

with atrial fibrillation (AF) undergoing radiofrequency catheter ablation (RFCA), using real-time three-dimensional echocardiography (RT3DE).

**Methods:** A total of 57 patients referred for RFCA were studied. Paroxysmal AF was present in 43 patients (75%), while 14 patients had persistent AF. After a mean follow-up of 7.9±2.7 months, patients were divided into 2 groups: successful RFCA (SR group) and recurrence of AF (AF group). RT3DE was performed before, within 3 days and 3 months after RFCA to assess LA volumes (maximum, minimum and preA) and function (passive, active and reservoir).

**Results:** A total of 38 patients (67%) had a successful RFCA (SR group). No differences in baseline characteristics were found between SR and AF groups except for higher percentage of persistent AF (42 vs. 11%,  $p<0.05$ ) and bigger LA maximum volume in AF group (31±8 vs. 26±8 mL/m<sup>2</sup>,  $p<0.05$ ). Immediately after RFCA, no significant changes in LA volumes and function were observed. After 3 months, a significant reduction in LA volumes and improvement in LA active and reservoir functions was noted only in SR group. Conversely, AF group showed a trend towards an increase in LA volumes and a deterioration of LA function (Table).

Table 1

	SR group N = 38	AF group N = 19	p value (SR vs AF group)
LA <sub>max</sub> Vol (mL/m <sup>2</sup> )			
Baseline	26±8	31±8	0.04
After ablation	26±8	31±8	0.04
3 months follow-up	23±7*	32±8	<0.001
LA <sub>min</sub> Vol (mL/m <sup>2</sup> )			
Baseline	13±5	16±7	NS
After ablation	12±5	17±6	<0.01
3 months follow-up	10±4*	18±6	<0.001
LA <sub>preA</sub> Vol (mL/m <sup>2</sup> )			
Baseline	16±5	18±6	NS
After ablation	16±5	18±4	NS
3 months follow-up	14±5*	20±6*	<0.01
LA <sub>passive</sub> EF (%)			
Baseline	39±9	38±10	NS
After ablation	39±9	35±10	NS
3 months follow-up	38±9	35±9	NS
LA <sub>active</sub> EF (%)			
Baseline	22±8	24±7	NS
After ablation	21±6	17±7	NS
3 months follow-up	33±9*	15±9*	<0.001
LA <sub>reservoir</sub> EF (%)			
Baseline	116±45	101±55	NS
After ablation	117±43	92±49	NS
3 months follow-up	152±54*	78±35*	<0.001

\* $p<0.01$  between baseline and follow-up.

**Conclusion:** In patients who maintain SR after RFCA, a significant LA reverse remodeling and functional improvement is observed using RT3DE.

### P2618 Long-term results in antral isolation of pulmonary veins with cryoballoon technique in paroxysmal atrial fibrillation



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**Background:** In the treatment of paroxysmal atrial fibrillation (af), circumferential substrate modification of the antrum of pulmonary veins (pv) seems superior in comparison to segmental methods. However, radiofrequency energy is associated with a risk of pv stenoses and esophago – left atrial fistulas. This study reports on the long-term experience in antral isolation of pv with cryoballoon technique in a large patient cohort.

**Methods:** After pv angiography isolation was performed with best fitting 28/23mm balloon (Arctic Front, Cryocath, Canada). The inflated over the wire balloon occludes the venous antrum freezing down to – 75°C 6 minutes two times per vein with nitrous oxide. Lasso mapped rest potentials were eliminated with additional balloon freezes or due to touch up with a 9 french Freezor Max catheter. Patients were followed every 3 months with 7-day holter.

**Results:** Out of more than 200 patients (p) we analysed the first 161 p (45 women, mean age 59±10 years, 149 with paroxysmal, 12 persistent af, left atrium 42±5 mm, 72 p with lone af, 65 hypertension, 24 mild structural heart disease) with 23/28 mm balloon. Mean vein diameter was 18±4 mm angiographically. With a mean number of 2.4±0.7 impulses applied in 113 p (70%), we isolated all pv with balloon only, in 30% with additional touchup. In the last 55 p all pv could be isolated with balloon only. In 33% we had to combine 23/28 mm balloon. Over time mean procedure time decreased to 164±31 min and x ray burden to 29±9 min. Phrenic nerve palsy in 7 p (4%) recovered within 3 to 9 months. During a mean follow-up of 10.7 months and 1.1 procedures per p (12 redos) of 120 p controlled with serial 7-day holter and symptoms, 72% (86 p) were free of af. 29 out of the remaining 34 p showed a marked reduction of af burden, an overall clinical success of more than 95%. In the 12 redos 77% of the 35 reconducting veins were initially isolated with the 28 mm balloon.

**Conclusion:** Antral cryoisolation of the pv with the balloon technique is safe and shows a convincing outcome in long-term experience. The superiority in comparison to substrate modification with RF will be an early and first line therapy of left

atrial disease. Avoidance of phrenic nerve lesion and focus on improvement of balloon design may be essential.

### P2619 PV antrum ablation for PAF by duty-cycled bipolar/unipolar RF energy through a novel circular decapolar catheter



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**Introduction:** PV antrum ablation remains a lengthy and difficult procedure requiring 3-D navigation, with widely varying success rates. We tested the clinical efficacy of a novel decapolar circular catheter delivering duty-cycled bipolar and unipolar low power RF energy.

**Methods:** 45 pts with paroxysmal AF were included in the study from April-December 2007. Structural abnormalities were excluded by MRI and TEE. Antrum ablation was performed with the circular PVAC catheter (PVAC, Ablation Frontiers Inc, Carlsbad CA) (25 mm Ø) by application of alternating bipolar and unipolar RF energy with a duty cycle of 4:1, with a maximum power of 10 W per electrode, producing a target temperature of 60°C at selected electrodes. Bi-plane fluoroscopy was used for steering, and no alternative ablation devices were needed. Anti-arrhythmic drugs were discontinued at 3 months. Follow-up included 3 months and 6 months visits with ECG recording, 24-hr Holter at 6 weeks, and 7-day Holter recording at 6 months in a drug free state. After the 3 month blanking period, symptomatic pts were encouraged to visit the hospital for an ECG during complaints, or were equipped with an event recorder. Any left atrial arrhythmia >30 sec was considered a failure of therapy. Anti-arrhythmic therapy was discontinued in all pts at 3 months.

**Results:** A single PVAC antrum ablation was performed in 45 pts (9 female, mean age 60±9 yr) with a procedure time of 97±32 min, fluoroscopy time of 20±9 min, for 29±7 applications per patient. A total of 172 veins (3 common) were all isolated (100%), checked by mapping distal to the ablation line with PVAC, and confirmed with Lasso in 18 of 45 pts. The number of applications was 9±3 LSPV, 7±3 LIPV, 8±3 RSPV, and 7±3 RIPV. Forty-four pts were followed with a mean follow-up of 5±2 mo, 32 of which beyond the 3 mo blanking period when drugs were discontinued. In 2 of 40 pts (5%) AF was seen on 24-hour Holter at 6 weeks. Beyond the 3 month blanking period, in 3 of 32 pts an ECG documented AF recurrence was observed. A 7-day Holter was performed in 14 pts at 6 months, showing AF in 2 additional pt. Taken together, 16% of pts had a documented AF recurrence after a single PVAC ablation. One pt was lost for follow-up due to cerebral hematoma after head trauma while on oral anti-coagulation. No specific procedure related complications were observed, either during the procedure or after 30 days.

**Conclusions:** PVAC antrum isolation with duty-cycled low power bipolar-unipolar RF energy is a novel ablation technique that is both feasible and safe. Current clinical efficacy is promising with 84% free of AF beyond 3 months.

### P2620 The effect of treatment of obstructive sleep apnea on atrial fibrillation success rates after pulmonary vein isolation in a longstanding persistent atrial fibrillation population



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**Background:** Prior studies have established a strong independent association between obstructive sleep apnea (OSA) and pulmonary vein antrum isolation (PVAI) failure. However, whether treatment of OSA with a CPAP or BiPAP device is associated with better PVAI success has yet to be established.

**Methods:** We collected data from 1,395 patients that had a PVAI at the Cleveland Clinic (Cleveland, Ohio), Stanford University (Palo Alto, California), Sutter Pacific Medical Center (San Francisco, California) and Texas Arrhythmia Institute (Austin, Texas) from 2004 to 2007. Patients with persistent long standing AF (CAF), PVAI, and OSA were selected. They were divided into two groups. Group 1: patients with OSA with either CPAP or BiPAP and Group 2: patients with OSA with no treatment prior to the procedure and during the follow up period.

Variable	Group 1	Group 2	P value
N	33	37	
Male	30 (94%)	32 (84%)	0,3
Age	60.9±1.6	59.4±1.5	0,5
HTN	16 (50%)	17 (44.7%)	0,7
DM	5 (15.6%)	8 (21%)	0,8
CAD	4 (12.12%)	3 (7.9%)	0,7
BMI	33.26±6.193	32.6±1	0,7
LA size	4.59±0.14	4.77±0.12	0,3
EF	53.8±2	50.6±1.7	0,2

N: number of patients, HTN: Hypertension, DM: Diabetes mellitus, CAD: Coronary artery disease, BMI: Body mass index, LA size: left atrial size, EF: ejection fraction.