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Clinical Image

CLINICAL IMAGE

An unexpected cause of hypertrophic myocardium

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A 60-year-old man with known atrial fibrillation (AF) was referred for routine cardiovascular magnetic resonance imaging (CMR) prior to AF ablation. He was normotensive and had no other previous medical conditions. A transthoracic echocardiogram had shown good systolic function with moderate left ventricular hypertrophy and mildly dilated atria (Fig. 1).

Initial CMR imaging for anatomy and function demonstrated normal ventricular size and mildly impaired systolic function (ejection fraction = 50%, normal >55%) with no significant valvular pathology. There was asymmetrical septal hypertrophy measuring 16 mm (normal <13 mm) in the basal septum versus 9 mm in the lateral wall at the same level with significantly elevated left ventricular mass at 241 g (Fig. 2a). There was no systolic anterior motion of the mitral valve or left ventricular outflow tract obstruction at rest. Both atria were slightly enlarged, the left atrium measuring 35 cm^2 and the right atrium measuring 36 cm^2. To identify the etiology of hypertrophy, conventional late gadolinium enhancement (Fig. 2b) was undertaken alongside novel native T1 mapping sequences (Fig. 3 and Supplementary Videos 1 and 2). Acquisition of late gadolinium images was technically challenging, giving the impression of diffuse enhancement associated with a relatively dark blood pool, both of which are suspicious of amyloid infiltration of the heart [1]. The native T1 maps showed an elevated septal T1 relaxation time (1148 ms, normal <1050 ms), supporting the initial impression of cardiac amyloid and further suggesting that this was most likely due to light chain deposition (AL amyloid) [2]. AL amyloid was subsequently confirmed by serum free light chain immunoassay and bone marrow trephine biopsy.

A combination of late gadolinium enhancement and novel T1 mapping sequences have the ability to correctly determine the underlying pathology in patients with hypertrophic myocardium and potentially help in the identification of the amyloid class.

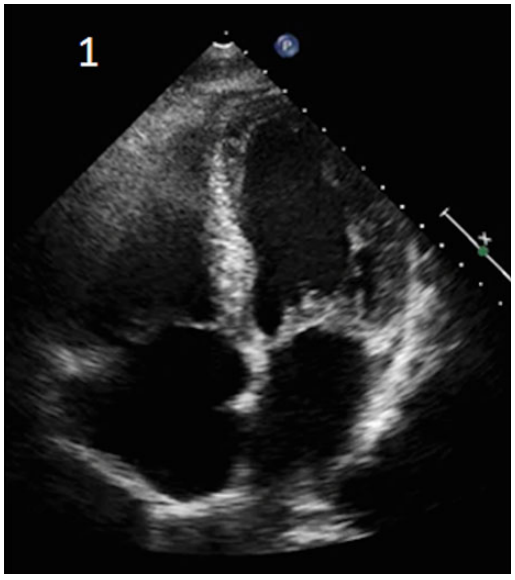

Figure 1: Four-chamber transthoracic echocardiography demonstrating moderate myocardial hypertrophy and mildly dilated atria.

SUPPLEMENTARY MATERIAL

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

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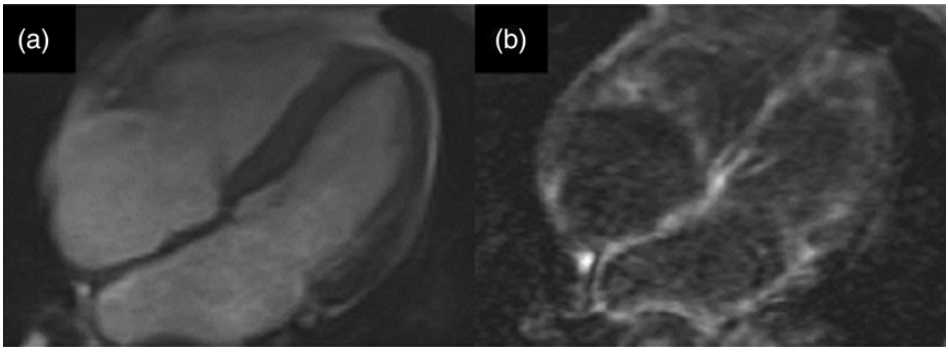

Figure 2: (**a**) A hypertrophic myocardium with mildly dilated atria. (**b**) Diffuse enhancement associated with a relatively dark blood pool (difficult 'nulling') of the myocardium, typical of cardiac amyloid.

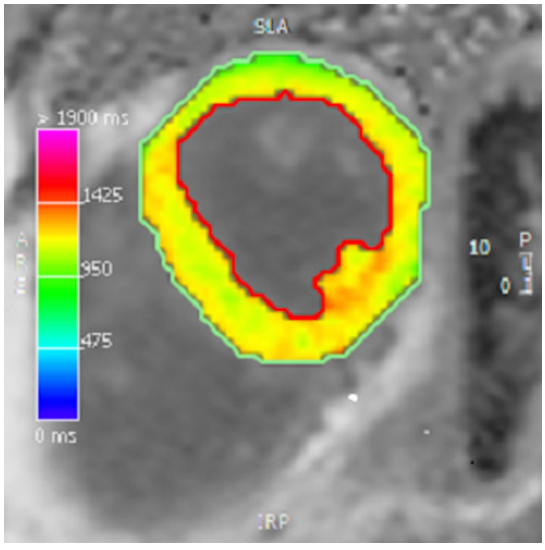

Figure 3: T1 map following motion correction and co-registration to enable calculation of native T1 values. In this case, the septal value was elevated at 1148 ms suggestive of light chain amyloid deposition (AL amyloid) and demonstrating how new techniques can be utilized to aid the diagnosis of rare pathology.

CONFLICT OF INTEREST STATEMENT

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