



Prevalence and Prognostic Value of Concealed Structural Abnormalities in Patients with Apparently Idiopathic Ventricular Arrhythmias of Left Versus Right Ventricular Origin

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PURPOSE

Routine diagnostic work-up occasionally does not identify any abnormality among patients with monomorphic ventricular arrhythmias of left ventricular origin (VAs-LV). The use of cardiac magnetic resonance imaging (MRI) may be of potential clinical value in this setting. Aim of the present study was twofold: 1) to investigate the value of comprehensive cardiac MR tissue characterization imaging for the detection of structural changes in patients with monomorphic VAs of LV vs. RV origin and negative routine diagnostic work-up; 2) to determine the prognostic value of concealed structural abnormalities detected by cardiac MRI in these patients.

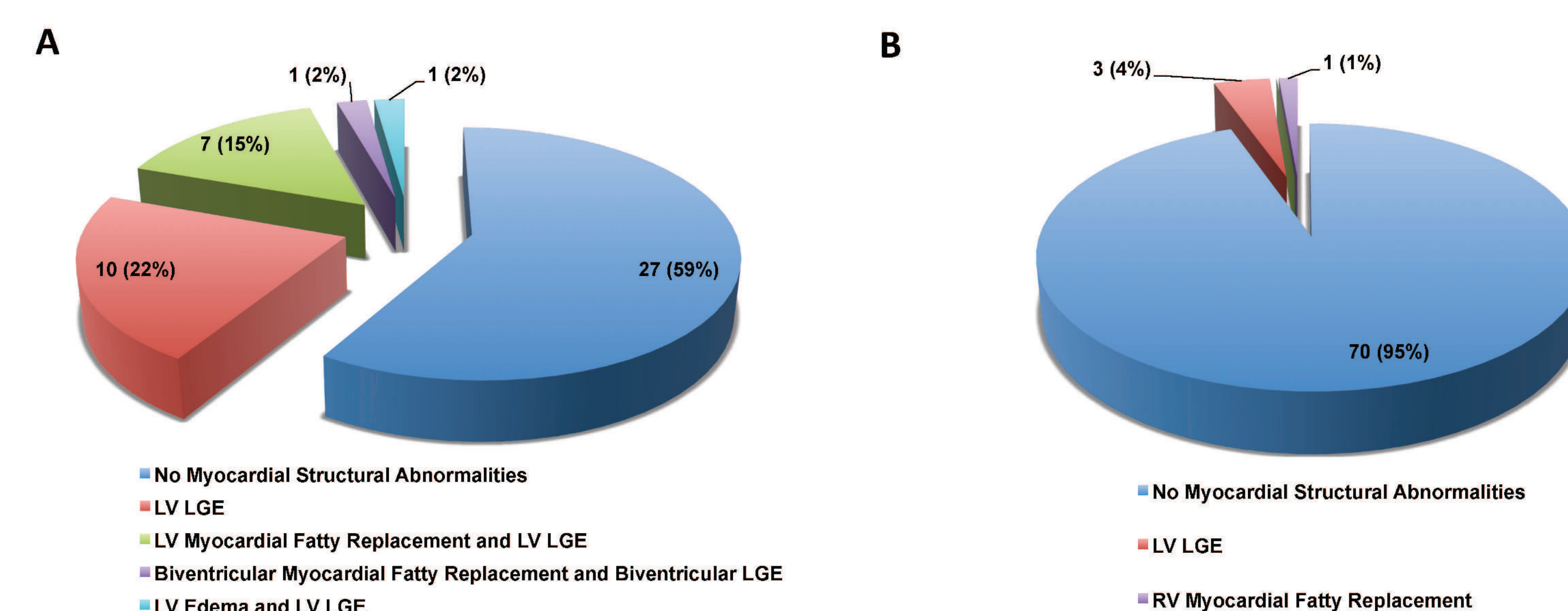


Figure 1

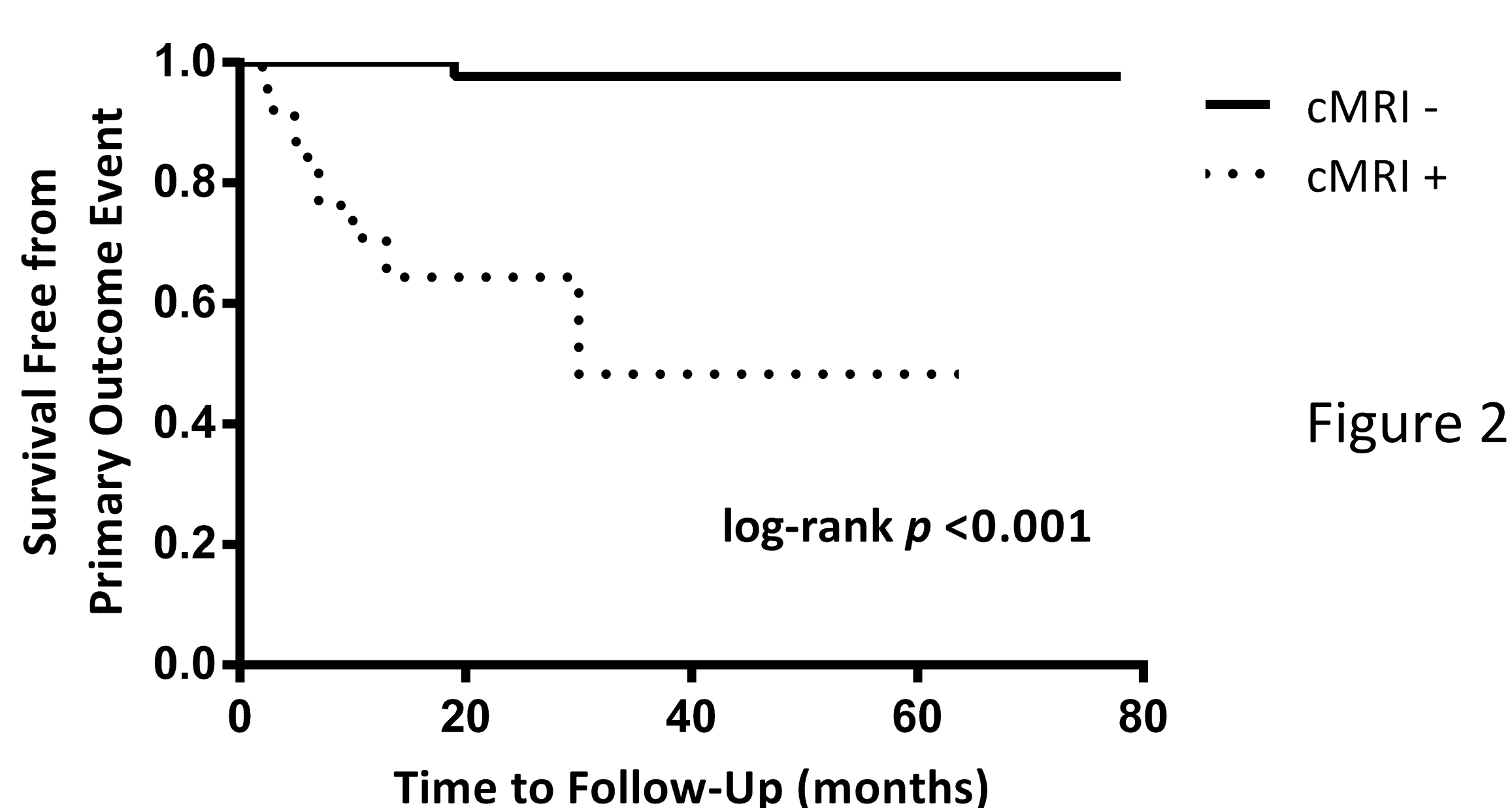


Figure 2

METHODS

Forty-six consecutive patients (65% males, mean age 44 ± 15 years) with monomorphic VAs-LV (i.e. with right bundle branch block morphology) and negative routine diagnostic work-up were included. Seventy-four consecutive patients (60% males, mean age 40 ± 17 years) with apparently idiopathic monomorphic VAs of right ventricular origin (i.e. with left bundle branch block morphology; VAs-RV) served as control group. Both groups of patients were referred to cardiac MRI using a 1.5 Tesla scanner to assess LV and RV function, myocardial fatty replacement, myocardial edema and necrosis/fibrosis. Patients were followed-up for 23 ± 20 months. The outcome event was an arrhythmic composite end-point of sudden cardiac death (SCD) or nonfatal episode of ventricular fibrillation or sustained ventricular tachycardia requiring external cardioversion or appropriate implantable cardioverter defibrillator therapy.

RESULTS

The 2 groups of patients did not differ in age ($p=0.14$) and gender ($p=0.57$). No significant difference was observed between patients with VAs-LV and VAs-RV regarding biventricular volumes and systolic function (LVEDVi 79 ± 19 ml/m² vs. 74 ± 12 ml/m², $p=0.16$; LVEF $65 \pm 10\%$ vs. $66 \pm 7\%$, $p=0.84$; RVEDVi 70 ± 15 ml/m² vs. 71 ± 13 ml/m²; $p=0.77$; RVEF $70 \pm 7\%$ vs. $69 \pm 7\%$, $p=0.42$). Cardiac MRI demonstrated myocardial structural abnormalities in 19 (41%) patients with VAs-LV vs. 4 (5%) patients with VAs-RV ($p<0.001$; figure 1). At multivariate analysis, age ≥ 40 years (OR=6.1; $p=0.021$), male gender (OR=9.5; $p=0.014$), family history of sudden cardiac death and/or cardiomyopathy (OR=4.1; $p=0.050$) and VAs with right bundle branch block morphology and superior QRS axis were significantly and independently related to the presence of myocardial structural abnormalities. The outcome event occurred in 9 patients; family history of sudden cardiac death and/or cardiomyopathy (HR = 6.3, 95% CI 1.68-23.5; $p=0.006$), sustained ventricular tachycardia (HR 19.8, 95% CI 4.7-83.0; $p<0.001$) and the presence of myocardial structural abnormalities on cardiac MRI (HR 41.6, 95% CI 5.2-225.0; $p<0.001$) were significantly related to the outcome event. Kaplan-Meier survival curves with regard to the outcome event according to presence (cMRI +) or absence (cMRI -) of myocardial structural abnormalities on cardiac MRI is shown in Figure 2. Figures 3-6 show examples of myocardial structural abnormalities demonstrated by cardiac MRI in 4 patients with apparently idiopathic VAs of LV origin.

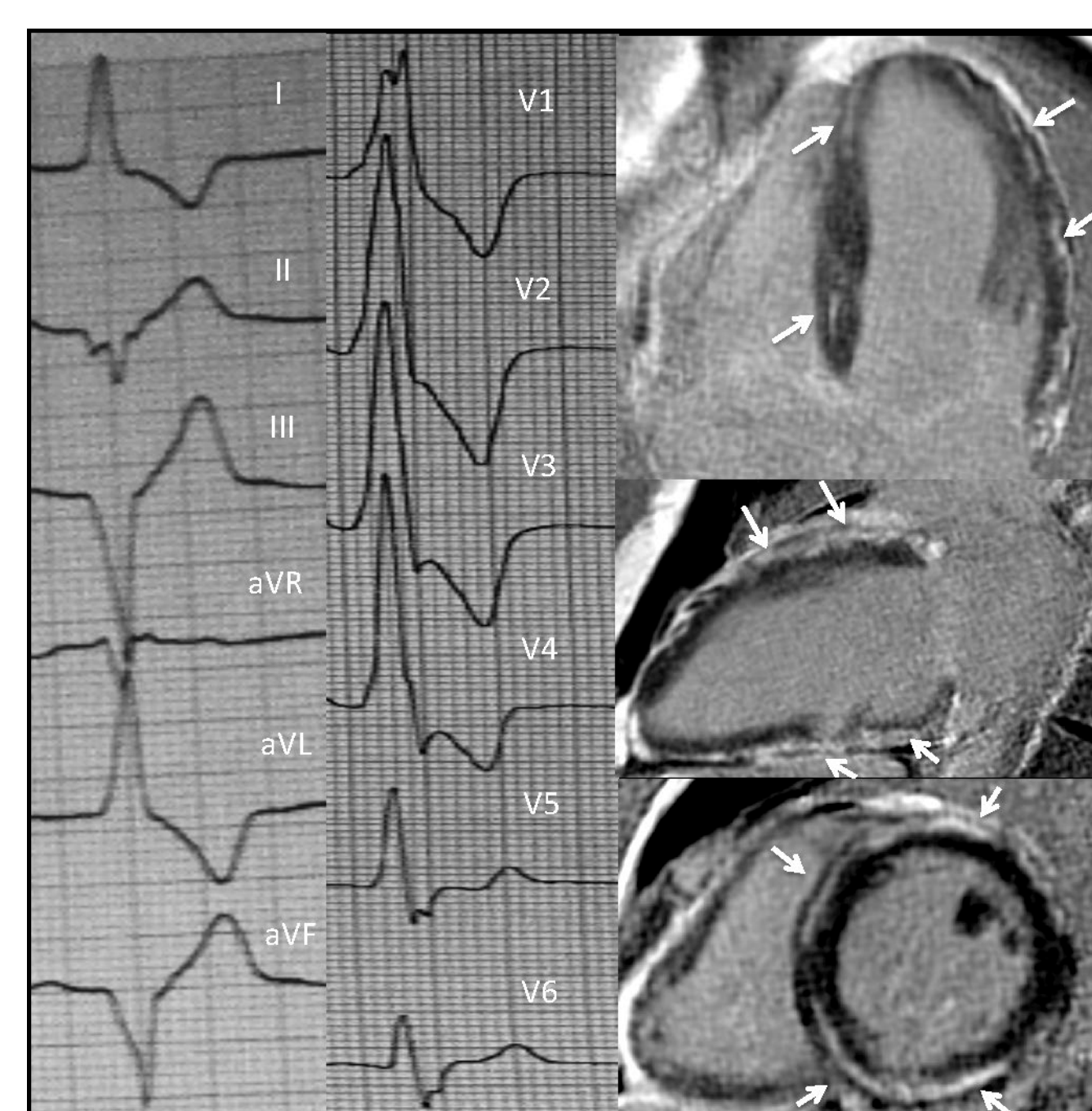


Figure 3



Figure 4

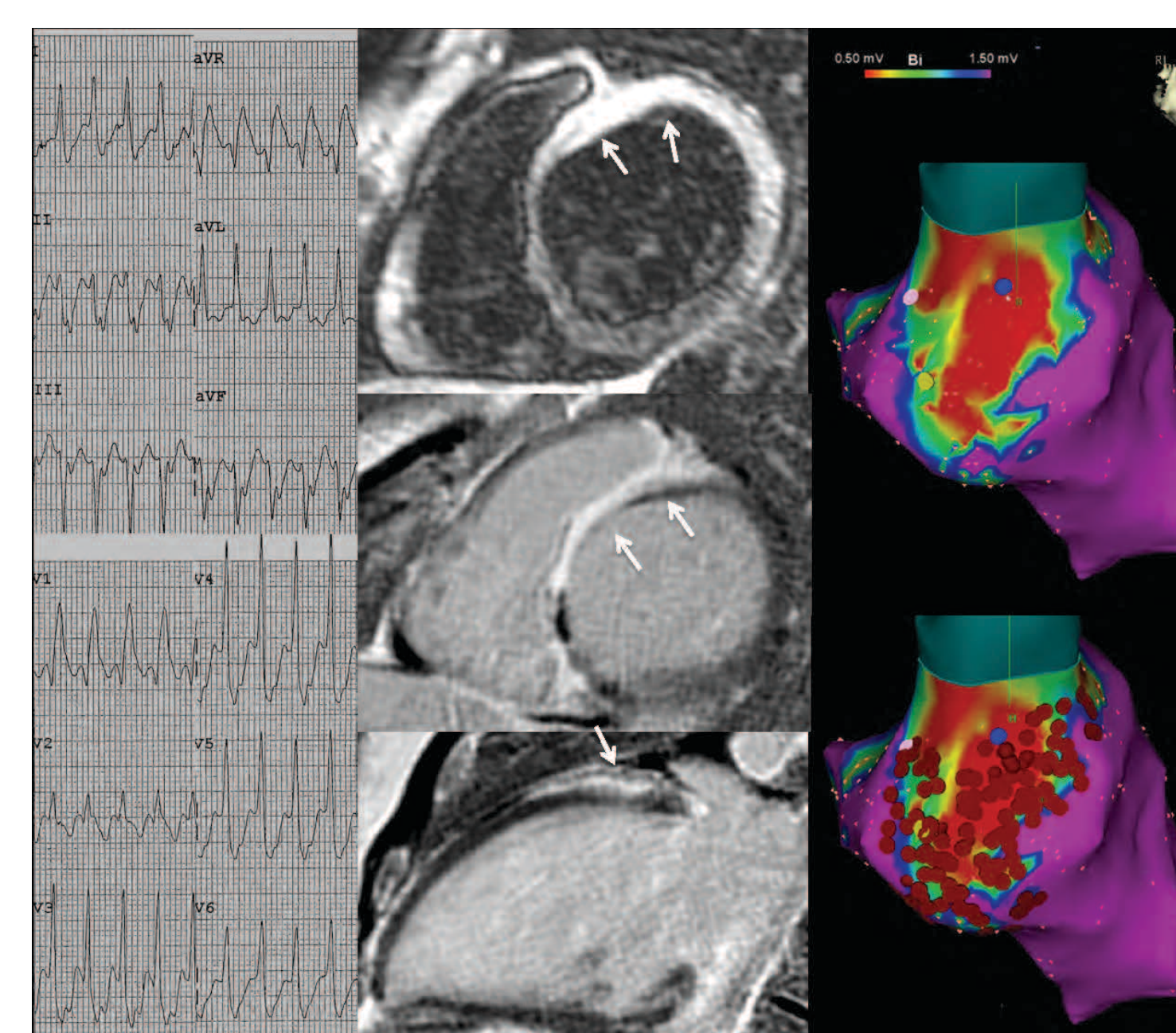


Figure 5

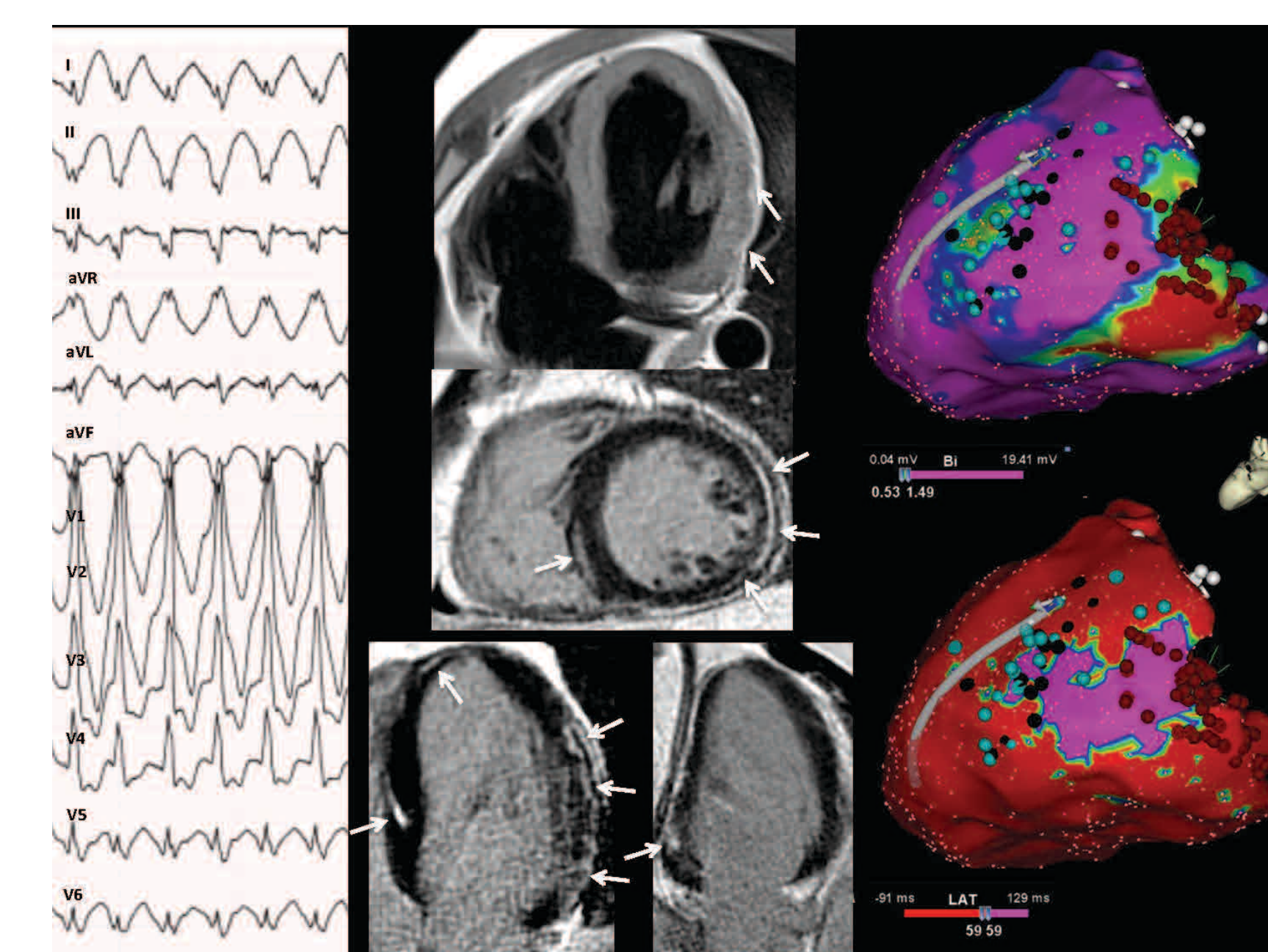


Figure 6

CONCLUSIONS

Cardiac MRI detects myocardial structural changes in a non-negligible proportion of patients with apparently idiopathic VAs of LV origin. In addition, myocardial structural abnormalities on cardiac MRI are associated with worse outcome. Accordingly, cardiac MRI should be implemented in the routine diagnostic work-up of these patients, in order to better characterize the pathogenic substrate of VAs.

Disclosures: none

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