

## Late Discovery of Left Ventricular Pseudoaneurysm: A Rare Clinical Case

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### Abstract

Left ventricular (LV) pseudoaneurysm is a rare complication of acute myocardial infarction (AMI). We report the case of a 67-year-old male patient seen in 2024. Following an AMI in 2019, the patient was diagnosed with a LV pseudoaneurysm after complaining of dyspnea and undergoing imaging tests including echocardiogram and magnetic resonance imaging. The patient underwent aneurysmectomy and revascularization surgery, progressing satisfactorily during the postoperative period.

### Introduction

Left ventricular (LV) pseudoaneurysm is a clinicopathological entity that constitutes a rare mechanical complication of acute myocardial infarction (AMI).<sup>1</sup> It is formed when the cardiac rupture is contained by pericardium or scar tissue, without the presence of the myocardium as a tissue component.<sup>1</sup> It generally occurs in the inferior and posterior ventricular walls, given that ruptures of the anterior wall tend to lead to cardiac tamponade and sudden death, whereas the inferior-posterior face of the heart rests on the diaphragm, facilitating containment of the ventricular cavity by the pericardium.<sup>2</sup> Given its composition, there is a high risk of rupture, making surgical correction necessary.<sup>3</sup>

### Case report

We report the case of a 67-year-old male patient, resident of the state of Bahia, Brazil, with hypertension for 10 years and diabetes for 5 years. He had been an ex-smoker for 32 years, with an estimated smoking history of 51 pack-years.

In 2019, he presented with AMI with ST-segment elevation in the anterior wall. However, he arrived at a unit with a hemodynamic service 8 days after diagnosis, without having received fibrinolytic therapy. Upon admission, he underwent coronary angiography, which showed 90% stenosis in diagonal branch and only parietal irregularities in the other coronary

arteries. He underwent transluminal angioplasty and was discharged from the hospital. The patient was advised to undergo outpatient follow-up at the cardiology service, which he did not follow.

Five years later, the patient returned for a consultation requesting clearance for inguinal herniorrhaphy. He complained of dyspnea upon moderate exertion, such as walking uphill, but he stated that this symptom had been present since 2019, without progression. He denied association with chest pain or other anginal equivalents. The general surgeon reported that there was a mass in the LV on the chest tomography.

Upon physical examination, the patient had an active precordium, with an apparent, visible, and palpable apex beat in the fourth left intercostal space, between the left midclavicular line and the anterior axillary line, which was propulsive and measured 3 fingertips. The patient was using acetylsalicylic acid 100 mg/day, metoprolol succinate 50 mg every 12 hours, spironolactone 25 mg/day, atorvastatin 80 mg/day, enalapril 20 mg every 12 hours, and metformin XR 500 mg every 12 hours. The patient was admitted for diagnostic confirmation.

Radiography showed a mass adjacent to the LV (Figure 1), and electrocardiography indicated residual ST-segment elevation in the precordial leads (Figure 2).

Transthoracic echocardiography described akinesia of the middle and apical segments of the anteroseptal, anteroapical, apical LV walls and inferobasal and inferoseptal walls of the LV, in addition to the formation of a pseudoaneurysm in the inferolateral wall with important global systolic dysfunction and ejection fraction (EF) of 21%, by the Simpson method. We observed diastolic filling and tissue Doppler imaging compatible with type 3 diastolic dysfunction (restrictive pattern). The examination performed in 2019 revealed EF of 27% and segmental LV involvement with severe systolic dysfunction, with no mention of pseudoaneurysm formation.

Cardiac resonance imaging was performed, thus establishing diagnosis of LV pseudoaneurysm measuring 48 × 36 × 30 mm from the apical anterior segment, with neck size of 30 mm. Transmural late enhancement was greater than 50% throughout the apical and anteroseptal region (Figure 3).

The patient underwent a new coronary cineangiography according to the surgical intervention schedule, showing 75% stenosis in the bifurcation of the first marginal branch, 90% ostial stenosis of the second marginal branch, 75% to 90% stenosis middle third of the posterolateral branch, and 75% stenosis in the middle third of the right coronary artery (Figure 4).

The patient was referred for aneurysmectomy and revascularization of the marginal branch and the right

### Keywords

False Aneurysm; Diagnostic Imaging; Post-Infarction Heart Rupture

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coronary artery with saphenous vein graft. During surgery, the diagnosis of pseudoaneurysm was confirmed (Figure 5). During the postoperative period, he developed a stroke after an episode of atrial fibrillation with high ventricular response. Nonetheless, he was discharged approximately 7 days after the procedure without sequelae.

## Discussion

AMI is the most common cause of LV pseudoaneurysm (55%). Less frequently, pseudoaneurysms occur as a complication of cardiac surgery, chest trauma, as a consequence of endocarditis, and, rarely, after suppurative pericarditis or tumor infiltration.<sup>1,4,5</sup>

Mechanical complications in the context of AMI are currently uncommon due to the effective implementation of early revascularization strategies. Although rare, cardiac rupture is one of the most feared events.<sup>3</sup> In the case of pseudoaneurysm, approximately 30% to 45% have a chance of rupture; in this context, surgical intervention can substantially reduce this risk.<sup>1,4,5</sup>

Some patients may present symptoms of heart failure due to LV dysfunction. However, approximately 10% are asymptomatic.<sup>4</sup>

Pseudoaneurysms can be detected on chest radiography as an area adjacent to the heart. On electrocardiography, there may be nonspecific repolarization changes.<sup>6</sup>

Echocardiography identifies changes in 90% of cases, but approximately 67% to 75% of cases are confused with aneurysms.<sup>4,5,7</sup> Left ventriculography, on the other hand, has been considered an important imaging modality, with a diagnostic accuracy of around 85%, given that it is possible to determine the neck of the pseudoaneurysm and the absence of surrounding coronary arteries.<sup>3,7</sup>

In 2005, Konen et al. assessed 22 cardiac resonance images of patients with pseudoaneurysm or LV aneurysm. Delayed enhancement of pericardium was more common in patients with pseudoaneurysm, leading to a sensitivity of 100% and specificity of 83.3%. For these patients, the end-diastolic volume was greater than in those with true aneurysm. Therefore, this test plays an important role in differentiating both pathologies.<sup>8</sup>

Treatment for acute and symptomatic cases is limited to surgical correction, taking patients' risks into consideration.<sup>1</sup>

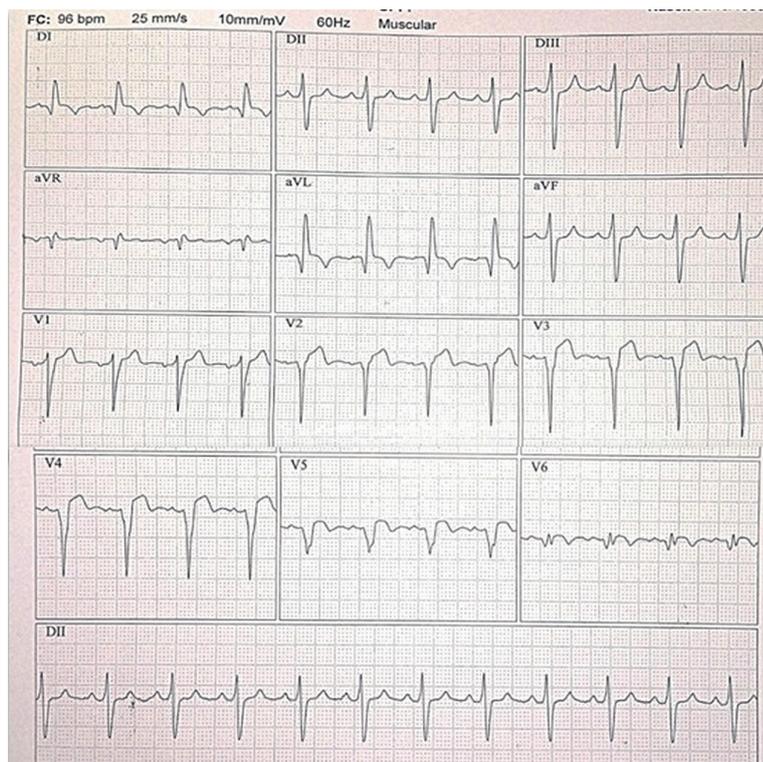
In 1998, Yeo et al. followed 52 patients with pseudoaneurysm for approximately 4 years. The majority were diagnosed incidentally; 42 patients underwent surgical correction, and mortality reached 7%. Ten patients were treated conservatively; they did not undergo the procedure due to high risk. After 2.3 years of study, 19 patients died, 6 of them in the conservative group. There were no reports of rupture.<sup>9,10</sup>

Following this same model, in 2003, Moreno et al. followed 10 patients, all diagnosed with pseudoaneurysm and in conservative treatment, for 3.8 years, and none of

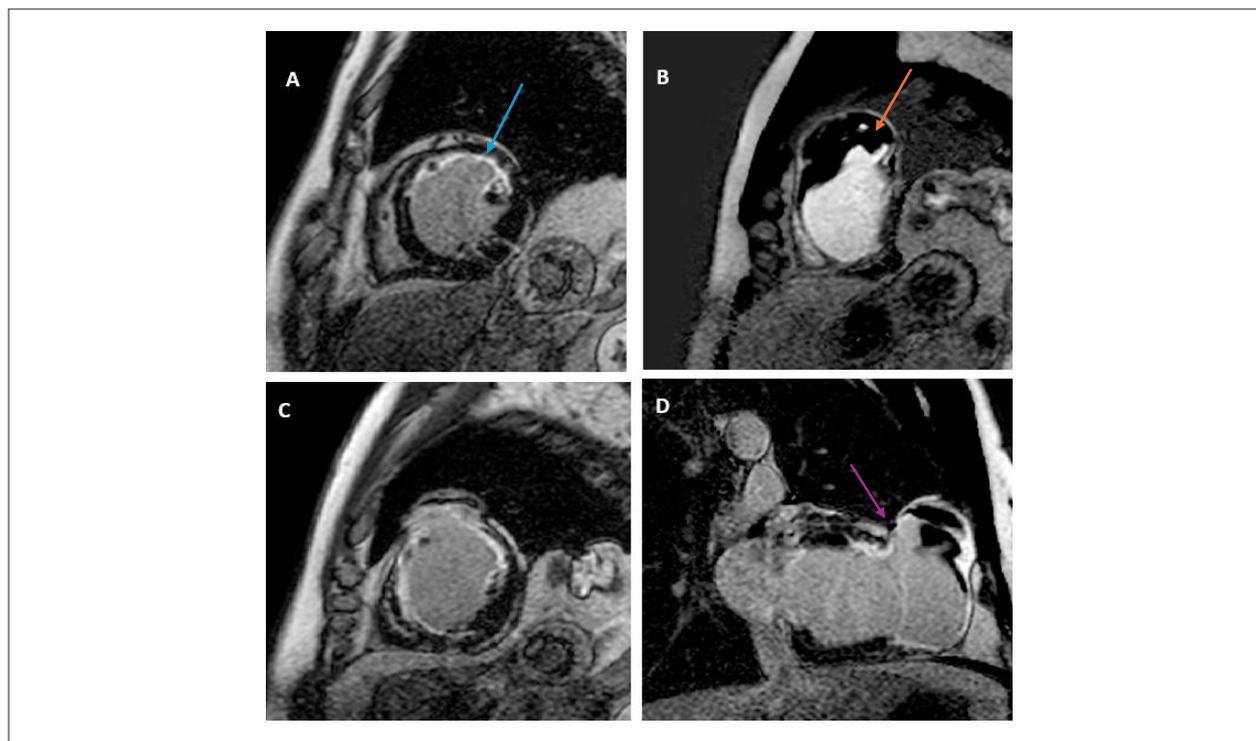


Figure 1 – Chest radiography. Altered cardiac silhouette.

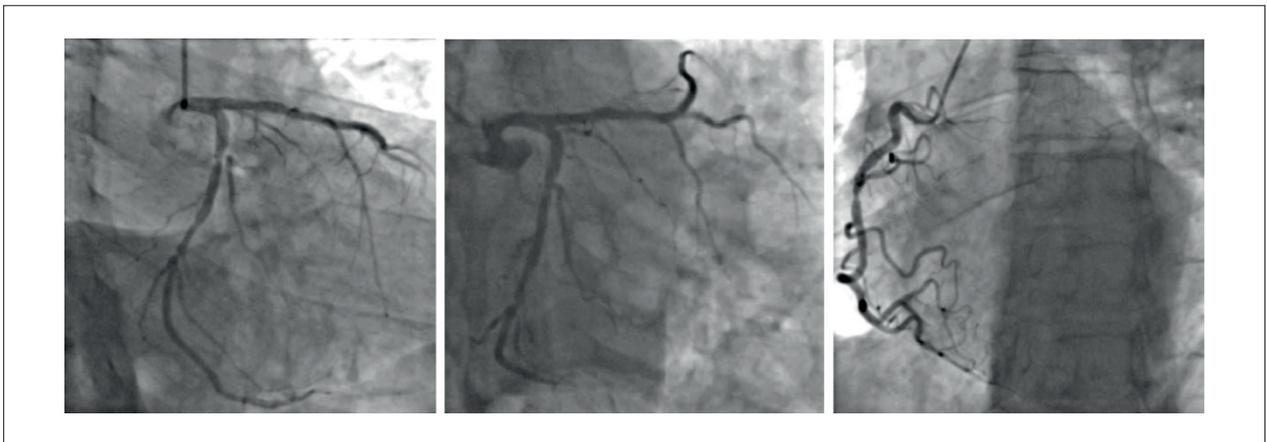
## Case Report



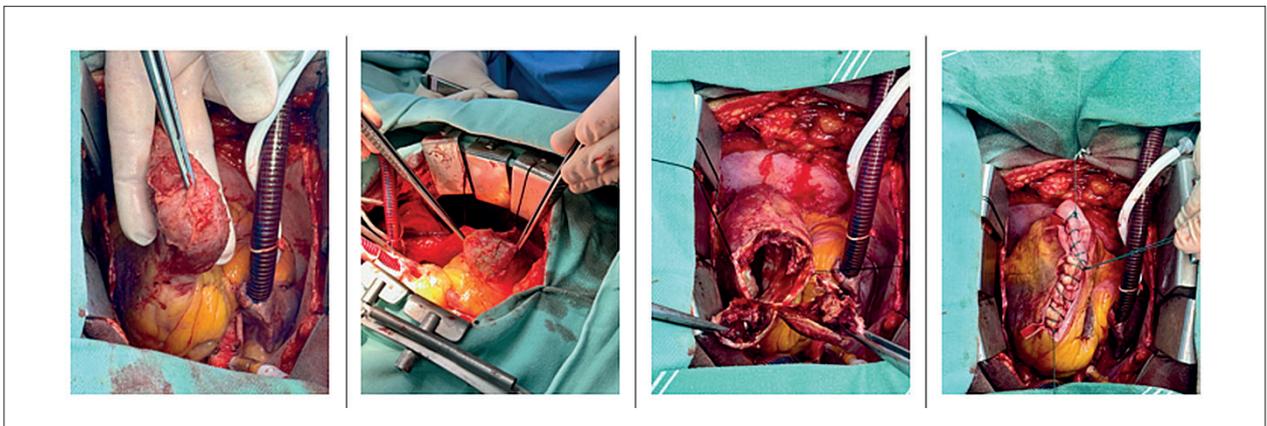
**Figure 2** – Electrocardiogram. ST-segment elevation in leads V1 to V5.



**Figure 3** – Cine cardiac magnetic resonance imaging. In image A, in the middle region of the heart, an area of anterior infarction can be observed due to the presence of late enhancement (blue arrow). In image B, in apical view, an intracavitary thrombus was found (orange arrow). In image D, the neck of the pseudoaneurysm is evident (purple arrow).



**Figure 4** – Coronary cineangiography. Residual two-vessel pattern, with significant lesions in the right and circumflex territories.



**Figure 5** – Cardiac surgery. Aneurysmectomy.

them developed fatal rupture during this period. However, the incidence of stroke reached 33%, which suggests the possibility of chronic anticoagulation adjacent to treatment.<sup>10</sup>

According to Faustino et al., there is still no consensus on treatment for chronic cases, but surgical indication has become routine due to the risk of rupture and thrombotic embolization. In patients with pseudoaneurysms larger than 3 cm, procedure is indisputably necessary. In the case of patients with high surgical risk, the possibility of percutaneous procedure can be assessed. Since the condition may also be present in previously operated patients, the presence of adhesions makes intraoperative management difficult and increases mortality. Defects can be occluded with septal occluders, such as those used in congenital heart disease.<sup>1,4,11</sup>

## Conclusion

This case illustrates the importance of diagnosing the LV pseudoaneurysm, which led to impaired EF. It is a rare condition that can remain asymptomatic for years, but it presents a significant risk of complications. Regular surveillance and follow-up are essential, especially in patients with a history of AMI. Diagnosis and surgical intervention are essential due to the high risk of rupture, even in the absence of symptoms. Imaging

modalities, such as magnetic resonance imaging, are crucial for assessment and treatment planning.

## Author Contributions

Conception and design of the research: Silva AP, Feitosa GS; acquisition of data: Silva AP, Moitinho RF, Torreão JA; analysis and interpretation of the data: Silva AP, Feitosa GS, Leal GCV, Moitinho RF, Torreão JA; writing of the manuscript: Silva AP; critical revision of the manuscript for intellectual content: Feitosa GS, Leal GCV, Torreão JA.

## Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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There were no external funding sources for this study.

## Study Association

This study is not associated with any thesis or dissertation work.

## Case Report

### Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of the Hospital Santa Izabel under the protocol number 90416125.4.0000.5520. All the procedures in this study were in accordance with the 1975 Helsinki Declaration, updated in 2013. Informed consent was obtained from all participants included in the study.

### Use of Artificial Intelligence

The authors did not use any artificial intelligence tools in the development of this work.

### Availability of Research Data

The underlying content of the research text is contained within the manuscript.

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