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IMAGING VIGNETTE

CLINICAL VIGNETTE

A Rare Case of New-Onset Atrial Fibrillation Presenting as Biatrial Inflammation Seen on ^{18}F-FDG-PET

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ABSTRACT

Isolated atrial myocarditis, a rare clinical entity, is presented in this case report as the diagnosis in a patient with new-onset atrial fibrillation. Our findings emphasize the potential for atrial arrhythmias and their unusual presentation; the role of multimodal imaging, especially ^{18}F-FDG-PET/CT, in diagnosis; and considerations for long-term treatment strategies. (J Am Coll Cardiol Case Rep 2023;28:102114) © 2023 Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Isolated atrial myocarditis is a rare presentation associated with nonspecific symptoms.[1] Previous studies have suggested its association with atrial arrhythmias and an increased risk of stroke caused by atrial dysfunction.[2] Diagnosing myocarditis often hinges on clinical presentation, laboratory tests, and imaging studies, notably, fluorine-18 labeled deoxyglucose (^{18}F-FDG)-positron emission tomography/computed tomography (PET/CT). This case underscores the higher incidence of atrial arrhythmias in isolated atrial myocarditis and highlights the need to consider oral anticoagulation therapy.

A 55-year-old man with a history of hypertension presented to his cardiologist's office with acute-onset palpitations, dizziness, and fatigue. The patient's initial electrocardiogram (ECG) revealed normal sinus rhythm with occasional premature ventricular contractions (PVCs) and premature atrial contractions.

The patient underwent a 2-dimensional echocardiogram, which revealed a left ventricular ejection fraction of 50% to 55%, mild biatrial dilation, and no regional wall motion abnormalities. Incidental atrial fibrillation (AF) was diagnosed during the transthoracic echocardiography. Consequently, he was referred to the cardiac electrophysiology clinic for further assessment. Given the patient's symptoms, an implantable loop recorder (ILR) was recommended. Additionally, the patient was advised to undergo cardiac magnetic resonance (CMR) and ^{18}F-FDG-PET/CT to rule out underlying infiltrative or inflammatory processes primarily as a cause of PVCs. ILR data showed an AF burden of 33% and a PVC burden of 1%. CMR did not detect late gadolinium enhancement to suggest LV myocardial inflammation and/or fibrosis (**Figure 1A and 1B**). ^{18}F-FDG-PET/CT with a high-fat, low-carbohydrate dietary preparation revealed avid FDG uptake involving the biatrial walls, including the interatrial septum, which was most consistent with active inflammation (**Figure 1C**, Supplemental Figure 1). The maximum standardized uptake value was 3.8. No LV myocardial FDG uptake was

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ABBREVIATIONS AND ACRONYMS

^{18}F-FDG-PET/CT = fluorine-18 labeled deoxyglucose positron emission tomography/computed tomography

AF = atrial fibrillation

ECG = electrocardiogram

ILR = implantable loop recorder

IST = immunosuppressive therapy

PVC = premature ventricular contractions

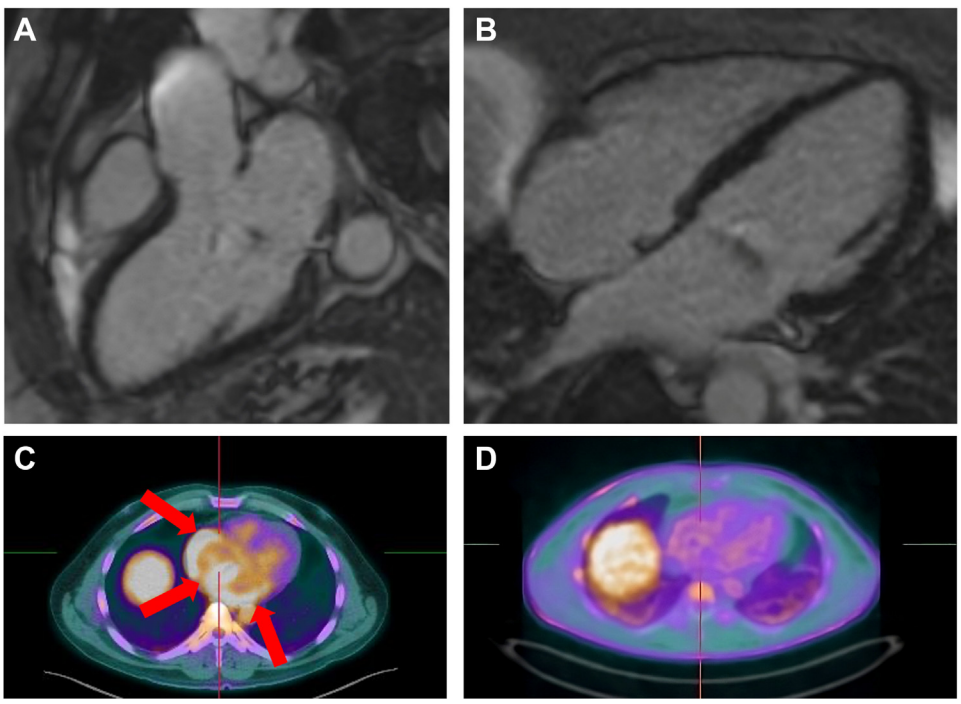
identified. The results of a comprehensive myocarditis laboratory panel of cytomegalovirus immunoglobulin M, angiotensin-converting enzyme, rheumatoid arthritis factor, cytoplasmic antineutrophil cytoplasmic antibodies, and cyclic citrullinated peptide, were unremarkable. The detailed workup and systemic imaging confirmed the absence of inflammatory activity in the rest of the body beyond the biatrial region.

The above clinical presentation and imaging findings led to the likely diagnosis of isolated atrial myocarditis. Treatment was initiated with dronedarone and oral anticoagulation (with a CHA_2DS_2-VASc score of 1) for thromboembolism prophylaxis, as well as immunosuppressive therapy (IST) with methotrexate and low-dose prednisone. Invasive atrial myocardial biopsy was deemed not necessary to avoid potential procedure-related complications.

After 2 cycles (spanning 6 months) of IST, follow-up ^{18}F-FDG-PET/CT displayed resolution of the prior FDG uptake in the atria (**Figure 1D**, Supplemental Figure 2). The ILR further demonstrated effective suppression of AF, with the atrial tachycardia/fibrillation burden reduced to 2.2% and an overall consistent PVC burden of 1%, and the patient continued maintenance use of antiarrhythmic drugs.

This case illustrates that isolated atrial myocarditis, an uncommon presentation of acute myocarditis, may carry a notable association with atrial arrhythmias, such as AF in our case. Advanced imaging diagnostic modalities such as ^{18}F-FDG-PET/CT prove valuable in confirming the diagnosis. The effectiveness of long-term IST warrants further investigation. Despite a low CHA_2DS_2-VASc score, consideration of oral anticoagulation for stroke prophylaxis is crucial because of the potential long-term implications of atrial dysfunction.

FIGURE 1 Multimodal Imaging in Isolated Atrial Myocarditis



(A, B) Cardiac magnetic resonance using phase-sensitive inversion-recovery late gadolinium enhancement sequences demonstrates normal left ventricular myocardium without evidence of inflammation and/or fibrosis. (C) ^{18}F-FDG-PET/CT scan with high-fat, low-carbohydrate dietary preparation shows avid FDG uptake in the biatrial walls (red arrows on axial slice). No ventricular myocardial uptake is observed. (D) Interval ^{18}F-FDG-PET/CT scan at 6 months reveals absence of atrial FDG uptake, indicating resolution of isolated atrial myocarditis. ^{18}F-FDG = fluorine-18 labeled deoxyglucose positron emission tomography/computed tomography.

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KEY WORDS ^{18}F-FDG-PET/CT, atrial arrhythmias, biatrial inflammation, cardiac magnetic resonance, immunosuppressive therapy, isolated atrial myocarditis

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