

2:00 p.m.

1008-94 Long Term Efficacy When Using Multi-Array Catheters and Phased Radiofrequency Energy for Ablation of Chronic Atrial Fibrillation

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Background: Widespread adaptation of radiofrequency catheter ablation (RFCA) of chronic atrial fibrillation (CAF) has been limited by long procedure times and low efficacy. This study was designed to evaluate the safety and efficacy of multi-array catheters combined with phased radiofrequency energy for RFCA of CAF.

Methods: Fifty-three patients with CAF underwent RFCA using a combination of three multi-array mapping and ablation catheters: A circumferential 10-electrode catheter for atrial pulmonary vein (PV) isolation, a 3-arm, 12 electrode catheter for septal ablation of complex fractionated atrial electrograms (CFAEs), and a 4-arm, 8 electrode catheter for CFAE ablation of the roof and other areas of the left atrium. Bipolar/unipolar phased radiofrequency was selectively delivered through all chosen electrodes at ratios of 1:1, 2:1, and 4:1, depending on the desired lesion depth. Non-fluoroscopic navigation systems were not utilized during the procedures. Power was limited to 10 watts/electrode. Acute success was defined as complete isolation of all PVs and stable sinus rhythm at the end of the procedure. Chronic efficacy was assessed with a continuous 7-day Holter monitor at six months post procedure.

Results: Acute efficacy was documented in 50/53 patients (94.3%). Procedure times once a trans septal puncture was completed was 2 hours and 8 minutes. 21/53 (40%) of patients required two ablation procedures. 27 patients have completed a 7-day Holter monitor recording six months post ablation. 7 days of continuous sinus rhythm have been documented in 23/27 patients (79.4%). 2 patients demonstrated intermittent episodes of self terminating PAF totaling 3.3 and 11% of the total recording. Of the 23/27 (79.4%) chronic success patients 2 remained on an AAD. The only serious complication was a transient neurologic event in one patient.

Conclusions: Multi-array catheters in conjunction with phased radiofrequency energy may allow good safety and long term efficacy when ablating CAF.

2:00 p.m.

1008-94A Safety, Efficacy, and Follow-up of Circumferential Pulmonary Vein Ablation in Octogenarians

Vincenzo Santinelli, Andrea Radinovic, Simone Sala, Gabriele Vicedomini, Patrizio Mazzone, Simone Gulletta, Cristiano Ciaccio, Giuseppe Cicone, Gabriele Paglino, Giuseppe Augello, Emma Geleza, Enrico Frigoli, Andreina Santagostino, Carlo Pappone, San Raffaele Hospital, Milan, Italy

Background: CPVA is an effective strategy for patients with atrial fibrillation (AF), but its safety and efficacy in the elderly have never been reported.

Methods: Between January 2005 and December 2006, all consecutive patients over the age of 80 referred for CPVA were enrolled. Complications and long-term outcome were prospectively assessed by daily transtelephonic monitoring (TTM) and echocardiography.

Results: The study population consisted of 172 patients (mean age, 83±2, male 55%) with paroxysmal AF (60 patients), persistent AF (50 patients), and permanent AF (62 patients). The average duration of AF prior to ablation was 7±5 years. Multiple comorbidities were present in 73% of patients (CAD in 38%, valvular heart disease in 46%, hypertension in 77%, diabetes in 20%, heart failure 15%, respiratory disease 10%). Respiratory arrest during anesthesia occurred in 5 patients. Complications during the procedure occurred in 4 patients including femoral pseudoaneurysm, arteriovenous fistula, or tamponade not requiring surgical intervention. Over a mean follow-up of 18±5 months, 43/172 patients with comorbidities (heart failure, diabetes and hypertension) had AF recurrences with an overall success rate of 75%; in particular, 54 patients (90%) with paroxysmal AF, 38 (76%) with persistent AF and 37 patients (60%) with permanent AF were in sinus rhythm. AF recurrences, as documented by TTM, were silent in 23/43 patients (53%). A repeat procedure was done in 6/36 patients and the remaining patients were cured medically. Embolic events occurred in 6 patients (3.5%) despite optimal anticoagulation. In patients with permanent AF and sinus rhythm after ablation an inadequate atrial function persisted up to 1 year after procedure.

Conclusions: In octogenarians, CPVA is a safe and effective treatment particularly for paroxysmal and persistent AF. Greater attention is required during the procedure considering a higher number of procedure-related complications. Asymptomatic recurrences after ablation are frequent underestimating the true recurrence rate in such population supporting the need to continue anticoagulation even in the presence of sinus rhythm.

2:00 p.m.

1008-97 Visualizing Ablation Gaps In Vitro Using a Deflectable Fiber Optic Endocardial Visualization Catheter

Afraz R. Irani, Bryant Lin, Christian Eversull, Paul J. Wang, Amin Al-Ahmad, Stanford University Medical School, Stanford, CA, Acumen Medical, Sunnyvale, CA

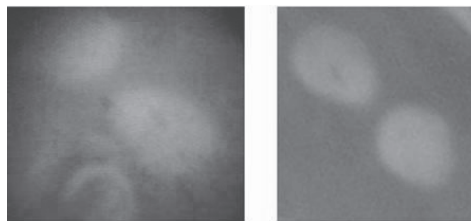
Background: The efficacy of pulmonary vein isolation for the treatment of atrial fibrillation (AF) may be limited by a clinician's ability to make a continuous lesion with a catheter based system. Gaps often persist between ablation lesions leading to failed electrical isolation, leading to recurrence of AF or the genesis of atrial flutter.

Methods: Ninety-four radiofrequency lesions (RF) were delivered to ex-vivo porcine endocardium. Gaps between the lesions ranged between 0.1mm and 9.8mm. We utilize a deflectable fiberoptic endocardial visualization catheter using light in the visible spectrum to visualize the endocardial surface and lesions. Videos were taken of the lesions and

shown to two blinded readers who were asked to identify the gaps ranging from less than 0.1mm to 9.8mm.

Results: Ninety-four lesions were reviewed. The readers demonstrated a combined accuracy of 98.4% at identifying lesion gaps. Figure 1 shows a 0.4 mm gap between two ablation lesions. The left panel shows the video capture from the direct visualization catheter, and the right panel shows the gross specimen of the same sample.

Conclusion: Gaps between ablation lesions can be accurately identified down to less than 1 mm distances in vitro using a direct visualization catheter. Further studies are warranted to confirm these finding in vivo.



2:00 p.m.

1008-98 Comparison of Pulmonary Veins and Left Atrial Dimensions in Humans Using Gated Rotational Cardiac Fluoroscopy vs. Cardiac CT

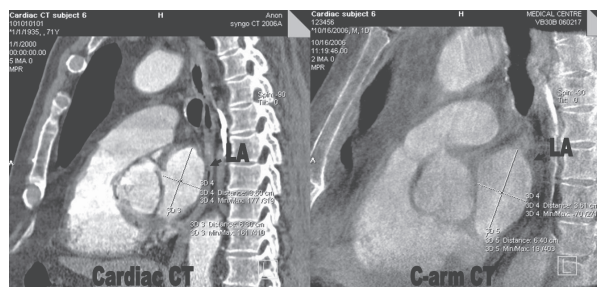
Azar Mehdizadeh, Rebecca Fahrig, Paul J. Wang, Paul C. Zei, Henry H. Hsia, Teri Moore, Jarret Rosenberg, Amin Al-Ahmad, Stanford University, Stanford, CA, Siemens Medical AX Division, Forchheim, Germany

Background: Cardiac CT is useful in visualizing the anatomy of the left atrium (LA) and pulmonary veins (PV) for ablation of atrial fibrillation (AF). Recently, cardiac C-arm CT has been developed to allow acquisition of several bi-directional sweeps during synchronized acquisition of ECG for retrospective gating (AXIOM Artis dTA, DynaCT, Siemens Medical Solutions, Forchheim, Germany). To evaluate cardiac C-arm CT image quality, we compared LA and PVs dimensions using C-arm CT and clinical CT in an in-vivo human study.

Methods: Gated clinical CT images were obtained in 6 humans, then 0, 1 or 2 AF ablation procedures were carried out, and finally cardiac C-arm CT images were acquired. The LA and the 4 major PVs were measured in 3D volumes along 2 orthogonal axes at the largest cross sectional area and at the level of entry into the LA respectively.

Results: There was high intrareader reliability for both CT (.885, p<.001) and C-arm CT (.884, p<.001) and strong concordance correlation between them (.989, p<.001). Bland-Altman Limits of Agreement were -.49 and +.37 mm. A Westlake test of equivalence found C-arm CT measurements equivalent within 20% to CT ones (p<.01), with mean differences of -0.167 mm (2 ablations) to 0.032 mm (no ablations).

Conclusions: 3D cardiac imaging, carried out in the EP lab using cardiac C-arm CT, is highly accurate and such images could be generated during an intervention, providing true images of patient anatomy during the intervention for guidance and procedural planning.



2:00 p.m.

1008-99 Feasibility of ECG-Gated CT-Fluoroscopy Registration in Catheter-Based Atrial Fibrillation Ablation

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Background: CT-fluoroscopy integration has been used to navigate the ablation catheter in the complex anatomy of the left atrium (LA) during atrial fibrillation (AF) ablation. However, this modality still faces multiple obstacles, including registration error due to mismatch during the cardiac cycle. We report on the feasibility of using an ECG-gated technique to overcome this hurdle.

Methods: One-hundred-twenty consecutive patients with symptomatic AF refractory to medical therapy (60% paroxysmal, 40% persistent, age 58±9, 99 males) underwent catheter ablation. All patients received pre-procedural contrast-enhanced CT during inspiration. Three-dimensional segmentation was done at 75% of R-R interval for patients in normal sinus rhythm (NSR) or 45% of R-R interval for patients in AF. During the ablation procedure, the fluoroscopic images were gated to the ECG at the exact timing of the cardiac cycle where the CT image was taken using two different techniques: prospective