

AB35-5

COMPLETION OF MITRAL ISTHMUS ABLATION USING A STEERABLE SHEATH: PROSPECTIVE RANDOMIZED COMPARISON WITH A NON-STEERABLE SHEATH

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Introduction: Mitral isthmus ablation between the left inferior pulmonary vein (PV) and the mitral annulus in patients with atrial fibrillation (AF) and peri-mitral atrial flutter has been shown to be an effective ablative strategy. The establishment of the bi-directional conduction block of the MI, however, is technically challenging. We investigated the usefulness of a steerable sheath for mitral isthmus ablation in patients with persistent AF.

Methods: A total of 80 consecutive patients (75 males; mean age 55±11 years) undergoing mitral isthmus ablation were randomized to one of the following two groups: group S (using a steerable long sheath) or group NS (using a non-steerable long sheath). Mitral isthmus ablation between the left inferior PV and mitral annulus was performed by using an open-irrigated ablation catheter with the guidance of a three-dimensional mapping system. The endpoint of the mitral isthmus ablation was the achievement of a bidirectional block of the line.

Results: Bidirectional block through the mitral isthmus was achieved in 87.5% (70/80) of patients with 14.0±6.7 minutes of radiofrequency application. The bi-directional block was more frequently achieved in patients in group S compared to group NS (97.5% (39/40) vs. 77.5% (31/40), P=0.02). Additionally, epicardial ablation within the coronary sinus was less frequently required in group S compared to group NS (12.5% (5/40) vs. 72.5% (29/40), P<0.0001). Atrial tachycardia after the procedure more frequently occurred in the patients in whom mitral isthmus block had not been achieved during the initial procedure (40.0% (4/10) vs. 10.0% (7/70), P=0.04).

Conclusions: The use of a steerable sheath resulted in a higher success rate of mitral isthmus block with a decreased need for epicardial ablation inside the coronary sinus in patients with persistent AF, compared to when a non-steerable sheath was used. A complete block of mitral isthmus should therefore be established to prevent atrial tachycardia post persistent AF ablation.

AB35-6

RADIOFREQUENCY ABLATION OF ATRIAL FIBRILLATION IN PATIENTS WITH MECHANICAL MITRAL VALVE PROSTHESES: FEASIBILITY, SAFETY AND OUTCOMES

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Introduction: The role of radiofrequency ablation (RFA) for atrial fibrillation (AF) in patients with mechanical mitral valve prostheses (MVP) is not yet established. We sought to evaluate the feasibility, safety and outcomes of RFA of AF in patients with MVP.

Methods: Between January 2003 and December 2008, all 81 patients with MVP referred to our electrophysiology laboratory for first time RFA of AF were included and compared to 162 age and gender matched controls. The position of the ablation catheter relative to the MVP was monitored by fluoroscopy, and

by intracardiac echocardiography. Arrhythmia recurrences were identified by symptoms with documentation, event monitoring, Holters and ECGs.

Results: All MVP patients and controls underwent ablation under therapeutic INR (2.4±0.6 vs. 2.6±0.8, p=0.82) and had isolation of all pulmonary veins. Patients with MVP had larger atria (23.1 vs. 30.3 cm², p<0.0001) and lower left ventricular ejection fractions (49.2 vs. 54.5%, p=0.0001). No entrapment of catheters within MVP or stroke occurred. Complications occurred in 7 patients with MVP (8.6%): 2 hematomas (1 required transfusion); 3 groin bleeds (1 required transfusion); 1 femoral pseudo-aneurysm required surgery and 1 asymptomatic pericardial effusion. There were no differences in terms of complications between the groups (p=NS) but patients with MVP received more radiation (397 vs. 241 mGy, p=0.01). At 24 months follow-up, more patients in the MVP group had arrhythmia recurrence (49.4 vs. 27.7%, p=0.0006). MVP patients with recurrence had older prostheses in place (7 vs. 4 years, p=0.03) and longer duration of AF (7 vs. 5 years, p=0.04). In Cox proportional hazards analysis, there were no independent predictors for AF recurrences in patients with MVP. An average of 1.4±0.6 ablations per patient was required to restore sinus rhythm in 70% of patients with MVP.

Conclusions: RFA is feasible and safe in patients with MVP, but is technically challenging. It allowed restoration of sinus rhythm in a substantial proportion of patients with MVP but recurrence rates were higher compared to controls. Surgical scarring and atrial myopathy from chronic MV disease likely underlie recurrences.

ABSTRACT PLUS SESSION AB36: Innovations in Ablation and Mapping of Atrial Arrhythmias

Friday, May 6, 2011

1:30 p.m. - 3:00 p.m.

AB36-1

PULMONARY VEIN ISOLATION USING THE VISUALLY-GUIDED LASER BALLOON: THE FIRST 200-PATIENT MULTICENTER CLINICAL EXPERIENCE

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Introduction: The visually-guided laser balloon (BAC) is unique in its ability to deliver contiguous point-by-point laser energy around PV ostia under endoscopic guidance. In single center experiences, this device has proven capable of achieving reliable PV isolation. Although PVI using the BAC has been shown to be possible, there is limited data. We report the multicenter world experience with the BAC in the first 200 patients treated for paroxysmal AF.

Methods: Drug refractory PAF pts (n=200) underwent BAC-based ablation as part of 4 clinical studies (15 sites, 4 countries). Following transseptal puncture, the BAC was positioned at the PV ostia through a 12 Fr deflectable sheath, and an adjustable 300 arc of laser energy (980nm) was used to isolate each PV under endoscopic visual guidance. PVI was verified using a circular mapping catheter.

Results: The mean age of the pts was 57.0±9.4 yrs (59%M/41%F). The procedural data is shown in Table 1.

Procedural complications consisted of Phrenic nerve injury in 6 pts (3%), pericardial effusions in 6 (3%). There were no strokes, PV stenosis, or atrial esophageal fistulas. Of the 107 pts (54%) that have achieved at least 6 months of follow-up, the freedom from AF was 65%.

Conclusions: In this initial multicenter experience, visually-guided laser balloon ablation can reproducibly achieve PV isolation to treat paroxysmal AF.

	N=200
# PVs Targeted	773
# PVs Isolated (%)	763 (98.7%)
# PVs isolated on First Attempt (%)	604 (78.1%)
Fluoroscopy Time (min)	31±21
Energy Delivery Time (min)	62±17
Total Procedure Time (min)	200±54

AB36-2

REDUCTION OF SPONTANEOUS DIAPHRAGM MOVEMENT AS A MORE SENSITIVE AND EARLIER WARNING SIGN OF IMMINENT PHRENIC NERVE PALSY DUE TO CRYO-BALLOON ABLATION COMPARED TO PACING FROM THE SUPERIOR VENA CAVA

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Introduction: Cryo-balloon ablation of the pulmonary vein (PV) is an effective and safe treatment modality of drug-refractory atrial fibrillation (AF). Apart from usually transient phrenic nerve palsy, complications are very rare. Phrenic nerve palsy however can occur in up to 10 % of ablation procedures. In case of imminent palsy, ablation must be terminated as soon as possible. The current study examines, if pacing of the phrenic nerve from the SVC or fluoroscopic observation of spontaneous diaphragm movements detects a developing phrenic nerve palsy at an earlier point of time.

Methods: 170 consecutive patients (pt) were included in the study. Following PV angiography, Arctic Front™ cryo-balloon ablation was performed. During cryo ablation of the right superior PV (RSPV), stimulation of the phrenic nerve from the SVC and palpation of the upper right abdomen was performed every 2.5 sec. At the same time fluoroscopy of the right diaphragm was performed every 10 sec for 5 sec. Cryo ablation was stopped immediately if any sign of developing phrenic nerve palsy occurred. Potential recovery of the right diaphragm was examined at the end of the ablation procedure, at discharge and during follow-up every 3 months.

Results: Partial or complete phrenic nerve palsy was documented in 17 out of 165 patients (10.3%) (11 men, mean age 62±11 years, 12 paroxysmal AF, 15 x 28mm balloon, 2 x 23mm balloon). Palsy was observed after 144±73 sec. Minimum temperature was - 55±8 °C. In all patients, reduced spontaneous diaphragm movement on fluoroscopy was observed first, before loss of capture at phrenic nerve pacing from the SVC. Phrenic nerve palsy had recovered fully at the end of the procedure in 11 pt, and partial in another 3 pt. 3 pt were discharged with persistent palsy. 2 of the 3 palsy had fully recovered 6 months after the procedure.

Conclusions: Fluoroscopic observation of spontaneous diaphragm movement is a considerably more sensitive test for early recognition of imminent phrenic nerve palsy compared

to phrenic nerve stimulation from the SVC. This allows earlier detection of imminent palsy and potentially reduction of the incidence of clinically significant phrenic nerve palsy.

AB36-3

ASSESSMENT OF LEFT ATRIAL INJURY BY CARDIAC MR: A RANDOMISED PROSPECTIVE COMPARISON OF ROBOTIC VERSUS MANUAL AF ABLATION.

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Introduction: Catheter stability, tissue contact force and RF duration are determinants of lesion formation and may be operator-dependent. The Hansen robotic system permits accurate titration of contact force while maintaining a stable catheter position. We compared atrial injury following manual or robotic catheter ablation by quantifying tissue necrosis with delayed enhancement (DE) and tissue edema with T2 enhancement on cardiac MR.

Methods: Following confirmed PVI, 24 pairs of PVs were imaged in 12 PAF patients (age 54±15 y) undergoing their first left atrial ablation. Manual, n=6 and robotic, n=6. DE and T2 imaging were performed pre and immediately post wide area circumferential ablation (WACA). % PV antrum encirclement was quantified for each of DE, T2 and DE & T2.

Results: Robotic ablation resulted in greater circumferential lesion extent as assessed by DE and T2. In both groups, areas of T2 (edema) not only overlapped with areas of DE but also filled in gaps between areas of DE, together producing near complete circumferential lesions for all PVs. Combination of T2 and DE conferred higher % encirclement in the robotic series (92%) versus standard navigation (71%) achieving a statistical significance (p=0.007). Higher robotic mean ratio of DE to (T2+DE) of 0.75±0.18 versus 0.61±0.30 was observed (statistically non-significant, p=0.20). Mean energy delivered was 84.2kJ versus 79.6kJ in the robotic and standard navigation groups (p=0.82) respectively.

Conclusions: In comparison with manual ablation, robotic LA ablation achieves more tissue necrosis and a greater degree of PV antral encirclement. This may be a function of improved stability and contact force information.