

Results: A total of 216 patients under 40 years of age [mean age: 34.3±5.2 years, male: 70% (n=151), paroxysmal AF: 75% (n=162)] who underwent radiofrequency ablation were included in the study. In addition to PV isolation, non-PV triggers were detected and ablated in 80 (37%) patients. Procedure time, radiofrequency time, and fluoroscopy time were 152.32±51.8 min, 43.3±27.0 min, and 35.1±24.7 min, respectively. After a single procedure, 147 (68%) patients remained arrhythmia-free. A second procedure was performed in 38 (55%) out of 69 patients with recurrence. During repeat procedures, non-PV triggers were detected and ablated in 21 (55%) patients. After a mean follow-up of 21.6±8.5 months, and a mean of 1.2±0.5 procedures, the cumulative success rate reached 82%. There were no major complications. One patient had pericardial effusion, managed by non-surgical measures.

Conclusions: CA is a very effective therapeutic strategy in AF patients under 40 years old, and is associated with an acceptable complication rate.

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Reinterventions and repeat ablations following recurrence post cryoballoon pulmonary vein isolation in persistent AF patients: results from the prospective multicenter CRYO4PERSISTENT AF Study

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Background/Introduction: Pulmonary vein isolation is well established as the cornerstone of AF ablation, including treatment of persistent atrial fibrillation. To our knowledge, this is the first prospective multicenter study characterizing reinterventions and repeat ablations after arrhythmia recurrence in persistent AF patients treated with the Arctic Front Advance exclusively during the index procedure.

Purpose: The CRYO4PERSISTENT AF study (NCT02213731) is a prospective, multicenter, non-randomized, single arm study to assess single procedure outcomes of pulmonary vein antrum isolation using the cryoballoon.

Methods: The study enrolled patients with persistent AF (diagnosis within 12 months of consent, 100% AF burden of 7–180 days, and/or AF requiring cardioversion) at 11 sites in France, Germany, and Greece experienced with the cryoballoon. The primary endpoint was freedom from AF/AFL/AT recurrence at 12 months, defined as arrhythmias ≥30 seconds or reintervention for AF, excluding a 3-month blanking period. After enrollment, patients without documented 100% AF burden (18-hour Holter or 3 consecutive ECG recordings in a timeframe ≥14 days) were exited. AF related reinterventions and repeat ablations were collected throughout study follow up. Patients were followed at 3, 6, and 12 months, with 48-hour Holters at 6 and 12 months. An independent core lab adjudicated arrhythmia recurrence and adverse events were adjudicated by an independent committee.

Results: A total of 101 patients (62±11 years, 74% male, LVEF 56±8%, LAD 43±5 mm) meeting criteria, undergoing a cryoballoon ablation, with follow-up data, were included in the analysis. Freedom from AF/AFL/AT recurrence was 60.7% at 12 months (1-sided lower 95% confidence bound: 51.1%). The only cryoballoon device related event was transient phrenic nerve injury which was observed in 2 patients (2%). Thirty-three patients had a primary endpoint failure event. 17 patients had a repeat ablation procedure (5 cryo, 12 RF). In the remaining patients at the time of endpoint failure one had a DCCV and antiarrhythmic medication increased, 6 patients had a DCCV, 1 patient had antiarrhythmic medication increased and no action was taken for 8 patients. At the time of repeat ablation, 5 patients had a cryoballoon PVI-only procedure and 12 used radiofrequency energy including, a CTI line in 1 patient, roofline ablation in 2 patients, and anterior line ablation in 1 patient.

Conclusion(s): Pulmonary vein isolation with the cryoballoon is a safe and effective treatment for patients suffering from persistent AF: with 61% of patients free from atrial arrhythmia recurrence at 12 months, after a single procedure. About half of the patients with a primary endpoint failure required a repeat ablation, and the remaining patients were managed with no action, a DCCV, or medication increase.

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Are the repeat cryoablations after index RF ablation safe and effective? Insight from a multicenter observational data collection

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Background: Despite the well-known efficacy of pulmonary vein isolation (PVI) in restoring and maintaining sinus rhythm in patients with symptomatic paroxysmal, persistent, and long-standing persistent atrial fibrillation (AF), some patients required more than one procedure to achieve symptom and rhythm control.

Aim: Purpose of this analysis was to evaluate long-term safety and efficacy in patients who underwent redo- PVI procedure using Cryoballoon approach after index failed RadioFrequency (RF) PVI.

Methods: All patients underwent cryoablation (CB) PVI after an index failed RF were prospectively followed up in 23 Italian cardiology centers. Data were collected prospectively in the framework of the One Shot TO Pulmonary vein isolation (1STOP) ClinicalService® project. Information on procedural complication, acute and long term outcomes were collected during PVI procedure, scheduled and unscheduled hospital visits and phone contacts. Freedom from AF Recurrence was estimated by using the Kaplan-Meier method.

Results: One Hundred fifty four patients (mean age 58±10 years, 78% male, left atrial diameter: 40±8mm) underwent “redo” CB PVI ablation. Of these, 65% suffered from paroxysmal AF, while the remaining 35% from persistent or long-term persistent AF. The mean procedural time was 104±39 minutes, of which 25 minutes were for fluoroscopic evaluations. In the 65.3% of patients all 4 PVs were treated, while in the 20.2% only 3 veins were treated and in the 9% 2 veins. In the 5.6% more than 4 PVs were treated. Out of 154 patients, only one patients had an acute complication, a Transient Diaphragmatic Paralysis. Over a mean follow-up of 12 months, 40 AF recurrences occurred in the overall population: 22 (22%) in paroxysmal AF patients and 18 (33%) in Persistent AF patients. Kaplan-Meier freedom from AF recurrence is comparable between paroxysmal and persistent AF (63% in paroxysmal vs. 58% in persistent at 1 year, p=0.3). Out of 40 patients with AF recurrence, 6 patients (15%) underwent repeat PVI procedure.

Conclusions: In our multicenter research, repeat ablation using cryoballoon technology may be an effective and safe method to treat patients with recurrence of AF after RF PVI. The rate of complications was very low and the efficacy was independent from AF type (paroxysmal, persistent).

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Procedural characteristics, efficiency, and outcomes during PVI-only cryoballoon ablation in persistent atrial fibrillation: results from the CRYO4PERSISTENT AF study

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Background/Introduction: Pulmonary vein isolation is well established as the cornerstone of atrial fibrillation ablation, including treatment of persistent atrial fibrillation. To our knowledge, this is the first prospective multicenter study reporting acute and mid-term outcomes after a single PVI-only procedure in persistent AF patients using the Arctic Front Advance Cryoballoon exclusively.

Purpose: The CRYO4PERSISTENT AF study (NCT02213731) is a prospective, multicenter, non-randomized, single arm study to assess single procedure outcomes of pulmonary vein antrum isolation using the cryoballoon.

Methods: The study enrolled patients with persistent AF (diagnosis within 12 months of consent, 100% AF burden of 7–180 days, and/or AF requiring cardioversion) at 11 European sites that were experienced with the cryoballoon. Cryoapplication parameters, intra-procedural monitoring, sedation methods, and ablation tool utilization were evaluated. Treatment failures were defined as documented AF/AFL/AT ≥30 seconds or reintervention for AF, excluding a 3-month blanking period. Patients were followed by Holter-ECGs at 6 and 12 months. An independent core lab adjudicated arrhythmia recurrence and adverse events were adjudicated by an independent committee.

Results: A total of 101 patients (62±11 years, 74% male, LVEF 56±8%, LAD 43±5 mm) were included in the analysis. The 28-mm cryoballoon was used exclusively in all procedures, with additional use of 23mm in two procedures. Mean number of cryoapplications per patient was 6.1, with an average application time of 213.9 seconds. The mean minimum balloon-temperature was -55.2±6.1°C. Time to isolation was observed in 237 applications with a mean time to isolation of 54.5s, 44.3s, 38.6s, 48.3s for LSPV, LIPV, RSPV, RIPV, respectively. Lab occupancy, procedure, and fluoroscopy times were 133±51 min, 53±22 min and 18±12 min, respectively. Phrenic nerve was monitored in all cases, esophageal temperature was monitored in 49.5% of procedures, and 56.4% of procedures utilized conscious sedation. Freedom from AF/AFL/AT recurrence was 60.7% at 12 months

(1-sided lower 95% confidence bound: 51.1%). The only cryoballoon device related event was transient phrenic nerve injury, observed in 2 patients (2%), with resolution pre-discharge.

Conclusion(s): Cryoballoon-based PVI-only is safe and effective. The single procedure success rate at 12 months is 61%. No patients experienced PNI post-discharge.

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Low dose amiodarone provides effective and safe control of atrial fibrillation

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Introduction: Amiodarone is the most effective drug for the treatment of atrial fibrillation (AF), but long-term administration of standard doses can have prohibitive side effects. Little data is available for use of lower doses. We sought to determine the lowest effective dose for rhythm control in a single-physician practice.

Methods: Consecutive AF patients treated with Amiodarone using a down-titration schema were prospectively followed. The goal was the lowest dose providing effective rhythm-control defined as less than 1% AF burden in patients with devices (42% of patients) or no symptoms or no AF on ECG at last office visit in non-device patients.

Results: 170 patients (89M, 81F) were followed for a mean period of 63 weeks (range 12–177). 79 of 170 (46%) had devices (6 ILR, 29 PM, 27 ICD, 17 CRT). 5 patients had drug-related transient side effects, including 1 transient hyperthyroidism. No patient had pulmonary fibrosis or death. 130 of 170 patients (76%) had successful control of AF. Figure 1 shows the number of patients effectively controlled at each weekly dose level. 51% had success at less than or equal to 400 mg per week. Renal disease, systolic heart failure with reduced ejection fraction, and advanced age were common comorbidities.

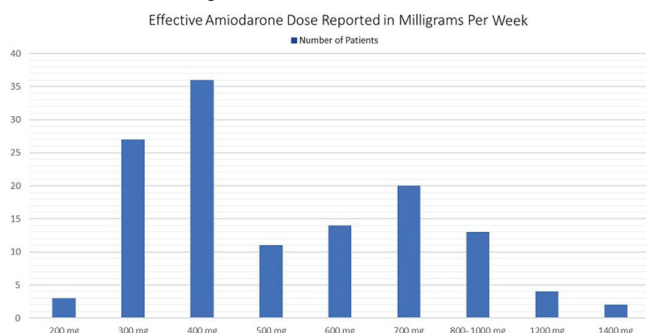


Figure 1

Conclusion: Low-dose Amiodarone is safe and effective for control of AF in most patients if carefully used in a down-titration protocol. Device diagnostics aid in patient management.

P5765

Prevalence, predictors, and clinical outcome of left ventricular reverse remodeling after catheter ablation for atrial fibrillation in patients with reduced ejection fraction

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Background: The purpose of this study was to determine the prevalence, predictors and clinical outcome of left ventricular reverse remodeling (LVRR) after catheter ablation (CA) for atrial fibrillation (AF) in patients with impaired LV function.

Methods and results: Among 2208 consecutive patients who underwent first-time CA for AF from January 2012 to September 2017 in our institute, 263 patients (12%) had baseline LV ejection fraction (LVEF) <50%. Among them, we retrospectively examined 242 patients who were subjected to 64-slice multi-detector computed tomography scanning to evaluate LV function at baseline and 3 months after CA. Although there was no significant change in LV end-diastolic volume, we found significant reduction in LV end-systolic volume (LVESV) (from 71±44ml to 46±48ml, $p<0.001$) and improvement in LVEF (from 40±9% to 62±15%, $p<0.001$). LVRR, which was defined as decrease in LVESV $\geq 15\%$, was observed in 146 patients (76%). Multivariate logistic regression analysis after adjustment for age and gender revealed that persistent AF (odds ratio, 3.05; 95% confidence interval, 1.34–6.95; $p=0.01$) and presence of underlying structural heart disease (odds ratio, 0.27; 95% confidence interval, 0.10–0.78; $p=0.02$) were significant predictors of LVRR. During the median follow-up of 669 days after CA, AF recurrence was observed in 79 patients (33%), and the incidence was similar between the groups (33% vs. 33%, $p=0.73$). On the other hand, heart failure (HF) hospital-

ization was observed in 8 (4%) patients and the incidence was significantly lower in patients with LVRR than those without it (1% vs. 16%, hazard ratio, 0.06; 95% confidence interval, 0.01–0.42, $p<0.001$).

Conclusion: A significant proportion of patients with impaired LV function achieved LVRR after CA for AF. Persistent form of AF and absence of apparent structural heart disease were predictors of LVRR. The low incidence of HF hospitalization despite equivalent AF recurrence in patients with LVRR taught us the significance of CA as HF management.

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Low baseline impedance and impedance response predict late pulmonary vein reconnection after ablation index guided ablation in persistent AF

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Introduction: The use of Ablation Index (AI) targets during PVI has been shown to improve outcomes. We hypothesised that tissue-catheter interface impedance behaviour, presumably related to differences in the underlying atrial substrate, could predict late reconnection (LRC).

Methods: 26 patients with persistent AF (81% male, 60.7 years [49.3–72.3]) underwent AI-guided point-by-point PVI. All patients underwent repeat study after 2 months to identify LRC in a 12 segment PV model. Novel algorithms were developed to analyse all 1724 RF lesions, including mathematical modelling of impedance response curves and AI:Impedance relationships.

Results: LRC was seen in 4/312 (1.3%) segments, 4/104 PVs in 4/26 (15%) patients. 55 lesions (3.1%) were delivered at segments that developed LRC; 91% of these were therapeutic according to AI targets (c/w 86% at other segments, $P=NS$). Significant predictors of LRC were impedance value at baseline, early during RF delivery, and minimum level; but none of the 'controllable' variables including contact force, AI or FTI.

Table 1. Parameters predicting late reconnection

Parameter	Late reconnection (n=55)	Durable lesions (n=1671)	p
RF time (s)	31.3±10.1	29.4±12.0	0.3
AI	510.4±65.7	500.5 ± 77.1	0.3
FTI	351.3±173.2	378.7±153.8	0.3
Contact force (g)	13.1±6.9	12.8±6.8	0.8
Baseline impedance (Ω)	155.1±8.8	162.7±17.3	<0.001
5 second impedance (Ω)*	149.1±7.7	159.1±16.9	<0.001
Impedance min (Ω)**	144.0±7.5	151.3±15.2	<0.001
Impedance drop (Ω)***	11.1±4.9	11.4±10.9	0.84
ID Time Constant (Ω/s)****	0.10±0.17	0.12±0.39	0.76
AI: ID Curve Slope*****	0.04±0.06	0.04±0.04	0.56

All values mean ± St.Dev. *Impedance after 5s of stable RF. **Lowest value during RF. ***Change from baseline to lowest impedance. ****Optimal fit exponential function to decay phase of lesion. *****Maximal derivative cubic polynomial function to AI: ID relationship.

Conclusion: Differences in the underlying tissue substrate between segments may be responsible for the limited LRC that occurs following target AI guided PVI. A substrate-specific RF strategy may further improve clinical outcomes.

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The effect of catheter ablation on visualized sympathetic innervation activity patterns by iodine-123 meta-iodobenzylguanidine in patients with atrial fibrillation: long-term follow up data

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Background: A novel cardiac gamma camera utilises the radiopharmaceutical Iodine-123 Meta-iodobenzylguanidine (123I –mIBG) to visualise cardiac sympathetic innervation. Physiologic uptake of 123I –mIBG provides anatomical quantification of autonomic nervous system (ANS) structures, with discrete uptake areas (DUA) located in the left atrium (LA) corresponding to main ganglionated plexi (GP) clusters that have previously not been able to be visualised.

Purpose: The purpose of this study is to visualise cardiac sympathetic innervation patterns in AF patients and to assess the influence of radiofrequency (RF) ablation on DUA sites in the LA during 6 month follow up.

Methods: Forty five AF patients (30 non-paroxysmal; 20 female, mean age 55±10) underwent cardiac computed tomography (CT) and 123I –mIBG nuclear imaging after isotope injection. Nuclear datasets were merged with the pre-acquired CT to generate a detailed anatomical map of cardiac sympathetic activity. The processed maps were imported to a 3D electroanatomical mapping system. High frequency stimulation (HFS) was performed using current recommended output settings at DUA sites indicating GP location and followed by targeted RF ablation. Additionally, HFS was performed in the expected anatomical GP areas. Circumferential pulmonary vein isolation with exit and entrance block confirmation was performed in all patients after DUA ablation. Follow up nuclear