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

Burt W. Hall, Srirak Veerareddy, Peter Cheung, Kamala Tamirisa, Jinhan Han, Kristina Lemholt, Ashrugh, Frank Peloso, Jr., Fred Mondry, Hakon Oral, University of Michigan, Ann Arbor, MI

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 electromagneticanatomical mapping system and an 8-mm-tip ablation catheter (temperature target 55°C, 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 an 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.

Cryoblation of Atrial Flutter: Results of a Multicenter Clinical Study

Robert H. Hoy, Christopher Fellowes, Roy John, Larry Chinitz, David T. Martin, Iowa Heart Center, Des Moines, IA

Background: Inadequate contact, catheter tip instability, and pain stimulus during radiofrequency (RF) ablation may pose difficulties when creating the linear lesion needed for cure of typical cavotricuspid isthmus-dependent atrial flutter (AFL). We evaluated the acute efficacy of cryoblation (cryo) for the treatment of isthmus-dependent AFL. Metho:ds: 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. Cryoblation 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 tip was −83 ± 4 °C, with a substantial increase of the tip temperature attainable with the 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 cryoblation is highly effective for 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.

Atrial Tachycardia Originating From the Pulmonary Veins: Is Single Vein Isolation Adequate?

John D. Burkhardt, Yaariv Khaykin, George Joseph, Mandeep Bharagava, Jennifer Cummings, Atul Verma, Patrick Tchou, Cleveland Clinic Foundation, Cleveland, OH

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.

Methods: Thirty-three patients underwent single pulmonary vein isolation or focal ablation for the treatment of atrial tachycardia. 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.