1090-218 **Randomized Comparison of Anatomical Versus Voltage-Guided Ablation of the Cavotricuspid Isthmus for Atrial Flutter**

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Background: It is not clear whether local atrial electrogram amplitude influences the achievement of complete cavotricuspid isthmus (CTI) block during radiofrequency ablation for atrial flutter. The purpose of this study was to prospectively compare the technical aspects and efficacy of CTI ablation using a strictly anatomic approach and using an approach guided by a bipolar voltage map to avoid high voltage zones in the CTI.
Methods: Thirty-two patients with atrial flutter were randomized to CTI ablation with an anatomical approach (Group I, 16 patients) or guided by a bipolar voltage map (Group II, 16 patients).A 3-D electroanatomical mapping system and an 8-mm-tip ablation catheter (temperature target 55°, power 70W) were used in all patients. With the anatomical approach, a line was created at a 6 o'clock position (LAO 45) in the CTI isthmus without detailed reconstruction of the CTI geometry. During voltage-guided ablation, a high-density bipolar voltage map of the CTI was created, then contiguous applications of radiofrequency energy were delivered at CTI sites with the lowest bipolar voltage.
Results: Complete CTI conduction block was achieved in 100% of patients in each group. The mean of the maximum voltages along the line were 3.3 ± 1.7 mV in Group I, compared to 1.4 ± 0.6 mV in Group II (p<0.001). Creating a high-density voltage map was associated with a 21 ± 11 minute increase in the total procedure time (p=0.2). During a mean follow-up of 59 ± 44 days, there was no recurrence of atrial flutter in either group. There were no complications in either group.
Conclusions: When CTI ablation for atrial flutter is performed with an 8-mm-tip catheter, complete block can be achieved in all patients regardless of local voltage. Ablation of high voltage zones is not associated with a higher incidence of recurrence. Therefore anatomical ablation without detailed mapping may be the preferred initial approach for CTI ablation.

1090-219 **Cryoablation of Atrial Flutter: Results of a Multicenter Clinical Study**

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Background: Inadequate tissue contact, catheter tip instability, and pain stimulus during radiofrequency (RF) ablation may pose difficulties when creating the linear lesion needed for cure of typical cavo-tricuspid isthmus-dependent atrial flutter (AFL). We evaluated the acute efficacy of cryoablation (cryo) for the treatment of isthmus-dependent AFL. Methods:30 patients with clinical AFL (23 males, mean age 66+/-9 yrs) underwent electrophysiology study with multipolar catheters positioned in the right atrium (RA) and coronary sinus. AFL was induced and entrained from the isthmus. Cryoablation was performed with a novel 10 Fr bipolar steerable cryo-catheter and console (CryoCor, Inc.). Contiguous 4 minute cryo applications using a freeze-thaw cycle were delivered across the isthmus from the tricuspid valve annulus to the inferior vena cava-RA junction. Results: A mean of 16+/-6 applications were delivered to the isthmus. Average cooling of the catheter tip was to -80+/-4 degrees C, which is substantially colder than the tip temperature attainable with other first-generation cryo-catheters. The catheter tip was adherent and remained stable during cryo. Acute endpoints of non-inducibility and bidirectional block were achieved in 28/30 patients (93%). The mean procedure time was 186+/-55 min, including at least 30 min observation post ablation, with fluoroscopy time of 43+/-22 min. Patients reported no discomfort during application of cryo. There were no procedure related adverse events. Conclusion: Clinical results from this study demonstrate that when lower temperatures are achieved, trans-catheter cryoablation is highly effective in the treatment of isthmus-dependent AFL. Catheter stability and patient comfort with cryo appears superior to that observed with RF ablation, whereas efficacy is comparable.

1090-220 **Atrial Tachycardia Originating From the Pulmonary Veins: Is Single Vein Isolation Adequate?**

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Background: Atrial tachycardia may arise from the pulmonary veins and presents with frequent paroxysms of tachycardia that are difficult to suppress with antiarrhythmic therapy. Premature atrial contractions from the pulmonary veins are known to initiate atrial fibrillation. In the age of pulmonary vein isolation for the treatment of atrial fibrillation, is single vein isolation for atrial tachycardia curative or will atrial fibrillation arise afterward? Objective: To evaluate the effectiveness of single pulmonary vein isolation for atrial tachycardias arising from that vein and identify the long-term arrhythmia risk in those patients. Methods: Thirteen patients underwent single pulmonary vein isolation or focal ablation for the treatment of atrial tachycardia mapped to that vein between April of 1997 and April of 2003. The patients were followed for a mean of 21.1 months (SEM +/- 6.7). Results: After successful isolation or focal ablation (2 patients required more than one procedure), none of the thirteen patients experienced further atrial tachycardia during follow up. Two patients who had atrial fibrillation prior to the procedure continued to have atrial fibrillation afterward, but none of the patients without atrial fibrillation prior to the procedure experienced this arrhythmia following ablation. Conclusion: Atrial tachycardias arising from the pulmonary veins in patients without atrial fibrillation can be successfully treated with single vein isolation without recurrence of this arrhythmia or subsequent development of atrial fibrillation.

1090-221 **Radiation Skin Exposure, Effective Organ Doses, and Estimated Cancer Risk for Pulmonary Vein and Cavotricuspid Isthmus Ablation Using a Low Frame Pulsed Fluoroscopy System**

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Background: Catheter ablation of the pulmonary veins (PV) represents a new treatment option for atrial fibrillation (AF). The procedure is complex and requires prolonged fluoroscopy exposure. Pulsed fluoroscopy with very low frame rate (7.5 fps) can reduce radiation exposure by greater than 50%. The purpose of this study was to measure radiation exposure during PV ablation procedures using a state of the art, pulsed fluoroscopy system and to compare it with ablation of the cavotricuspid isthmus.
Methods: 15 patients (pt) referred for PV isolation and 5 pt referred for cavotricuspid isthmus ablation for atrial flutter (AFL) were studied. A biplane pulsed (7.5/sec) fluoroscopy system (Siemens Bicor HS) was used. Pt's skin exposure was measured by 60 thermoluminiscent dosimeters positioned on the pt's back, corresponding to the location of the fluoroscopy tubes.
Results: Mean fluoroscopy time for AF was 68±21 min in RAO and 62±17 min in LAO projection. Mean fluoroscopy time for AFL was 18±5 min in RAO and 12±7 min in LAO projection. Mean peak skin dose for AF was 1.0±0.5 Gy in RAO and 1.5±0.4 Gy in LAO projection. Mean peak skin dose for AFL was 0.4±0.2 Gy in RAO and 0.5±0.5 Gy in LAO projection. For AF pts the effective organ dose was 27.3 mSv for males and 18.7 mSv for females, resulting in an excess risk of fatal malignancy of 2099 per 1 million pts in males and 1518 per 1 million pts in females. For AFL pts, the effective organ dose was 3.79 mSv, resulting in an excess risk of fatal malignancy of 292 per 1 million pts.
Conclusion: Even though catheter ablation of AF using a PV approach is associated with prolonged fluoroscopy duration, the skin exposure to pts was below the threshold for skin injury (<2Gy) for low frame rate pulsed fluoroscopy. The excess risk of fatal malignancy was similar to what has been reported in the past for catheter ablation of regular supraventricular tachycardias using conventional fluoroscopy systems.

1090-222 **A Randomized Study of Prophylactic Catheter Ablation in High-Risk Children With Asymptomatic Wolff-Parkinson-White Syndrome**

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Background – Adults with asymptomatic ventricular preexcitation that prophylactic radiofrequency catheter ablation of accessory pathways is of benefit in preventing life-threatening arrhythmic events and ventricular fibrillation.
Objective – A randomized comparison of prophylactic radiofrequency catheter ablation of accessory pathways versus no ablation in high-risk children.
Methods – The subjects were asymptomatic high-risk children of ages 5 to 17 years with Wolff-Parkinson-White syndrome. An increased risk was defined as inducibility of sustained atrioventricular reciprocating tachycardia and/or sustained atrial fibrillation at electrophysiologic testing. The main endpoint was the occurrence of arrhythmic events over a 5-year follow-up period.
Results – Of the 172 enrolled children, 47 patients (27%) completed the study (20 received prophylactic ablation). The baseline clinical and electrophysiologic characteristics of the two randomized groups were similar. The median hospital stay was 2 days in each group. There was a higher rate of symptomatic arrhythmic events in the control group than in the ablation group (7 events vs. 0 events, P=0.002). The event-free rates at 5 years among patients in the ablation and control groups were 100% and 74% (Figure), respectively.
Conclusions – We found a significant and durable benefit of prophylactic ablation of accessory pathways over no treatment in pediatric high-risk subjects with asymptomatic Wolff-Parkinson-White syndrome.