

## Left Ventricle Pseudoaneurysm After Mitral Valve Replacement: Case Report and Literature Update

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### Introduction

Left ventricular pseudoaneurysm (LVPA) is characterized as partial myocardial rupture, which is contained by the pericardium or the epicardium of the left ventricle (LV) wall.<sup>1</sup> It is an unusual complication of lower wall infarction but, less commonly, it may occur after anterior wall infarction.

LVPA rarely occurs after mitral valve replacement, either with an early or late clinical condition. It is estimated that LVPA represents only 0.02% of the mitral valve replacement complications,<sup>2</sup> as in this case. The clinical condition may include mild dyspnea, heart failure, precordial pain, endocarditis, and cardiac tamponade. However, the patient may be completely asymptomatic. As LVPA rupture is associated with high mortality, the recognition of this complication, as well as early intervention, is essential for a better patient prognosis.<sup>1,2</sup>

### Case Report

We report the case of a 62-year-old patient seen at our institution with a history of sudden dyspnea and lipothymia. She reported history of systemic arterial hypertension and had undergone two mitral valve replacements — in both cases, bioprosthesis was chosen. The first mitral valve replacement was performed ten years before, and the second one, two months prior, due to rupture of the prosthesis leaflet.

Initial physical examination revealed crackling rales at the bases of both lungs and systolic murmur in the mitral area (4+/6+), spreading to the armpit. On the day of admission, she developed respiratory insufficiency, requiring orotracheal intubation, and cardiogenic shock, requiring hemodynamic support with vasoactive drugs (norepinephrine and dobutamine).

The patient was transferred from the emergency ward to the intensive care unit. One of the initial diagnostic suspicions was pulmonary thromboembolism (PTE). Computed tomography of the chest (negative for PTE) was performed. Suspicion of coronary artery disease was

ruled out after serial evaluation of troponin and creatine kinase-MB (CK-MB). Transthoracic echocardiography (TTE) was also performed. Its main findings were pseudoaneurysm (Figure 1), severe paraprosthetic reflux (Figure 2) and rupture of chordae (Videos 1 and 2).

Pseudoaneurysm at the base of the LV inferolateral wall was also suspected. Due to the clinical picture and the echocardiographic findings, surgical treatment was chosen, which confirmed the presence of subvalvular LVPA. Plication of the pseudoaneurysm was performed with Prolene®3.0 wire, followed by placement of a new bioprosthesis #29. Postoperatively, the patient progressed clinically well and was discharged from hospital with administration of diuretics, beta-blockers, angiotensin-converting enzyme inhibitor and anticoagulation after 14 days in hospital. Postoperative TTE showed well-positioned and normal-functioning bioprosthesis, with no evidence of leaking.

### Discussion

LVPA is a rare and clinically variable condition, making it challenging to deliver diagnosis.<sup>1</sup> The most frequent etiology is acute myocardial infarction. Less commonly, as in the present case, it may occur as a complication of mitral valve replacement, especially when it comes to a second valve replacement. Other predisposing factors are endocarditis and placement of a valve prosthesis with a diameter greater than that recommended for the patient. These two factors are related to the formation of LVPA for causing lesions in the annulus fibrosus. This is also important in differentiating the LVPA from the real aneurysm. The pseudoaneurysm walls are formed by fibrous tissue, whereas in the real aneurysm, besides the fibrous tissue, the myocardium is also present.<sup>3</sup>

In addition to this differentiation, it is also important to define the anatomical location of the LVPA, since proximity to coronary vessels, for example, may modify surgical planning.<sup>3</sup> Although computed tomography is capable of showing such details, in clinical practice, imaging is initiated with either transthoracic or transesophageal echocardiography. The main echocardiographic finding is the image of endocardial discontinuity.<sup>4</sup> In this case, however, the aneurysmal cavity was observed in the LV inferolateral wall, which, combined with the patient's clinical conditions, strongly suggested the diagnosis of LVPA. The most sensitive imaging test is magnetic resonance imaging, but due to lack of availability, this test is reserved for cases of diagnostic doubt.<sup>5</sup>

Surgical approach is the treatment of choice. Among other options, primary suture for correction of pseudoaneurysm is conducted.<sup>4</sup> However, conservative treatment can be chosen to treat any potential complications. In a short study of eight patients with LVPA after mitral valve replacement, Sakai et

### Keywords

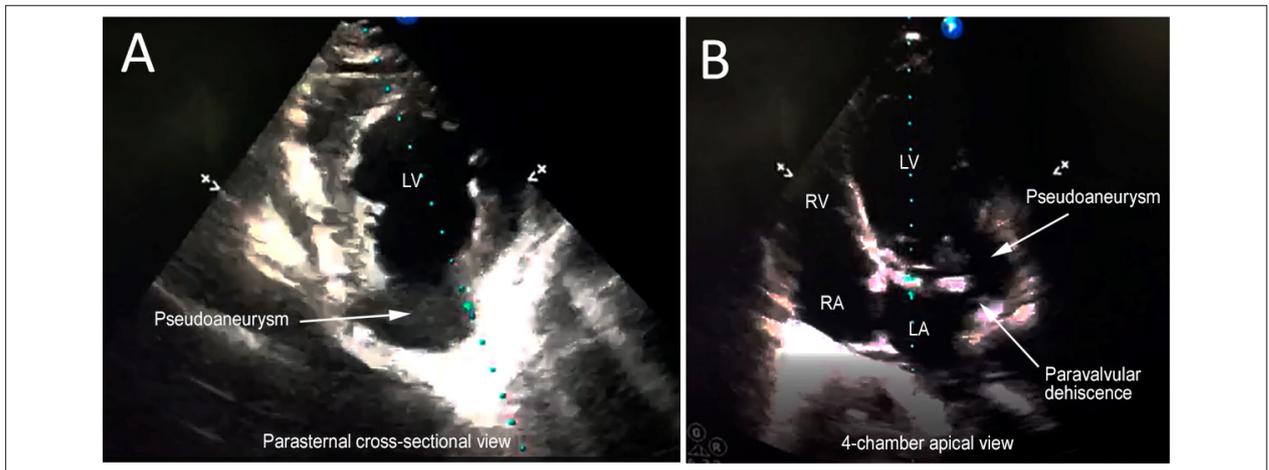
Mitral Valve/Surgery; Mitral Valve/Complications; Aneurysm, False/Surgery; Echocardiography/Diagnostic Imaging.

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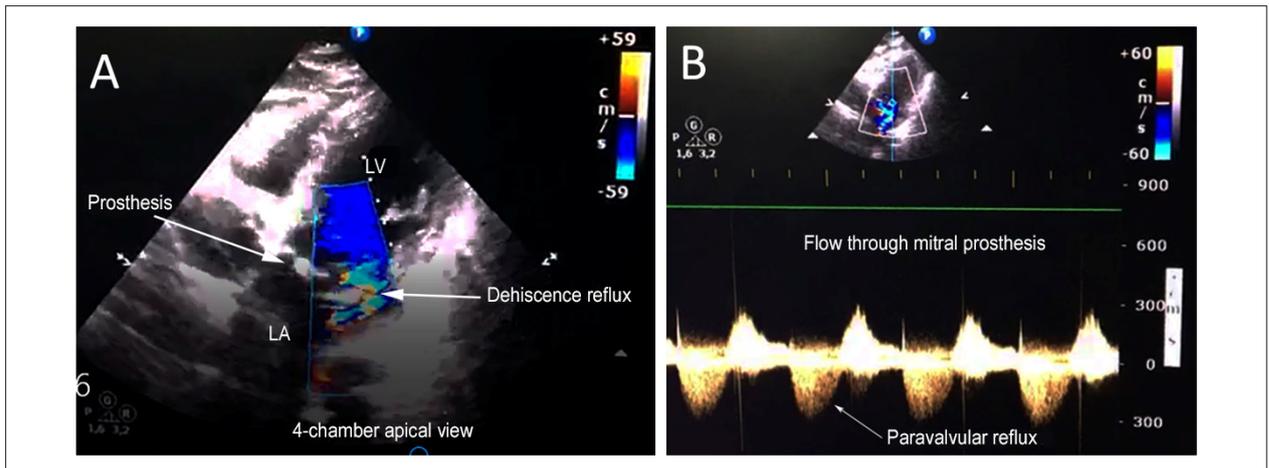
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**Figure 1** – Transthoracic echocardiogram showing pseudoaneurysm in the left ventricular (LV) inferolateral wall in the parasternal transverse (A) and apical four-chamber (B) views. RV: right ventricle; LA: left atrium; RA: right atrium.



**Figure 2** – Transthoracic echocardiogram showing mitral prosthesis, paravalvular dehiscence and severe paraprosthetic reflux (A and B). LV: left ventricle; LA: left atrium.

al.6 conservatively managed all patients, of which seven had no complications. Sakai et al.,<sup>6</sup> however, emphasized that conservative management should only be considered in small-diameter pseudoaneurysms and when such correction was the only recommendation of surgery. In patients with large-diameter pseudoaneurysm, and who had another recommendation of cardiac surgery, pseudoaneurysm plication should be performed.<sup>6</sup>

This study is relevant as it reports a case of LVPA formation due to an uncommon etiology: mitral valve replacement. The treatment chosen was surgical approach. Plication of the pseudoaneurysm and mitral valve replacement were performed.

### Authors' contributions

Research creation and design: Nascimento PRO, Góes GHB; data acquisition: Nascimento PRO, Góes GHB; data analysis

and interpretation: Góes GHB, Sepulveda DPL, Lima RC, Del Castillo JM, Sobral Filho DC; manuscript writing: Nascimento PRO, Góes GHB; critical revision of the manuscript for important intellectual content: Góes GHB, Sepulveda DPL, Lima RC, Del Castillo JM, Sobral Filho DC.

### Potential Conflicts of Interest

There are no relevant conflicts of interest.

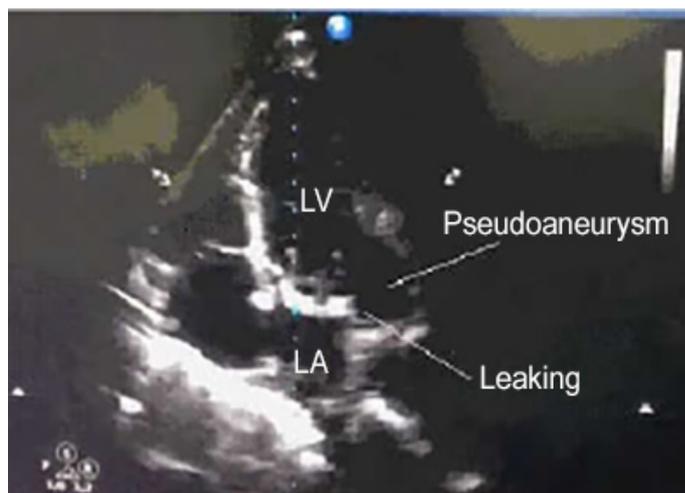
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This study had no external funding sources.

### Academic Association

This study is not associated with any graduate program.

## Case Report



**Video 1** – Apical 4-chamber view showing mitral prosthesis, pseudoaneurysm in the left ventricular inferolateral wall, and flow through it. Watch the videos here: [http://departamentos.cardiol.br/dic/publicacoes/revistadic/2018/v31\\_3/video\\_v31\\_3\\_212\\_ingles.asp](http://departamentos.cardiol.br/dic/publicacoes/revistadic/2018/v31_3/video_v31_3_212_ingles.asp)



**Video 2** – Apical 4-chamber view showing mitral prosthesis, pseudoaneurysm in the left ventricular inferolateral wall, and flow through it. Watch the videos here: [http://departamentos.cardiol.br/dic/publicacoes/revistadic/2018/v31\\_3/video\\_v31\\_3\\_212\\_ingles.asp](http://departamentos.cardiol.br/dic/publicacoes/revistadic/2018/v31_3/video_v31_3_212_ingles.asp)

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