

Letter to the Editor

Fat in the right heart: the role of cardiac magnetic resonance imaging in differentiating diffuse lipomatous hypertrophy of the right ventricle from arrhythmogenic right ventricular cardiomyopathy

Dear Editor,

We read with great interest the recent article by Dr. Sustar, describing the role of cardiac magnetic resonance imaging (MRI) in the diagnosis of an unusual form of hypertrophic cardiomyopathy¹. Cardiac MRI also has significant utility in identifying the etiology of fat in the right ventricle.

A 52-year-old female smoker presented as a referral to our center for 1-year history of mild dyspnea on exertion with right ventricular (RV) hypertrophy. Prior evaluation, consisting of pulmonary function test and chest computed tomography (CT) scan with contrast, was not remarkable for any abnormalities, including pulmonary emboli. An electrocardiogram (ECG) showed incomplete right bundle branch block with T-wave inversions in leads V1 and V2. Stress echocardiogram revealed no ischemic changes. Complete transthoracic echocardiogram characterized the RV free wall as 14 mm thick.

At our center, cardiac MRI delineated a thickened RV free wall with a fatty layer measuring 5-8 mm that was found to interdigitate with myocardium measuring 4-7 mm (Figure 1A and 1B). RV size and function were otherwise normal. A Holter monitor and signal-averaged ECG showed no arrhythmia. There was no family history of sudden death, and genetic testing was not obtained. Given stability of symptoms, absence of arrhythmia, and procedural risks, invasive testing with right heart catheterization, electrophysiology study, and endomyocardial biopsy was not pursued.

Myocardial fat in the right ventricle, while commonly found on CT scans and MRI, raises concern for arrhythmogenic right ventricular cardiomyopathy (ARVC)². Diagnosis of ARVC is challenging, and rests on a combination of structural, functional, and electrophysiologic abnormalities³. Morphological changes on cardiac MRI in ARVC patients include RV myocardial fat as well as RV wall thinning, wall hypertrophy, and outflow tract enlargement^{4,5}. Functional changes consist of RV aneurysm, dilatation, akinesia, and dyskinesia with systolic dysfunction (Figure 1C and 1D)^{4,5}.

The MRI finding of RV myocardial fat, though described in ARVC patients, is not a diagnostic criterion for ARVC and should be approached very cautiously³. Functional abnormalities on MRI, such as RV aneurysm and reduced RV ejection fraction, are more established criteria (Figure 1C and 1D)³. Based on known data, our patient does not meet the diagnostic threshold for ARVC³. Further, a right ventricle with thickness ≥ 6 mm due to lipomatous infiltration and no functional changes has been described as distinct from ARVC⁶. This diffuse lipomatous hypertrophy of the right ventricle (DLHRV), as in our patient, may represent a variant on the broader spectrum of RV cardiomyopathy that includes ARVC.

No clinical guidelines regarding management of DLHRV are available. Since our patient's symptoms were mild and stable with no additional abnormalities found upon non-invasive testing, she was treated conservatively with repeat cardiac MRI after one year that showed no remarkable changes. Her symptoms are unlikely to be related to the cardiac finding.

Conflict of Interest

The Authors declare that they have no conflict of interests.

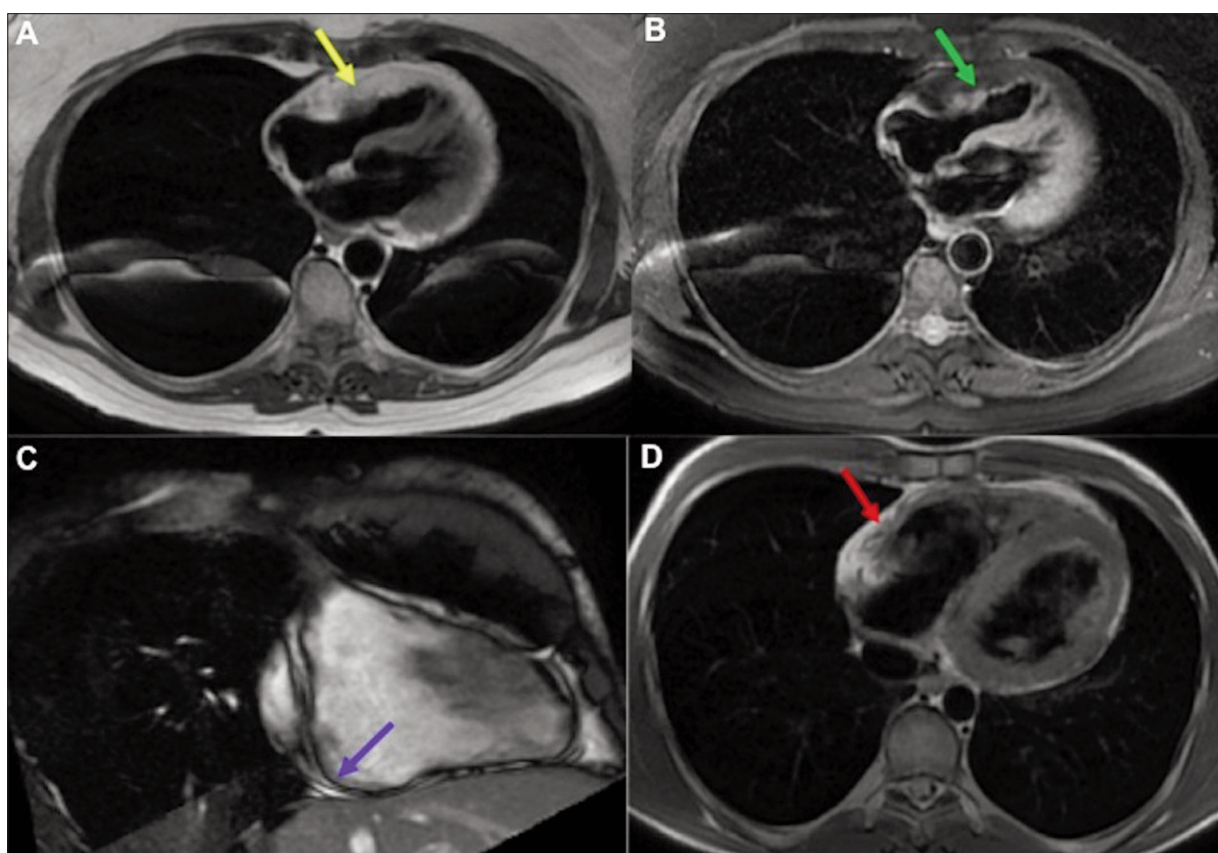


Figure 1. *A-B*, Axial double inversion recovery magnetic resonance imaging (MRI) delineated a thickened right ventricular (RV) free wall measuring 12 mm with diffuse hyperintense signal (*yellow arrow*) that suppresses on fat-suppressed image (*green arrow*), indicating diffuse lipomatous infiltration of myocardium in the RV free wall. No RV aneurysm, akinesia, or dyskinesia was appreciated. Ratio of RV end-diastolic volume to body surface area was 50 ml/m², and RV ejection fraction was 46%. *C-D*, Displayed for comparison are images from a patient with arrhythmogenic right ventricular cardiomyopathy at our center. Fast imaging employing steady-state acquisition MRI showed a right ventricle with focal aneurysm (*purple arrow*). Cine image (*not shown*) demonstrated dyskinesia of this aneurysm. RV function was decreased with ejection fraction of 25%. Axial double inversion recovery MRI showed no fatty infiltration (*red arrow*).

References

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