Cardiac magnetic resonance demonstrating an isolated apical diverticulum of the left ventricle revealed by ventricular tachycardia

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A 47-year-old woman presented with recurrent ventricular tachycardia (VT). Her past medical and family histories were unremarkable. Her physical examination was normal. ECG revealed normal sinus rhythm with monomorphic premature ventricular beats (PVB) issued from left ventricle (LV). A 24-h Holter monitor revealed >20 000 PVB with non-sustained VT. Chest X-ray demonstrated a mild bulge in the left lower border. Trans-thoracic echocardiography revealed an apical akinetic aneurysm of the LV. Cardiac magnetic resonance imaging (CMR) was performed to further characterize this aneurysm. It demonstrated a huge 38 × 50 mm latero-apical accessory chamber of the LV which remained partially contractile, with persistent muscular wall and few trabeculations [Panels A and B, cine CMR, three-chamber view in diastole (Panel A) and in systole (Panel B); LA, left atrium; LV, left ventricle; di, diverticulum; see Supplementary material online, Movie 1, showing the same images in cine]. The papillary muscles were originating apart from diverticulum, and mitral valve was functioning properly.

Delayed-enhanced (DE) images performed 10–15 min after injection of gadolinium chelates showed no delayed enhancement of the diverticular and the myocardial walls, thus, ruling out ischaemic necrosis (Panel C, DE-CMR, three-chamber view, white arrows showing the diverticular wall; LA, left atrium; LV, left ventricle). These images were suggestive of isolated congenital left ventricular diverticulum. ECG-gated iodine-enhanced CT scanner was performed to rule out coronary artery disease. Right and left coronary arteries were of normal origin, distribution, and were free of atherosclerosis. Three-dimensional (3-D) volume rendering post-processed images of the heart demonstrated a giant apical left ventricular chamber, with a narrow neck located on the latero-apical wall (Panel D; cardiac CT-scan, 3-D volume rendering post-processed view). The patient was operated upon, the diverticulum was removed, and a small patch was used to replace the myocardial wall. The post-operative outcome was simple, and clinical examination performed 6 months after surgery revealed no abnormalities with reduction to <1000 PVB on 24-h Holter monitor recording.

Diverticulum of the LV is extremely rare among all forms of diagnosed congenital heart diseases and may be isolated without thoraco-abdominal midline defects. Cardiac failure and tachyarrhythmia are the usual modes of clinical presentation. When diagnosed in an adult, cardiac MR and CT imaging may help to differentiate between isolated congenital muscular diverticulum and post-infarction LV aneurysm.

Panels A and B. Cine CMR, three-chamber views in diastole (Panel A) and in systole (Panel B); showing a huge contractile latero-apical accessory chamber of the LV with few ‘trabeculations’ (LA, left atrium; LV, left ventricle; di, diverticulum).

Panel C. DE-CMR, three-chamber view, post-gadolinium-delayed image demonstrating a huge apical accessory chamber of the LV (white arrows) with no delayed enhancement of the diverticular and LV walls.

Panel D. 3-D post-processed view of an ECG-gated 64-row multi-detector cardiac CT-scan realized after iodine injection showing a giant latero-apical LV chamber with a left anterior descending artery of normal aspect.

Supplementary material is available at European Heart Journal online.