

P318**The efficacy of stepwise approach in radiofrequency ablation of idiopathic persistent atrial fibrillation**

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Objectives: The evaluation of efficacy and safety of stepwise approach in endovascular treatment of idiopathic persistent atrial fibrillation.

Methods: from 2013 to 2015 43 patients with persistent AF underwent stepwise ablation with analysis of complex fragmentation atrial activity during every step. First stage included antral isolation of pulmonary veins and right isthmus. Second stage included verification of pulmonary veins reconnection and additional lesion in left atrium (roof line, posterior wall, full "box lesion"). Also 60 patients with idiopathic persistent AF with traditional combined procedure (simultaneous PVI and endocardial "box lesion") were included as control group. Mean follow-up was 2 years.

Results: Mean efficacy in study population after stepwise ablation and control group was 76.67% and 36.6% respectively, $p < 0.001$. Pulmonary veins reconnection was found in 53.48% of patients in study population, and right isthmus reconnection in 4.65%. The analysis of fragmentation in first stage showed that the median number of significantly involved in arrhythmogenesis areas of LA was 6 (5;6) with median CFAE surface 22.95 cm² (19.3;24.8). In the second stage this parameters were 3 (3;4) and 12.55 cm² (10.6;12.9). No complications and mortality was observed. Conclusion: stepwise approach can be useful in idiopathic persistent patients and is characterized with above-average efficacy and lack of complications. Withal, electrophysiological verification of CFAE shows that mostly half of AF substrate areas are related to antrum of pulmonary veins and tend to reconnection in time.

P319**Intracardiac echocardiographic speckle tracking imaging as method for the evaluation of catheter treatment efficacy in patients with atrial fibrillation**

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Background: Valid methods for detection of transmural myocardial damage during application of radiofrequency energy are currently unavailable. In clinical practice, doctors use indirect signs such as a change in impedance under the tip of ablation electrode and a decrease in the amplitude of the potential on the electrogram registered on the catheter. The use of intracardiac echocardiography allows for intraoperative visualization of the pulmonary vein ostia and for the assessment of changes in the rate (speed) of tissue deformation of the pulmonary vein ostia using echocardiographic speckle tracking imaging.

Aim: The aim of the study was to implement measurements of tissue deformation of the pulmonary artery ostia in patients with atrial fibrillation (AF) during catheter-based treatment using intracardiac echocardiography to evaluate the effective isolation.

Materials and Methods: The study comprised 20 patients (12 men (76%)) with persistent and paroxysmal forms of AF who received radiofrequency ablation (RFA) treatment with pulmonary vein isolation using intracardiac echocardiography. Age of patients was 51.2 ± 7.6 years ranging from 38 to 65 years. During the procedure, intracardiac echocardiographic speckle tracking imaging was used. Electrophysiology criterion for pulmonary vein isolation consisted in a disappearance of pulmonary vein potential on the Lasso electrode. During stimulation, "entrance block" and "exit block" were registered. Intracardiac echocardiographic speckle tracking imaging is based on the analysis of spacial pattern of speckles during ordinary 2D sonography. Tracking the motion of speckles during cardiac cycle allows for semi-quantitative processing of myocardial deformation data in three spatial directions: longitudinal, radial, and circumferential. In our study, we assessed only longitudinal deformation of the muscular sleeves of the pulmonary veins. Recorded data were processed using special acoustic-tracking software.

Results: In our patients, mean deformation of the upper left pulmonary vein was $21.56 \pm 1.55\%$ before and $14.61 \pm 1.12\%$ after RFA; tissue deformation decreased by 6.95% ($p < 0.001$). Mean deformation of the lower left pulmonary vein was $20.50 \pm 0.87\%$ before and $13.6 \pm 0.65\%$ after RFA; tissue deformation decreased by 6.9% ($p < 0.001$). Mean deformation of the upper right pulmonary vein was $21.42 \pm 1.45\%$ before and $14.78 \pm 1.16\%$ after RFA; tissue deformation decreased by 6.64% ($p < 0.001$). Mean deformation of the lower right pulmonary vein was $21.74 \pm 1.27\%$ before and $15.13 \pm 0.87\%$ after RFA; tissue deformation decreased by 6.61% ($p < 0.001$).

Conclusions: Providing that the electrophysiology criteria of the pulmonary vein isolation are met, tissue deformation significantly changes according to data of intracardiac echocardiography. This approach allows to use the parameters of changes in the speed of myocardial deformation to determine electrical isolation of the pulmonary veins.

P320**Incidence of silent cerebral thromboembolism in catheter ablation for atrial fibrillation under the use of DOAC: Comparison of cryoballoon versus radiofrequency ablation system**

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Background: Cerebral thromboembolism (CE) is one of the most feared complications in catheter ablation, and silent CE in ablation for atrial fibrillation (AF) is not rare. Prior our study has reported lower incidence of silent CE in AF radiofrequency (RF) ablation using irrigated-tip catheter than conventional 4 or 8mm-tip catheter. Recently pulmonary vein isolation (PVI) using cryoballoon (CB) has emerged as an alternative technique to RF ablation because some studies suggested that the efficacy for PVI by CB was equivalent to RF. However, incidence of silent CE in CB ablation under the use of direct oral anticoagulant (DOAC) is unknown.

Purpose: We aimed to evaluate the incidence of thromboembolic event including silent CE in AF ablation using CB system compared with irrigated RF system under the use of DOAC.

Methods: 167 consecutive patients with paroxysmal or persistent AF (52 using CB system, 115 using RF system) who underwent the first AF ablation were taking DOACs: dabigatran, rivaroxaban, apixaban or edoxaban more than one month prior to the procedure. In all patients DOAC was held on the morning of the procedure and resumed just after hemostasis. Throughout AF ablation procedure, heparin was administered to maintain activated clotting time (ACT) between 300 and 400 seconds. Head magnetic resonance imaging (MRI) was performed in all patients within 24 hours after the procedure.

Results: In 4 (7.7%) patients using CB and in 15 (13.0%) patients using RF, diffusion weighted imaging of head MRI showed embolic lesions without neurological symptom ($P = 0.43$). There were no significant differences in clinical data, coagulation parameters such as D-dimer before procedure. Although the amount of heparin during the procedure in group CB was significantly less than in group RF (15796 ± 3219 U vs. 18844 ± 4844 U; $P < 0.0001$), amount of heparin per hour in group CB was more than in group RF (7644 ± 1640 U/h vs. 5491 ± 1358 U/h; $P < 0.0001$) because procedure time in group CB was shorter than in group RF (128.6 ± 28.8 min vs. 207.7 ± 32.5 min; $P < 0.0001$). Mean ACT in both groups was maintained high level (332.0 ± 22.7 sec. vs. 339.8 ± 20.4 sec.; $P = 0.283$). In univariate analysis, maximum ACT and minimum ACT during procedure were significantly correlated with the incidence of silent CE ($P = 0.026$ and 0.003 , respectively).

Conclusions: The incidence of silent CE in AF ablation using CB system was lower than RF system, although it was not a significant difference between different ablation techniques for AF. In AF ablation, the use of CB may be preferred rather than RF as ablation system in regard to risk reduction of thromboembolic complications.

P321**A novel visitag-guided pulmonary vein isolation protocol results in unipolar electrogram criteria for transmural ablation within 7s**

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Background: Radiofrequency (RF) pulmonary vein isolation (PVI) guidelines suggest a target contact force (CF) of 20g and minimum force time integral (FTI) of 400gs per lesion. Most such lesions will therefore be of 20s minimum duration. Purpose: To investigate the time to occurrence of unipolar electrogram (UE) criteria for transmural ablation (i.e. pure R wave) using CARTOREPLAY. Methods: Following the release of CARTOREPLAY (September 2015), UE analysis was performed in 6 unselected consecutive patients, undergoing PVI using a standardised VISITAG-guided PVI protocol. Results: PVI was completed in 100% with a median (range) of 15.2 (11.9 - 19.9) minutes RF and without spontaneous / dormant recovery of pulmonary vein (PV) conduction at 30 minutes. All patients were free from AF without antiarrhythmic medication at 12-months' follow-up. All 368 annotated tags were analysed (see data table for medians). UE criteria for transmural ablation were typically achieved within 7s, with the greater CF occurring during ablation of the right PVs associated with a significantly shorter time to transmural UE criteria than the left PVs. Conclusions: UE criteria for transmural ablation occur rapidly during PVI, even when utilising a VISITAG-guided ablation protocol employing significantly lower CF than presently considered appropriate. Such data may be useful in the derivation of both safer and more effective "operator-specific" VISITAG-guided PVI protocols. Further details of this novel VISITAG-guided approach to PVI will be provided during presentation of this abstract, if accepted.

	Left PV	Right PV	P
Contact Force (CF, g)	9.5	14.0	<0.0001
Duration (s)	14.4	12.0	0.001
Force time integral (FTI, gs)	132	161	<0.0001
Impedance drop (Ω)	8.5	6.2	0.0001
Time to unipolar R (s)			
• All tags	5.7	3.5	0.005
• Power 0-30W (i.e. "RF ON" sites)	6.7	5.9	0.22
• Power 30W (i.e. "continuous RF" sites)	4.3	3.2	0.04

Abstract P321 Figure.