCM was a cost-effective alternative resulting in an ICER of €25,506 and €5,368 per QALY gained in scenarios A and B, respectively. Probabilistic sensitivity analysis revealed that FCM was likely to be cost-effective in over 80% & 99%, at scenarios A and B, respectively, at a willingness-to-pay threshold of €34,000 per QALY gained.

**Conclusion:** Ferric carboxymaltose may be a cost-effective alternative against to no iron treatment for the management of iron deficiency of HF patients in Greece.

## P1765

**Soluble transferrin receptor as a marker of erythropoiesis activity in anemic patients with chronic heart failure and chronic kidney disease**

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Anemia has been recognized as a very common and serious comorbidity in chronic heart failure (CHF) and chronic kidney disease (CKD), with a prevalence ranging from 10 to 79%, depending on diagnostic definition, disease severity and patient characteristics. A clear association of anemia with worse prognosis has been confirmed in multiple heart failure trials. This finding has recently triggered intense scrutiny in order to identify the underlying pathophysiologic mechanisms.

The aim - to evaluate the activity of erythropoiesis based on determining the dynamics of soluble transferrin receptor (sTfR) level in patients with CHF and CKD with anemia varying grades of severity.

**Materials and methods.** 105 anemic CHF and CKD patients were examined (age 68 ± 10 years) - 45% male and 55% female. It was found that 60% of all anemic patients had III NYHA class and 40% of them - IV NYHA class. Control group included 35 non-anemic CHF patients (age 66 ± 11 years) - 69% male and 31% female. The concentration of sTfR in serum was determined by immunoassay.

**Results.** In anemic patients with CHF and CKD decreasing of sTfR level according to increase anemia severity was found (grade 1 of anemia 2,21 ± 0,05 pg/ml, grade 2 of anemia 1,117 ± 0,04 pg/ml, grade 3 of anemia 0,47 ± 0,02 pg/ml,  $p < 0,001$ ). There were no differences between sTfR levels in patients with grade 1 of anemia compared to controls (grade 1 of anemia 2,21 ± 0,05 pg/ml, controls 2,25 ± 0,067 pg/ml,  $p \geq 0,05$ ). Results of studying the dynamics of sTfR in anemic patients with CHF and CKD showed deep disturbances in the form of its serum concentrations reduction in parallel with anemia severity, which reflects the depletion of erythropoietic activity.

**Conclusions.** Presence of 1<sup>st</sup> grade anemia in patients with CHF and CKD is accompanied by sufficient erythropoiesis, which indicates the existence of adequate

adaptive reactions at this stage. Progression of anemia severity was characterized by reduced erythropoietic activity.

## P1766

**Improvement of heart failure symptoms and functional status in high surgical risk patients with severe mitral regurgitation following percutaneous mitral valve repair with MitraClip system**

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**Purpose:** MitraClip has been increasingly performed in Asian countries since 2011. Our study is to evaluate the effectiveness of improvement of symptoms and quality of life in heart failure patients with percutaneous approach of reduction of mitral regurgitation (MR) with the MitraClip system.

**Methods:** Patients were selected for the MitraClip procedure based on the consensus of the Heart Team in our hospital. Between February 2012 and June 2013, 24 patients deemed high risk as surgical candidates undergone percutaneous therapy for severe MR using the MitraClip. All the patients underwent clinical and echocardiographic evaluation at baseline, and at 6-month follow-up. Mortality data, including cause of death, were collected.

**Results:** The mean age was 67 years (53–86), 58.3% (n = 14) was male with a mean logistic EuroSCORE of 21%. At baseline, 90% of patients were in New York Heart Association (NYHA) functional class III or IV and 46% of patients had a left ventricular ejection fraction (LVEF) ≤ 50%. 45.8% (n = 11) patients presented with functional mitral regurgitation (FMR) and 54.2% (n = 13) patients presented with degenerative mitral regurgitation (DMR). Procedural success was achieved in 96% of patients. Severity of MR was reduced in all successfully treated patients, 18 (75%) were discharged with MR ≤ 2+. There was improvement in the severity of MR at 6 months, compared with baseline ( $p < 0.0001$ ). Thirty-day mortality was 6%. At 6 months, approximately 90% of patients had New York Heart Association functional class II or class I ( $p < 0.0001$ ).

**Conclusions:** Results of the study demonstrate that mitral regurgitation reduction with MitraClip treatment is effective, low risk, and leads to significant improvement in NYHA functional class in approximately 90% of patients with heart failure.

## P1767

**Effectiveness of resynchronization therapy in patients with severe chronic heart failure with QRS complex duration between 120 and 150 msec**

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**Objective:** to assess the effectiveness of CRT implantation in patients with QRS complex duration between 120 and 150 msec

**Methods:** 28 patients (pts) with ischemic or dilated cardiomyopathy complicated by CHF NYHA functional class (FC) III-IV, LV EF below 35%, QRS duration between 120 and 150 msec and with ECHO confirmed mechanic myocardial dyssynchrony were examined. All patients underwent the LV end-diastolic size (LVEDV), LV end-systolic size (LVESV), LVEF, interventricular delay (QAo-QLA), dyssynchrony index (TS-DS), standard deviation time for 12 segments were estimated by ECHO. The levels of BNP, six-minute walk test (6MWT) and life quality (LQ) were measured initially and at six months after CRT implantation.

**Results:** in 96,2% of pts with CHF and QRS between 120 and 150 msec intraventricular delay was associated with interventricular delay, in 3,8% of patients signs of interventricular delay were absent but all these patients demonstrated impaired intraventricular conduction. At 6 months, LVEDV evidently decreased from 313,2 ± 16,3 ml to 263,8 ± 21,2 ml ( $p < 0,05$ ); LVESV decreased from 249,8 ± 13,6 to 199,5 ± 21,6 ( $p < 0,05$ ); LVEF increased evidently from 25,1 ± 1,2% to 32,0 ± 3,06% ( $p < 0,05$ ). Intracardiac hemodynamic changes were accompanied by decreased mechanic dyssynchrony event rate; there was a trend to the evident decrease of QAo – QLA from 50,5 ± 5,6 to 39,5 ± 5,1 msec. ( $p = 0,07$ ); TS-DS- from 61,9 ± 4,45 to 52,7 ± 4,7 msec. ( $p = 0,1$ ); standard deviation time for 12 segments from 142,1 ± 7,9 to 140,8 ± 13,7 msec. ( $p = 0,6$ ); improved LQ of patients: LQ evidently decreased from 45,4 ± 3,0 scores to 33,4 ± 5,3 scores ( $p < 0,05$ ); 6 MWT increased from 162,8 ± 0,4 m to 323,46 ± 29,6 m; BNP decreased from 1239,3 ± 220,7 to 519,5 ± 181,5 ( $p < 0,05$ ); HF FC decreased from 3,21 ± 0,06 to 2,26 ± 0,18 ( $p < 0,05$ ).

**Conclusions:** biventricular heart stimulation evidently enhances heart haemodynamics and the clinical conditions of pts, improves exercise tolerance in pts with QRS duration between 120 and 150 msec.

## P1768

**Connection of renal dysfunction with hospital complications in ischemic heart disease patients undergone coronary artery bypass grafting**

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**Purpose.** To evaluate the frequency of renal dysfunction (RD) detection and its impact on hospital stay outcomes in patients undergone coronary artery bypass grafting (CABG). **Materials and methods.** The study included 719 patients undergone CABG. All the patients prior to CABG were measured plasma creatinine level and calculated glomerular filtration rate (GFR) by MDRD (Modification of Diet in Renal Disease) formula, as well as were graded on additive risk scale EuroSCORE. **Results.** As a threshold level of GFR the level 60 ml/min/1,73 m<sup>2</sup> was selected, which demonstrated a significant impact on the nearest outcomes in patients undergone CABG. No significant differences in preoperative clinical status in patients with or without renal dysfunction were revealed. However in hospital stay patients with renal dysfunction developed more often fatal cases, myocardial infarctions, progression of renal failure, bleedings which were the cause of reoperation, as well as extracardiac complications. It was identified that among the patients of high and medium EuroSCORE risk the patients with RD prevailed, while in the low risk group of EuroSCORE the patients without RD prevailed. **Conclusion.** While estimating the contribution of renal dysfunction defined by GFR level to the development of poor prognosis it is found out that in all EuroSCORE risk groups with RD presence the in-hospital complications after CABG were registered definitely more frequently.

### P1769

#### First steps of Russian hoSpital Heart Failure Registry (RUS-HFR)

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**Purpose:** The RUS-HFR was aimed to describe clinical epidemiology and 1-year outcomes of inpatients with chronic systolic HF, to evaluate how recommendations according evidence-based treatments regarding pharmacological and non-pharmacological aspects for HF are adopted in Russian clinical practice.

**Methods and Results:** The RUS-HFR (clinical database which includes about 250 different parameters) is a prospective, multicentre, observational study conducted in 3 Cardiology Centers (St. Petersburg - the central coordinator of the project, Samara, Orenburg). Inclusion criteria were HF NYHA I-IV, EF ≤ 40%, age 18-75 years. From October 2012 to Jun 2013, 251 patients were enrolled in three participating clinics. The mean age of the patients was 59.0 ± 11.5 years and 81.9% were men. Main etiologies were IHD in 58.3-76.2%, hypertensive in 68.3-93.7%, and due to dilated cardiomyopathy in 3.0-4.2%. More than half of the patients (58.8%) were in NYHA II-III, 22.0% showed a SBP > 140 mmHg and 7.8% SBP < 100 mmHg. Mean EF was 28.8%. COPD was present in 11.1-28.0% of the patients, AF in 20.8-33.3%, diabetes in 22.2-25.0%. Renin-angiotensin system (RAS) blockers, beta-blockers (β-AB), and mineralocorticoid antagonists (MRAs) were used in 82.2%, 80.6, and 74.3.0% of patients, respectively. Overall, 66.7-83.3% of patients were on diuretics and 5.5-45.8% of patients were treated with digitalis at hospital discharge. Inotropes were administered in 1.6-12.5% of the patients. The median duration of hospital stay was 16 days (interquartile range 12-20). CRT and ICD have been previously implanted with 4.3% and 5.5% of patients from St. Petersburg clinic, respectively. The all-cause death and hospitalization for HF decompensation within six months were 0-25.0% and 8.8-33.3%, respectively. Indications for implantation ICD or CRT were determined at 25% and 8% of HF patients in St. Petersburg and Samara, respectively.

**Conclusions:** The RUS-HFR shows that compared with 10 years ago in Russia, the percentage of patients with HF receiving RAS blockers, β-AB, MRAs increased and now compares with European registers. Of the main drugs for the treatment of HF, the most commonly prescribed RAS blockers and beta-blockers therapy and MRAs used more rarely. Diuretics per os are not indicated for the clinical manifestations of HF about at 20-35% of cases, which is unacceptable. Duration of HF hospitalization significantly exceeds that determined for the in the Europe and the U.S.A. which allows for titration of doses. High-tech methods of treatment in HF patients (NYHA II-IV) in hospitals participating RUS-HFR recommend not often enough.

### P1770

#### Chronic kidney disease and heart failure: is tolvaptan a safe option to treat refractory hyponatremia?

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**Purpose:** Chronic kidney disease (CKD), defined as the decrease in renal function, defined by a glomerular filtration rate by MDRD < 60 ml/min/1,73m<sup>2</sup> or the presence of renal damage for at least 3 months, is one of the most common comorbidities related to heart failure (HF). One of the most frequent electrolytic abnormality, related with poor prognosis in these patients is the hyponatremia (plasma sodium (Na) ≤ 135mEq/L). Tolvaptan, a vasopressin receptor antagonist, has been accepted as a

new therapeutic alternative. The aim of this study was to assess the utility of tolvaptan in the treatment of refractory hyponatremia in patients with CKD and HF.

**Methods:** A retrospective study of all patients with CKD, admitted for HF and refractory hyponatremia (Na < 135 mEq/L despite fluid restriction and/or administration of hypertonic saline) treated with Tolvaptan was made. We evaluated Na, potassium (K) (mEq/L), creatinine (Cr) (mg/dL) and glomerular filtration rate by MDRD (< 60 ml/min/1,73m<sup>2</sup>) in plasma, rate of diuresis (ml/h), blood pressure (mmHg) and weight (kg) when Tolvaptan was administered, and 24 and 48 hours later. For statistical analysis SPSS v.21 was used.

**Results:** 15 patients were enrolled (10 (67%) men with an average age of 71 ± 11 years). Baseline Cr and MDRD levels were 1,5 ± 0,3 mg/dL and 41 ± 6 ml/min/1,73m<sup>2</sup> respectively. The most common cause of HF was ischemic heart disease (40%). Nine patients (60%) had ventricular dysfunction (mean EF 38 ± 16%). All carried optimal treatment for HF and 100% standard diuretic therapy at home. 14 (93%) received 15mg of tolvaptan. Plasma levels of Na before receiving Tolvaptan were 130 ± 3 mEq/L with a significant increase at 24 hours and persisting the effect at 48 hours (130 ± 3mEq/L at baseline, 134 ± 2 mEq/L 24 hours, 135 ± 3 mEq/L 48 hours, p < 0.05). Urine output was significantly increased at 24 hours, maintaining the effect at 48 hours (95 ± 62ml/h, 152 ± 74 ml/h, 150 ± 65ml/h, p < 0.05). Significant decrease in weight was observed at 48 hours (70,4 ± 14,7 kg at baseline, 70,3 ± 15,9 24 hours, 68,3 ± 14,9 48hours, p < 0.05). No significant changes were detected in levels of K, Cr, MDRD or blood pressure.

**Conclusions:** According to our experience, the use of Tolvaptan in patients with chronic kidney disease with refractory hipoantremia in the context of decompensated heart failure is safe and effective, increasing significantly plasma sodium levels and diuresis in the first 48 h.

### P1771

#### Influence of Trimetazidine on both heart and kidneys functional status in patients with chronic heart failure and renal dysfunction

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**Objectives:** to evaluate influence of Trimetazidine been inserted to standard complex therapy on left ventricle diastolic function (LV DF) and glomerular filtration in patients with ischemic chronic heart failure (CHF) and renal dysfunction.

**Materials and Methods:** 60 CHF patients with CAD and CHF with preserved ejection fraction (EF) and renal dysfunction with eGFR ≤ 60 ml/min/1.73m<sup>2</sup> were divided into two equal groups. The 1<sup>st</sup> group consisted of patients who took Trimetazidine in modified release drug form in daily dose of 70 mg additionally to standard therapy. The 2<sup>nd</sup> group received only standard therapy. Duration of treatment was 6 months. All patients underwent following examination before and after treatment: echocardiography, serum creatinine, dynamics of creatinine clearance (Cockcroft-Gault formula), dynamics of eGFR (MDRD formula). Average functional class of CHF was 2,44 ± 0,43. Average eGFR was 51,5 ± 10,7 ml/min/1.73m<sup>2</sup>.

**Results:** during therapy LV EF in 1<sup>st</sup> group increased in boards of normal range: Δ 1,8 [0,2; 4,3]%, and did not change in 2<sup>nd</sup> one Δ 0,2 [0,6; 2,1] (p% = 0,012). Diastolic function parameters changed in a certain way: E velocity decreased on 13,1 [4,8; 19,7] in 1<sup>st</sup> group and 1,2 [0,2; 8,5] in 2<sup>nd</sup> (p% = 0,002); A velocity increased on 10,5 [-0,2; 15,1] and 6,4 [-0,3; 7,4] (p% = 0,086); E/A increased in 1<sup>st</sup> group and did not change in 2<sup>nd</sup> 9,8 [-1,3; 16,1] and 1,1 [0,2; 4,2] (p < 0,001); IVRT of LV decreased significantly more in 1<sup>st</sup> group than in 2<sup>nd</sup> one: 18,3 [2,2; 33,6] vs 8,6 [-1,2; 12,5] (p% = 0,011). Serum creatinine decrease was indicated in both groups without reliable difference. Increase of eGFR was more significant in 1<sup>st</sup> group: 8,9 [-0,5; 16,9] vs 2,8 [-1,8; 6,3] (p% = 0,017), as well as in creatinine clearance dynamics. **Conclusions:** insertion of Trimetazidine in standard complex treatment of ischemic CHF with preserved EF showed both cardioprotective and nephroprotective effects which are characterized with LV diastolic dysfunction correction, increase of LV EF in normal range, eGFR escalation.

### P1772

#### Improving in arterial stiffness parameters by pulse-wave analysis in obese patients with arterial hypertension, heart failure with preserved ejection fraction and dyslipidemia using different statin-b

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**Objective: Aims:** 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 arterial hypertension (AH), heart failure with preserved ejection fraction (HFpEF) and dyslipidemia treated with rosuvastatin compared with atorvastatin.

**Design and Method: Methods:** 82 obese patients (age 61.5 ± 10 ys) with AH, HFpEF, 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 (Alx), systolic BP in aorta (SPa), digital pulse amplitude augmentation (PAA) were accessed.

**Results:** Before the treatment impaired SI, elevated RI, Alx, Spa were shown. Lipids and BP goals were achieved in all patients validating further analysis. Decrease in SI ( $\Delta$  SI,  $\mu$ /c -0,87 Atorva and -0,89 Rosuva), RI ( $\Delta$ RI, % -7,89 Atorva and -7,21 Rosuva) were revealed in both treatment arms ( $p > 0.05$ ), whereas significant trends towards Alx decrease were demonstrated only in Rosuvastatin-treated patients ( $\Delta$ Alx, % -1.88 Atorva and -1.92 Rosuva,  $p < 0.05$ ) Rosuvastatin group demonstrated better increasing in PAA than Atorvastatin group (PAA (Atorva): before treatment  $1,58 \pm 0,42$  and After 5 weeks:  $1,82 \pm 0,51$   $p = 0.06$  vs PAA (Rosuva): before  $1,68 \pm 0,22$  and After 5 weeks  $1,95 \pm 0,23$ ,  $p < 0.05$ ).

**Conclusions:** Pulse-wave analysis in patients with AH, HFpEF and dyslipidemia demonstrated increasing vascular stiffness. Both Atorvastatin and Rosuvastatin treatment resulted in arterial stiffness parameters, whereas only Rosuvastatin treatment was significantly associated with trends in Alx and PAA improvement in short-term follow-up.

### P1773

#### Effects of meldonium on the morphological and functional status of platelets in patients with chronic heart failure and preserved systolic function

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We know enough evidence on the role of platelet activation in the pathogenesis of thrombotic complications in chronic heart failure (CHF). Meldonium have shown anti-ischemic effect, however the role of meldonium in the system of platelet-derived hemostasis in patients (pts) with CHF and preserved systolic function remains debatable.

**Objectives:** we aimed to evaluate the effects of meldonium for the morphological and functional status of platelets in pts with CHF and preserved systolic function.

**Methods:** 12 pts (8 M, 4 F, mean age -  $67,8 \pm 2,7$  years) with CHF NYHA II-III class and preserved systolic function were enrolled. 7 (58,3%) pts received the standard treatment and meldonium 1,0 g/day intravenously (1 group), while 5 (41,7%) (2 group) - received only the standard treatment for 2 weeks. The morphological and functional status of platelets were performed by electronic microscopy in all pts at baseline and at the end of the study.

**Results:** After 2 weeks of treatment with meldonium in the 1 group the inactivated platelets were increased and the activated and aggregated platelets were decreased ( $p < 0,05$ ). But in the 2 group only the activated and aggregated platelets were decreased ( $p < 0,05$ ) (tab. 1). Increased number of inactivated forms correlated to decreased activated platelets ( $r = -0,35$ ;  $p < 0,05$ ).

**Conclusion:** Meldonium is effective and safe for the pts with CHF and preserved systolic function. Meldonium reduces the number of activated, aggregated, degranulated forms and increased the number of inactivated forms. Its administration may provide benefits for the reduction of mortality from thrombosis in this population.

### P1774

#### Relationship between left ventricle end-diastolic pressure and BNP values in patients with symptomatic chronic heart failure

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The existing data on the relationship between left ventricle end-diastolic pressure (LVEDP) and BNP is still controversial.

The aim of the study is to investigate the correlations between the LVEDP and BNP values in patients with symptomatic chronic heart failure (CHF). Material and **Methods:** 21 patients with CHF, NYHA Functional Class I - III were included in the study. All patients underwent an invasive measurement of LVEDP, echocardiographic assessment of LVEF and biochemical analysis of neurohormonal marker BNP. Systolic dysfunction was defined at LVEF < 50%. BNP was investigated with enzyme immunofluorescent method (ELFA). A cut off value for BNP was defined at 100 pg/ml. The data are summarised in terms of frequencies and percentages for categorical variables, and by mean and standard deviations (SD) for continuous variables. Group comparisons were made with the independent t-test, Mann-Whitney U-test and  $\chi^2$ -test where appropriate. Univariate associations of the variables with BNP were investigated with linear regression analyses. Natural logarithmic transformation was used for skewed variables, including the dependent variable BNP. Multiple regression analysis was used to identify the variables with an independent predictive effect. Statistical analyses were done on SPSS version 13.0 (SPSS Inc, Chicago, IL).

**Results:** The distribution by FC was as follows: 28.6% (6), 42.9% (9) and 28.6% (6) were with symptoms of I, II and III NYHA FC, respectively. Systolic dysfunction was observed in 39.8% (8) of patients. BNP was elevated in 66.7% (14) of patients. There were observed significant correlations between the dependent variable BNP and LVEDP ( $\beta = 4.6$ ,  $p = 0.001$ ), FC ( $\beta = 2.9$ ,  $p = 0.000$ ) and LVEF ( $\beta = 16.5$ ,  $p = 0.001$ ). After adjustment for each other in the multiple linear regression model the variables LVEDP and LVEF did not show an independent effect on BNP ( $F = 8.2$ ,  $p = 0.001$ ). An independent relationship was only observed for the

effect of FC ( $\beta = 1.3$ ,  $p = 0.000$ ).

**Conclusion:** According to our data LVEDP is not an independent predictor for BNP in patients with CHF. The secretion of natriuretic peptides is influenced by many cardiac determinants and therefore their plasma levels should be characterized as an integrated marker of altered cardiac structure and function not only as a marker of a single determinant (LVEDP).

### P1775

#### Endocannabinoid system and NT-proBNP level in patients with abdominal obesity

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**Purpose:** Endocannabinoids and their receptors have been associated with cardiac adaptation to injury, inflammation and fibrosis, and endocannabinoid system is activated in patients with obesity. Obesity is associated with cardiac remodeling, and NT-proBNP is one of the markers of heart failure and asymptomatic left ventricular dysfunction.

We assumed the level of two endocannabinoids (ECs) (anandamide and 2-arachidonoylglycerol (2-AG)) and NT-proBNP level in patients with abdominal obesity (AO).

**Material and Methods:** Anandamide and 2-AG levels were determined in 24 patients ( $45.1 \pm 0.8$  years old) with AO (IDF, 2005) and in 20 non-obese (NO) subjects ( $40.3 \pm 0.9$  years old). 46.4% of obese patients were hypertensive. None of them had clinical symptoms of heart failure. Levels of ECs was evaluated by chromat-mass-spectrometry method, NT-proBNP level - by electrochemiluminescent immunoassay.

**Results:** Levels of anandamide and 2-AG were higher in obese patients versus NO-subjects (anandamide:  $16.0 \pm 2.2$  ng/ml and  $7.1 \pm 1.1$  ng/ml;  $p < 0.0001$ ; 2-AG:  $0.9 \pm 0.1$  ng/ml and  $0.5 \pm 0.1$  ng/ml;  $p < 0.01$ ). NT-proBNP level didn't differ in patients with AO and in NO-subjects ( $50.7 \pm 15.3$  pg/ml and  $42.5 \pm 13.8$  pg/ml;  $p > 0.05$ ). We revealed correlations between anandamide level and next parameters: duration of obesity (DO) ( $r = 0.6$ ;  $p = 0.02$ ), body mass index (BMI) ( $r = 0.6$ ;  $p = 0.0001$ ), waist circumference (WS) ( $r = 0.6$ ;  $p = 0.0001$ ), systolic blood pressure (SBP) ( $r = 0.5$ ;  $p = 0.001$ ) and diastolic BP (DBP) ( $r = 0.5$ ;  $p = 0.001$ ). We revealed correlations between 2-AG level and DO ( $r = 0.5$ ;  $p = 0.001$ ), BMI ( $r = 0.4$ ;  $p = 0.002$ ), WS ( $r = 0.4$ ;  $p = 0.004$ ), SBP ( $r = 0.3$ ;  $p = 0.004$ ) and DBP ( $r = 0.3$ ;  $p = 0.005$ ). Correlations were revealed only between 2-AG level and NT-proBNP level ( $r = 0.7$ ;  $p = 0.002$ ).

**Conclusion:** Endocannabinoid system is activated in patients with abdominal obesity. Activation of endocannabinoid system is associated with duration of obesity, anthropometric parameters, and NT-proBNP level.

### P1776

#### Study of NO-ergic system at patients with chronic heart failure

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The purpose of present examination is the assessment of indexes of nitric oxide system in thrombocytes at patients having postinfarction atherosclerosis, complicated by CHF.

**Material and methods:** 70 PICS patients, complicated by CHF, have been examined: men at the age of 38-60 years old (mean age -  $51.8 \pm 1.03$  years). The patients have been randomized by FC CHF in compliance with New York classification of cardiologists (NYHA) under conduction of test for 6 minutes walking (TSW); and by the scale of assessment of clinical condition (SACC) of patients: 37 patients were with II FC CHF and 33 patients with III FC CHF. The level of NO in thrombocytes has been determined - by the sum of nitrates' and nitrites' metabolites (NO<sub>2</sub> and NO<sub>3</sub>), activity of transhydrogenase (NADFN) - diaphorase (NOS) and nitrate-reductase activity (iNOS).

**Results:** Analysis of examination's results showed that initial NO-synthase is reduced that is testified by reduce of eNOS for 24,6% at patients with II FC and for 42,6% at patients with III FC CHF, accompanying with the reduce of metabolites NO (NO<sub>2</sub>-NO<sub>3</sub>) for 28,6 and 45,4% accordingly II and III FC, that is explained by re-modelling of vessels, characterized by dysfunction of endothelium, predominance of vasoconstrictive reaction of vessels and stipulated by this reduction of NO production.

**Conclusions:** Thus, at patients with CHF, the reduce of NO-synthase expression, which is testified by the reduce of eNOS, is accompanied with reduce of metabolites NO (NO<sub>2</sub>-NO<sub>3</sub>) for 28,6 and 45,4% accordingly II and III FC.

Abstract 60664 Table: Status of platelets in pts with CHF

	1 group (n = 7)			2 group (n = 5)		
	before the treatment	after treatment	$\rho$	before the treatment	after treatment	$\rho$
Inactivated platelets, %	40,0 [37,0; 58,0]	51,0 [42,0; 68,0]	0,018	43,0 [40,0; 63,0]	47,0 [40,0; 65,0]	0,225
Activated platelets, %	60,0 [42,0; 63,0]	49,0 [37,0; 58,0]	0,018	57,0 [54,0; 60,0]	42,0 [35,0; 53,0]	0,043
Aggregated platelets, %	19,0 [16,0; 23,0]	13,0 [12,0; 16,0]	0,028	19,0 [18,0; 21,0]	16,0 [15,0; 20,0]	0,043
Degranulated platelets, %	14,0 [12,0; 17,0]	11,0 [10,0; 15,0]	0,151	13,0 [10,0; 14,0]	13,0 [10,0; 14,0]	0,787
The density of alpha-granules, mkm <sup>3</sup> /mkm <sup>3</sup>	0,070 [0,060;0,079]	0,074 [0,063;0,091]	0,398	0,077 [0,058; 0,079]	0,067 [0,062; 0,069]	0,500

**P1777****Individualized approach to the development of more precisely physical rehabilitation program**

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**Purpose:** To divide physiological stages of physiological compensatory reactions in organs and systems which provide transport and consumption of O<sub>2</sub> during exercise. This can help clinicians to develop the more precisely individualized physical rehabilitation program (PRP).

**Methods:** 36 healthy adults, 29 men, 25,0±/8.7 yo, BMI 26±/2.8 performed treadmill exercise test (CPET) with gas exchange system "Oxycon Pro" (Jaeger). Individual test protocol was created for every participant. All persons reached peak exercise in 12 -15 min. Maximal exercise has been defined by a plateau of VO<sub>2</sub>, RER 1.2 or maximal predicted HR. Venous blood samples were taken through cubital catheter at baseline and at 1-min intervals during test. pH and lactate (La) values were estimated using i-STAT, cartridge CG4 (Abbot). Physiological stages of involving compensatory reactions were determined by changes in pH, lactate and HCO<sub>3</sub><sup>-</sup> levels in correlation with dynamics of oxygen uptake (VO<sub>2</sub>), CO<sub>2</sub> output (VCO<sub>2</sub>), minute ventilation (VE), CO<sub>2</sub> ventilatory equivalent (VE/VCO<sub>2</sub>).

**Results:** Through first 3–5 min La in blood was 2.1±/0.2 (1.9-2.5) Mm/L. It starts to increase when intensity of physical exercise reaches 12–30% VO<sub>2</sub> peak and comes up to 12±/3.2 Mm/L (8–19 Mm/L) on exercise peak. Inflection of La curve can be fixed on this stage - it is La-threshold. After this La increases gradually (Fig 1). pH was in normal limits at baseline: pH 7.32±/0.05. pH does not change significantly till the intensity of exercise >45 % of VO<sub>2</sub> peak and after this begins to diminish, that marks start of metabolic acidosis development - pH-threshold. In all examined persons this phenomenon appears significantly later, than increase of La. Respiratory compensation point (RCP) was determined, when ventilation dramatically increase relative to VE/VCO<sub>2</sub>. Up to a certain point VO<sub>2</sub> increases linearly and than become stable. This plateau of VO<sub>2</sub> appears at exercise intensity 93±/2.5% VO<sub>2</sub> peak. Entry of exercise in stage of plateau means that increase of aerobic energy production is impossible further - aerobic limit.

**Conclusion:** We have marked four physiological stages during incremental physical exercise: La-THRESHOLD, pH-THRESHOLD, RCP and AEROBIC LIMIT. This new concept of the division of physical exercises on the physiological phases can help us to develop the more precisely individualized PRP.

**P1778****Single mediastinal irradiation affects cardiac cell-to-cell coupling protein, connexin-43, and PKC signalling as well as miR-1 and miR-21 expression in rat heart**

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**Objectives:** Radiation-induced heart disease has been a significant source of morbidity and mortality to those exposed to therapeutic doses of chest irradiation. Myocardial connexin-43 (Cx43) channels provide electric and metabolic coupling for direct communication between cardiomyocytes that is essential for heart function. We aimed to explore whether radiation affect myocardial levels of Cx43 protein and miRNA-1, which regulates its expression, PKC signaling and miR-21 implicated in cardiac remodelling.

**Methods:** The chest of adult, male Wistar rats was subjected to single-dose photon irradiation at 25 Gy and after six weeks the hearts were excised from anaesthetized animals. Left ventricular tissue (LV) was taken for immunoblotting of Cx43 and PKC-epsilon and delta, while miR-1 and miR-21 levels were quantified using real-time PCR.

**Results:** Body and heart mass were decreased in irradiated rats when compared to the controls. Total Cx43 protein, its functional phosphorylated forms and PKC-epsilon, which phosphorylates Cx43 were significantly increased in LV of rats exposed to irradiation. In parallel, the level of miRNA-1 expression was significantly decreased in those animals compared to controls. Moreover, expression of anti-apoptotic and anti-hypertrophic miR-21 and PKC-delta, which is implicated in cardiac ischemic tolerance were increased in LV of rats after irradiation.

**Conclusions:** Results suggest up-regulation of myocardial Cx43 due to suppression of miR-1 in response to irradiation. It appears that enhancement of cell-to-cell communication as well as PKC signaling and miR-21 might be a compensatory mechanism at early stage of irradiation.

**P1779****Determining The Physical Activity Levels of Health Professionals**

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**Objectives:** Physical activity insufficiency is the most important risk factor of many chronic diseases such as cardiovascular diseases and obesity that cause of low life quality and deaths, in our country and world. The purpose of this study is to determine the physical activity levels of the health professionals.

**Method:** Among totally 814 health professionals who have been working at a university school of medicine hospital, except the participants who refuse to participate to study (11.91%) and who left the study (2.21%), 344 volunteers (42.27 %) participated in the study between 1<sup>st</sup> April- 1<sup>st</sup> June 2013. The volunteers were interviewed face to face at their working environment. The information was collected by using the short form of International Physical Activity Questionnaire (IPAQ) and assessed statistically.

**Results:** 227 of the total 344 volunteers were women (%80.5) and the mean of the age of the total participants was 30.22±6. The mean of the total physical activity levels were 1502.12 ±26 and were defined as moderate level according to the International Physical Activity Questionnaire. The mean of the daily rest time was 263.08±24 minutes. The total physical activity levels exhibited no statistically significant difference among the jobs (p> 0.005), but daily rest time of the doctors were more than nurses (p< 0.01). The physical activity level of the participants who live alone were more the ones who lived with their family or friends (p%=0.026, p%=0.034, p< 0.05). There was no significant connection between BMI and physical activity levels of the participants. 34.9% of the participants were over weight (BMI%=25.1–30 and 30.1–40) 43.3 % males and 46.3 % females waist sizes were assessed in the risk group in terms of cardiovascular diseases.

**Conclusion:** Our study demonstrated that the physical activity levels of the health professionals are insufficient and also, the waist size and weight gain are found at high levels that can be causes of health dysfunction.

**P1780****High prevalence of hypertension in O positive ABO subjects: a NMR spectroscopy study**

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The relationship of blood ABO grouping and certain pathologies has always been a hot topic. The possibility to guess a particular predisposition (e.g. cardiovascular disease or gastric cancer) through ABO grouping, although unexplicated, has still some space in scientific literature and popular culture. In Japanese culture, blood

types are thought to strongly influence human personality and vulnerability to diseases. The O type is believed to represent self-centered "workaholic" subjects, while A type tends to be stubborn and tense.

To investigate the role of ABO grouping in cardiovascular disease we screened 994 healthy blood donors (723 M, 271 F, mean age  $41.46 \pm 11.87$  yrs). All of them underwent full clinical, hematological and instrumental evaluation as well as NMR spectrometry and metabolical analysis to assess whether there is any difference in the metabolome of these patients that could be associated to a specific ABO group. Of the 994 enrolled patients, 89 resulted to have essential hypertension (7 M, 19 F, mean age  $41 \pm 12$  yrs). Their blood type was O+ in 41 patients whilst 17 were A-, B- type was the less represented type with only 1 patient. No discrimination was possible amongst the A+ and O+ hypertension subjects, suggesting that no difference could be detected in the metabolic machinery of these patients as a basis for any hypertension development hypothesis. Our data suggest that ABO groups may be considered as the result of phylogenesis and interpreted in an anthropological rather than medical perspective.

#### P1781

##### Efficacy of a hospital-primary care integrated heart failure program: a population-based analysis in 56,742 patients

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**Introduction and Objectives.** Heart failure programs have proven effective in clinical studies, but its applicability in a real practice environment is more controversial. The present study evaluated the feasibility and efficacy of an integrated primary care-hospital HF management program in an integral healthcare area of 309,345 inhabitants.

**Methods.** The analysis included all consecutive patients hospitalized for a primary diagnosis of HF and discharged alive in all hospitals in Catalonia during the period 2005-2011 in which the program was implemented and compared mortality and readmissions among patients exposed to the IHFP and all patients exposed to the remaining healthcare areas of the Catalan Healthcare Service.

**Results.** In this study, 56,742 patients were included. There were 181,204 hospitalizations and 30,712 deaths in this period. In the adjusted analyses, the 2,083 patients exposed to the program, compared to the 54,659 patients exposed to the remaining healthcare areas, had lower risk of death (hazard ratio: 0.92 [0.86-0.97]  $p = 0.005$ ), lower risk of clinically-related readmissions (hazard ratio: 0.71 [from 0.66 to 0.76],  $p < 0.001$ ) and lower risk of readmissions for HF (hazard ratio: 0.86 [0.80-0.94]  $p < 0.001$ ). It was observed that the positive impact on morbidity and mortality was more pronounced in the consolidation period of the program.

**Conclusions.** The implementation of multidisciplinary heart failure programs integrating hospital and community is feasible and is associated with a significant reduction in morbidity and mortality of patients.

#### P1782

##### Maintenance of exercise performance following cessation of disease specific rehabilitation programmes for patients with chronic cardiovascular and pulmonary disease: efficacy of a community based mode

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**Purpose:** Community-based maintenance exercise training (CMET) programmes offer a feasible option for patients completing centre-based cardiac (CR), heart failure (HFR) and pulmonary rehabilitation (PR) programmes. This study aimed to explore the efficacy of CMET for maintaining functional gains of rehabilitation over the first 3 months of participation, and explore the effect of frequency of attendance and referring programme type.

**Methods:** Prospective observational cohort study of participants referred from CR, HFR or PR in Brisbane, Australia to one of 7 CMET programmes supervised by trained fitness instructors. Functional capacity was measured using a standardised 6 minute walk test distance (6MWD) assessed at rehabilitation entry, rehabilitation exit, and after 12 weeks of CMET. Primary outcome was change in 6MWD between rehabilitation exit and 12 week follow-up. Functional improvement was compared between attendance and disease subgroups.

**Results:** 47 participants (mean age 68; 36% CR, 38% HFR, 26% PR) provided data. Overall, there was a small mean improvement in 6MWD from rehabilitation exit to follow-up (460m [SD 84m] to 467m [SD 86m]). Participants attending

no CMET classes ( $n = 12$ ) tended to decline (mean change - 16m), those attending up to once per week ( $n = 18$ ) remained unchanged (mean change -1m), and those attending more than once per week ( $n = 17$ ) showed improvement (mean change +33m,  $p = 0.02$ ). Results did not differ significantly between rehabilitation programmes.

**Conclusions:** Participants in CMET programmes maintained or improved rehabilitation gains, with evidence of a dose effect. Participating more than once per week was associated with continuing functional gains over 12 weeks.

#### P1783

##### Occupational hazards affect morphological changes of myocardium and worsen the clinical course of postinfarction period

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The purpose of our study was to examine morphological changes of the myocardium in patients with acute myocardial infarction with ST-segment elevation (STE MI) depending on the noxious work.

**Methods.** We examined cases of 119 males (mean age  $52.18 \pm 6.38$  years) 5-6 years after STE MI. Patients were divided into two groups, depending on the noxious substances influence (xenobiotics (XB) in anamnesis: 54 persons (I group) subjected to long-term (over 20 years) effects of XB and 65 persons (II group) without any exposure. Patients of the two groups did not differ significantly in frequency and duration of smoking (as an important factor in the development of coronary artery diseases and source of XB). We analyzed clinical course of acute phase of MI, left ventricle (LV) remodeling and biopsy of LV aneurysm (removed during coronary artery bypass grafting).

**Results.** We have determined clinical and morphological differences between the two groups. The ejection fraction (EF) on the first day of MI in the I group was  $40.8 \pm 82.7\%$ , in the II -  $48.10 \pm 2.85\%$ ,  $p \leq 0.05$ . Threatening arrhythmias on first 21 days of MI occurred more frequently in the I group by 46%. EF 5-6 years after MI in patients of I group was 41.8%, in the II group - 51.18%. Chronic aneurysm was formed in 15 (27.78%) and in 4 (6.15%) persons of the I and the II group, respectively. Were founded typical ultra structural changes in areas near scars: combination of unmodified cardiomyocytes (CMC) with hibernated CMC and CMC with signs of apoptosis. Also secondary necrosis and replacement of the capillaries by histiocytes (that initiates fibrosis and hibernation) was founded. Regions with modified myocardium prevailed significantly more in biopsy of persons with noxious substances influence in anamnesis as compare with individuals without occupational hazard work.

**Conclusions.** XB significantly alter the course of MI, impairing the reparation of myocardium. Clinical deterioration, worse elevation of EF, LV remodeling are based on the expressed morphological changes of myocardium which were more pronounced in persons with long-term exposure to occupational hazards.

#### P1784

##### "Therapeutic window" for protection of myocardium with single bolus i.v. injection of CoQ10 after coronary occlusion

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Coenzyme Q10 (CoQ10) levels are decreased in patients with cardiovascular diseases. CoQ10 bioavailability per os is limited to 2-3% and increase of its myocardial levels for cardioprotection requires long-term intake. In urgent cases the single effective way of heart protection with CoQ10 - its intravenous (i.v.) injection immediately after coronary occlusion. The aim of this study was to define the time constraints of CoQ10 injection after coronary occlusion.

**Methods.** Solubilized CoQ10 (30mg/kg, Kudesan solution, "Akvion", Russia) or saline (1 ml/kg, 0.9% NaCl) were injected i.v. once on either 10<sup>th</sup> (CoQ10 -  $n = 11$ , saline -  $n = 8$ , sham -  $n = 7$ ), 60<sup>th</sup> (CoQ10 -  $n = 12$ , saline -  $n = 9$ , sham -  $n = 10$ ) or 180<sup>th</sup> (CoQ10 -  $n = 8$ , saline -  $n = 9$ , sham -  $n = 7$ ) min after onset of rat myocardial ischemia (MI) induced by coronary artery ligation. 21 day after occlusion pressure-volume conductance catheter (SPR-838; Millar Instruments, USA) was inserted into the left ventricle (LV) through the right carotid artery to measure functional characteristics of the heart. LV infarct zone was calculated. The CoQ10 levels in LV were determined by HPLC with electrochemical detection.

**Results.** 21 days after coronary artery ligation all saline rats and rats treated with CoQ10 on 180<sup>th</sup> min had loss of functional myocardium and formed aneurysms. Rats treated with CoQ10 on 10<sup>th</sup> min or 60<sup>th</sup> min had scars localized within ischemic LV walls; limited LV dilatation, improved cardiac contractile and relaxation capacity in contrast with dropped values of control animals. In 60<sup>th</sup> series saline-treated rats had increased end-systolic volume (ESV) by 83%, LV-diastolic volume (EDV) by 50%, decreased ejection fraction (EF) by -67%, LV contractility (LVC) by -44%; CoQ10

treated rats had less increase in ESV by 27%\*, EDV by 19%\*, less decrease in EF by -29%\*, in LVC by -12%\* (# -  $p < 0.05$  vs sham-operated, # -  $p < 0.05$  vs saline-treated infarct group). At the 21<sup>st</sup> day CoQ10 LV levels were significantly increased in all rats received CoQ10. Its levels correlated with ESV ( $r = -0.65$ ), EDV ( $r = -0.56$ ), EF ( $r = 0.67$ ), LVC ( $r = -0.64$ ) in rats treated on 60<sup>th</sup> min after ligation ( $p < 0.001$ ).

**Conclusion.** CoQ10 intravenous injection after coronary occlusion is effective up to 60 min after MI onset. Parenteral administration of CoQ10 within 1h after onset of myocardial infarction could be recommended for effective protection of myocardium.

#### P1785

##### Evaluation of management of hypertension in Moroccan women

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**Introduction:** Hypertension is a major risk factor for ischemic heart disease. The aim of our study is to evaluate the therapeutic goals with antihypertensive treatment in Moroccan women compared to men.

**Materials and Methods:** This is a prospective study, included 152 patients checked for hypertension, we excluded secondary hypertension, pregnancy and hypertensive emergencies.

All of them have been benefited from a complete clinical examination, a measure of blood pressure, tests recommended by WHO; an electrocardiogram, an echocardiography, supra aortic and lower limbs vessels Ultrasonography and coronary angiography depending on the indications.

**Results:** These are 71 women [Gr1] and 81 men [Gr2], there is no statistically significant difference in age and two groups had more than two cardiovascular risk factors dominated by physical inactivity in group 1 and smoking in group 2.

Concerning the classification of hypertension, 50.7% had hypertension grade I [Gr1] versus 43.2% [Gr2], 29.5% grade II in [Gr 1] versus 33.3% [Gr2] and 19, 7% grade III in [Gr1] versus 23.5% [Gr2], complicated by stroke in 11.2% [Gr1] versus 12.3% [Gr2] nephropathy in 14% [Gr1] versus 17.2% [Gr2], retinopathy in 22.5% [Gr1] versus 24.6% [Gr2].

Besides antihypertensive therapy, 23.9% of women went on the low salt diet versus 25.9% men, 18.3% of [Gr1] had regular physical activity [Gr1] versus 45.6% [Gr2], 47% of patients [Gr2] stopped smoking.

After 03 to 06 months of treatment and according to the level of hypertension, there are no statistically significant difference between two groups in terms of therapeutic goals, 50.7% of women are well treated versus 49, 3% who are not and 51.8% of men are well treated versus 48.2% who are not.

**Conclusion:** Hypertension treatment is well established by the guidelines, the lifestyle change is very important and the prescription of antihypertensive drugs is essential to have both men and women well-treated.

## CLINICAL AND TRANSLATIONAL RESEARCH – POSTER DISPLAY

#### P1786

##### Metformin modulates galectin-3 cardiac expression in chronic heart failure

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**Purpose:** Metformin (MET), an anti-diabetic drug, has consistently been shown to ameliorate cardiac remodeling after ischemia/reperfusion injury, as well as in several models of heart failure (HF). However, the molecular mechanisms that explain the ability of MET to prevent cardiac remodeling and slow HF progression remain to be elucidated. The present study aimed to analyze whether MET modulates the cardiac galectin-3 (Gal-3), a key protein in the development of cardiac fibrosis, inflammation and remodeling in HF.

**Methods:** Male Wistar rats (6-8 weeks old, 180-250 g) were used and myocardial infarction (MI) was induced by permanent ligation of the left anterior descending coronary. Animals were randomly assigned to not receive treatment (MI group, n = 12) or to receive MET (MET+MI group, n = 21) from the day of surgery and for 4 weeks at the dose of 250 mg/kg/day. A sham group was used as control (n = 8). The mRNA expression of molecules involved in Gal-3 signaling (Gal-3, Smad-2 and Smad-3) were analyzed by quantitative RT-PCR in the infarcted area of left ventricle. The mRNA expression of fibrosis and inflammatory markers were also assessed. Each value is expressed as fold of control  $\pm$  SEM.

**Results:** Compared to sham group, MI group showed higher levels of Gal-3 ( $62.6 \pm 24.7$ ,  $p < .001$ ), Smad-2 ( $3.4 \pm 0.7$ ,  $p = .01$ ) and Smad-3 ( $9.1 \pm 2.6$ ,

$p = .003$ ) in the infarcted myocardium. The treatment with MET reduced the expression of Gal-3 ( $12.8 \pm 1.9$ ,  $p = .017$ ), Smad-2 ( $1.7 \pm 0.3$ ,  $p = .03$ ) and Smad-3 ( $2.4 \pm 0.4$ ,  $p = .022$ ). MI group also showed higher levels of fibrosis and inflammatory markers than the sham group: collagen I ( $61.3 \pm 24.7$ ,  $p < .001$ ), collagen III ( $169.9 \pm 84.5$ ,  $p = .014$ ), TIMP-1 ( $62.5 \pm 16.2$ ,  $p < .001$ ),  $\alpha$ -sma ( $15.9 \pm 5.1$ ,  $p = .005$ ), TGF- $\beta$  ( $9.1 \pm 1.9$ ,  $p < .001$ ), MCP-1 ( $5.2 \pm 0.9$ ,  $p < .001$ ) and IL-6 ( $16.7 \pm 8.7$ ,  $p = .001$ ). The treatment with MET significantly reduced the expression level of all of these remodeling markers. In addition, the expression level of Gal-3, Smad-2 or Smad-3 was correlated with all markers of fibrosis or inflammation.

**Conclusions:** Our results suggest that the inhibition of Gal-3 expression may be an important mechanism involved in the anti-fibrotic and anti-inflammatory effect of MET in the context of post-infarction HF.

#### P1787

##### The role of erythropoietin upon myocardial fibrosis

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**Introduction:** The process of myocardial remodeling include inappropriate collagen deposition in the interstitium developing an overall process of structural and geometric remodeling of the heart. Erythropoietin (EPO) may have a cardioprotective effects including inflammatory and oxidative stress modulation.

**Objective:** The aim of this study was to assess the role of EPO upon structural, geometric and functional remodeling at the heart.

**Materials and Methods:** 60 Wistar rats were divided into 4 groups: Control, Control+EPO, Infarcted, Infarcted+EPO. Interstitial collagen volume fraction in the left (LV-ICVF) and right ventricle (RV-ICVF) was quantified by videomorphometry using a Quantimet 520 Image Analyses System (LEICA Microsystems). The analyzed echocardiographic parameters were the left ventricle shortening fraction (LVFS) and diastolic diameter (LVDD, cm). Real time RT-PCR was used to assess inflammatory cytokines. Non parametric analysis was performed and  $p \leq 0.05$  was considered significant.

**Results:** LV-ICVF (%) was greater in the infarcted groups compared to controls ( $p < 0.001$ ), and attenuated by EPO ( $p = 0.05$ , MI vs MI+EPO) (CT% =  $0.76 \pm 0.20$ ; CT+EPO% =  $0.62 \pm 0.16$ ; MI+EPO% =  $1.22 \pm 0.86$ ; MI% =  $3.80 \pm 2.6$ ). The RV-ICVF (%) was also greater in the infarcted groups compared to controls (CT% =  $0.60 \pm 0.2$ ; CT+EPO% =  $0.82 \pm 0.28$ ; MI+EPO% =  $1.02 \pm 0.58$ ; IAM% =  $1.62 \pm 1.20$ ) ( $p = 0.007$ ) but without statistical difference between MI vs MI+EPO. The infarcted groups had a worsening shortening fraction compared to controls (CT% =  $45.65 \pm 6.4$ ; CT+EPO% =  $40.81 \pm 4.44$ ; MI+EPO% =  $17.32 \pm 6.01$  and MI% =  $20.11 \pm 9.41$ ) ( $p < 0.001$ ) but without EPO protection. The infarcted groups also showed increased LV dilation ( $p < 0.001$ ) (CT% =  $0.73 \pm 0.06$ ; CT+EPO% =  $0.74 \pm 0.05$ ; MI+EPO% =  $0.81 \pm 0.08$ ; MI% =  $0.90 \pm 0.11$ ) without EPO attenuation. The TNF- $\alpha$  ( $p = 0.018$ ) and TGF- $\beta$  ( $p = 0.0034$ ) expression was increased on MI groups compared to controls, but it not show any EPO protective effect.

**Conclusions:** EPO significantly attenuated the accumulation of interstitial collagen, but it did not reflected in the protection of the heart dilation or dysfunction and inflammation gene expression in this model.

#### P1788

##### Effects of sympathectomy on myocardium

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**Introduction:** Sympathectomy is a therapeutic modality used in some diseases as the case for hyperhidrosis, arrhythmias and long QT syndrome. Recently, some studies suggested this technique in the treatment of heart failure as alternative for beta-blockers if is contraindicated. However, its physiological effects upon the heart have been slightly studied.

**Objective:** The aim of this study was to evaluate the effects of sympathectomy regarding mainly to the autonomic nervous system, heart function and myocardial catecholamines.

**Materials and Methods:** 75 Wistar rats were divided into 5 groups: control (CT), left unilateral sympathectomy (UNI), bilateral sympathectomy (BIL), left unilateral sympathectomy + atenolol (UNI+A) and atenolol without sympathectomy (CT+A). The geometric and functional variables were evaluated by ech including left ventricular diastolic diameter (LVDD, mm), fractional shortening (FS, %) and isovolumetric relaxation time (IRT, ms). The autonomic response was evaluated by maximal exercise test using heart rate (HR, bpm), exercise time (ET, m), mean arterial blood pressure (MAP, mmHg). The myocardial norepinephrine was obtained by High Performance/Pressure Liquide Chromatography.

**Results:** There was no difference regarding systolic and diastolic function FS (CT% = 42 ± 6, CT+A% = 41 ± 5, UNI% = 39 ± 7, UNI+A% = 44 ± 6, BIL% = 44 ± 1, p% = 0.66), IRT (CT% = 31 ± 6, CT+A% = 39 ± 7, UNI% = 35 ± 10, UNI+A% = 37 ± 5, BIL% = 37 ± 5, p% = 0.12). The LVDD also did not show difference (CT% = 7 ± 1, CT+A% = 8 ± 0.5, UNI% = 7 ± 1, UNI+A% = 8 ± 1, BIL% = 7 ± 0.5, p% = 0.066). The exercise test did not show difference in ET (CT% = 10 ± 3 C+A% = 10 ± 2 UNI% = 10 ± 2, UNI+A% = 9 ± 2, BIL% = 8.13 ± 1.85, p% = 0.32). Heart Rate was higher in bilateral and unilateral sympathectomy groups without atenolol (p < 0.001). The MAP at peak of exercise was higher in BIL group (p% = 0.036). There was no difference in myocardial norepinephrine (p% = 0.08).

**Conclusions:** These findings may suggest an extra cardiac compensatory pathway keeping the sympathectomy group in higher HR sustaining MAP in exercise, without changes in geometric and functional variables.

#### P1789

##### The m<sup>2</sup> muscarinic acetylcholine receptor-induced RhoA activation in cardiac myocytes requires intact caveolae and a complex formation of p190RhoGAP with RGS3, caveolin-3 and eNOS

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Regulator of G protein signaling (RGS) proteins are GTPase activating proteins (GAPs) for heterotrimeric G protein  $\alpha$  subunits and therefore important negative regulators of G protein coupled receptor (GPCR) signals. One of the RGS proteins known to be upregulated in human heart failure is RGS3 which acts as GAP for the  $\alpha$ -subunits of Gi/o and Gq/11 proteins. RGS3 exists in several splice variants. Besides its GAP activity, the RGS3L isoform has an additional function. It switches the activation of monomeric GTPase Rac1 to the activation of RhoA after m<sup>2</sup> muscarinic acetylcholine receptor (m2AChR) stimulation. This switch requires a Gi $\beta\gamma$  mediated activation of PI3Ks, but the mechanism is still not understood. p190RhoGAP is one of the most important RhoGAPs, which is able to change the Rac1-RhoA balance in the cell. The activation of p190RhoGAP is likely dependent of tyrosine-nitration by endothelial nitric oxide synthase (eNOS) localized in the caveolae. Therefore the aim of the study was to investigate the possible role of p190RhoGAP, eNOS and caveolae in the RGS3L-mediated RhoA activation in cardiac myocytes.

By reciprocal co-immunoprecipitations we have detected a complex formation between p190RhoGAP, RGS3L, caveolin-3 and eNOS in neonatal rat cardiac myocytes (NRCM). Interestingly, stimulation of NRCM with carbachol increased the interaction of these proteins. The complexes could be visualized by a proximity ligation assay. As we detected an interaction of p190RhoGAP with eNOS in NRCM we treated NRCM with L-NAME, an inhibitor of nitric oxide synthases. L-NAME suppressed the carbachol-induced RhoA activation in the presence of RGS3L. Similarly, the carbachol-induced RhoA activation was attenuated when the cells were treated with methyl- $\beta$ -cyclodextrin disrupting caveolae by cholesterol depletion.

We conclude that the complex formation of p190RhoGAP with RGS3L, eNOS and caveolin-3, which occurs most likely in caveolae, is important for the appearance of a carbachol-induced RhoA activation in cardiac myocytes. This RhoA activation could mediate the described m2AChR-induced increase in cardiac contractility in experimental heart failure.

#### P1790

##### Cell-based therapy of congestion heart failure: stem-cells delivery options

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**Preface.** Diffuse myocardial injury in patients with congestion heart failure (CHF) could be treated by methods of cell-based therapy. Intracoronary (IC) injection of stem-cells is optimal for uniform distribution, but the limiting factor is a risk of coronary embolization and myocardial infarction (MI). Intramyocardial (IM) delivery is less hazardous, though provocative for critical arrhythmias.

**Aim.** Our study assessed exploited combination of IC-IM delivery for the purpose of CHF treatment.

**Materials and Methods.** Gradiently separated mononuclear fraction of bone marrow (10x10<sup>6</sup> cells/100  $\mu$ l) was labeled with Technetium-99m (99m-Tc)-HMPAO and implanted in rats with Rubromycin-induced CHF. IC, IM and IC-IM delivery options were compared. IC delivery embodied injection of 100  $\mu$ l in ascending aorta with its simultaneous compression just after site of injection. IM method consist in delivery of 50  $\mu$ l either in apex and lateral wall of left ventricle (LV). IC-IM option was the combination of IC injection of 50  $\mu$ l and apical and in lateral wall of LV delivery in equal 25  $\mu$ l portions. 99m-TcHMPAO labeled cells distribution and retention in myocardium were assessed at 1-3 and 20 hrs after transplantation by planar scintigraphy in anterior projection - 200-300 kcnts per image. Presumable chemotactic mechanism of cells fixation led to an increased focal uptake and visualization of 'hot spots' at scintigraphy.

**Results.** There were no lethality in group of combined delivery method. Survival in IC-group was less than 60%, most of rats died just after transplantation. IM delivery followed with 20% of deaths during the first 4-5 days after surgery. Planar scintigraphy at 1-3 hrs and after 20 hrs revealed focal increased uptake of labeled mononuclear cells with maximal site-to-background (S-BG) ratio of >2.8. Most intensive uptake after 1 hr was noted in IM-group (S-BG% = 0.0872), less - in IC-IM (S-BG% = 0.0737). After 20 hrs maximal retention of cells reported in IC (S-BG% = 0.0642) and less - also in IC-IM (S-BG% = 0.0594). Although, minimal washout and redistribution of cells were in IC-IM treated rats (A% = 0.0143) that witnessed predominant efficacy of this delivery method.

**Conclusion.** Study results suggested that combined IC-IM delivery of mononuclear fraction stem cells in injured by CHF myocardium of rats is more effective and safe than IC and IM methods separately.

#### P1791

##### The infusion of marrow stromal cells following myocardial infarction increases myocardial S100A6, attenuates myocyte hypertrophy, reduces apoptosis and improves cardiac function

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**Purpose:** Stem cell-based therapies have demonstrated that there is significant potential to improve myocardial function after myocardial infarction (MI). Among the cell types investigated for cardiac repair, bone marrow stromal cells or mesenchymal stem cells (MSC) have emerged as promising. Whether the improved cardiac function results from regeneration of cardiac myocytes, modulation of remodeling, or preservation of injured tissue through paracrine mechanisms is actively debated. We investigated whether the benefit of stem cell transplantation could be attributed to the MSC secretion of the antiapoptotic EF-hand calcium binding protein S100A6.

**Methods and Results:** At baseline, cultured green fluorescence protein marked MSC expressed S100A6. Hypoxia (2 hrs - 5%CO<sub>2</sub>, 95%N<sub>2</sub>) increased S100A6 mRNA, protein and release into the culture medium approximately 4-5 fold compared to baseline. Further, MSC transfected with siRNA against S100A6 and exposed to hypoxia resulted in apoptosis as quantified by an increase in TUNEL (12.5±1.5 vs. 3.8±0.7 % apoptotic nuclei), caspase-3 activity (54±3 vs. 25±3 micro-mol/mL) and 2.5 fold increase in the BAX/Bcl2 ratio compared to hypoxic MSC transfected with a scrambled siRNA. We injected transfected MSC (siRNA against S100A6 or scrambled control) or saline in a murine model of permanent MI due to coronary artery ligation. Twenty one days post injection, despite the absence of lodged donor MSCs, S100A6 was increased 10 fold in peri- and infarcted myocardial cells in mice receiving MSC transfected with scrambled siRNA compared to MSC transfected with siRNA against S100A6 or saline. Hemodynamic studies, echocardiography and postmortem examination indicated that mice receiving MSC transfected with siRNA against S100A6 or saline mounted a hypertrophic response (21-23 % increase) accompanied by a program of fetal gene re-expression, fibrosis and apoptosis. Whereas mice that received MSC transfected with scrambled siRNA showed an attenuated myocyte hypertrophic response, less fibrosis and apoptosis which was beneficial to preservation of cardiac function.

**Conclusion:** Therefore, MSC-derived S100A6 is a novel target for myocardial preservation.

#### P1792

##### The importance of telomerase in ischemic myocardial disorders.

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**Introduction:** Telomerase replaces telomeric repeat DNA lost during the cell cycle, restoring telomere length. This enzyme is present only during cell replication and its activity reflects the extent of proliferation. Ki-67 is a nuclear antigen, strictly correlates with cell proliferation and is expressed in all phases of the cell cycle except G0. The aim of this study was to investigate the presence of myocyte replication by analyzing the expression of telomerase and Ki-67 in myocytes after myocardial infarction.

**Method:** We studied myocardial samples of eighty hearts with histologic findings of myocardial infarction. Myocardial samples of twenty normal hearts were used as controls. An immunohistochemical method was performed with the use of telomerase and Ki-67 antibodies, in order to investigate the expression of these markers in infarcted hearts.

**Results:** The percentage of Ki-67 and telomerase positive expression samples was 80% and 70% in myocardium infarction, respectively. Moreover, we report that 72% of Ki-67 positive samples expressed telomerase. Positive expression of telomerase and Ki-67 appeared rarely in control group.

**Conclusions:** The increased expression of Ki-67 and telomerase in infarcted myocardium, suggest the presence of myocyte proliferation and this may be a compensatory mechanism that could be replace damaged myocardium.

#### P1793

##### Predictors of atrial fibrillation in heart failure

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**Background:** Atrial fibrillation (AF) is the most common sustained arrhythmia. Heart failure (HF), has become the most important risk factor of AF in developed countries. Inflammatory response is key in vascular remodeling in HF. Polymorphisms in genes encoding interleukin-6 (IL6) might be related to AF development in patients with HF.

**Aims:** To investigate clinical and genetic predictors of AF in patients with HF.

**Methods:** Prospective, matched case-control study involves 187 patients with HF, 107 with AF and 80 without AF. Genomic DNA was extracted using conventional protocols. IL6 gene was genotyped by Taqman probes and Applied-Biosystem-7000. A comprehensive history, physical examination and demographic profile were obtained from each participant.

**Results:** AF was present in 59,5% of patients. Age > 65 years old and significant valvulopathy were independent predictors of AF (OR 2,7 and 2,1) Allele C of -174G>C of the IL6 polymorphism was found to be more prevalent in patients with AF(60,2% vs 40,2; OR 1,5).

**Conclusion:** Age > 65 years old, significant valvulopathy and Allele C of -174G>C of IL6 gen are independent risks factors related to AF development in patients with HF.

#### P1794

##### Comparison of changes in reverse remodeling associated myocardial gene expression between carvedilol and metoprolol in nonischemic dilated cardiomyopathy

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**Background:** When  $\beta$ -blocking agents produce reverse remodeling (RR) in non-ischemic dilated cardiomyopathies (NDCMs) they partially reverse changes in constituents of the fetal-adult contractile protein and  $\beta$ 1-adrenergic receptor (AR) signaling networks. However, it is unknown whether these changes vary depending on the  $\beta$ -blocker used. The objective of the current study was to compare RR-associated changes in myocardial gene expression between patients receiving carvedilol vs. metoprolol.

**Methods and Results:** We measured the mRNA expression of 50 genes by quantitative PCR in RNA derived from RV septal endomyocardial biopsies done at baseline, 3 and 12 months in 47 NDCM patients (mean baseline LVEF 24+9%, RVEF 27+9%) randomized to carvedilol, metoprolol, or metoprolol + doxazosin. Thirty-one patients had RR defined as improvement in LVEF of 8 units at 12 months or 5 units at 3 months including 9/16 (56.2%) who carvedilol and 22/31 (71.0%) who received metoprolol (p=NS). All 15 significant gene expression changes in carvedilol RR patients compared to baseline represented downregulation, whereas 4/18 significant changes in metoprolol patients represented upregulation. Gene expression changes associated with RR were different between carvedilol and metoprolol patients for 12 genes. In 8/12 patients receiving metoprolol, genes (ADRB2, MYH7, ATP2A2, PLN, RYR2, ADRA1A, HNRNP2, TNNT2) were significantly upregulated in RR, whereas in 3/12 patients receiving carvedilol, genes (ACTC1, GS, GQ), were significantly more downregulated. NPPA was significantly downregulated in metoprolol RR patients, but not in carvedilol patients. Eight genes (SLC8A1, GL2, CTF1, MYL2, HK2, PDHX, CSRP3, and CASQ) were downregulated significantly in both.

**Conclusions:** RR patients receiving metoprolol showed upregulation of contractile, adrenergic signaling, and calcium handling proteins consistent with reversal of the fetal/adult gene program, whereas RR patients receiving carvedilol therapy showed more downregulation of myocardial genes. The importance of these differences for identifying key molecular pathways associated with RR warrants further investigation.

#### P1795

##### Enhance of diastolic wall strain in comorbid patients with arterial hypertension and chronic obstructive pulmonary disease

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**Background:** During the last decade we evaluated an increasing of comorbid patients with arterial hypertension and chronic obstructive pulmonary disease (COPD). The traditional non-invasive parameters of left ventricular (LV) diastolic function have limitation during the pseudonormal and restrictive LV filling patterns. 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 of study was to assess DWS index in patients with arterial hypertension and COPD, define the relationship between DWS and cardiac structure.

**Methods:** 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.

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

#### P1796

##### ECG derived respiration for sleep disordered breathing screening in chronic heart failure patients

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**Background:** Because of high prevalence of sleep disordered breathing (SDB) in patients with cardiovascular conditions, and because of the highly increased cardiovascular risk associated to that condition, time-delay and cost for diagnosis and treatment should be taken into account. Thus, it appears of interest to develop routine cardiologist tools adapted for an efficient screening of SDB using standard cardiology signals. Some methods using indices calculated from heart rate analysis were developed, but they were not adapted for cardiac heart failure or dysautonomic patients due to blunted heart rate in such clinical settings. We assessed a new SDB screening method based on ECG Derived Respiration (EDR) in a group of chronic heart failure patients.

**Methods:** Patients with a left ventricular ejection fraction below 40% were recruited. All patients underwent a nocturnal polygraphic recording including an ECG derivation. The EDR method is based on the analysis of the induced modifications of electrical ECG QRS shape induced by spontaneous thoracic respiratory movements, allowing to rebuild the respiration signal. The EDR signal could thus be used to detect SDB events and to calculate an estimation of the apnea/hypopnea index (AHI<sub>EDR</sub>). In that population, the results of EDR were compared to the standard polygraphic scoring (AHI<sub>Poly</sub>) performed by separate operators.

**Results:** 94 subjects were included (13 women; 64.6 ± 12.6 years, 79.6 ± 20.2 kg, 171.5 ± 7.8 cm, LVEF: 31.4 ± 7.5 %). AHI<sub>Poly</sub> ranged from 0.2 to 91.9 events/hour (mean 26.6 ± 18.5 events/hour; AHI<sub>Poly</sub> < 5: n=9, 530: n=34). Sensitivity and specificity were 82.4% and 83.3% for an AHI<sub>threshold</sub> = 30. The method was applicable even for patient with implanted pacemaker, atrial-fibrillation or bundle-branch block. Significant correlations appeared between AHI<sub>Poly</sub> and AHI<sub>EDR</sub> (AHI<sub>Poly</sub>% = 0.56 \* AHI<sub>EDR</sub> + 14.99, r<sup>2</sup> = 0.43, p < 0.0001), suggesting that the method tends to slightly over-estimate AHI index for mild SDB. Bland and Altman plot shows a non-significant difference between AHI<sub>Poly</sub> and AHI<sub>EDR</sub> reaching -3.3 ± 14.4 events/hour.

**Conclusion:** These results suggest that EDR is satisfactorily effective in moderate SDB and highly effective for severe SDB screening in chronic heart failure patients. Such algorithm easily implementable in an ECG-Holter software could be used as an efficient SDB diagnosis tool in cardiac populations with suspected SDB as well as in the larger at risk population as patients suffering from atrial fibrillation without being diverted by pacemaker implantation or bundle-branch block. This may lead to an improved cardiovascular prevention.

Abstract 60165 Table 1

	RV apex+ LV basal posterior (CRT)	RV apex+ LV apex lateral	RV apex +LV basal anterior	RV apex+LV basal posterior+ LV basal anterior	LV basal anterior+LV apex lateral	LV basal posterior+LV apex lateral	LV basal posterior+LV basal anterior
Cardiac output (ml/min)	2579±559	2698±1032 NS	2968±622 NS	2538±657 NS	3117±932 NS	2893±547 p% = 0,004	2623±677 NS
Heart Rate (beats/min)	118±21 NS	118±22 NS	118±19 NS	114±17 NS	121±17 NS	120±15 NS	118±14 NS
Ejection Fraction(%)	37,7±5,6	41,7±6,3 p% = 0,01	40,7±4,1 NS	39,7±7,1 NS	45,3±6,9 p% = 0,002	43,2±6,9 p% = 0,004	37,7±7,3 NS
Rotation Basal (°)	-4,1±1,5	-4,5±1,9 NS	-4,1±1,9 NS	-4,5±1,6 NS	-4,05±1,6 NS	-3,9±1,6 NS	-3,5±2,8 NS
Rotation Apex (°)	3,3±1,1	2,6±1,3 NS	4 ±2,7 NS	2,7±2,5 NS	3,3±1,1 NS	3,4±1,6 NS	3,7±2,2 NS
Torsion (°)	6,6±2,06	7,3±3,0 NS	5,8±3,1 NS	5,9±2,9 NS	6±2 NS	6,9±2,5 NS	6,5±3,2 NS
Circumferential basal(%)	-10,4±2,4	-11,6±2,3 p% = 0,02	-10,9±2,5 NS	-10,8±2,4 NS	-10,8±2,4 NS	-10,8±1,7 NS	-10,4±2,9 NS
Circumferential apex(%)	-9,4±4,13	-10,6±3,1 NS	-12,2±4,7 NS	-11±2,6 NS	-10,8±3,4 NS	-12,8±3,3 p% = 0,04	-12,4±3,4 p% = 0,03
Radial basa(%)	27,4±10	24,9±11,2 NS	29,3±12,9 NS	21,8±8,4 NS	23,8±7,1 NS	26,2±6,6 NS	19,4±9,8 p% = 0,006
Radial apex(%)	33,3±9,1	30,9±15 NS	32,8±9,8 NS	30,6±10 NS	29,7±11,4 NS	36,5±16,5 NS	30,8±11,7 NS
QRS(msec)	87±16	95±12 NS	94±12 NS	90±18 NS	94±10 NS	90±18 NS	94±14 NS

## Results

## P1797

**Comparison of classical biventricular pacing with the combination of different pacing sites. experimental study**

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**Objective:** The aim of this study was to compare the classical biventricular pacing with the combination of different pacing sites on left ventricular function, including rotational and torsional parameters in intact myocardium.

**Method:** In 13 healthy anesthetized pigs we performed simultaneous epicardial atrioventricular pacing with electrodes at the apex of the right ventricle (RV) and in various sites of left ventricle (LV). The combinations of sites we studied were:

- 1)RV apex+LV basal posterior (CRT)
- 2)RV apex+LV apex lateral
- 3)RV apex+LV basal anterior
- 4)RV apex+LV basal posterior+LV basal anterior
- 5)LV basal anterior+LV apex lateral
- 6)LV basal posterior+LV apex lateral
- 7)LV basal posterior+LV basal anterior

In each experiment the combination used was in random order. We used echocardiography and 2D speckle tracking (via special software EchoPAC PC, GE) to measure:

- i) Ejection Fraction (EF)
- ii) Cardiac Output (CO)
- iii) Rotation of the apex and basal wall of LV
- iv) Torsion
- v) Circumferential strain of the apex and basal wall of LV
- vi) Radial strain of the apex and basal wall of LV

**Results:** Table 1

**Conclusion:** In intact myocardium, the pacing combination of LV apex lateral + LV basal posterior significantly increases the ejection fraction, the cardiac output and the circumferential strain of the apex compared with the classical biventricular pacing. Additional studies are required to confirm these findings in cases with heart failure.

## P1798

**Comparison of nt-probnp and galectin-3 levels in end-stage heart failure and 3 months after heart transplantation**

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**Purpose:** Heart transplantation (HT) provides an opportunity to compare serum Galectin-3 (sGal3) levels in the presence and absence of the diseased heart.

**Methods:** We retrospectively measured NT-proBNP and sGal3 in serum samples taken from 50 patients (53±12years, 78% men) who had undergone HT for

end-stage heart failure (HF) and who 12 months post-HT had normal graft function and no history of graft rejection (left ventricular ejection fraction ≥ 60% and ISHLT grade < 2R). Serum samples were obtained pre-HT and 3 months post-HT. Determinations of sGal3 were by ELISA (Galectin-3 BG Medicine, Inc.). Immunohistochemical staining of Gal3 in explanted tissue and endomyocardial biopsies (EMBs) obtained at 3 months post-HT were done (n=13). Values of sGal3 were expressed as median and interquartile range and paired values were compared by Wilcoxon's test.

**Results:** NT-proBNP values 3 months post-HT were statistically lower than pre-HT (Me: 670 pg/ml [Q1:404 Q3:1,075] vs Me: 3,020 pg/ml [Q1:1,273 Q3:4,975]; p<0.001). Unexpectedly, post-HT Gal-3 levels were similar to pre-HT levels (Me: 16.8 ng/ml [Q1:12.4 Q3:28] vs 17.8 ng/ml [Q1:14.4 Q3:25.2]; p%=0.703)(figure 1). Gal3 is expressed in both explanted tissue and in EMBs, although there was a variable expression of Gal3 in 3 months EMBs: severe (7/13), moderate (3/13) and mild (3/13).

**Conclusions:** NT-proBNP decreased significantly after HT, but 3 months post-HT sGal3 was essentially the same as before organ transplantation. Gal3 was expressed in both HF heart and new functional organ. In EMBs from functional hearts, Gal3 might be expressed due to an inflammatory state of new organ, and no as a fibrosis biomarker. Whether post-HT sGal3 and Gal3 expression are of prognostic significance for the health of the graft, as might be expected, remains to be seen.

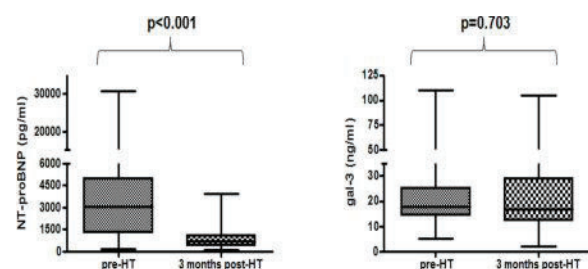


Figure 1

## P1799

**Economic evaluation of ivabradine across different populations of chronic heart failure patients in Greece**

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**Objectives:** To conduct an economic evaluation of ivabradine plus standard care in CHF patients with NYHA class II to IV, systolic dysfunction and baseline resting heart rate  $\geq 75$  bpm, as well as in specific sub-populations.

**Methods:** An existing Markov cohort cost-effectiveness model was adapted to the Greek health care setting. In each one-month cycle during their life span, patients can either remain alive or die. Health state utilities, CV death and all-cause hospitalisation data were derived from the SHIFT clinical trial. Costs included in the model reflect the year 2013. The analysis was conducted from a Greek third party-payer perspective and the model results were expressed in terms of an incremental cost per quality-adjusted life year (QALY). The base case analysis was performed for a cohort of patients attaining similar baseline characteristics to the overall population included in the SHIFT trial. Subgroup analyses including age greater or less than 75 years, HF duration (categories by quartile cut points), NYHA class, LVEF (categories by quartile cut-points), prior ischaemia, prior diabetes and beta-blocker use were also performed.

**Results:** The base case analysis revealed that ivabradine plus standard care was a cost-effective option compared with standard care alone (ICER: €9,986/QALY gained). Subgroup analyses showed that ivabradine plus standard care remained a cost-effective alternative across all subgroups. Notably, ivabradine plus standard care was found to be even more cost-effective among patients with NYHA class IV (6,445), those not receiving beta blockers (€7,267), and those with LVEF  $< 26\%$  (€8,072). On the other hand, the ICER was found to be higher than that calculated in the overall population (but still lower than the threshold of €36,000/QALY gained) in patients aged more than 75 years (€11,355), in NYHA class II patients (€11,112), those receiving beta blockers more than the target dose (€11,619) and those with LVEF  $\geq 33\%$  (€11,807). No significant change was detected in the other subgroup analyses.

**Conclusions:** Ivabradine added to standard care could be a cost-effective treatment for a variety CHF patients profiles in Greece, including the most severe ones.

#### P1800

##### Role of the nonspecific proteinases and their inhibitors in the development of systemic inflammatory response syndrome in patients with myocardial infarction

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**Purpose:** Inflammatory response is an important feature of acute coronary syndromes and myocardial infarction (MI). Clinical manifestation of systemic inflammation is known as systemic inflammatory response syndrome (SIRS). Elevated cytokine levels have been reported in patients with MI complicated by cardiogenic shock (CS) when compared to patients with uncomplicated MI. The prognostic value of proteinase-inhibitory imbalance in patients with acute MI complicated by cardiogenic shock is unknown.

The aim of our study was to characterize the reaction of the elastase-like (ELA) and trypsin-like (TLA) activities and level of proteinase inhibitors (antitrypsin activity and acid-stable inhibitors) in serum of patients with acute MI.

**Methods:** Eighty two patients (age 68  $\pm$  19 years) with different forms of acute ST-elevated myocardial infarction, which was confirmed by ECG, were studied. All patients were divided into 2 groups: uncomplicated MI or MI with complications such as coronarogenic shock, pulmonary edema, disturbances of cardiac rhythm and conduction. Venous blood was collected on 1, 3 and 7 day after MI. In all patients' serial plasma concentration of ELA, TLA and activities of acid-stable and acid-nonstable inhibitors were detected.

**Results:** An increased ELA and TLA level was found in 96% serum in patients with acute myocardial infarction. Activation of proteolytic enzymes take part together with changes of proteinase inhibitors level. Six patients with CS developed a systemic inflammatory response syndrome. Development of SIRS leads for more intensive increase ELA and TLA. Patients with CS, particularly those who developed SIRS, showed significantly higher ELA and TLA levels, and lower level of proteinase inhibitors than patients with uncomplicated MI. In patients with high activity of proteinases the level of inhibitors was decreased.

**Conclusions:** Increase levels of proteinases and their inhibitors in patients with acute myocardial infarction indicate participation of proteinase-inhibitory system in pathogenesis of MI. The levels of proteinases are significantly elevated in patients with MI complicated by CS when compared to patients with uncomplicated MI. On the other hand, the level of proteinase inhibitors is decrease, as a consequence of imbalance in proteinase-inhibitory system. In conclusion, the further study role of proteinases and their inhibitors in development of MI will allow to perfect approaches to increase effect of treatment of acute myocardial infarction, prevent development of SIRS and decrease mortality from acute MI.

#### P1801

##### Electrocardiographic changes in patients with non-st-elevation acute coronary syndrome and severe heart failure

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**Introduction:** Coronary artery disease is the cause of approximately two-thirds of cases of systolic Heart Failure (HF).

**Purpose:** Identifying electrocardiographic changes that are predictors of the occurrence of severe HF in patients with non-ST-elevation acute coronary syndrome (NSTACS).

**Methods:** Retrospective study of 3147 patients suffering from NSTEACS registered in a multicenter study between 2012/10/01 and 2012/10/19 divided in the following groups: Group A (patients with heart failure, 605 patients) and group B (patients without heart failure, 2542 patients). We considered patients with severe HF those with Killip-Kimball class  $\geq 3$  on arrival or hospitalization.

The following parameters were registered: age; sex; type of ACS (instable angina vs. myocardial infarction) and electrocardiogram at admission (rhythm, QRS morphology ST-segment and T wave changes).

**Results and Conclusions:** In group A patients are older ( $76 \pm 10$  years vs.  $65 \pm 13$  years  $p < 0.001$ ) and this group has a higher rate of women (42.3 vs. 27.3%,  $p < 0.001$ ) and patients with myocardial infarction (96 vs. 84%,  $p < 0.001$ ) and abnormal QRS morphology (37 vs. 18%,  $p < 0.001$ ); left bundle branch block is the most frequent alteration in QRS morphology (15.7%). In this group patients have more persistent or transient ST-segment changes (77.5 vs. 65%,  $p < 0.001$ ), commonly ST-segment depression (41%). Group B has more patients with sinus rhythm (91.5 vs. 76.5%,  $p < 0.001$ ) and T wave inversion (25 vs. 20%,  $p = 0.03$ ) at admission. Multivariate analysis showed that only old age (OR:1.051;  $p < 0.001$ ) and T-wave inversion (OR:0.488,  $p = 0.017$ ) are predictors of occurrence or absence of severe HF, respectively, in this study.

#### P1802

##### Constructing a new myocardial bioprosthesis for cardiac repair

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**Purpose:** Currently, progenitor cells and tissue engineering are being proposed as an addition to conventional therapies of myocardial infarction. Engineered tissue grafts and myocardial bioprostheses aim to improve cellular engraftment and viability, combining cellular components with supporting materials. Here, we proposed a new bioprosthesis composed by human pericardial-derived scaffold and adipose tissue progenitor cells (ATPCs) for human cardiac repair.

**Methods:** Surgical samples of human pericardium were obtained from 39 patients (27 males, 12 females; mean age  $68 \pm 11$  years; range 50 to 84 years) undergoing cardiothoracic surgery, with apparently healthy pericardia. For decellularization, a protocol combining detergents, enzymatic digestion and agitation was used and remaining DNA was quantified by spectrophotometry. Decellularized pericardia were lyophilized by drying under vacuum, sterilized by gamma irradiation and analyzed by scanning electron microscopy. To assess in vitro degradation, lyophilized scaffolds were incubated with 0.1% collagenase I. Recellularization was carried out by mixing equal volume of cell suspension (GFP+-ATPCs in 10% sucrose) with hydrogel (RAD16-I 0.3% in 10% sucrose). In vitro biocompatibility was tested by loading hydrogel (with or without GFP+-ATPCs) in the pericardial scaffolds and then cultured 1 week under standard conditions. Masson's trichrome staining was performed to verify recellularization and cell viability was analyzed with a commercial kit.

**Results:** After decellularization, human pericardia were pale collagen scaffolds free of cellular debris and rich in filaments. Total DNA content within the acellular scaffold was significantly lower ( $P = 0.012$ ) than that obtained for native pericardium ( $66 \pm 24$  ng DNA/mg scaffold vs.  $214 \pm 79$  ng DNA/mg pericardium, respectively). Nuclei staining with Hoechst 33342 confirmed no residual nucleic acids in decellularized pericardium. Furthermore, biodegradability experiments showed that scaffolds lost 70% of their original weight after collagenase I treatment ( $P < 0.001$ ). After 1 week of recellularization, the majority of GFP+-ATPCs remained viable inside the bioprosthesis.

**Conclusions:** Decellularization protocol efficiently removed all cellular and nuclear material of human pericardial tissue. In addition, evidences of biocompatibility and biodegradation of the resulting bioprosthesis were further provided in vitro. This pericardial-based bioprosthesis could be deliverable via currently used, minimally invasive methods, to promote cell homing into damaged myocardium.

#### P1803

##### Evolution of soluble hla-g levels before and after heart transplantation: prognostic value

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**Purpose:** Study the longitudinal evolution of soluble HLA-G (sHLA-G) from HT patients in order to know the behavior of this molecule along the first year post-HT and its relation with the cumulative incidence of acute rejection (AR).

**Methods:** Longitudinal study of sHLA-G in sera from 59 HT patients (55 ± 12 years; 81% men). Serum samples were obtained at point times: pre-HT and at 1, 3, 6 and 12 months post-HT. The concentration of sHLA-G was analyzed by ELISA. Patients were classified into AR or NoAR groups based on the incidence of any AR event during the follow up (AR if grade ≥ 2R, ISHLT or if treatment was needed). The behavior of sHLA-G between both groups of patients was compared by Chi square tests.

**Results:** During the clinical follow-up 58% patients had at least one episode of AR. There was a high variability in the behaviour of sHLA-G along the first year, describing 5 expression profiles: A-E (Figure 1). Overall, expression profile (A-E) was associated with the incidence of AR during the first year post-HT (p% = 0.027). Also, the expression profiles which sHLA-G went down or were undetectable from pre-HT values to first month post-HT (B, C and D), had a similar or worse prognostic value than the profile with sHLA-G undetectable along the study (E), traditionally described as the worse prognosis value. The comparison of AR frequencies between the group which increase sHLA-G during the first month (A) and the other groups suggested a potential protective factor associated to A profile (OR: 0.16 (0.03-0.86), p% = 0.029).

**Conclusions:** There was a high variability in sHLA-G behavior along the first year post-HT. We described 5 expression profiles, with different clinical prognosis value. So, the early increase of sHLA-G (A profile) was associated with a protective role for the development of AR.

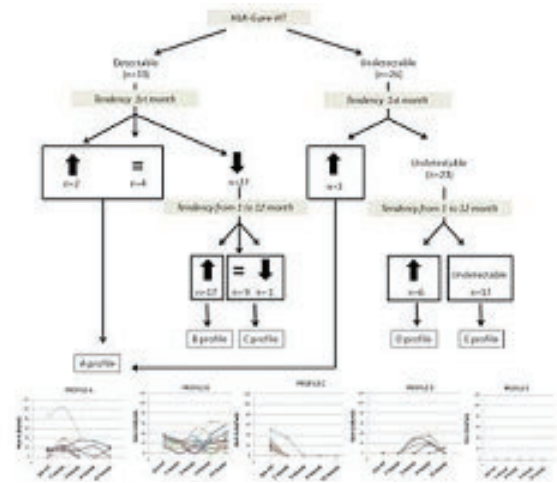


Figure 1