

An unusual case of cardioembolic stroke in a young female

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A previously healthy 25-year-old woman presented with neurological symptoms consistent with left hemiplegia and mouth commissure deviation and was transferred to the emergency department. A cranial contrast computed tomography scan revealed thrombosis of the right middle cerebral artery (RMCA). Right internal carotid artery angiography showed an acute thrombotic occlusion of the RMCA, which was treated with mechanical thrombectomy with aspiration allowing for complete reperfusion. Transthoracic echocardiography (TTE) showed an image compatible with a left ventricular apical aneurysm (LVA; [Figure 1](#), [Supplementary material online](#), [Video S1](#)). Differential diagnosis of this entity as a pseudoaneurysm or congenital diverticulum was considered. Cardiac magnetic resonance (CMR) showed the LVA was connected to the left ventricle (LV) by a wide

neck, demonstrating paradoxical systolic expansion with a slow flow without thrombus, and consisted of myocardial tissue and trabeculations. No late gadolinium enhancement was detected ([Figure 2](#), [Supplementary material online](#), [Video S2](#)). Cardiac catheterization showed normal coronary arteries. Thrombophilia evaluation was normal. All cardiac imaging findings led to the diagnosis of congenital LVA, which was considered the cause of cardioembolic stroke. The patient was treated with anticoagulants and remained asymptomatic 1 year later.

Most LVA occurs as a result of myocardial infarction (MI). Other causes include hypertrophic cardiomyopathy with mid-ventricular

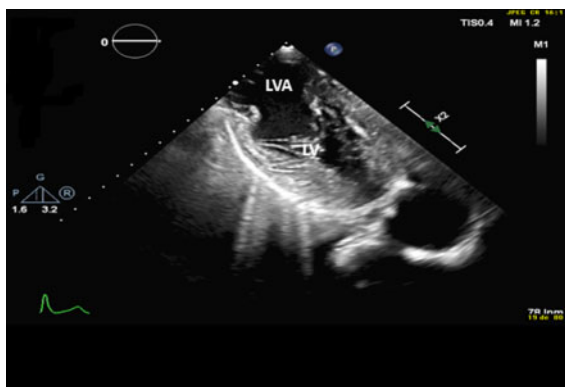


Figure 1 Transthoracic echocardiogram (intermediate apical view between 2 and 3 chambers) with a large left ventricular apical aneurysm with a wide communication neck with the ventricular cavity.

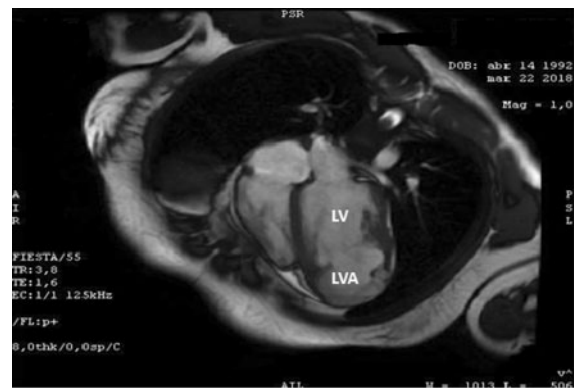


Figure 2 Cardiac resonance with gadolinium confirming the presence of a left ventricular aneurysm connected to the ventricular cavity by a wide neck. The aneurysm showed a paradoxical systolic expansion and consisted of myocardial tissue and trabeculations with a slow flow inside. No late gadolinium enhancement was detected.

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obstruction, trauma/cardiac surgery, tuberculosis, Chagas disease, anomalous origin of the left coronary artery in the pulmonary artery, rheumatic fever, sarcoidosis, and acute myocarditis.

Congenital LVA must be distinguished from congenital diverticulum of the LV. They are two distinct entities, with different histologic and morphologic characteristics. Congenital diverticulum is characterized by the presentation of a narrow communication neck with the ventricular cavity, synchronous contractility with the LV, and three myocardial layers on histologic examination. Additionally, it is usually detected as part of Cantrell's pentalogy, where other thoracoabdominal defects can be present. On the other hand, LVA is characterized by akinesis with paradoxical systolic motion, wide connection to the ventricle, and only one fibrotic layer on histologic examination that is often calcified in the absence of other heart or mid-line thoracoabdominal defects. Cardiac magnetic resonance is a useful method to identify fibrotic walls and the lack of myocardial fibres in LVA, as well as the existence of three distinct layers in congenital diverticulum of the LV.¹ In our case, CMR findings helped to determine the presence of LVA. The exclusion of other causes, including infiltrative or autoimmune myopathies, supported the diagnosis of congenital LVA.²

LV pseudoaneurysms are rare among young people, may result from the rupture of the ventricular free wall, and are contained by adherent pericardium or scar tissue. LV pseudoaneurysms also occur after MI, cardiac surgery, trauma, and infection. There are no specific clinics for LVA or pseudoaneurysms. Again, TTE diagnoses more than 90% of cases, but LVA differentiation is made using magnetic resonance imaging (MRI) due to its high spatial resolution and capacity for tissue characterization.

We present a case of a 25-year-old female patient with a thrombo-embolic episode and congenital LVA, diagnosed by TTE and cardiac MRI. The tissue characteristics of LVA on MRI, and the lack of a history of other causal diseases supported the diagnosis of congenital LVA.

The prevalence of congenital LVA is 0.34% in adults.³ The use of TTE and CMR allowed LVA diagnosis, and myocardial tissue characterization by CMR validated it.¹ Patients with congenital LVA may be asymptomatic but could manifest with heart failure, cardiac rupture, sudden death, or cardioembolism.^{1,2} Treatment is not standardized and should be individualized according to the clinical presentation and findings. In severely symptomatic patients, surgical treatment should be performed, including isolated aneurysmectomy, mitral valve replacement, or suture of the neck area and aneurysm site. For asymptomatic patients, a more conservative attitude can be adopted, including endocarditis or embolism prevention with antiplatelets or oral anticoagulants. In cases of symptomatic ventricular tachycardia, radiofrequency ablation or defibrillator implantation must be considered. Our patient refused surgery and received oral anticoagulants.

Supplementary material

Supplementary material is available at *European Heart Journal – Case Reports* online.

Consent: The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: none declared.

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