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CASE REPORT

Tamponade Caused by Cardiac Lipomatous Hypertrophy

Saul G. Myerson,[1] Robin Roberts,[2] Neil Moat,[1] and Dudley J. Pennell[1,*]

[1]Cardiovascular Magnetic Resonance Unit and Department of Surgery,
Royal Brompton Hospital, London, UK
[2]Department of Cardiology, Queen Mary's Hospital,
Roehampton, UK

ABSTRACT

Cardiac lipomatous hypertrophy is an unusual disorder that typically affects the interatrial septum. We report a case in which large subpericardial deposits of fat were initially mistaken for a pericardial effusion and the subsequent clinical picture resembled tamponade. The patient improved following a pericardiectomy.

Key Words: Lipomatous hypertrophy; Pericardial effusion; Cardiac tamponade; Cardiovascular magnetic resonance; Surgery.

INTRODUCTION

Cardiac lipomatous hypertrophy is a disorder of unknown etiology affecting the interatrial septum, which becomes thickened and infiltrated with fat cells (Prior, 1964). It is also associated with large subpericardial fat deposits (Shirani and Roberts, 1993) and is being increasingly recognized with the widespread use of tomographic imaging of the heart. We report a case in which this condition was initially mistaken for a chronic pericardial effusion in a patient with features of cardiac tamponade.

CASE REPORT

A 72-year-old woman presented with breathlessness, and a diagnosis of chronic pericardial effusion was made by echocardiography. This proved impossible to drain percutaneously. At the initial referring hospital, she had a video-assisted left thoracotomy in an attempt to drain the effusion and create a pericardial window. The surgeon reported the finding of ''excess fat'' within the pericardial cavity but no effusion. She was subsequently referred to the Royal Brompton Hospital for further investigation.

*Correspondence: Prof. D. J. Pennell, CMR Unit, Royal Brompton Hospital, Sydney St., London SW3 6NP, UK; Fax: +44-20-7351-8816; E-mail: d.pennell@ic.ac.uk.

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Cardiovascular Magnetic Resonance (CMR) was performed with echocardiogram (ECG)-gated spin-echo images (TE 40 msec, TR 800 msec, FOV 35 × 35 cm, matrix 256 × 256 voxels) showing high intensity signal in the subpericardial space, of identical signal intensity to the subcutaneous fat (Fig. 1a). The interatrial septum was thickened (9 mm) and also of high signal intensity (Fig. 2). Gradient echo images [echo time (TE) 3.8 msec, repetition time (TR) 8 msec, flip angle 32°, FOV 35 × 35 cm] were taken at the same levels with the addition of a ''fat saturation'' sequence: a nonspatially selective, fat-specific, chemical-shift-selective saturation pulse at 110° flip-angle, applied immediately prior to the imaging pulses in each cardiac cycle, with the operating frequency of the imaging pulse adjusted to the water peak in the spectrum. This sequence greatly reduces the signal from fat and is specific for this tissue (Fig. 1b,c). These confirmed that the subpericardial and interatrial tissue were both fat, suggesting the diagnosis of cardiac lipomatous hypertrophy.

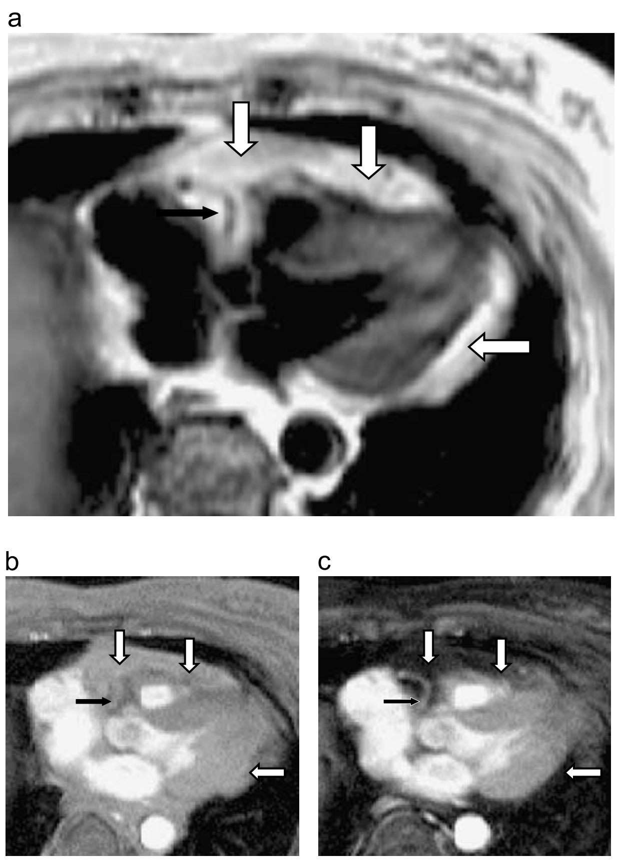

Figure 1. Transaxial magnetic resonance images through the left ventricle of a patient with cardiac lipomatous hypertrophy infiltrating the subpericardial space (white arrows). The right coronary artery can also be seen (black arrow). a) Spin echo image demonstrating the high signal intensity from subpericardial fat; b) Gradient echo image at the same level; c) Same gradient echo image with fat saturation pulse to ''remove'' fat from the image.

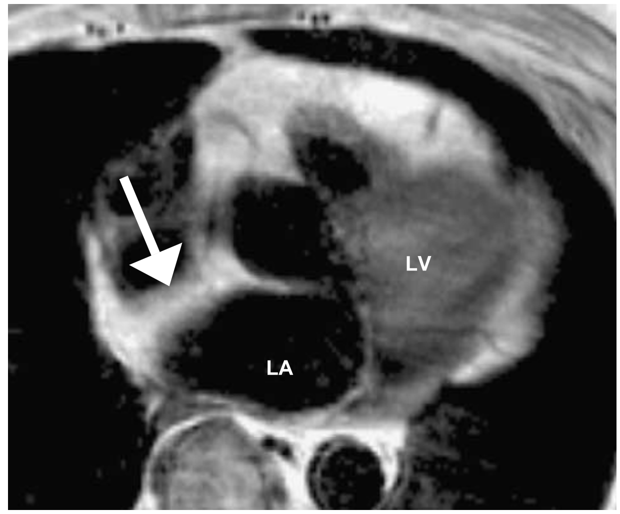

Figure 2. Transaxial spin-echo image through the atria, demonstrating the thickened interatrial septum (arrow) of high signal intensity, similar to the pericardial fat. LV = left ventricle; LA = left atrium.

She was treated conservatively but her breathlessness worsened, with no other cause identified. Repeat CMR 2 months later showed similar amounts of fat but reduced diastolic volumes (Table 1). After discussion on the optimal management of this lady, it was proposed that the excess epicardial fat may be acting in a way to produce tamponade and impaired diastolic filling, particularly of the right ventricle. A mediastinotomy was performed at which the pericardium was essentially normal and was incised in the midline, through which the heart bulged out. There was an unusual distribution of fat around the heart, with little fat around the left ventricle but an exuberant deposition

Table 1. Sequential left ventricular volumes in a patient with subpericardial lipomatous hypertrophy.

	EDV (mls)	ESV (mls)	SV (mls)
Initial scan	84	32	53
2 months later	74	23	52
6 weeks post-surgery	88	26	63

Note: EDV = End-diastolic volume; ESV = end-systolic volume; SV = stroke volume.

of fatty tissue around the right ventricle, particularly on its anterior surface. The coronary arteries were clearly running within this adipose tissue and it was not feasible to resect any of the tissue. A wide incision of the pericardium anterior to the phenic nerves was performed to decompress the presumed tamponade. An intraoperative transesophageal echocardiogram confirmed that the atrial septum was not obstructing any vena caval or tricuspid flow and this was left intact.

The patient made an uncomplicated recovery, and at follow-up 6 weeks later, was symptomatically much improved and no longer limited in her exercise capacity. A follow-up CMR scan at that time was performed that showed normal cardiac function and an increase in the end-diastolic volume (Table 1). At 1-year post operation, she remains symptomatically well.

DISCUSSION

Previous reports of cardiac lipomatous hypertrophy have focused mainly on the interatrial septum, in which the fatty infiltration can mimic other atrial masses such as myxoma (Burke et al., 1996; Reyes and Jablokow, 1979). It may be associated with coronary atherosclerosis, atrial arrythmias, obstructive symptoms, or sudden death (Gay et al., 1996; Shirani and Roberts, 1993), and the interatrial septum may be up to 7 cm thick (Gay et al., 1996).

This case highlights the possible misinterpretation of pericardial lipomatous hypertrophy by echocardiography as a pericardial effusion, particularly when drainage is impossible. Cardiovascular magnetic resonance is particularly good for the assessment of pericardial diseases due to the superior picture quality in all planes and accurate assessment of diastolic and systolic chamber sizes. The pericardium can be readily distinguished from the surrounding structures, the degree and extent of pericardial thickening can be assessed, and other differential cardiac diagnoses can be excluded [e.g., reduced left ventrical/right ventrical (LV/RV) function, LV hypertrophy]. The excellent reproducibility of volume measurements (Bellenger et al., 2000; Grothues et al., 2002; Semelka et al., 1990) also allowed their confident serial assessment in this case, which aided management. Magnetic resonance spin-echo images are particularly good for identifying adipose tissue due to its high signal intensity relative to other tissues, and MR has been used previously to identify interatrial lipomatous hypertrophy in vivo (Kozelj et al., 1995; Levine et al., 1986). Our images of pericardial fatty tissue closely resemble postmortem slides from another patient reported elsewhere (Shirani and Roberts, 1993). Care should be taken however, as some pericardial effusions (particularly exudates) can also exhibit high spin-echo signal intensity, and a fat saturation sequence should be used if available to aid the diagnosis.

This is the first time to our knowledge, that this condition has resulted in a possible ‘‘fat tamponade’’ and that pericardiectomy has been performed to alleviate symptoms.

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