Cardiac Magnetic Resonance Imaging: Comparison of New Simplified Technique for 3-D Mapping and Ablation

Methods: 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-six patients with RVOT tachycardia underwent cardiac MRI; of these 26 were normal and 11 were abnormal. Therefore, the positive rate of MRI was 62% in RVOT pts, and the negative rate in RVOT pts was 30%

POSTER SESSION

1147
Management of Implantable Cardioverter Defibrillator Patients
Tuesday, March 09, 2004, Noon-2:00 p.m.
Morial Convention Center, Hall G
Presentation Hour: 1:00 p.m.-2:00 p.m.

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Background: The presence of elevated cardiac enzymes after spontaneous implantable defibrillator (ICD) shocks is frequently attributed to the shocks delivered. We tested the hypothesis that the less specific cardiac enzymes CK and CK-MB would be related to number of ICD shocks whereas the more specific cardiac enzyme troponin T (TnT) would not.

Methods: Patients admitted to our institution because of one or more ICD shocks were identified. Patients who had cardiac enzymes drawn within 24 hours of the last ICD shock were included. Clinical data were abstracted from medical records. Number of ICD shocks was obtained using interrogation of the ICD on admission. Logistic regression coefficients for the association between number of ICD shocks and cardiac enzyme level were calculated for the cardiac enzymes CK, CK-MB, and TnT.

Results: A total of 73 patients with spontaneous ICD discharges and cardiac enzyme measurements were included. The mean age of patients was 58 years, and 54 (74%) were male. Mean peak CK was 371 ± 31 U/L, mean peak CK-MB was 22.1 ± 9 ng/ml, and mean peak TnT was 0.47 ± 0.8 ng/ml. Both peak CK (rho=0.34, p=0.005) and peak CK-MB (rho=-0.41, p=0.004) were significantly correlated with the number of spontaneous ICD discharges delivered. However, there was no correlation between TnT and the number of spontaneous ICD discharges (rho=-0.11, p=0.53). Of the 12 patients who had TnT above the upper limit of normal, 11 (81%) had known coronary disease.

Conclusion: Although peak CK and peak CK-MB are correlated with the number of spontaneous ICD discharges, peak TnT is not. An elevated TnT in a patient who has received one or more spontaneous ICD shocks should not be attributed to delivered ICD shocks, but does warrant evaluation for ischemia.

1147-209
Spontaneous Implantable Defibrillator Shocks Do Not Increase Troponin T

1147-210
Implantable Cardiac Defibrillator Interactions With Magnetic Resonance Imaging at 1.5 Tesla

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Background: Implantable cardiac defibrillators (ICDs) are considered an absolute contraindication to magnetic resonance imaging and angiography (MRI/ERA). Only limited animal studies have been performed to assess the potential interactions between these devices. From our experience, pacemaker patients have undergone MRI scanning with-out difficulty. Given the design similarities, an assessment of the interaction between ICDs and MRI scanners was thought to be warranted and reasonable.

Methods: Prospectively, 11 consecutive patients in need of cardiac, vascular and general MRI testing, with varied ICD models and leads, were scanned. Battery impedance, lead impedance, pacing threshold and sensing threshold were obtained prior to entering the 1.5 Tesla magnet. Tachydysrhythmia detection and therapy were disabled, while bradycardia therapy was left intact. Symptoms, non-invasive blood pressure and electrocardiographic signal were monitored continuously. Repeat ICD interrogation was performed after the scan. Defibrillation threshold testing was performed on all systems after the scan.

Results: There were no episodes of loss-of-capture or device movement during the scan. Of the 14 leads scanned, none suffered a significant change in pacing threshold. No changes were seen in lead impedance or sensing thresholds. All systems had defibrillation thresholds that provided greater than the standard 10-Joule margin of safety. One patient reported mild heating around the defibrillator at the time of spin echo sequences. One patient experienced a brief, but asymptomatic, pause in pacing during scanning. One patient underwent scanning with his device 1 month into the elective replacement period. This device was found to be in a back-up mode after MRI scanning and could not be interrogated. The device was set for destructive testing, at which time normal device function had returned. Circuit integrity was maintained.

Conclusion: ICDs in 11 of 11 patients with MRI and MRI scanning in a 1.5 Tesla magnet was found to be safe under carefully controlled conditions. MRI scanning of ICDs with low battery voltage may result in transient loss of function.

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