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Acute change of hemodynamics during radiofrequency catheter ablation of atrial fibrillation
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Background: Radiofrequency catheter ablation (RFA) of atrial fibrillation (AF) using open irrigation catheters is associated with obligatory volume overload, change in heart rate and/or rhythm, and alteration of left atrial (LA) compliance.

Methods: Study included 209 patients (age: 61±10 years; males: 68%; LA diameter: 42±8 mm; left ventricular ejection fraction [LVEF]: 57±8%; CHA2DS2-VASc score: 1.9±1.4) undergoing RFA for AF (paroxysmal AF: 65%). Heart rhythm/rate, arterial blood pressure, central venous pressure (CVP) and LAP were recorded at baseline and at the end of the procedure.

Results: Sinus rhythm (SR) after ablation accelerated by 7±12 bpm (median: 6; IQR: 0–13; P <0.0001). In patients with AF at the beginning and SR at the end of the procedure, heart rate dropped by 21±23 bpm (median: 20; IQR: 6–33; P <0.0001). Changes in systolic/diastolic arterial blood pressure were not significant. CVP and LAP increased by 1.7±2.1 mmHg and 2.8±4.1 mmHg (both P <0.0001), respectively. Significantly higher increase of LAP was observed in patients with: [A] persistent vs. paroxysmal AF (4.0±4.1 vs. 2.2±4.0 mmHg, P <0.01), [B] substrate ablation vs. pulmonary vein isolation (PVI) only (4.6±4.2 vs. 1.9±3.8 mmHg, P <0.0001), [C] conversion from AF to SR vs. both measurements in SR (4.0±3.0 vs. 2.2±3.6 mmHg, P <0.01), and [D] LVEF <55% vs. >55% (4.3±3.7 vs. 2.3±3.8 mmHg, P <0.01). In multivariate analysis, substrate ablation (P <0.0001) and LVEF <55% (P <0.05) were independent predictors of LAP elevation. LAP increased by 1.6±3.7 mmHg in the absence of both factors and by 5.4±5.0 mmHg in their presence (Figure). Changes in LAP correlated weakly with changes in CVP (R=0.24, P <0.001).

Conclusions: Elevation of LAP during RFA for AF appears to be early indicator of stiff LA syndrome. It may be subsequently associated with the development of postcapillary pulmonary hypertension. Principal factor of LAP elevation is extensive LA ablation, particularly in patients with LV systolic dysfunction.

Abstract P350 Figure. Categorized histogram of LAP change

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Temperature control technique of cryoballoon ablation: non-randomized three-center study
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Introduction: Second-generation cryoballoon ablation is very effective and rather simple method of pulmonary vein isolation but there are some features associated with 8-polar diagnostic catheter Achieve (Medtronic inc.). According to recent studies a temperature control technique while ablation shows comparative results.

Purpose: The aim of our study was to compare cryoballoon ablation using Achieve catheter to check the criteria for isolation of pulmonary veins and temperature control technique.

Methods: One hundred forty five (145) patients with paroxysmal and persistent atrial fibrillation were treated by cryoballoon ablation in three centers. The following groups were formed: in the first group 87 patients were ablated using Achieve catheter and in the other group 58 patients were operated with the help of temperature control technique. All procedures were performed using second-generation cryoballoon ArcticFront Advance (Medtronic inc.), 12.5 F delivery introducer Flexi (Medtronic inc.) and 8F ICE catheter AcuNav (Siemens inc.). In temperature control group the target effect was evaluated by rate of temperature drop (-40 C up to 60 sec), temperature itself and exposition (120 sec with less than -40C). The endpoint of the study was AF recurrence.

Results: We observed 4 cases of phrenic nerve palsy in both groups. At the same time there were no other intra- and postoperative complications. In one-year follow up Achieve group had 18 (20.7%) recurrences of AF versus 14 (24.1%) recurrences in the other group with no statistical difference (p=0.68).

Conclusion: We suppose that temperature control technique is safe and effective approach, on the other hand, Achieve catheter is useful but not necessary device in cryoballoon ablation.

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Myocardial injury biomarkers and outcomes after pulmonary vein isolation using contact force sensing radiofrequency catheter or advanced cryoballoon
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Background: Catheter ablation for atrial fibrillation (AF) results in myocardial injury causing the elevation of cardiac biomarker levels.

Purpose: Our study aims to compare the levels of myocardial injury biomarkers and their impact on AF recurrence following radiofrequency ablation (RF) and cryoballoon ablation (CB) for paroxysmal AF.

Methods: In this prospective study 94 consecutive patients (pts) [30 [91.9%] women, mean age 60±9.7 years] were enrolled undergoing pulmonary vein isolation (PVI) using RF ablation (n=48) or the advanced CB ablation technique (n=46) for the first time. We measured C-reactive protein (CRP), Lactate Dehydrogenase (LDH), high-sensitivity Troponin T (hs TnT), and Creatinine Kinase-MB (CKMB) at baseline and 19-24 hours after the procedure. Pts had follow-up (FU) visits at 3, 6, and 12 months after the ablation procedure. Myocardial injury biomarkers were compared between both ablation groups taking into consideration the 12-month AF recurrence outcome.

Results: We observed significantly higher post-ablation CRP, LDH, hs TnT and CKMB levels in the RF and CB groups (p<0.001 for all). Post-ablation LDH and post-ablation CKMB levels were significantly higher in the CB group compared with the RF group: CRP: 475.2±28.2 ng/mL and 18.9±7.2 ng/mL vs. RF: 412.5±75.9 ng/mL and 8.3±4.1 ng/mL, p<0.001). At 12-month FU, the success rate was comparable in the RF and CB group (70.5% vs. 68.2%, log rank p=0.91). In the CB group, higher post-ablation CKMB and post-ablation hs TnT levels were measured in pts without AF recurrence compared with pts with AF recurrence (21.9±6.7 ng/mL and 1041±404.9 ng/L vs. 13.1±4.2 ng/mL (p<0.001) and 771.2±288.5 ng/L (p<0.002)). Linear regression analysis in the CB group revealed ΔCKMB as a negative independent predictor of AF recurrence (p<0.001). Elevated CKMB and hs TnT levels were not correlated with AF recurrence in the RF group (p=0.05).

Conclusion: Evidence of myocardial injury as indicated by the release of cardiac biomarkers can be detected after AF ablation using different ablation techniques. CB ablation may cause more significant myocardial damage. Elevated CKMB levels after CB ablation were independent negative predictors of AF recurrence.

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Evaluation of optimal Ablation Index for pulmonary vein isolation in patients with atrial fibrillation (OPTIMUM study): early experience of applying Ablation Index
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Background: Ablation index (AI), integration of contact force (CF), ablation time, and radiofrequency power by a weighted formula, has been recently utilized as a novel marker of lesion quality.

Purpose: We identified the association between AI and acute pulmonary vein reconnection (PVR) after PV isolation (PVI) in patients with atrial fibrillation (AF). Furthermore, we sought to find out the optimal target AI that predicted less acute PVR by regional differences.

Methods: Drug refractory symptomatic AF patients were prospectively enrolled. Patients underwent PVI with conventional strategy using a CF sensing catheter (Thermocool SmartTouch Catheter, Biosense Webster, Inc.). Conventional PVI was performed with signal reduction-guided, point-by-point ablation using VisiAll automated annotation (30-35W, 30-40 seconds for anterior and roof area; 25W, 15-30 seconds for posterior and inferior area, target force range 10-20g). AI values and other ablation parameters by each ablation point were analyzed after PVI using 14 predefined segments. Acute PVR was defined as early reconnection (ER) and dor-mant conduction (DC) after 30 minutes observation. For evaluation of optimal threshold AI, we categorized 14 segments by 2 different regions as follow: anterior/roof and posterior/inferior. Using Receiver Operating Characteristic (ROC) analysis, we chose the optimal region with the highest area under the curve (AUC) and performed the Wilcoxon rank-sum test.

Results: 132 patients with drug-refractory symptomatic AF were enrolled and AI was calculated at 47±4.3. Seventy-four patients (55.8%) had PVI failures at post-PVI with acute PVR (ER or DC). AI was different between PVI failures and successes (median: 33.5 vs. 40.5; p<0.001). The AUC was highest when AI was ≤30 (sensitivity: 73.3%, specificity: 67.7%, positive likelihood ratio: 1.82, negative likelihood ratio: 0.7). The optimal cut-off value was 30 with an area under the ROC curve of 0.747 (95% confidence interval: 0.676 to 0.819).

Conclusion: Our study suggests that the use of Ablation Index was a feasible approach to define an optimal AI cutoff for PVI. However, there is a need for further investigation to confirm the results of the present study.