

Correlation between ECG abnormalities and late gadolinium enhancement in cardiac magnetic resonance in patients with acute myocarditis

INTRODUCTION

In acute myocarditis correlation between ECG abnormalities and late gadolinium enhancement (LGE) in cardiac magnetic resonance (CMR) are not well defined.

The aim of this study is to describe prevalence and type of ECG abnormalities and to evaluate their correlation with LGE distribution.

Methods

99 patients were admitted in our centre for suspected acute myocarditis between 2012 and 2018. All patients had non-significant coronary artery disease at coronary angiography. We evaluated 12-lead ECG at admission and performed a 3-Tesla CMR, which revealed typical myocardial edema (T2 mapping sequences) and a non-ischaemic LGE pattern.

Results

81 patients had abnormal ECG upon admission (82%). In this group, the most common abnormality was ST-elevation (77%), followed by ST-depression or T-wave inversion (17%) and bundle-branch-block (6%).

In patients with anterior or septal LGE (fig.1), ECG abnormalities were more frequently observed in antero-septal leads (85% vs 15% in other leads), whereas in patients with lateral or inferior LGE (fig.2) their prevalent location was in infero-lateral leads (87% vs 13% in other leads). In patients with apical or diffuse LGE there wasn't a specific pattern of distribution.

Bundle-branch-block was equally distributed between groups (4 patients with antero-septal LGE, 7 patients with infero-lateral LGE and 3 with diffuse LGE).

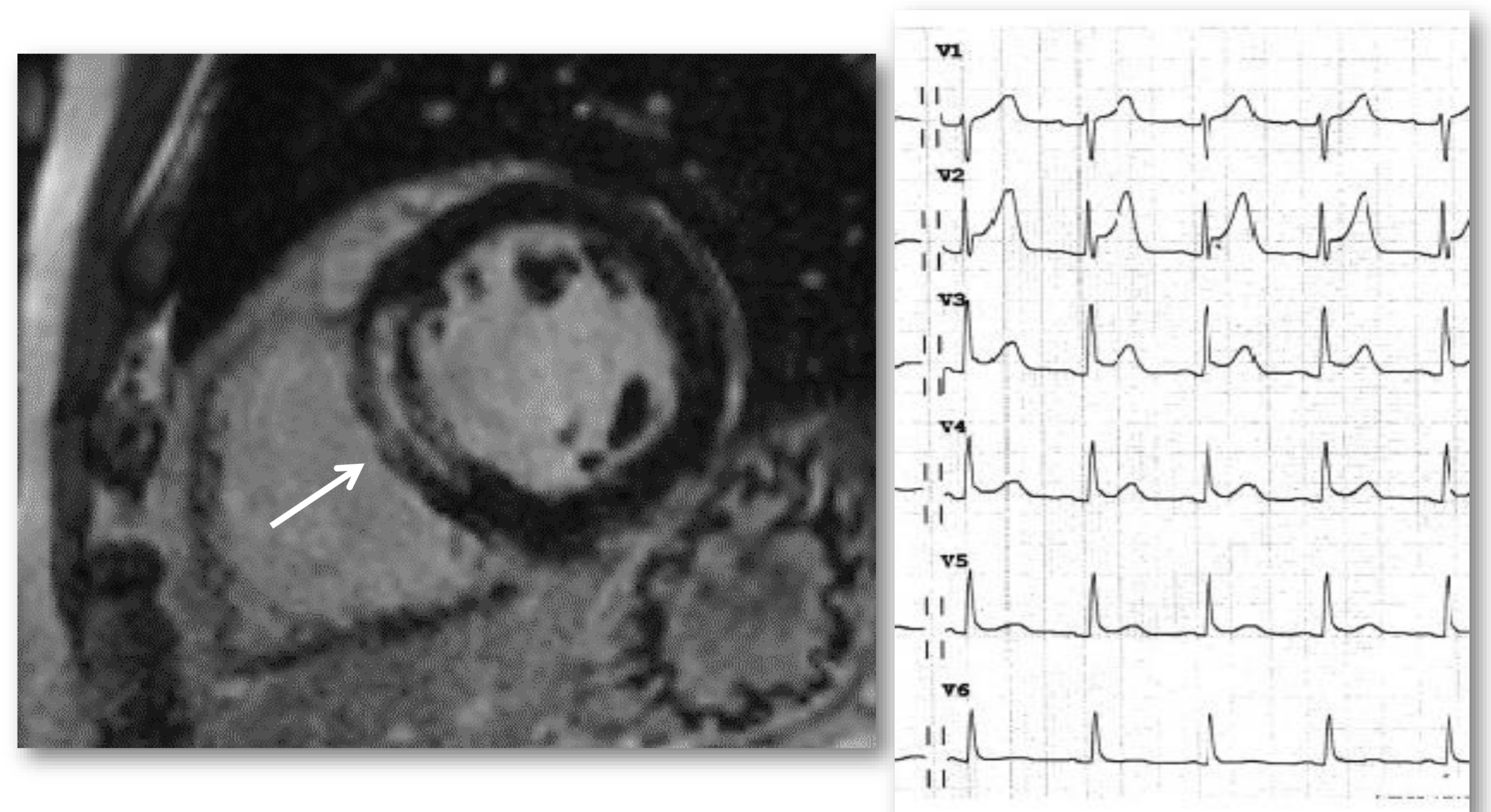


Fig.1 Midwall LGE on interventricular septum in cardiac MRI (white arrow, A). ST-segment elevation in antero-septal leads - V1 to V3 - in the same patient (B).

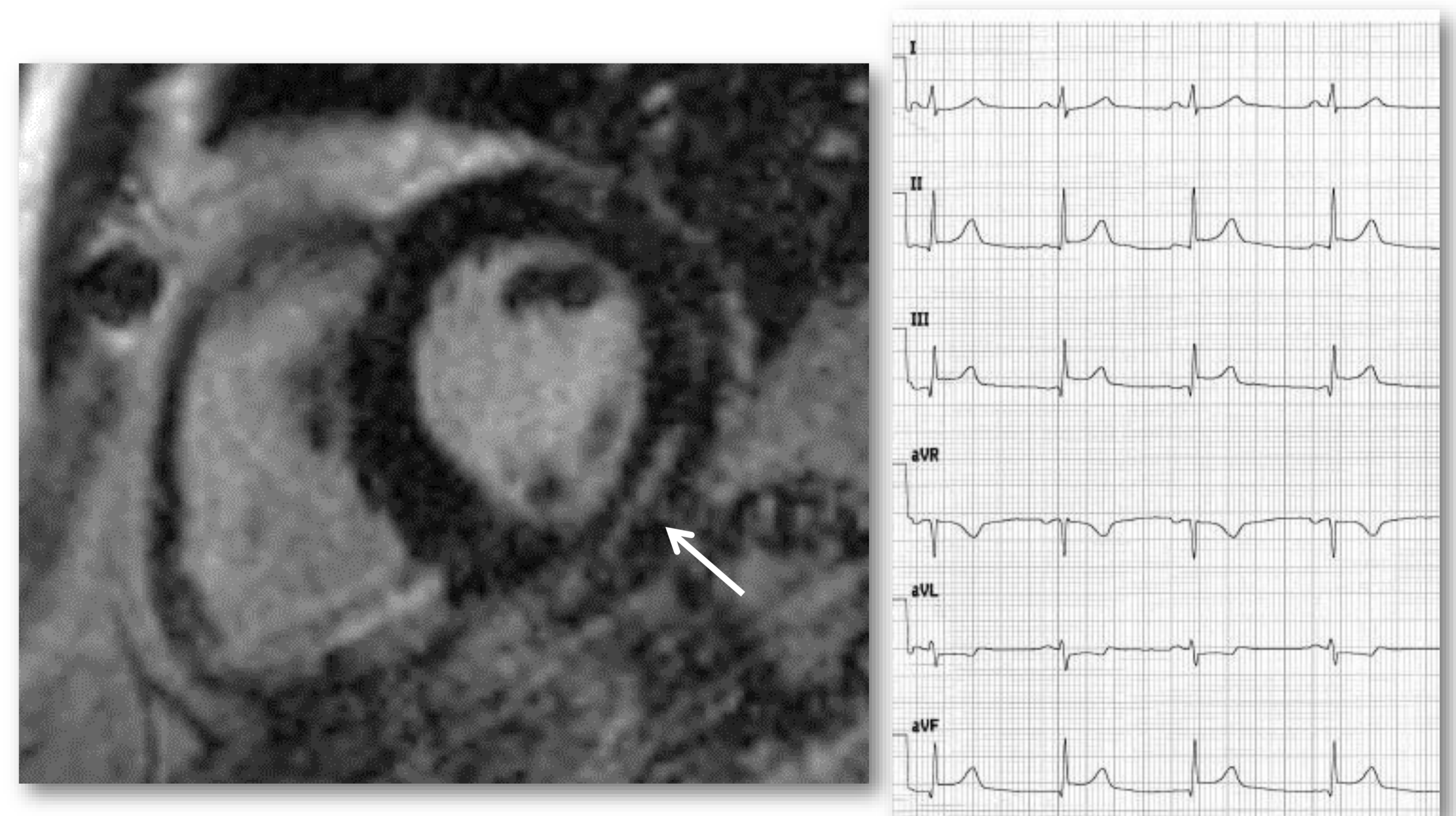


Fig.2. Midwall LGE on infero-lateral wall (white arrow, A) and concordant ST-segment elevation in inferior leads (B).

We also found a normal ECG at admission in 45% of patients with antero-septal LGE and in 24% of patients with infero-lateral LGE: this condition was usually associated with a low number of myocardial segments (3 on average) involved by fibrosis.

CONCLUSION

ECG abnormalities can be found in most patients with acute myocarditis at presentation, but a normal ECG can't exclude the diagnosis (especially in mild myocardial involvement), which is now strongly based on CMR findings. However, the good correlation between LGE localization and ECG abnormalities confirms the important clinical role of ECG in the evaluation of these patients.