



An unusual case of double-chambered left ventricle

A case of double-chambered left ventricle communicated with right ventricle through a ventricular septal defect presented during only in diastole and a concomitant mitral valve prolapse.

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A 37-year-old male was referred to ER of our hospital due to persistent palpitations for over 2 weeks. A transthoracic echocardiography (TTE) showed the presence of a complex muscle band, originating from the posterior papillary muscle to the apical septum wall of Left Ventricle (LV) diverting the LV into two separate “cavities” (Fig. 1, panel b, c/Supplemental video B, C). The basal “cavity” has normally muscle wall thickness and systolic function, while the second apical “cavity” seems thinned, akinetic almost aneurysmal. Mitral valve (MV) leaflets are thick with prolapse of especially posterior leaflet and moderate regurgitation (Fig. 1, panel a/Supplemental video A). Cardiovascular magnetic resonance (CMR) confirmed our findings depicting the muscle band and the apical aneurysmal “cavity” with diffuse sub-endocardial fibrosis in late gadolinium enhancement (Fig. 1, panel d). Interestingly, CMR reveals the presence of blood flow from the normal right ventricle to apical “cavity” of LV during diastole (Supplemental video D). The subsequent coronary angiography was normal and the rhythm Holter recorded numerous ventricular ectopic beats.

In the literature, double-chambered right ventricle (DCRV) is more common than DCLV. In contrast to DCRV, etiology of DCLV is less well known and chambers usually

are in parallel, while remains congenital and non-progressive [1, 2] Differential diagnosis includes diverticulum, aneurysm, pseudoaneurysm, hypertrophic cardiomyopathy (HCM), and dilated non-compaction cardiomyopathy (NC).

DCLV patients are usually diagnosed incidentally in adulthood and are asymptomatic. Several clinical considerations are raised to this rare clinical case such as formation of thrombus, as well as the subsequent need for anticoagulation, and aneurysmal apex favors thrombus formation [3]. In addition, several cases of DCLV were attributed to either HCM or dilated phase of NC but after genetic testing over 50% in HCM and much more in NC is unidentifiable. The presence of arrhythmias and the possibility of ICD implantation for primary prevention should also be clarified, though no previous studies in DCLV patients exist. Finally, the mitral valve regurgitation, due to prolapsed posterior MV leaflet, follow-up is also problematic due to the double-chambered character of LV [4, 5].

To our best of knowledge, this is an unusual case of a DCLV communicated with right ventricle through a ventricular septal defect presented during only in diastole and a concomitant MV prolapse.

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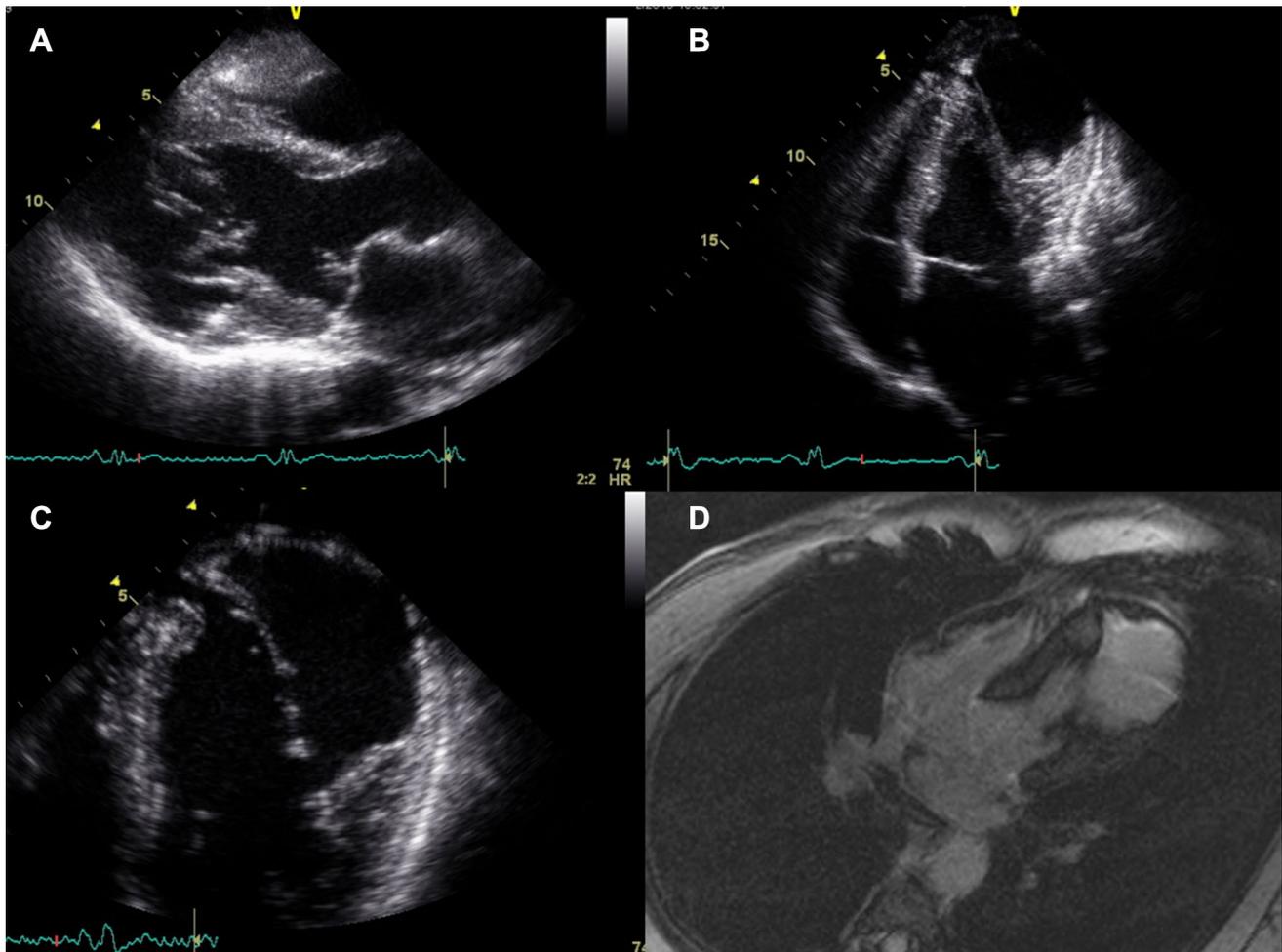


Fig. 1 **a** TTE thick mitral valve leaflets with prolapse and MR. **b** TTE complex muscle band diverting the left ventricle. **c** TTE complex

muscle band diverting the LV into basal cavity and aneurysmal apex. **d** MRI muscle band and apical aneurysm

Compliance with ethical standards

Conflict of interest Destounis A, Tountas C, Theodosis-Georgilas A, Zahos P, Kasinos N, Palios J, Beldekos D declare that they have no conflicts of interest.

Ethical standards All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later revisions. Informed consent was obtained from all patients for being included in the study.

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