Cardiac Cine Magnetic Resonance Imaging Identifies Anatomical and Functional Abnormalities in Patients With Arrhythmias of Right Ventricular Origin

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Background: A definitive diagnosis of arrhythmogenic right ventricular dysplasia (ARVD) is made by histological demonstration of transmural fibrofatty replacement of right ventricular myocardium. Cardiac cine MRI (cMRI) is noninvasive and can offer information about RV myocardial infiltration as well as RV structure and function. It may also have a role in the diagnosis of RV outflow tract tachycardia (RVOT VT).

Objectives: Identify the cMRI findings in patients with arrhythmias of RV origin. Assess the role of cMRI in the diagnosis of ARVD and RVOT VT by identifying abnormalities in global or regional RV structure, shape, and function.

Methods: We examined the cardiac cMRI scans of all patients with ventricular arrhythmias of RV origin (LBBB morphology) referred for possible diagnosis of ARVD between 02/1999 and 04/2001. Patients were included in one of 3 groups: rare PVCs (<12000/24 hours), frequent PVCs (>12000 PVCs/24 hours) and ventricular tachycardia (VT).

Results: We identified 116 patients with arrhythmias of LBBB morphology (mean age 38 y; range 14-70 y; and 44% men). Of these 37 patients (30%) had VT whereas 81 had PVCs (rare PVCs: 14%, frequent PVCs: 25%). The most common indications for testing were syncope, palpitations and asymptomatic arrhythmia. The cMRI showed tachycardia and tachycardia-related abnormalities in 40% of patients. Abnormalities were most common in the infundibulum, followed by the apex and the base of the RV. Abnormalities were significantly more frequent in the patients with VT or NSVT (52%) than in patients with PVCs (rare PVCs: 15%, frequent PVCs: 25%). Based on cMRI, a diagnosis of ARVD was made in 10% of patients and excluded in 71%. 15% of patients (10%) had suggestive of RVOT VT (small areas of akinesia or dyskinesia limited to the infundibulum).

Conclusion: Many patients with RV arrhythmias have abnormalities on cMRI. In these patients, cMRI is a useful tool in the diagnosis of ARVD and RVOT VT. A subgroup of patients with very frequent PVCs and abnormalities of RV structure or function may have a mild form of RV cardiomyopathy.

POSTER SESSION

1141 Studies of Myocardial Blood Flow and Physiology in Disease States

Monday, March 18, 2002, 3:00 p.m.-5:00 p.m.
Georgia World Congress Center, Hall G
Presentation Hour: 4:00 p.m.-5:00 p.m.

Effect of Spinal Cord Stimulation on Cardiac Adrenergic Nervous Fiber Function in Patients With Angina and Normal Coronary Arteries


Background. 123-I-meta-iodo-benzylguanidine (MIBG) scintigraphy is helpful to assess the integrity and function of cardiac adrenergic nerve fibers. Cardiac MIBG uptake can be impaired in patients with angina and normal coronary arteries (NCA), and spinal cord stimulation (SCS) improves symptoms in these patients. In this study we assessed whether SCS improves cardiac adrenergic nerve function in patients with angina and NCA.

Methods. We studied 7 patients (4 men; 59.3±11 years) with angina and NCA, who underwent SCS because of symptoms refractory to medical therapy. Patients underwent cardiac MIBG scintigraphy both during SCS and in the absence of SCS. The 2 tests were done in random order 3 weeks apart from each other. Global MIBG uptake, assessed on planar radioisotope images, was expressed as hearttochestratio (H/R) ratio. Furthermore, on cardiac tomographic images the left ventricle was divided into 24 segments and a MIBG uptake score was assigned to each segment, according to the scale: 0=normal uptake; 1=mild defect; 2=moderate defect; 3=severe defect. A global MIBG uptake score was calculated for each patient as the sum of all segmental scores. A 99m-Tc-sestamibi exercise stress test was performed to assess myocardial perfusion within ±1 day from MIBG scintigraphy, both in presence and absence of SCS.

Results. Abnormalities in MIBG uptake were found in 5 patients (71%), both in presence or absence of active SCS. The H/R ratio was 1.78±0.36 and 1.73±0.37 (p=0.74), and the MIBG uptake score was 16±2.05 and 18.4±2.5 (p=0.79), in presence and absence of active SCS, respectively. Reversible exercise-induced perfusion defects were detected in 4 patients at the absence of active SCS. The perfusion defects improved in 2 of these patients during active SCS.

Conclusions. Our data show that cardiac MIBG uptake abnormalities are present in a significant number of patients with angina and NCA. SCS had no significant effects on MIBG defects, suggesting that its clinical benefits may be unrelated to improvement in cardiac adrenergic nerve function. SCS, however, improved reversible myocardial perfusion defects in 2 patients, suggesting that it may have detectable anti-ischemic effects.