Cardiac Magnetic Resonance Imaging: Comparison of Patients With Right Ventricular Outflow Tract Tachycardia and Arrhythmogenic Right Ventricular Dysplasia

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Background: Magnetic resonance imaging (MRI) is a commonly used modality to help differentiate patients with right ventricular outflow tract (RVOT) tachycardia and those with arrhythmogenic right ventricular dysplasia (ARVD). Both of these groups of patients present with monomorphic ventricular tachycardia (VT) arising from the right ventricle.

Methods and Results: Patients were diagnosed with ARVD and RVOT tachycardia using standard clinical criteria. Thirteen ARVD patients underwent cardiac MRI; 5 had normal scans and 8 had findings suggestive of ARVD (including fatty infiltration, fibrosis, and right ventricular wall thinning, hypokinesis, or dyskinesis). Thirty-seven patients with RVOT tachycardia underwent cardiac MRI; of these 26 were normal and 11 were abnormal. Therefore, the positivity rate of MRI was 62% in ARVD pts, and the neg- ative rate in RVOT pts was 30%.

Conclusions: These findings suggest that abnormalities of the right ventricle seen on cardiac MRI appear to be nonspecific for ARVD. In addition, the sensitivity of MRI imaging in detecting patients with ARVD is suboptimal, as these pts not uncommonly have normal or only mildly abnormal cardiac MRI scans, especially early in the disease process.

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 complexes (n=1) was performed. In group 3 (n=6), 3-D mapping was performed with a multi-catheter elec- troanatomic system (Lasso-n=5, Halo-n=1). The Lasso catheter was advanced into the RVOT and its cranio-caudal position was optimized to the earliest set of 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 attempts were performed 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<0.1 by ANOVA, p<0.03 group 1 vs. 3 by Fisher’s. 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 SRO 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 ± 9.7, 13.7 ± 8.3 and 16 ± 12.9 for groups 1, 2, and 3 (p=0.9).

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.