

MINI-FOCUS ISSUE: IMAGING

BEGINNER

IMAGING VIGNETTE: CLINICAL VIGNETTE

Rare and Complex Case Mimics Acute Myocardial Infarction



The Importance of Multimodality Imaging

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ABSTRACT

We report a rare and complex case of cardiac sarcoidosis in a patient presenting with ventricular tachycardia. Multimodality imaging, along with clinical and histological examination, was essential in establishing the diagnosis of cardiac sarcoidosis. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2021;3:125-7)

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A 62-year-old man with a history of hypertension and polymyalgia rheumatica was seen in the emergency department for symptoms of palpitations, dizziness, and dyspnea. His initial electrocardiogram (ECG) showed ventricular tachycardia at a rate of 219 beats/min. Subsequently, he underwent synchronized cardioversion to sinus rhythm, and the post-cardioversion ECG showed normal sinus rhythm with first-degree AV block, fusion complexes, a rightward axis, nonspecific intraventricular block, Q waves in the inferior leads, and poor R-wave progression. After cardioversion, his initial troponin level was 1.3 ng/ml, which decreased to 0.99 ng/ml in 6 h, and his N-terminal pro-B-type natriuretic peptide level was 164 pg/ml, his erythrocyte sedimentation rate was 9 mm/h, and his angiotensin-converting enzyme level was 5 U/l. An echocardiogram revealed reduced function with akinetic mid- to apical segments (left ventricular [LV] ejection fraction 37%) and reduced LV global longitudinal strain (−7%) (**Figures 1A and 1B**, **Videos 1 and 2**). A coronary angiogram showed no obstructive coronary artery disease. Cardiac magnetic resonance revealed elevated T_2 values in the mapping sequences in the mid- to apical septum and anterior wall suggestive of active inflammation (**Figure 1C**). Delayed gadolinium enhancement images showed a subendocardial and transmural pattern of late gadolinium enhancement in the mid- to apical LV segments (**Figure 1D**) and the right side of the interventricular septum, with contiguous extension to the apical anterior right ventricular free wall, consistent with the hook sign (**Figure 1E**) (1). Computed tomography of the chest showed highly attenuated mediastinal lymph nodes that were concerning for granulomatous disease. Furthermore, a fluorodeoxyglucose (FDG)-positron emission tomography (PET) scan demonstrated intense FDG uptake in the mid- to apical LV segments, contiguous right ventricular apical free wall, and multiple lymph nodes, suggestive of active inflammation (**Figure 1F**). Fine-needle aspiration and core biopsy with flow cytometry of the supraclavicular lymph node showed non-necrotizing granulomatous inflammation suggestive of sarcoidosis, given the clinical scenario and multimodality imaging findings.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

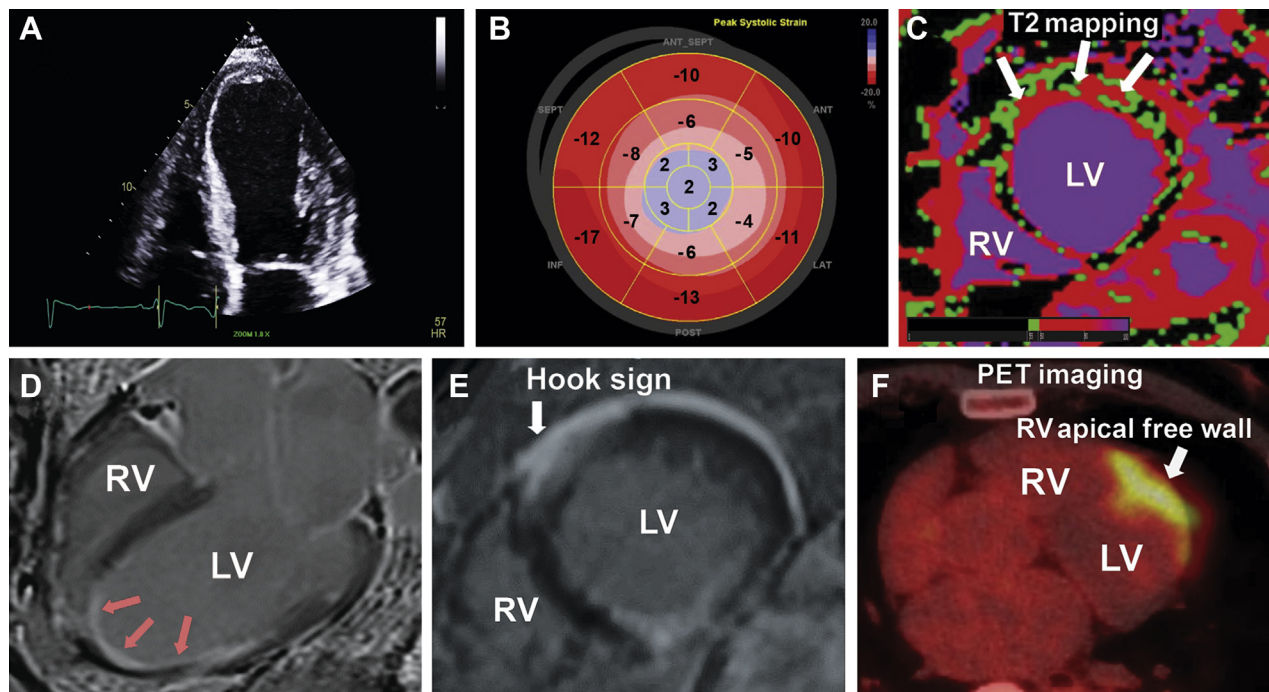
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**ABBREVIATIONS
AND ACRONYMS**

ECG = electrocardiogram
FDG = fluorodeoxyglucose
LV = left ventricular
PET = positron emission
tomography

Sarcoidosis, a granulomatous disease with multisystem involvement, is caused by an immunologic response to an unknown antigen in genetically prone individuals. Although asymptomatic cardiac involvement is seen in up to 25% of patients with systemic sarcoid, significant cardiac manifestations occur only in 5% (2). Multimodality imaging with echocardiography, cardiac magnetic resonance, and FDG PET is essential in establishing the diagnosis because clinical and biopsy criteria have limited accuracy. The presence of late gadolinium enhancement also provides strong prognostic value (3). In the world of contemporary medicine, with marked improvements in imaging modalities, the rate of diagnosis of cardiac sarcoidosis has increased. Maintaining a high suspicion for the disease in patients presenting with conduction abnormalities and ventricular arrhythmias will help early diagnosis and initiation of immunosuppressant agents that can be useful either to maintain or improve LV function.

FIGURE 1 Complementary Roles of Multimodality Imaging in Cardiac Sarcoidosis



(A) Echocardiogram shows significant wall thinning in the mid- to apical septum and apex. **(B)** Bull's-eye plot of longitudinal strain imaging reveals apical dyskinesia and decreased longitudinal strain values. **(C)** Increased T2 values in the midanterior and anteroseptal walls suggest active inflammation (arrows). **(D)** Cardiac magnetic resonance shows the transmural late gadolinium enhancement pattern (arrows) in the mid- to apical left ventricular wall segments. **(E)** Late gadolinium enhancement in the right side of the interventricular septum with contiguous extension to the apical anterior right ventricular (RV) free wall, consistent with the hook sign, is seen. **(F)** Fluorodeoxyglucose positron emission tomography (PET) imaging shows an increase in uptake in the left ventricle (LV) and right ventricle (RV), suggestive of active inflammation.

AUTHOR DISCLOSURES


The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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KEY WORDS cardiac sarcoidosis, multimodality imaging, ventricular tachycardia, wall motion

 **APPENDIX** For supplemental videos, please see the online version of this paper.