



# Giant Compressive Pseudoaneurysm of the Anterior Wall of the Left Ventricle Following Cardiac Surgery of Aortic Endocarditis: A Case Report

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## Abstract

**Background:** Left ventricular pseudoaneurysm (LVP) is a rare but serious clinicopathologic entity. LVP is very uncommon in infective endocarditis, it may complicate the clinical course of infective endocarditis or occur postoperatively. **Case presentation:** We describe the case of a 10-year-old patient with a history of aortic vegetation resection with aortic valve repair for Staphylococcus Aureus infective endocarditis of the aortic valve complicated by a periaortic abscess and who presented nine months after surgery with exertional dyspnea revealing a giant pseudoaneurysm of the anterior and antero-septal wall of the left ventricle extended anteriorly in front of the right atrium, the pulmonary infundibulum and the pulmonary artery and extended to the level of the aortic arch, with two neo cavities, one right and the other left measuring  $73 \times 59$  mm and  $16 \times 17$  mm respectively, responsible for compression of the pulmonary artery associated with severe aortic regurgitation secondary to total retraction of the antero-right cusp. The diagnosis was established by transthoracic echocardiography and computed tomography angiography of the chest. Urgent cardiac surgery is performed with excision of the pseudoaneurysm and direct closure of the defect, combined with replacement of the aortic valve with bioprosthetic valve. Unfortunately, the patient died early post-op a few hours after leaving the operating theatre. **Conclusions:** LVPA due to infective endocarditis is rare and can be promoted by the abscess formation in the left ventricular myocardium. This case illustrates the fatal nature of this complication and encourages us to ensure regular and close post-operative monitoring despite satisfactory early post-operative control.

## Subject Areas

Cardiology

## Keywords

Endocarditis, Staphylococcus Aureus, Left Ventricle, Pseudoaneurysm, Case Report

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## 1. Introduction

Aortic valve endocarditis can be complicated by valve perforation, annulus abscess, fistula or damage to subaortic structures. One of its rare complications is pseudoaneurysm of the free wall of the left ventricle. Left ventricular aneurysm is very uncommon in infective endocarditis, usually presenting in cases of myocardial infarction.

## 2. Case Presentation

We report a case of a 10-year-old patient with a non-specific medical history, who presented with acute dyspnea associated with prolonged fever lasting 3 weeks. During clinical examination, we found good oral hygiene, a temperature of 38.3°C, a heart rate of 120 bpm, a blood pressure of 109/52 mmHg, a Glasgow Score of 15/15, a diastolic murmur at the aortic area of intensity 3/6 on the auscultation of the heart, and there were no skin lesions. An electrocardiogram showed sinus rhythm at 121 bpm without any notable anomaly. Routine laboratory tests showed: microcytic hypochromic anemia with hemoglobin at 10,8 g/dL, leukocytes at 13,000/ $\mu$ L, creatinine at 40  $\mu$ mol/L, and C-reactive protein at 135 mg/L. Initial diagnosis suspected infective endocarditis. transthoracic echocardiography confirmed the diagnosis of infective endocarditis by revealing the existence of several vegetations on aortic cusps with severe aortic regurgitation, a non-dilated left ventricle with an ejection fraction of 67%, moderate tricuspid regurgitation with pulmonary arterial pressures at 49 mmHg.

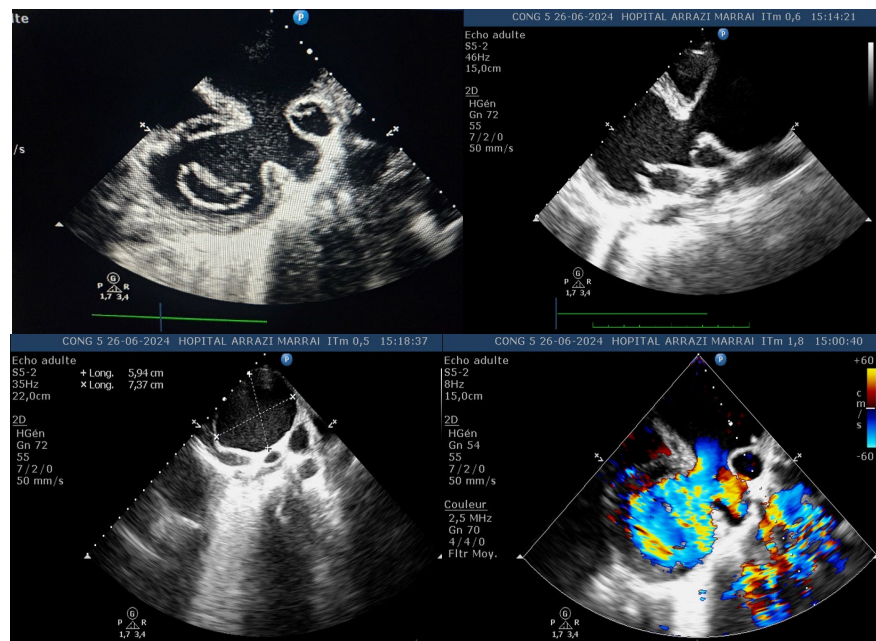
Other oral, dental and ear, nose and throat (ENT) examinations were carried out, revealing deep tooth decay complicated by the beginnings of a dental abscess as the portal of entry. An abdominal ultrasound was also performed as part of the extension work-up, but no specific findings were observed. initial blood cultures were negative.

The patient was hospitalized, and an empirical combination of antibiotic therapy with Ampicillin, Cloxacillin and Gentamicin has been prescribed for him. subsequent blood cultures were positive for methicillin-sensitive Staphylococcus aureus, leading to a therapeutic de-escalation with monotherapy based on Cloxacillin 12 g/day. During evolution, transthoracic echocardiography showed extension of valve damage with increasing vegetations that had become mobile and the development of periannular aortic abscess. Urgent surgical intervention

was performed for appropriate and early management.

Assessment of valve damage noticed a thickened tricuspid aortic valve with large vegetation and several periannular abscess. We proceeded to a reparation of the aortic cusps and vegetectomy with debrided the periannular abscess. The valve culture was positive for the same germ and we, therefore, decided to continue the antibiotic treatment with for six weeks (in the hospital) from the day of the intervention. The patient had a favorable recovery course initially with the obtainment of definitive apyrexia and normalization of inflammatory markers. Transthoracic echocardiography, performed during the first two months post-operatively, was satisfactory.

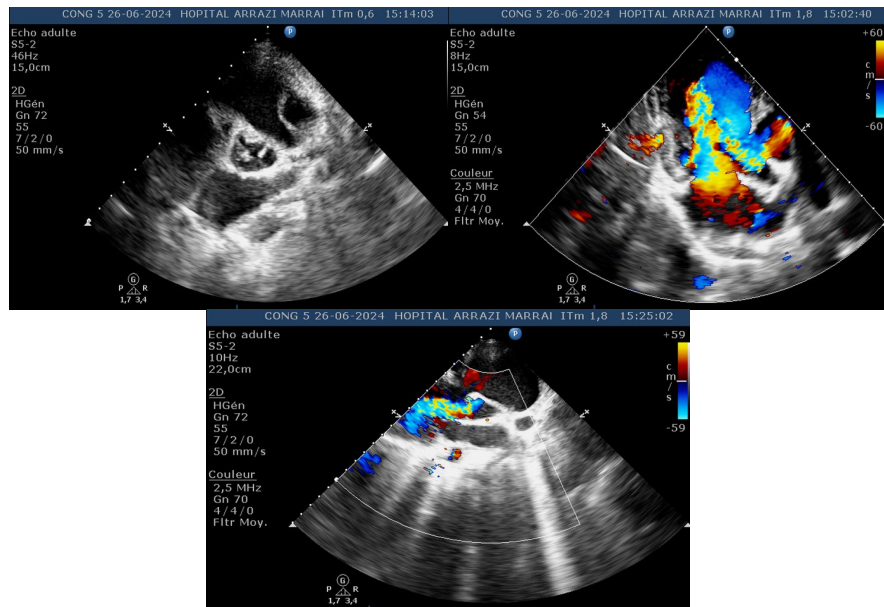
But at nine months post-operatively the patient presented for an echocardiographic check-up with exertional dyspnea as a new symptom. Transthoracic echocardiography revealed a giant pseudoaneurysm of the anterior and antero-septal wall of the left ventricle (**Figure 1**) extended anteriorly in front of the right atrium, the pulmonary infundibulum and the pulmonary artery and extended to the level of the aortic arch, with two neo cavities, one right and the other left measuring  $73 \times 59$  mm and  $16 \times 17$  mm respectively, responsible for compression of the pulmonary artery and its branches with a remodeled aortic valve with total loss of mobility of the right coronary leaflet, resulting in significant central diastasis and severe and excentric aortic regurgitation (**Figure 2**).



**Figure 1.** Transthoracic echocardiography showing the pseudoaneurysm of the anterior and antero-septal wall of the left ventricular.

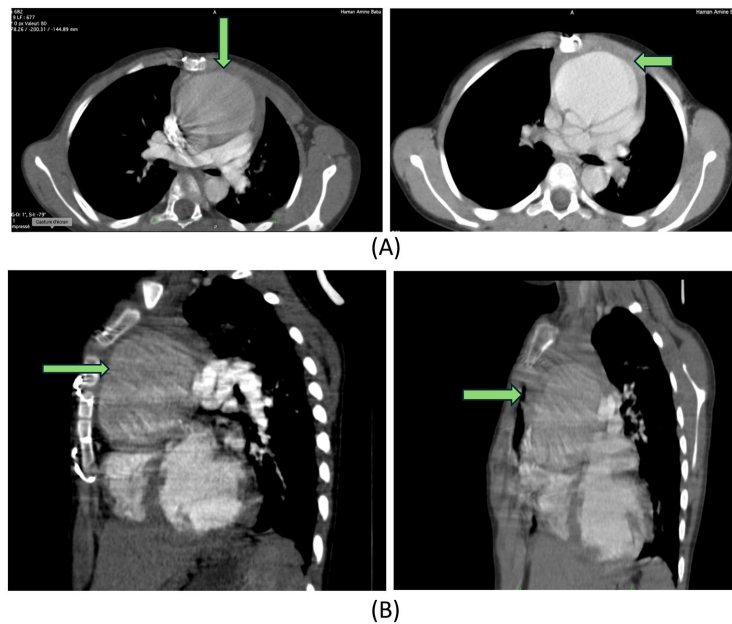
A complement by thoracic Angio scanner was necessary showing (**Figure 2**) evidence of a right anterolateral para-aortic cystic formation, well limited, spontaneously hypodense, opacified after contrast injection, measuring  $60 \times 68 \times 72$  mm, in continuity with the left ventricle, possibly related to a false aneurysm

with compression of the pulmonary artery and its right branch.



**Figure 2.** Transthoracic echocardiography showing a severe aortic regurgitation.

The patient was therefore referred for urgent surgery with an indication for aortic valve replacement with cure of the pseudoaneurysm, but unfortunately died immediately postoperatively a few hours after the operation. (See **Figure 3**)



**Figure 3.** Computed tomography angiography of the chest showing the pseudoaneurysm of the anterior wall of the left ventricular. (A) axial view. (B) coronal view.

### 3. Discussion

Infective endocarditis is an endovascular microbial infection of intracardiac

structures facing the blood, including the large intrathoracic vessels and intracardiac foreign bodies [1]. IE is known to have high morbidity and mortality rates, regardless of age group. A variety of complications can result from IE. Cardiac structural complications can occur when the infection spreads inside the heart, giving rise to a pseudoaneurysm or a periannular abscess.

The latest ESC recommendations recommend monotherapy with cloxacillin or cefazolin for 4 - 6 weeks in cases of methicillin-susceptible staphylococci endocarditis on native valves [2].

The pseudoaneurysm is characterized by a wall containing neither endocardium nor myocardium, unlike a true aneurysm of the left ventricle [3]. Most of the LVPs develop after MI or cardiothoracic surgery. In a systematic literature review of 290 patients, MI (55%), surgery (33%), and trauma (7%) were the top 3 associations [4]. while endocardial origin accounts for only 13% of cases according to some authors [5].

Surgical procedures frequently associated with pseudoaneurysms include mitral valve replacement, aortic valve replacement, and correction of congenital heart disease [6].

In the presence of infectious disease, three mechanisms have been described for the formation of left ventricular pseudoaneurysms: septic coronary embolism leading to myocardial infarction and secondary rupture, dissemination from an adjacent perivalvular abscess, and seeding of the endocardium by a regurgitant jet [3]-[7].

In our case, the pseudoaneurysm certainly developed during the postoperative period of the valve surgery, but in the presence of an aggravating situation which is infectious endocarditis initially complicated by abscesses with the postoperative persistence of a severe aortic regurgitation, the exact mechanisms are not clear and are often interrelated. However, an iatrogenic origin cannot be excluded.

The high pressure in the left ventricle facilitates sac-like expansion of the pseudoaneurysm and dissection of the weakened wall [8]. The pseudoaneurysm may decompress, forming a fistula with the left atrium, or perforate the epicardium, causing cardiac tamponade. The size, location and extent of the of the aneurysm sac can also lead to compression of adjacent organs causing myocardial infarction or compression of the pulmonary arteries [9].

Regarding the clinical presentation, the revealing symptoms of pseudoaneurysm are variable and are not specific. On the other hand, transthoracic echocardiography can lead to the fortuitous discovery of the disease, as in our case. The proportion of asymptomatic patients varies between 10% and 48% depending on the study [3].

According to the literature, the natural course of pseudoaneurysms is marked by the risk of rupture in 30% to 45% of cases [3] [4]. Surgery is the gold standard treatment for pseudo aneurysms of the left ventricle, with a 23% risk of early death [4]. the size of its neck, the location, and the age of the pseudoaneurysm determine the choice of surgical method.

In high-risk surgery patients and those requiring a redo cardiovascular surgery, percutaneous device closure of LVPs is preferable [10].

Recently, preference for medical therapy in cases with chronic LVPs has been stressed, especially for lesions less than 3 mm in size. The main aim of treatment is to reduce the enlargement of the pseudoaneurysm. In addition, reducing stress on the ventricular wall by reducing afterload and reducing the risk of thromboembolism are essential elements of therapy [10].

In our patient, the size of the aneurysm, the thinness of the aneurysm wall, and the presumed significant progression were signs of an imminent rupture, as were its compressive nature and its association with a severe aortic leak, which led to the decision to undergo surgical treatment.

#### 4. Conclusions

LVPA due to endocarditis can be promoted by the abscess formation in the left ventricular myocardium. The diagnosis is made by echocardiography and is better characterized by thoracic angiography or CT scanner.

This case illustrates the fatal nature of this complication and encourages us to ensure regular and close post-operative monitoring despite satisfactory early post-operative control.

#### Conflicts of Interest

The authors declare no conflicts of interest.

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