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# Early and Follow-up CMR Features of Acute Biventricular Myocarditis

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**Conflict of Interest**
The authors have no financial conflicts of interest.

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A 17-year-old male had fever, cough, rhinorrhea for 10 days. He suddenly complained of chest pain; troponine raised to 31 ng/mL (normal 0.15 ng/mL); electrocardiogram showed concave inferolateral ST elevation (**Figure 1A**). Left ventricular (LV) inferolateral hypokinesia was displayed at transthoracic echocardiography (TTE). Cardiovascular magnetic resonance (MR) confirmed TTE patterns and showed normal LV ejection fraction (LVEF; 56%) and right ventricular ejection fraction (RVEF; 54%), with normal LV strain values at feature tracking but altered right ventricular (RV) global longitudinal strain (GLS, –18.9%) and global radial strain (GRS, 9.5%) (**Figure 1B**, **Movie 1**), and demonstrated diffuse late gadolinium enhancement (LGE) hypersignals affecting the myocardium of both ventricles (**Figure 1C and D**).

LVEF and RVEF remained normal at follow-up (65% and 57% respectively) as well as LV GLS and GRS (–20.9% and 65.7%), whereas RV GLS and GRS returned to normal values (–27.6% and 86.6%) with less disorganized features than on initial MR imaging (MRI; **Figure 1E**, **Movie 2**). RV LGE had quite completely resolved whereas patchy LV LGE remained present (**Figure 1F and G**). TTE did not reveal any RV abnormality at presentation and follow-up (**Movie 3**).

RV dysfunction is frequent during the course of acute myocarditis.[1] RV involvement is seldom recognized at cardiac imaging, despite as frequent as 17.8% in acute myocarditis, with 2% exclusive RV involvement.[1] MRI[1-3] allows for depiction of RV involvement in acute myocarditis, with or without LV injury. Lake Louise criteria are difficult to apply at the level of the right ventricle; LGE, along with T2 and T1 mapping[4] and strain using feature tracking[2] are the cornerstones of multiparametric MR acquisitions. As for LV myocarditis, MR follow-up is of paramount importance to monitor complete RV resolution or disease persistence.

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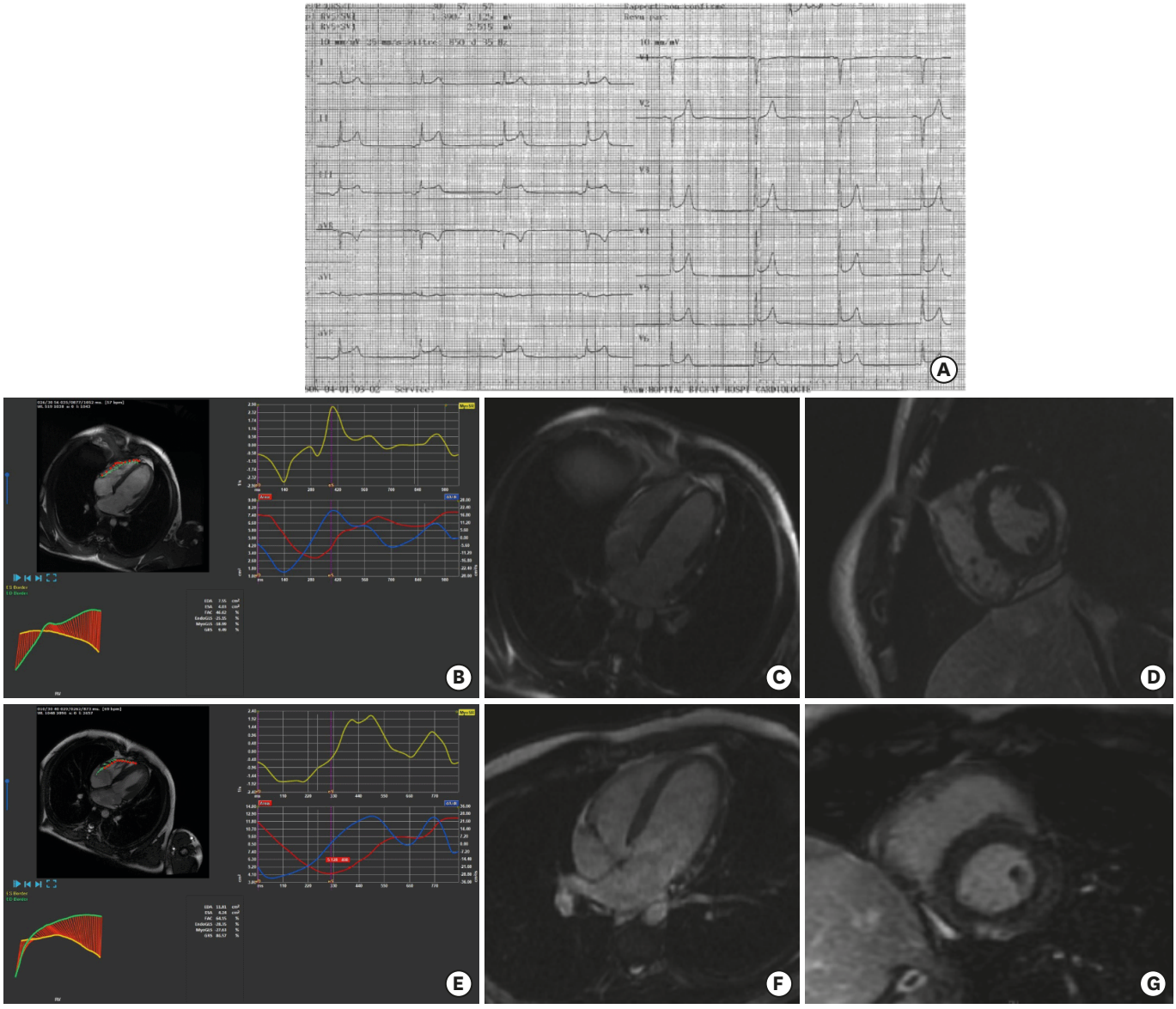


**Figure 1.** Electrocardiogram recorded during chest pain shows widespread ST-segment elevation (A). RV GLS and GRS measurements in a 4-chamber plane at initial presentation (B). Late gadolinium enhancement MR view in a four chamber (C) and short axis (D) orientation showing multiple foci of inflammation/necrosis of the free RV wall, septum and lateral LV wall. Follow-up RV GLS and GRS measurements (E) and LGE MR at 1 year, same orientations (F, G). RV involvement has quite completely resolved whereas LV LGE remains present.
GLS: global longitudinal strain, GRS: global radial strain, LGE: late gadolinium enhancement, LV: left ventricular, MR: magnetic resonance, RV: right ventricular.


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## SUPPLEMENTARY MATERIALS

### Movie 1

Feature tracking of right ventricular free wall myocardial strain at presentation.

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### Movie 2

Feature tracking of right ventricular free wall myocardial strain at follow-up.

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### Movie 3

TTE in 4-chamber plane at follow-up. Four chamber TTE views of right ventricular at presentation and follow-up were unremarkable.

Click here to view

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