

## Images in Cardiovascular Disease



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#### Conflict of Interest

The authors have no financial conflicts of  
interest.

# Multimodality Imaging Guidance in Fulminant Myocarditis: When Endomyocardial Biopsy Is Not Amenable

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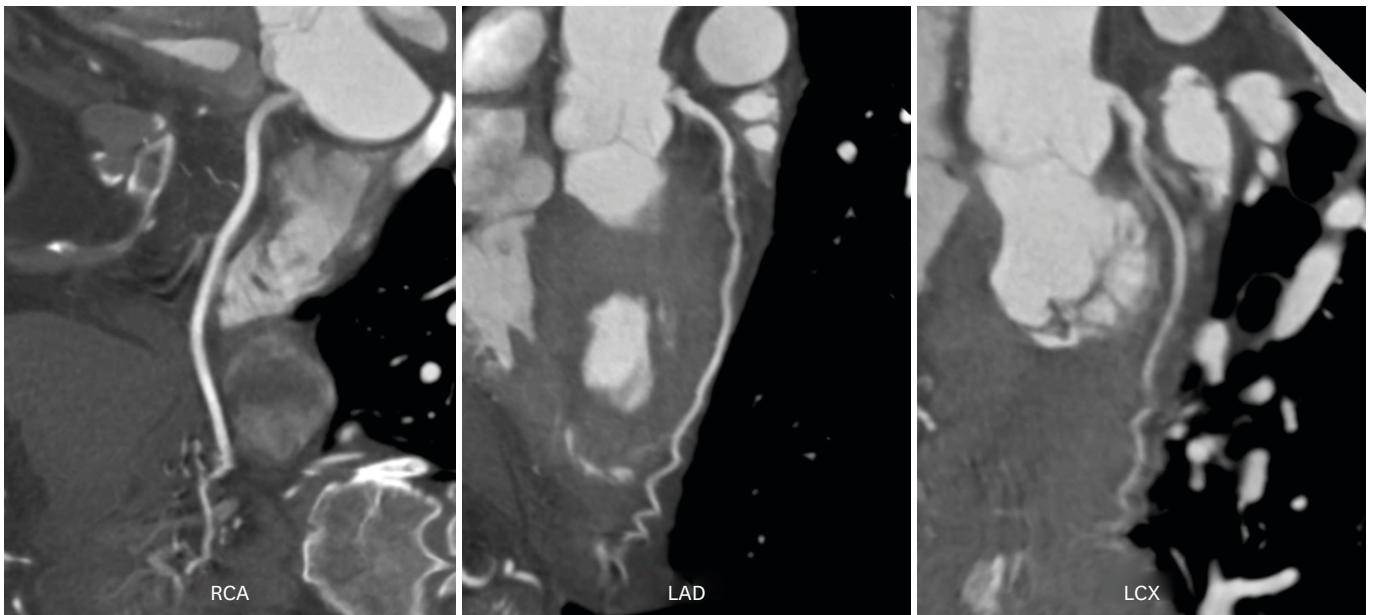
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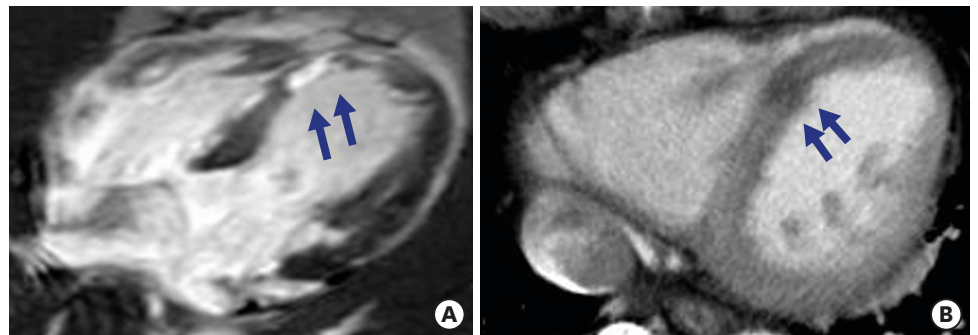
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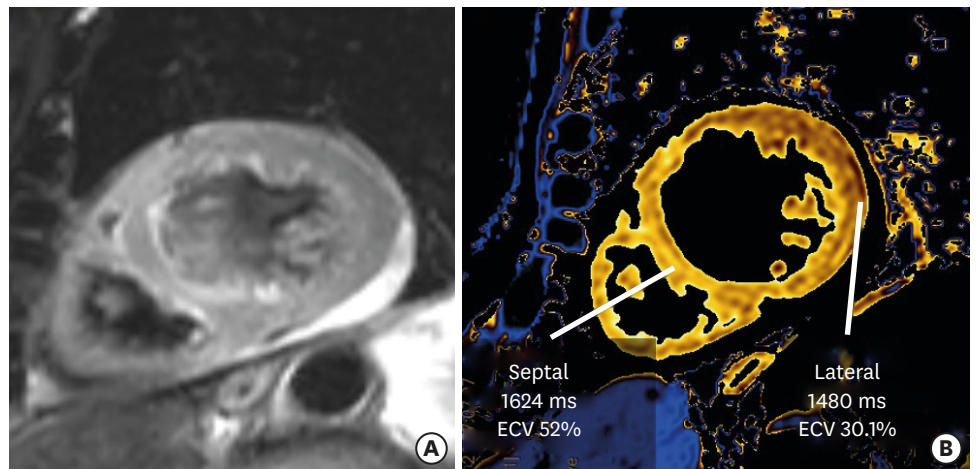
A 69-year-old male presented with dyspnea. Acute myocarditis was highly suspected due to cardiac enzyme elevation and fever without coronary stenosis on cardiac computed tomography (CCT) (**Figure 1**). On transthoracic echocardiography (TTE), left ventricular (LV) ejection fraction (EF) was severely decreased by 18%, with akinetic motion especially at the septal and apical walls. An LV apical mural thrombus was also noted. Despite sustained ventricular tachycardia and need for inotropic dose escalation due to cardiogenic shock, endomyocardial biopsy was postponed considering the risk of LV thrombus embolization. After stabilization, cardiac magnetic resonance (CMR) imaging was performed, and diffuse edematous changes in the LV myocardium, especially at the septal and apical walls, were noted (**Figure 2A**) and correlated with focal low attenuating lesions on CCT (**Figure 2B**). The mean native T1 value was elevated (1542 millisecond, ms, reference normal value of the native T1 was 1200 ms) and especially high in the mid-apical septum (1622 ms) (**Figure 3**). Delayed enhancement sequence demonstrated myocardial thinning with subendocardial enhancement in the mid-apical septum. On two-month follow-up TTE, LVEF was recovered to 44%. Follow-up CMR showed a markedly decreased native T1 value suggesting improvement in myocardial edema (mean 1419 ms). However, the T1 value in the mid-apical septum was still elevated (1699 ms). Mid-apical septal akinetic motion with thinning and delayed hyperenhancement was also maintained, suggesting irreversible scar formation (**Figure 4**). Combined with multimodality imaging results including follow up CMR, it appeared that acute fulminant myocarditis resulted in myocardial scarring, which mimicked myocardial infarction in the mid-apical septum and could be clearly identified.



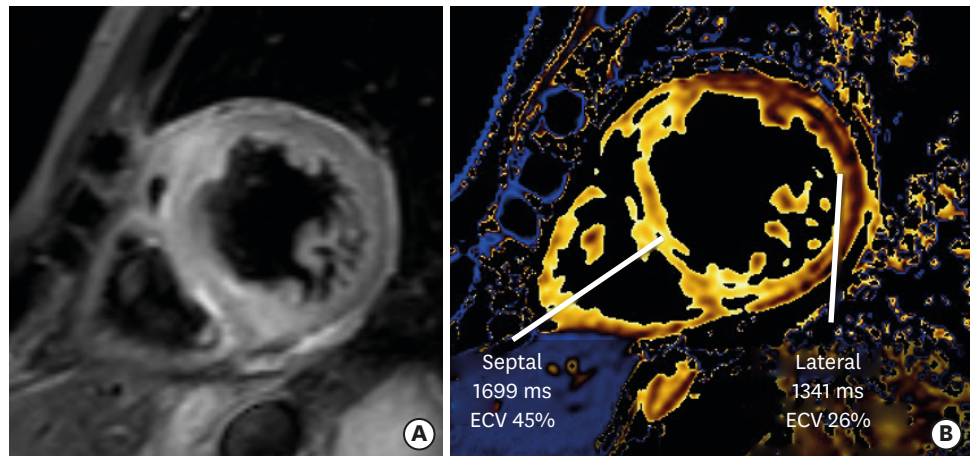
**Figure 1.** Cardiac computed tomography showing no significant coronary artery stenosis. (RCA, right coronary artery; LAD, left anterior descending artery; LCX, left circumflex artery)



**Figure 2.** Cardiac magnetic resonance imaging showing diffuse edematous changes in the left ventricular myocardium (blue arrows), especially at the septal and apical walls (A) and correlated with focal low attenuating lesions on cardiac computed tomography (B).



**Figure 3.** Initial cardiac magnetic resonance imaging at the mid-left ventricular level. - Elevated mean native T1 value (1542 ms) with higher value noted especially in the mid-apical septum (1622 ms).



**Figure 4.** Follow-up cardiac magnetic resonance imaging at the mid-left ventricular level.  
 - Decreased mean native T1 value (1419 ms) but still elevated value in the mid-apical septum (1699 ms) suggesting irreversible scar formation.