Journal of Cardiovascular Magnetic Resonance

Poster presentation

Utility of cardiovascular magnetic resonance imaging in patients with malignant ventricular arrhythmias

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from 13th Annual SCMR Scientific Sessions
Phoenix, AZ, USA. 21-24 January 2010

Published: 21 January 2010

Journal of Cardiovascular Magnetic Resonance 2010, **12**(Suppl 1):P302 doi:10.1186/1532-429X-12-S1-P302

This abstract is available from: http://jcmr-online.com/content/12/S1/P302

Introduction

Cardiac magnetic resonance (CMR) imaging is well established as an accurate method for detection of both acute and prior myocardial injury. The role of combined tissue characterization using T2-weighted (edema) imaging, T1-weighted (fat) imaging and delayed gadolinium enhancement (DE) imaging has not been evaluated in patients presenting with malignant ventricular arrhythmias.

Purpose

This prospective study evaluates the prevalence of abnormal tissue characteristics in patients presenting with resuscitated sudden cardiac death (SCD) or sustained ventricular tachycardia (). The impact of CMR on disease diagnosis is also evaluated.

Methods

Consecutive patients with resuscitated SCD or sustained were enrolled. Imaging was performed using either a 1.5 T or 3 T MRI scanner. Standard cine imaging was performed in serial short axis planes followed by T2-wighted turbo spin-echo imaging using a triple inversion recovery sequence (STIR) in the same planes. DE imaging was performed in matched slice orientations following the administration of 0.125 to 0.2 mmol/kg gadolinium intravenously. T1-weighted imaging (axial slices) was additionally performed in patients with LBBB morphology. All images were blindly interpreted using visual scoring. T2 and DE images were also evaluated by semi-automated quantitative techniques.

Results

67 patients were enrolled (24 with SCD, 43 with) with a mean age of 51 ± 15 years. Myocardial disease was known to be present in 33 patients (49%); prior myocardial infarction (MI) in 18, dilated cardiomyopathy (DCM) in 4 and hypertrophic cardiomyopathy (HCM) in 1. The mean ejection fraction (EF) was 53 ± 18% with 32 patients (48%) having an EF >55%. T2 weighted imaging was abnormal in 10 patients (15%) with findings consistent with acute myocarditis in 7 and ischemic injury in 3. DE imaging was abnormal in 35 patients (52%) with findings consistent with MI in 20, hypertrophic cardiomyopathy (HCM) in 9, myocarditis in 6 and sarcoidosis in 2. Two patients had a combined MI-HCM DE pattern. Of 15 patients enrolled with LBBB morphology the T1 weighted imaging was abnormal in 2. Overall, myocardial tissue disease was demonstrated by CMR in 41 patients (62%). A new myocardial disease or change in diagnosis was provided by CMR in 14 patients (21%).

Conclusion

CMR tissue characterization is frequently abnormal in patients presenting with or resuscitated SCD. CMR also provides a new myocardial diagnosis or change in diagnosis in approximately one-fifth of patients presenting with malignant ventricular arrhythmias. The prognostic utility of these findings warrants further evaluation.