Cardiac Magnetic Resonance Imaging: Comparison of Implantable Cardiac Defibrillator Interactions With Cardiac Arrhythmias

13.7 ± 8.3 and 16.0 ± 28.6 for groups 1, 2 and 3 (p = 0.9). The median # and range of ABL lesions was 16.7 ± 7.9, 5/5 (100%) for groups 1, 2 and 3. The mean ±SD # of ABL lesions was 16.7 ± 7.9, and 5/5 (100%) for groups 1, 2 and 3. The use of a Lasso catheter for mapping the RVOT provides a simplified technique to perform 3-D mapping for ablation of RVOT arrhythmias.

New Simplified Technique for 3-D Mapping and Ablation of Right Ventricular Outflow Tachycardia

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Background: Mapping and successful catheter ablation (ABL) of arrhythmias originating from the right ventricular outflow tract (RVOT) requires 3-D localization in the vertical and horizontal plane. The most efficient mapping technique remains to be determined.

Methods: Catheter ABL for RVOT ventricular tachycardia (n=10) or premature ventricular beats (n=6) was performed in 20 cases (18 patients, age 40±15 years, 6 males). In group 1 (n=8), 3-D mapping was performed with a single ABL catheter and fluoroscopy. In group 2 (n=8), 3-D mapping using a non-contact mapping system (Endocardial Solutions, n=7) or the Biosense electroanatomic system (n=1) was performed. In group 3 (n=6), 3-D mapping was performed with a multielectrode catheter (Lasso; n=5; Halo; n=1). The Lasso catheter was advanced into the RVOT and its cranio-caudal position was optimized to the earliest endocardial activation times identified on the Lasso during the arrhythmia. At that level, endocardial activation times were simultaneously evaluated on the circular catheter in the anterior, septal, posterior, or lateral plane. Based on this map, the ABL catheter was directed toward the Lasso electrodes with the earliest endocardial activation times. Further mapping in this area was done with the ABL catheter. All ablation lines were made with 4 mm tip catheters and used radiofrequency energy.

Results: The mean ±SD fluoroscopy time (minutes) was 71 ± 37, 55 ± 18 and 39 ± 13 for groups 1, 2 and 3 (p < 0.01 by ANOVA; p < 0.03 group 1 vs. 3). Raised power. In group 2, there were 2 tamponades, one prior to attempted ABL. In group 3, the Lasso became entrapped in the tricuspid valve requiring surgery in 1 patient in whom catheter ABL was not performed. Subsequent cases were done positioning the Lasso via a long SRL sheath positioned across the valve. The acute success rate was 8/8 (100%), 5/7 (71%), and 5/5 (100%) for groups 1, 2 and 3. The mean ±SD # of ABL lesions was 16.7 ± 7.9, 13.7 ± 8.3 and 16.7 ± 7.9 for groups 1, 2 and 3 (p = 0.9). The median # and range of lesions was 19.5 (5-25), 12 (4-23), and 2 (4-17).

Conclusions: The use of a Lasso catheter for mapping the RVOT provides a simplified technique to perform 3-D mapping for ablation of RVOT arrhythmias.

Surface Electrophysiological Clues to Localization of Ventricular Tachycardia to the Aortic Cusps


Background: Repetitive monomorphic ventricular tachycardia (VT) occurring in the absence of structural heart disease typically originates in the outflow tract regions of the right and left ventricles. The EGCG pattern for VT originating from right ventricular outflow tract has been well described. However, a site of origin from the coronary cusps has not been well documented and may be more common than previously recognized.

This study identifies surface electrophysiological clues that suggest VT originating from the aortic cusps.

Methods:

A total of 8 patients undergoing ablation for VT that had detailed (>150 points) 3D electrocardiographic mapping (MEAM) and pace-mapping performed from the aortic cusps and from the endocardial aortomital continuity (AMC) at threshold. The sites were identified and tagged using MEAM, and confirmed by fluoroscopy and/or intracavitary echocardiography. The surface electrophysiological clues were analyzed with pacing from each of the 3 aortic cusps and AMC. The ECS morphology was recorded on the Prucka™ system at a sweep speed of 100 msec and analyzed offline. The mean QRS duration for LC pacing was 143±12 msec (range 125-161 msec), RC was 140±12 msec (range 108-168 msec), and AMC was 141±12 msec (range 120-176 msec). Lead V1 was found to be the most useful in distinguishing the different sites. LC pacing uniformly produced a typical ‘n’ or ‘w’ shape multiphasic pattern in V1, AMC pacing demonstrated a qR pattern in V1, and RC pacing demonstrated a qR type of pattern in V1. The wave rhythm occurred earlier (ie by V2 in 8 of 8 patients) with LC and AMC pacing than with RV pacing (by V3 or V4 in 6 of 8 patients and by V2 in only 2 patients).

Conclusions: VT originating from the right and left aortic cusps and the adjacent endocardial aortomital continuity have distinct patterns on the 12-lead ECG that can be useful in identifying the probable location of the VT and therefore the region to target for ablative therapy.