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LETTER TO THE EDITORS

Double-chambered left ventricle in a patient with chest pain

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Sirs:

A 42-year-old man with atypical chest pain was admitted to hospital. He had no health problems until that time. At presentation, the electrocardiogram showed sinus rhythm at 84 beats per minute, along with left bundle branch block (Fig. 1). Echocardiographic studies revealed a reduced left ventricular ejection fraction of 39% and an unusual, aneurysm-like structure adjacent to the lateral wall of the left ventricle. Coronary angiography ruled out coronary artery disease. Left ventricular angiography confirmed the aneurysm-like outpouching of the lateral wall of the left ventricle (Fig. 2) and the reduced ejection fraction.

On magnetic resonance imaging, the four-chamber view showed a double apex. The left ventricle was divided into two chambers by a muscle bundle (Fig. 3). This accessory septum originated between the two apices, was compact in the apical segment, then merged into a non-compacted segment, leaving a broad opening at the cardiac base with some chorda-like muscular strings reaching the outer site of the annulus of the mitral valve. The ventricular septum itself was observed at the anticipated site, dividing the right ventricle from the left ventricle. Late gadolinium-enhanced imaging gave no evidence of myocardial scarring [1].

Differential diagnosis comprises diverticulum, false aneurysm of the left ventricle, aneurysm of the left ventricle, and double-chambered left ventricle (DCLV). The morphological arrangement encountered in our patient met the criteria of DCLV as described by Kumar et al. [2]. The supernumerary component had a homogeneous oval shape and contracted in synchrony with the dominant ventricular component. Such synchronous contraction is considered the feature that serves to distinguish the DCLV from an aneurysm. In the setting of aneurysm, as the consequence of myocardial infarction, the entire aneurysmal wall would be expected to show late gadolinium enhancement with the pattern of contraction being akinetic or dyskinetic. Neither of these characteristics was found in our patient. Furthermore, coronary angiography revealed normal coronary arteries with no signs of stenosis or occlusion.

A diverticulum contains all three layers of cardiac tissue and has a narrow connection to the ventricle. A DCLV is also composed of all three layers of cardiac tissue but has a wide connection to the ventricle, from which it is separated by the anomalous septum or muscle bundle.

Distinguishing between these three entities is of clinical importance given the different treatment modalities and prognosis. Although most congenital left ventricular aneurysms and diverticula are asymptomatic they may cause systemic embolization, heart failure, valvular regurgitation, ventricular wall rupture, ventricular tachycardia or sudden cardiac death. When symptomatic or when associated with other cardiac abnormalities, surgical treatment is frequently recommended [3]. DCLV is usually asymptomatic and has a benign prognosis. Nevertheless, one case with coronary embolism and two cases with non-sustained ventricular tachycardia-ventricular fibrillation have been described.

In contrast, the more commonly occurring double-chambered right ventricle is characterized by a hypertrophied muscle bundle that divides the right ventricle in two chambers and is often associated with a ventricular septum defect [4]. To prevent progression to right ventricular failure, surgery is usually recommended with resection of the obstructive muscle bundles and repair of any associated defect [5].

Our patient was treated with aspirin and an angiotensin converting enzyme inhibitor.

There are no studies investigating the pathophysiology and embryology of DCLV. The findings in our patient suggest that the condition might be the result of incomplete

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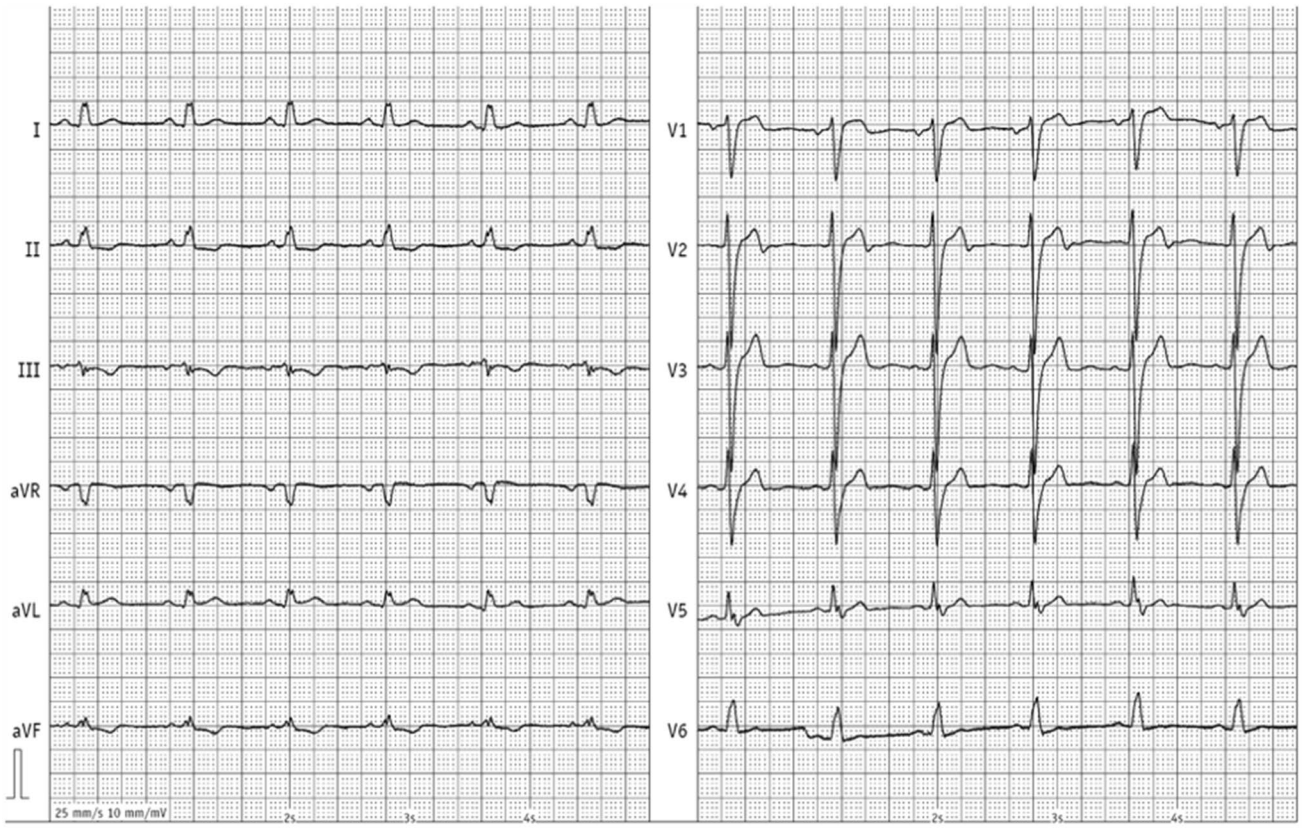

Fig. 1 ECG with sinus rhythm and left bundle branch block

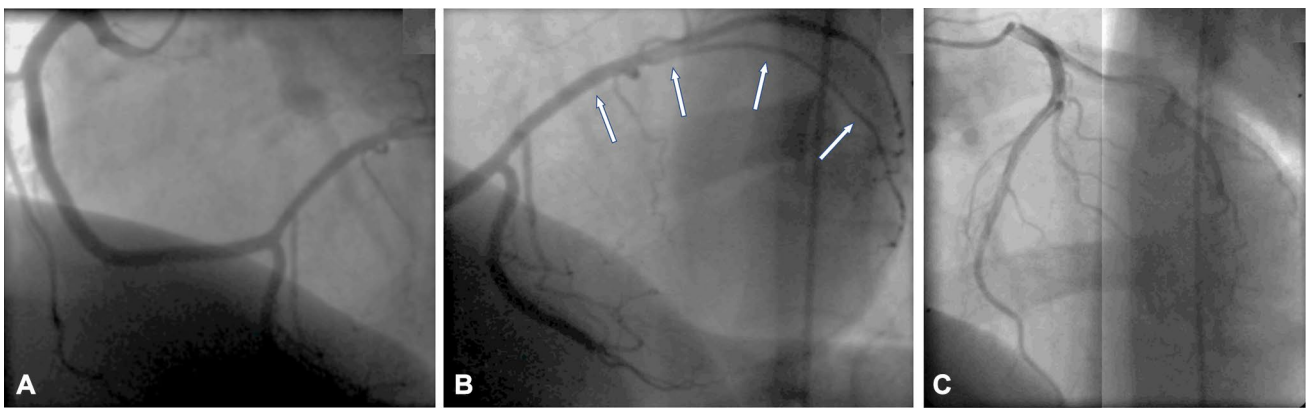

Fig. 2 **a**–**c** Coronary angiogram showing no stenosis. The right coronary artery is the dominant vessel (**a**). Note outpouching of the left lateral ventricular wall (arrows in **b**). Left coronary artery with tortuous distal vessels (**c**)

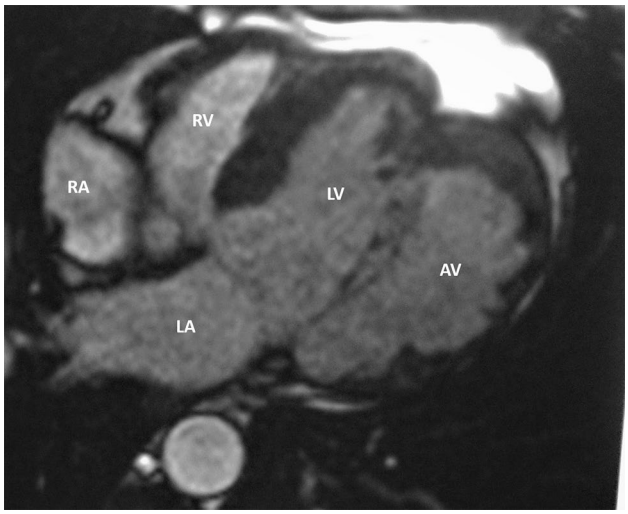

Fig. 3 Four-chamber view showing right (RA) and left (LA) atrium, right ventricle (RV), left ventricle (LV) and accessory left ventricle (AV) with two apices and an accessory septum separating LV and AV

regression of the trabecular component, and thus probably representing a variant of non-compaction cardiomyopathy [6].

Compliance with ethical standards

Conflict of interest The authors declare to have no conflicts of interest.

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