

INCIDENTAL FINDING OF A CONGENITAL LEFT VENTRICULAR DIVERTICULUM

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ABSTRACT

The left ventricular diverticulum represents 0,1% of all congenital heart disease. It is a rare abnormality that can be isolated or most often associated with others cardiac disorders. Most cases are asymptomatic and discovered incidentally. Multimodal imaging contributes to support the diagnostic. Its main complications are arrhythmia and thromboembolic events. Due to the absence of clear guidelines, the management is based on the current risk of the patient. In this article, we report the case of our 48-year-old female patient, diagnosed and managed a year ago as a case of a paradoxical thromboembolic event in another center where she benefited from the closure of a patent foramen oval. She consulted this time at our health facility for a lower back pain and an incidental finding of a congenital left ventricular diverticulum was made on a contrasted computed tomography scan. A conservative treatment has been decided in the case of our patient for a long-term anticoagulant therapy.

KEYWORDS: Left ventricular diverticulum, Congenital heart disease, Heart anomaly, Cardiac imaging.

INTRODUCTION

Left ventricular diverticulum is a rare congenital heart disorder. It is defined as an outpouching from the ventricle with a preserved synchronous contractility.^[1] Most cases are discovered incidentally on imaging studies performed for other medical conditions but can also be revealed by a thromboembolic event. The diagnostic suspicion is made on echocardiography and is further confirmed by other complementary investigations after having ruled out a left ventricular aneurysm which is the main differential diagnosis. There are currently no recommendations for the management of left ventricular diverticulum. We present the case of our 48-year-old female patient, diagnosed and managed a year ago as a case of a paradoxical thromboembolic event in another center where she benefited from the closure of a patent foramen oval. This time she consulted our health facility for a lower back pain and an incidental finding of a congenital left ventricular diverticulum was made on a contrasted computed tomography scan. A conservative treatment has been decided in the case of our patient for a long-term anticoagulant therapy.

CASE PRESENTATION

Past Medical History

This is a young woman aged 48, moderately obese with a body mass index of 34.54 kg/m², who weaned from smoking several years ago. She has had a myomectomy on an account of uterine fibroids and an appendectomy during her childhood. She also has a history of renal

infarction secondary to a recent thromboembolic event with the closure of a patent foramen oval (PFO) in another center a year ago.

History Of Presenting Complaint

In June 2022, she consulted our health facility about a lower back pain. A recurrence of a thromboembolic event was suspected and we performed a thoraco-abdominopelvic computed tomography scan that found no peculiarities in the abdominal region, but the thoracic acquisitions show an aspect of an apical aneurysm of the left ventricle. (Figure 1)

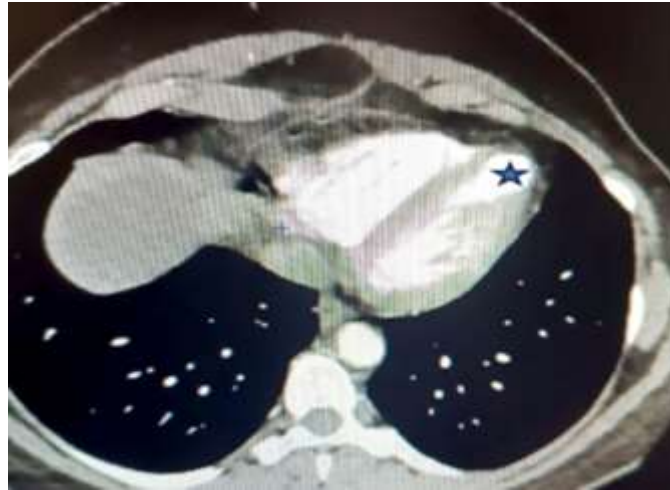


Figure 1: Aspect of left ventricular apical aneurysm (star) in a contrasted chest computed tomography scan.

Investigations

Recall that the patient had no cardio-pulmonary symptoms, the heart sounds were normal with no

murmurs, there were no signs of heart failure and his electrocardiogram registered a sinus rhythm. (Figure 2)

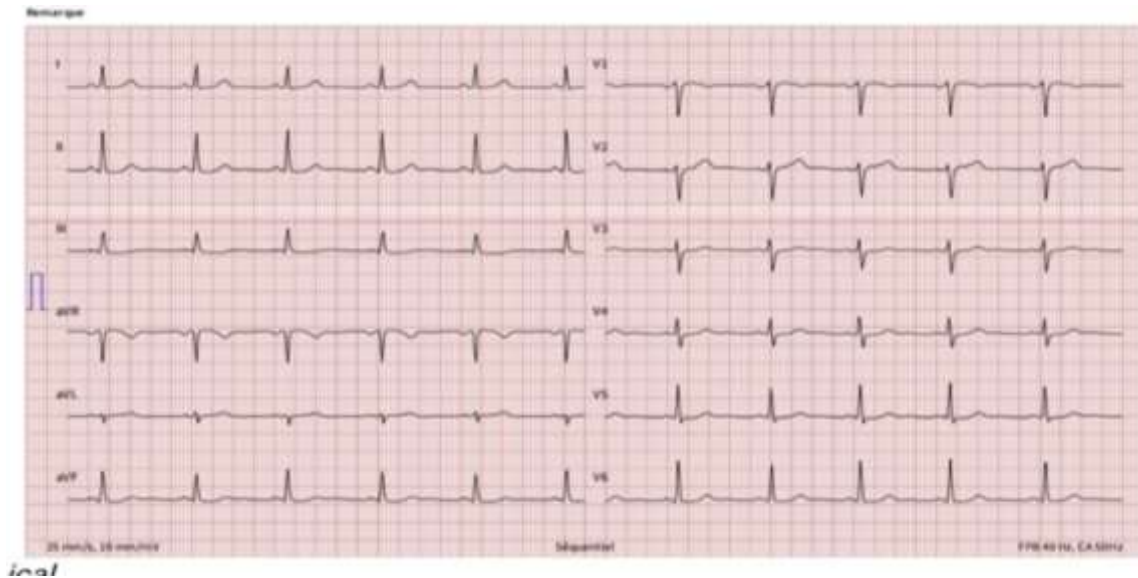


Figure 2: 12-lead ECG in sinus rhythm.

On a trans-thoracic echocardiogram, we also found an apical aneurysm aspect measuring 17,3mm*19,5mm in

an apical four chamber view and measuring 18,1*19.5mm in an apical two chamber view (figure 3).

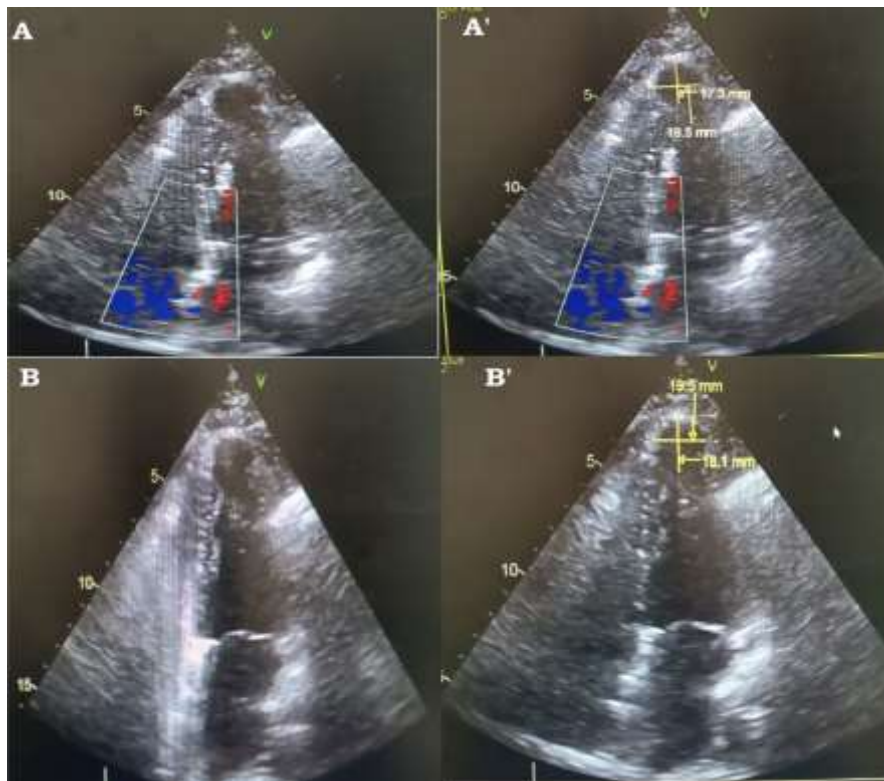


Figure 3: Contrast echocardiography showing apical aneurysm aspect of the left ventricle measuring 17.3mm*19.5mm in apical four chamber (A') and 19.5mm*18.1mm in apical two chamber (B').

An exploration by a trans-esophageal echocardiography showed no residual shunt at the site of the PFO closure prothesis. There was no presence of thrombus in the left auricle, and the left ventricle ejection fraction was 65%.

An implantable loop recorder (figure 4) placed six months ago showed no atrial fibrillation or other emboligenic cardiac arrhythmia.



Figure 4: Caudal right anterior oblique view, showing PFO closure prothesis AMPLATZER 25x18mm (arrow) and the implanted loop recorder (star).

The thrombophilia assessment was negative. Supra aortic doppler was also normal. Two diagnostic hypotheses were suggested after these first investigations, an ischemic apical aneurysm of the left ventricle or a congenital left ventricular apical diverticulum. This

required further investigations, first a coronary angiography found an insignificant atheromatous lesions of about 40% on the left anterior descending artery (LAD) and on the ostium of the ramus intermedius artery (Figure 5)

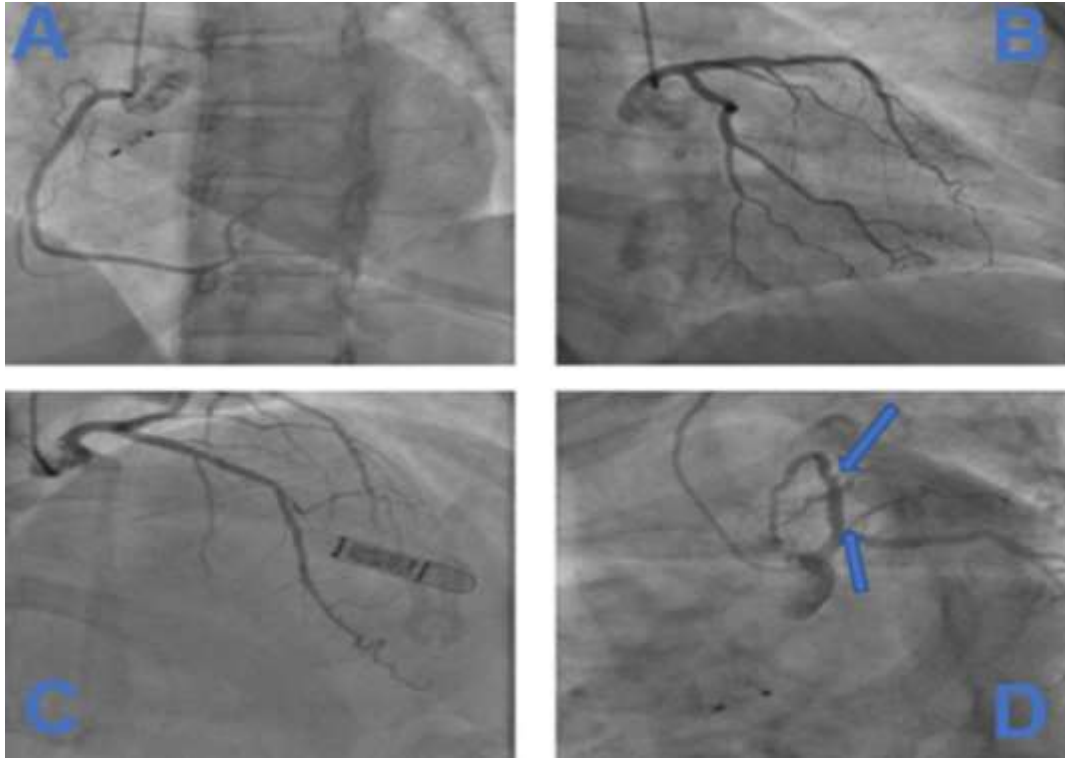


Figure 5: A) Left anterior oblique view showing right coronary artery. B) Caudal right anterior oblique view showing circumflex artery. C) Cranial right anterior oblique view showing LAD. D) Caudal left anterior oblique view showing non-significant lesion.

Left ventriculography performed at the same time as the coronary angiography, described the presence of accessory chamber at the apex of left ventricle, evoking

in the first instance a left ventricular apical diverticulum. (Figure 6)

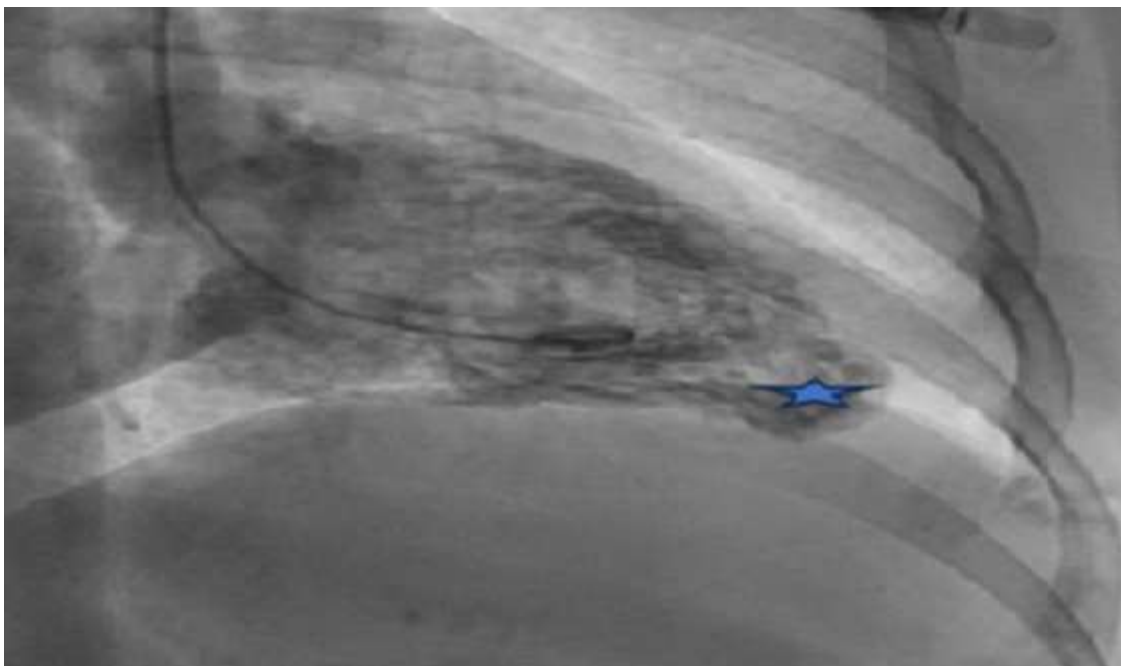


Figure 6 : Left ventricle apical diverticulum on ventriculography.

Thus, the diagnosis is supported by an anatomical myocardial magnetic resonance imaging (MRI), first in a left apical ventricular diverticulum (star), with normal

contraction measuring 17mm*22mm. Gadolinium was not injected due to patient claustrophobia. (Figure7)

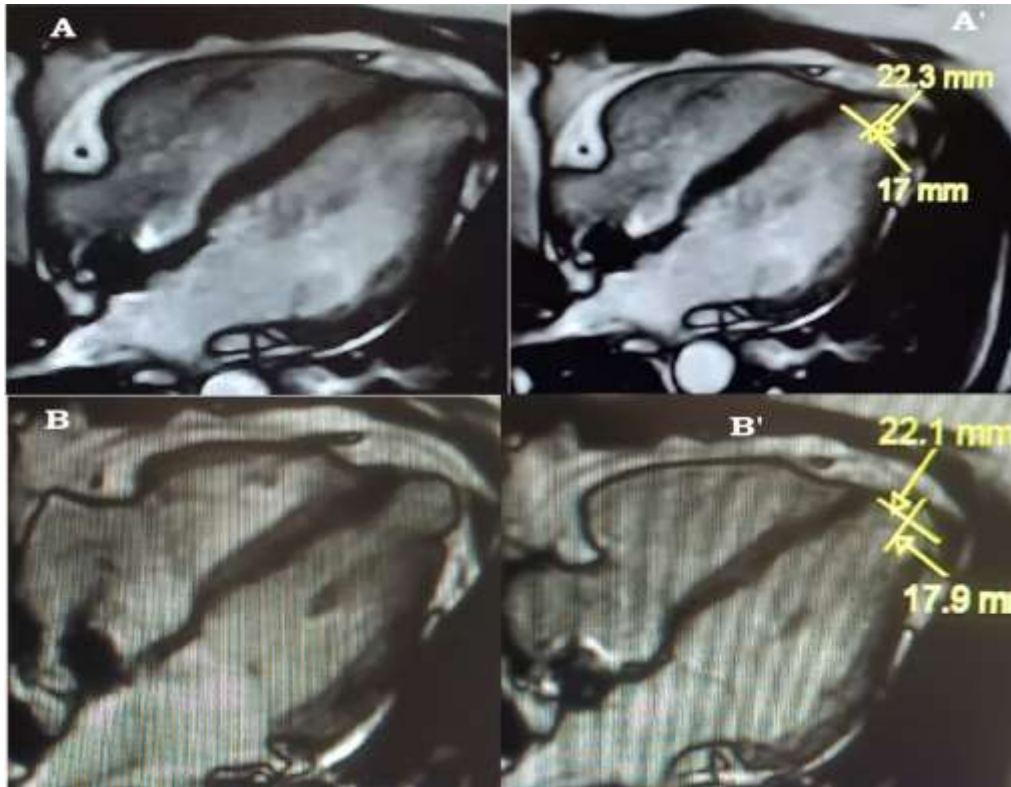


Figure 7: Left ventricle apical congenital diverticulum on myocardial MRI on apical 4 chambers view in systole (A and A'); diastole (B and B'); measuring 22.3mm*17mm (A') and 22.1mm*17.9mm (B').

Management

After a medical staff between cardiologist, neurologist and radiologist, we decided to place the patient on a long-term anticoagulant therapy based on Non-vitamin K oral anticoagulants, this according to the high thromboembolic risk.

DISCUSSION

The left ventricular diverticulum is a rare congenital abnormality, about 0,1 % of congenital heart diseases. Some authors had reported an incidence of 0,4 %, such as 3 of 750 cases following autopsy after cardiac deaths. According to a meta-analysis, 453 left ventricle diverticulum cases were described from 1816 to 2022. The etiopathogenesis is due to partial cessation of ventricular wall formation during the 4th week of the embryonic period.^[2]

30% of left ventricle diverticulum are isolated^[3] and 70% associated with other cardiac malformations (ventricular septum defect, coronary anomalies, atrial septum defect, ectopic cordis)^[4] or extracardiac abnormalities as the Cantrell pentalogy which includes: supra umbilical hernia, hernia of the anterior part of the diaphragm, substernal malformation and diverticulum of the left ventricle. The diverticulum of the left ventricle is asymptomatic, most often discovered incidentally during imaging performed for other reasons.

However, several exams contribute to the diagnosis. Echocardiography shows an accessory anechoic chamber from left ventricle lateral wall, that remains contractile

and synchronous the left ventricle. As for the contrasted cardiac computed tomography, it helps to determine with precision, the dimensions of the diverticulum and its different localizations: mostly apical types (left ventricle apex) and non-apical types (sub-aortic, left ventricle inferior wall, right ventricle).^[5] It is also used to assess coronary arteries in case of low cardiovascular risk. Myocardial MRI shows a normal myocardial signal with no delayed gadolinium enhancement.^[6] Coronary angiography is performed in the case of a coronary artery disease suspicion. And left ventriculography performed at the same time helps to make a better description of this lesion. The main differential diagnosis is the aneurysm of the left ventricle, characterized on myocardial MRI by an akinesia with transmural delayed gadolinium enhancement^[6] and more often the existence at coronary angiography of significant lesions or a coronary embolism possibility. The most frequent complications are cardiac arrhythmias including ventricular tachycardia and ventricular fibrillation in 9.9% of the cases, the underlying mechanism is a macro-reentry, then may occur some thromboembolic events that represent 2.9% of cases, as for diverticular rupture, it is rare in adults but rather frequent in children occurring in the first two years of life in 4.2% of cases.^[7]

About our patient, this apical topography represents the type of description in the literature. The absence of akinesia; the presence of synchronic contraction of the outpouching wall on echocardiography, MRI and ventriculography allowed us to rule out an apical ischemic aneurysm of left ventricle; moreover, coronary

angiography found no significant lesions. A medical staff between specialist was necessary to study the balance of thromboembolic risk and the risk of diverticular rupture. Given her age and the previous history of renal infarction, we introduced long-term anticoagulation based non-vitamin K oral anticoagulants. Most authors recommend conservative treatment in that case.^[8]

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CONCLUSIONS

Left ventricular diverticulum is a rare congenital anomaly which is mostly asymptomatic and discovered as an incidental finding on imaging studies. The main differential diagnosis to be considered is a left ventricular aneurysm. While suspecting a congenital left ventricular diverticulum, imaging studies such as myocardial MRI, coronary angiogram and ventriculography may help support the diagnosis and also help to rule out a left ventricular aneurysm. Despite the absence of clear recommendations about the management of this rare pathology, there are some therapeutic possibilities such as medical treatment based on anticoagulation, surgery or a regular follow-up.

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