

less effective in LA substrate modification than radiofrequency ablation (RFA). CBA lesions strongly depend on cryoballoon nadir temperature (CBNT). It was reported that acute success rate of LA roofline conduction block creation by CBA was 88.2%, applying with mean CBNT of -40 degree Celsius (-36 to -44 degree Celsius). In this report, the Achieve catheter was inserted into the left superior pulmonary vein (LSPV) during CBA at LA roof.

Methods: We performed cryoballoon-guided LA roofline ablation in 100 AF patients. We first inserted the Achieve catheter into LSPV or the right superior pulmonary vein (RSPV) during left- or right-sided LA roof ablation, respectively. If CBNT did not reach -40 degree Celsius during CBA at LA roof, we induced AF and inserted rapid ventricular pacing (RVP) to stagnate blood flow and lower CBNT. The pacing cycle length of RVP was adjusted at 350 - 550ms so that the arterial blood pressure could be maintained at least between 70 and 80 mmHg range. Nevertheless, when CBNT did not reach -40 degree Celsius despite these techniques, we anchored the Achieve catheter into RSPV and positioned a cryoballoon at the same spot and started freezing again. Finally we performed voltage and activation mapping during left atrial appendage pacing, and evaluated complete LA roofline conduction block.

Results: In 70 patients, CBNT did not reach -40 degree Celsius, and so we performed RVP. In 52 of 70 patients with additional RVP, CBNT could reach -40 degree Celsius by additional RVP. Further reduction of CBNT of 5.1 ± 3.5 degree Celsius on average could be obtained. In the majority of patients, the site where CBNT did not reach -40 degree Celsius was the left-sided LA roof near the center portion when LSPV anchoring. In 18 patients in whom CBNT during LA roof ablation by LSPV anchoring did not reach -40 degree Celsius with additional RVP, CBNT during LA roof ablation was -36 ± 3 degree Celsius. In these 18 patients, CBNT during LA roof ablation at the same spot fell to -46 ± 4 degree Celsius ($p < 0.01$) by anchoring the Achieve catheter into RSPV even during CBA at left-sided LA roof. In all of these 18 patients, CBNT by RSPV anchoring was always lower than that by LSPV anchoring, and complete LA roofline block was easily achieved in all patients. As a result, LA roofline conduction block was successfully achieved in all 100 patients. Esophagogastroscope performed the following day revealed no esophageal ulcer. No complications occurred.

Conclusion: RSPV anchoring is definitely better than LSPV anchoring during cryoballoon-guided LA roofline ablation. Cryoballoon-guided LA roofline ablation with RVP and RSPV anchoring could be a promising and alternative approach to create complete LA roofline conduction block with excellent success rate and acceptable safety.

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Outcome after catheter ablation for left atrial flutter

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Introduction: Left atrial flutter (LAFL) has been reported to occur in as many as 10% of patients after pulmonary vein isolation (PVI) or cardiac surgery. LAFL typically is highly symptomatic, responds poor to medical antiarrhythmic treatment, and is treated by catheter ablation (CA). Data regarding arrhythmia recurrence rate after CA for LAFL are few and mainly reported for patients with peri-mitral atrial flutter (PMFL).

Purpose: We aimed to investigate the mid-term freedom from recurrent arrhythmia after CA of LAFL.

Methods: In the National Danish Ablation Registry we identified consecutive patients, who had undergone CA for LAFL during the period from January 1st, 2014 to April 1st, 2017 at our centre. We reviewed CA procedure reports to record procedural data and rhythm outcomes during follow-up.

Results: A total of 56 patients were identified. Mean age was 62.5 ± 12.5 years. Forty (71%) were male. Forty-three patients had previously undergone at least one left atrial CA procedure (77%), median 2 (interquartile range 1–3, range 1–7), seven patients had prior surgery for congenital heart disease (13%) and only six patients (10%) had no previous cardiac intervention. All the patients were highly symptomatic, with a median EHRA-score of 3 (range 2–4) before CA. Acute procedural success, defined as non-inducibility of any atrial arrhythmia, was achieved in 48 of 56 patients (86%). At the index procedure, median number of morphologies ablated was 2 (interquartile range 1–3). In 27 patients, PMFL was observed, and a mitral isthmus block line (ML) was created. On the short-term, EHRA score was reduced to a median of 1 (range 1–3) after a mean of 8 ± 5 months after CA ($p < 0.001$, Wilcoxon signed rank test). During follow-up (mean 21 ± 12 months), 27 patients had at least one documented episode of recurrent arrhythmia (48%). LAFL was the recurrent arrhythmia in 14 cases (52%), seven had atrial fibrillation (AF) (26%), five had both LAFL and AF (19%), and one had an ectopic atrial tachycardia (3%). Fourteen of the 27 (52%) patients underwent a repeat procedure during follow-up. Creating a ML was associated with significant reduction in arrhythmia recurrence during follow-up (arrhythmia recurrence in 9/27 patients with ML versus in 18/29 patients without ML, $p = 0.03$, Chi-2 test).

Conclusion: LAFL is preceded by left atrial catheter ablation or surgery in 90% of patients. Acute success of CA is achieved in the majority of patients, and CA effectively reduces symptoms. During mid-term follow-up, almost half the patients experience recurrent atrial arrhythmia.

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Real-time ultrasound guidance for venous access reduces vascular complications in women aged 75 years or older undergoing catheter ablation for atrial fibrillation under uninterrupted anticoagulation

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Background: After the age of 75 years, about 60% of the people with atrial fibrillation (AF) are women. Female gender is also a known independent predictor of vascular complications in AF patients undergoing catheter ablation. Real-time ultrasound allows direct visualization of vascular structures. Thus, it is logical that it can reduce the inadvertent trauma to the femoral vein and artery thereby decreasing the vascular complications, especially in patients under anticoagulant therapy.

Objective: We evaluated the rate of vascular complications in traditional landmark-based and the ultrasound (US)-guided venipuncture in women ≥ 75 years undergoing AF ablation.

Methods: A total of 496 women aged ≥ 75 years undergoing femoral vein-access for AF ablation were included in this retrospective analysis and classified to group 1: landmark-based access: n=217 and group 2: US-guided access: n=279. The primary endpoint was vascular access complications requiring intervention such as hematoma, pseudoaneurysm, arteriovenous fistula and access bleeding needing blood transfusion.

Results: All patients were on uninterrupted oral anticoagulation therapy [warfarin, 195 (39%); NOAC, 301 (61%)]. Overall success rate of venous access was 100% for both groups. Procedure time was comparable between the groups; 132.9 ± 54.8 vs 140.7 ± 49.8 minutes ($p = 0.1$) in gr. 1 and 2 respectively. Vascular access complications occurred in 11 of 217 (5.1%) in group 1 and 1 of 279 (0.40%) in group 2 ($p < 0.001$).

Conclusions: Real-time ultrasound-guided femoral vein access was associated with significantly lower risk of vascular complications in elderly women undergoing AF ablation under uninterrupted anticoagulation.

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Predicting application failure during cryoballoon ablation: how to decide for an additional-freeze-application?

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Background: Treatment of early manifest pulmonary vein (PV) reconnection or dormant reconnection may improve outcome of AF ablation.

Objective: To identify procedural and biophysical parameters that may predict early reconnection (ERC) of the PVs.

Methods: Consecutive patients with AF undergoing cryoballoon ablation (Arctic Front Advance) between 2014 and 2017 were included. ERC defined as either early manifest or dormant reconnection unmasked with adenosine was evaluated 30 min after ablation. If present, an additional freeze-application of 240 seconds (s) was applied. Procedural characteristics including time-to-isolation (TTI) and biophysical data including balloon temperature (BT) after 30 and 60 s, nadir BT, mean BT below 0°C, and three thawing times (TT) measured from the end of the freeze to 0, 15 and 20°C were evaluated as potential predictors for ERC.

Results: A total of 151 pts (60 ± 9 years, 108 male, 95% paroxysmal AF) were included. ERC was found in 40/151 (27%) patients (ERC group) and in 53/604 (9%) veins and was more prevalent in male patients (83% vs. 66%, $p = 0.049$). Procedure time and total ablation time were longer in the ERC group compared to the non-ERC group (150 ± 40 min vs. 125 ± 34 min and 24 ± 5 min vs. 17 ± 4 min; $p < 0.001$). The total number of applications (8 ± 2 vs. 5 ± 1) and the number of unsuccessful freezes (20 (38%) vs. 125 (24%) of the veins) were significantly higher in the ERC group. TTI could be measured in 80% (481/604) of the veins during ablation and was significant longer in the ERC group (70 ± 30 vs. 48 ± 28 s). The BT was significantly lower at 30 s (-39 ± 6 vs. -35 ± 6 °C, $p = 0.004$) and the nadir BT was higher in the ERC-group (-42 ± 9 °C vs. -47 ± 7 °C, $p < 0.001$). In addition, significantly shorter TT were found at 0, 15 and 20°C in the ERC group). The mean BT below 0°C was -35 ± 7 °C in the ERC group compared to -38 ± 5 °C in the non-ERC group ($p < 0.001$). Multivariate analysis showed that a higher BT at 30s (HR 0.9 [0.81–0.99], $p = 0.036$), a higher nadir BT (HR 1.2 [1.1–1.3], $p < 0.001$) and a longer TTI (HR 1.0 [1.01–1.03], $p < 0.001$) were independently associated with ERC.

Conclusion: Three easily available biophysical parameters were associated with ERC. Using these parameters during ablation can help to avoid waiting period and adenosine challenge in selected patients.