

## CLINICAL IMAGE

# Bi-atrial fibrosis detected using three-dimensional late gadolinium enhancement magnetic resonance imaging in a patient with cardiac sarcoidosis<sup>★</sup>

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## Abstract

Presented is the case of a 62-year old male with a history of sarcoidosis and sinus node dysfunction, who underwent late gadolinium enhancement magnetic resonance imaging, which demonstrated left ventricular hyperenhancement and bi-atrial fibrosis.

## CLINICAL IMAGE

A 62-year old male initially presented in 1995 with odynophagia, shortness of breath and erythema nodosum. Subsequent investigations, including biopsy of the uvula, confirmed sarcoidosis, and the patient was successfully treated with prednisone for 8 months with resultant remission of his sarcoidosis. In 2004, he represented with mild asymptomatic sinus node dysfunction (SND), evidenced by sinus bradycardia, and additionally, a first-degree atrioventricular block (AV block) on electrocardiogram. He again represented in 2017 with symptomatic SND and subsequently underwent cardiac magnetic resonance imaging (MR). Late gadolinium enhancement (LGE) phase sensitive inversion recovery (PSIR) images of the left ventricle demonstrated

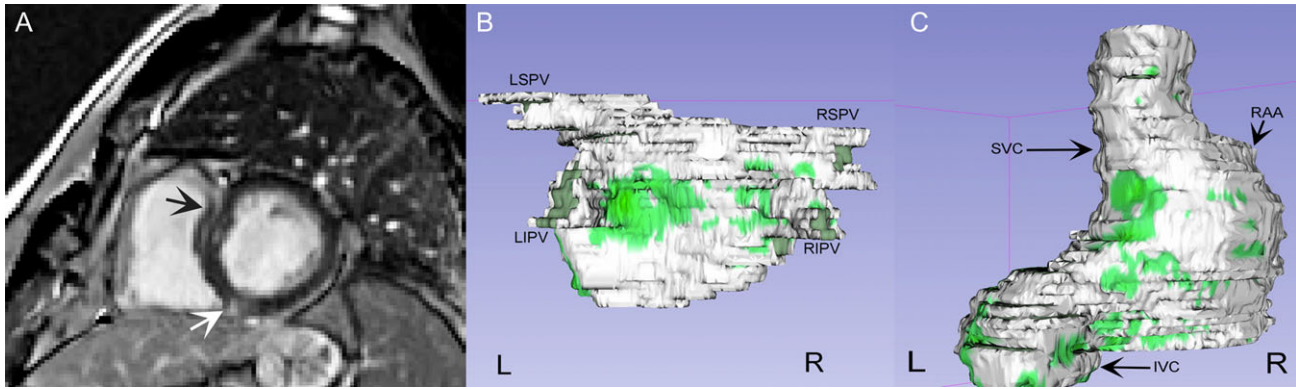
linear mid-myocardial hyperenhancement on the basal septum, and patchy hyperenhancement in the inferoseptal wall (see panel A, Fig. 1). This pattern of enhancement is highly suggestive of cardiac sarcoidosis in the clinical context of a prior histologic diagnosis of sarcoidosis with cardiac arrhythmia [1, 2]. On 3D-LGE MR of the atria, the reconstructed 3D color models demonstrated areas of hyperenhancement (see panels B and C, Fig. 1), indicating atrial fibrosis [3]. The amount of fibrosis in the atria was quantified at 6.9% on the left atrium, and 6.2% on the right atrium using a method that accounted for both the mean and standard deviation of the MRI signal intensity in the left atrial blood pool [3, 4]. Notably, recent data using endocardial voltage mapping in patients with atrial fibrillation (AF) found that 90% of

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**Figure 1:** (A) 2D LGE PSIR image in short axis plane demonstrating linear hyperenhancement in the basal septum (black arrow) and patchy enhancement in the basal inferoseptal wall (white arrow); (B) 3D-LGE MR images reconstructed as 3D color models showing patchy areas of enhancement indicating fibrosis (green areas) and normal atrial myocardium (white background) in the posterior wall of the left atrium (B) and posterior wall of the right atrium (C).

patients with paroxysmal, and 65% of patients with persistent AF had no detectable left atrial fibrosis [5].

In the absence of evidence to demonstrate active cardiac sarcoidosis on clinical examination, echocardiography (normal biventricular function without significant valvulopathy), or computed tomography of the chest, prednisone was not prescribed. An electrophysiologic ventricular tachycardia (VT) stimulation study was performed without induction of VT, and accordingly the patient underwent an uncomplicated dual-chamber pacemaker insertion.

3D-LGE-MRI atrial imaging has recently been described in patients undergoing AF ablation [6]. Additionally, atrial arrhythmias and SND have been described in cardiac sarcoidosis, however we believe this is the first MRI description of atrial fibrosis in a patient with cardiac sarcoidosis and SND.

## SUPPLEMENTARY MATERIAL

Supplementary material is available at *Oxford Medical Case Reports* online.

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## CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest to disclose.

## ETHICAL APPROVAL

Ethical approval not applicable (none required).

## CONSENT

Written patient consent was obtained.

## GUARANTOR

DHB serves as guarantor of this article.

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