CASE REPORT

One aneurysm and two pseudoaneurysms, same patient

Daniela Carvalho,[1] Jorge Mimoso,[1] Ilídio de Jesus,[1] José Fragata[2,3]

[1]Cardiology, Centro Hospitalar e Universitário do Algarve, Faro, Portugal
[2]Cardiothoracic Surgery - Hospital de Santa Marta, Centro Hospitalar de Lisboa Central EPE, Lisboa, Lisboa, Portugal
[3]Cardiovascular & Lung, Universidade Nova de Lisboa, Lisboa, Lisboa, Portugal

Correspondence to
Dr Daniela Carvalho,
danielacarvalhosilva@gmail.com

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SUMMARY

Ventricular pseudoaneurysms are rare pathological entities that mainly arise in the context of myocardial infarction or post-cardiac surgery. The clinical presentation is usually non-specific, and at times patients are asymptomatic. Mortality is high even with timely surgical intervention.

The authors present a case of postoperative recurrence of a left ventricular pseudoaneurysm superimposed on an ischaemic true aneurysm.

BACKGROUND

Ventricular pseudoaneurysms are rare complications of a wide range of cardiac conditions namely myocardial infarction, post-cardiac surgery (typically mitral valve replacement), trauma and infection. When associated with myocardial infarction, pseudoaneurysms usually occur in the first week after the event. If it happens to rupture, cardiac tamponade followed by death is the prevailing outcome.[1] A pseudoaneurysm superimposed on a post-myocardial infarction chronic true aneurysm is poorly described in the literature.[2] The clinical presentation is usually non-specific and around 10% of patients are asymptomatic. Surgical repair is the main treatment.[1] To our knowledge, this is the first report of a pseudoaneurysm late relapse after initial surgical repair.

CASE PRESENTATION

A male patient, born in June 1952, with prior history of smoking, dyslipidaemia, hypertension and anterolateral myocardial infarction in 1999, for which he underwent angioplasty of the anterior descending and circumflex arteries. As a sequela, he developed an apical left ventricular aneurysm. Post-infarction ECG showed pathological Q waves and persistent ST-segment elevation and inverted T-waves in the anterolateral wall. Between 1999 and 2010, he was lost to follow-up due to emigration.

In 2010, he was admitted to our Cardiology Department due to high-risk syncope. The *ECG* on admission was similar to the previous one and *blood tests* showed a troponin I of 3.2 mcg/L (normal range: <0.033 mcg/L). A *transthoracic echocardiogram* was performed, which showed moderate left ventricular systolic dysfunction due to hypokinesia of the anterior, septal and inferior walls, and also a left ventricular apical aneurysm with a solution of continuity of its wall giving rise to a cavity which was filled with an ecodense material (suggestive of a pseudoanuerysm superimposed on the aneurysm). *Contrast echocardiography* confirmed the presence of a pseudoaneurysm, with contrast leakage into the cavity.

The patient underwent *coronary angiography*, which revealed a subocclusive stenosis of the anterior descending artery at a previous stent implantation location. *Ventriculography* revealed a ventricular aneurysm, surrounded by a large cavity apparently filled with thrombi, opacified by contrast and probably corresponding to ventricular pseudoaneurysm.

The patient was referred for urgent cardiac surgery and underwent a bypass surgery (graft from the left internal mammary artery to the anterior descending artery) with resection of the ventricular pseudoaneurysm and aneurysm. The gap in the ventricular wall was closed with a pericardial patch.

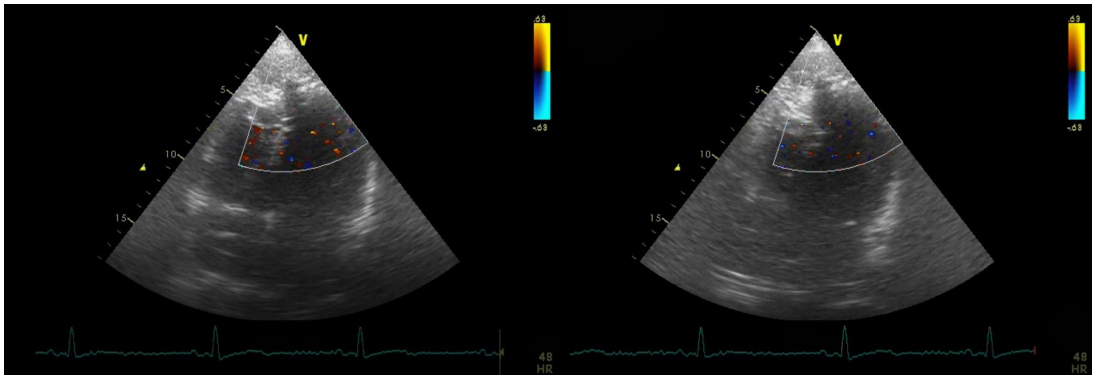

Figure 1 Echocardiogram with four chamber view (two-dimensional+colour Doppler). It shows the pericardial patch without any apparent solution of continuity.

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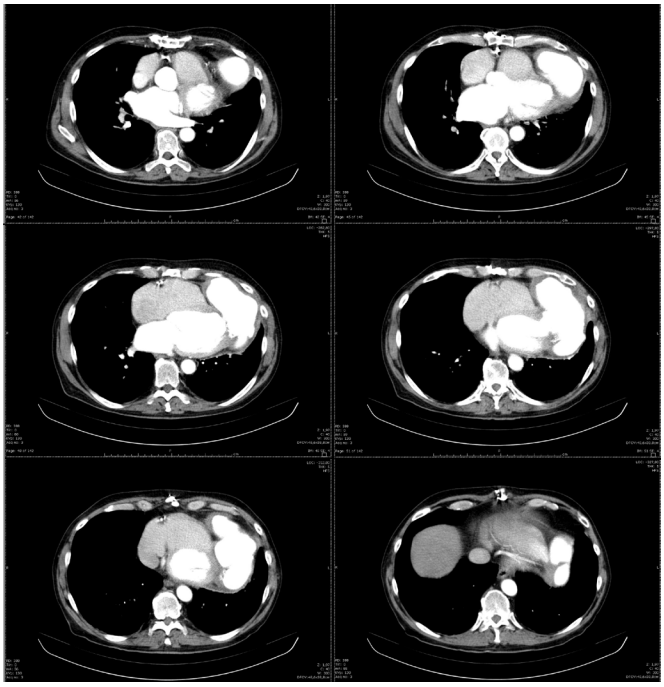

Figure 2 Thoracic CT with iodised contrast. It shows a large mediastinal mass in communication with the left ventricle.

Surgery and the early postoperative period were uneventful. Until 2013, he remained asymptomatic and with no signs of ventricular wall anomalies relapse on serial echocardiographies (figure 1). He was lost to follow-up in 2013. The clinical evolution of the patient up to this point has already been described by Sousa *et al*.[3] In August 2014, he was diagnosed a prostate adenocarcinoma, and underwent diagnostic tests for staging.

INVESTIGATIONS

In August 2014, he was diagnosed a prostate adenocarcinoma, and underwent diagnostic tests for staging. A chest CT with iodinated contrast revealed a large mediastinal mass communicating with the left ventricle and in close relation with the thoracic wall (figure 2). This mass had a diameter of 12 cm, opacified with intravenous iodised contrast and presented coarse

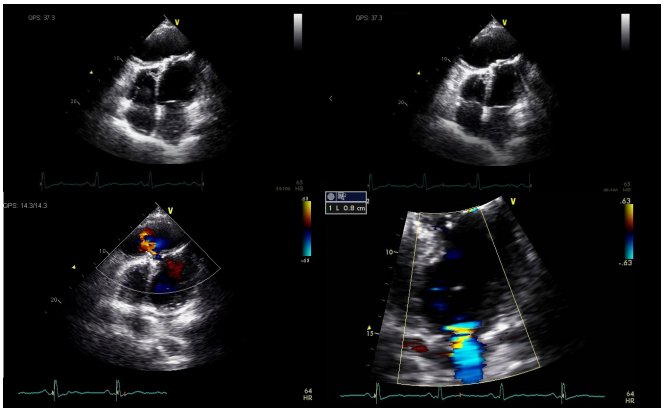

Figure 3 Echocardiogram with four chamber view. The first three images show the dehiscent pericardial patch and colour Doppler shows flow across the dehiscence, in and out the pseudoaneurysm cavity. The last image shows the colour Doppler of the mitral insufficiency and the width of the *vena contracta*.

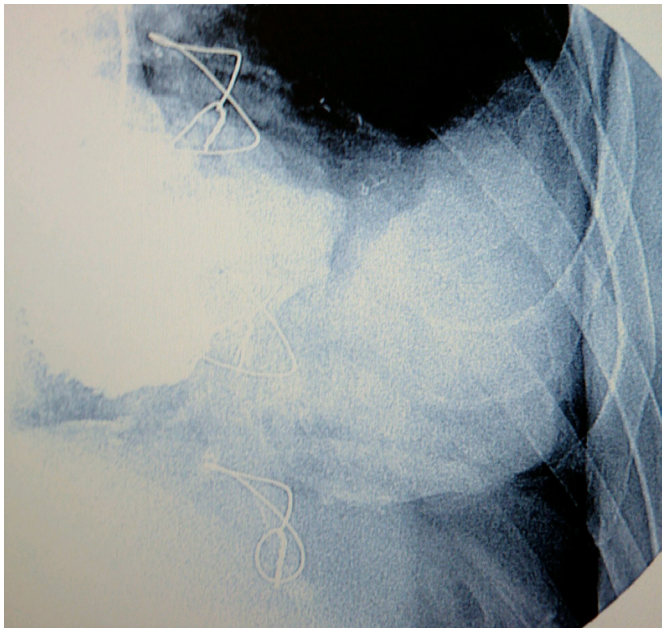

Figure 4 Ventriculography with inverted colours. The image shows the extravasation of contrast to a voluminous pseudoaneurysm cavity.

calcifications in its periphery, being compatible with recurrence of a ventricular pseudoaneurysm. The remaining investigation did not show metastasis of prostatic neoplasia. A new echocardiogram was performed, which also showed dehiscence of the ventricular patch and a secondary severe mitral regurgitation (figure 3).

TREATMENT

At this time point, the patient was informed about the prognosis and the available therapeutic options for his cardiac condition and declined hospital admission and surgical re-intervention. Two months later, he reconsidered his decision to surgical intervention and underwent preoperative diagnostic tests. *Left heart catheterisation* showed obstruction of the anterior descending artery, patent left internal mammary artery bypass graft to the anterior descending artery and a giant left ventricular pseudoaneurysm (figure 4). The *carotid angiogram* showed no significant atherosclerotic disease. He was then re-operated to correct the left ventricular pseudoaneurysm. A mitral valve annuloplasty was also performed.

OUTCOME AND FOLLOW-UP

The postoperative course was complicated by an atrial flutter (later submitted to electrical cardioversion), a left lung pneumonia and infection of the surgical wound. After 18 months of follow-up, control echocardiograms and CT showed no signs suggestive with ventricular pseudoaneurysm relapse. The mitral valve presented minor regurgitation. The patient remained asymptomatic.

DISCUSSION

This case is remarkable not only for the rarity of this clinical entity but also for its peculiar presentation mode. As reported by Sousa P. *et al*, ventricular pseudoaneurysms in the setting of ischaemic heart disease usually occur in the early phase of the event.[3] When the anterior wall is affected, its rupture usually leads to cardiac tamponade and death.[1] The rare cases in which the clinical evolution is less catastrophic occur more frequently

in the setting of inferolateral wall infarction where the rupture is more likely to be contained by pericardial adhesions and thrombi.[1–3] Anterior wall chronic pseudoaneurysms have a frequency less than half than those of the posteroinferolateral wall.[1]

Clinically, the manifestations of left ventricular pseudoaneurysms are often non-specific and more than 10% of patients may remain asymptomatic.[1] In the present case, it is likely that the ventricular pseudoaneurysm had a chronic evolution and no clinical manifestations. Although we cannot be sure, we believe that the symptoms that motivated the 2010 admission were related to a new ischaemic event and not to the pseudoaneurysm establishment point. The hypothesis of a chronic evolution is corroborated by the angiographic images suggestive of the presence of thrombi within the cavity of the pseudoaneurysm.

Surgical therapy has a high mortality in the early postoperative period. However, the mortality reported for the conservative approach is significantly higher, given the tendency of these pseudoaneurysms to rupture (~30%–45% of the cases).[1] Surgical mortality rates are even higher when concomitant mitral valve intervention is performed, increasing to 20%–30% in this subgroup.[4]

The recurrence of ventricular pseudoaneurysms after surgical correction is infrequent, being reported in about 5% of cases.[1] It is thought that the frequency may be higher when there is concomitant resection of aneurysmatic tissue due to incomplete resection of fibrotic tissue, where the patch is subsequently sutured, as well as changes in the surrounding myocardial properties.[4]

In this case, we believe that after the first infarction a pericardial inflammatory process created adhesions and calcifications that allowed the pseudoaneurysm to remain asymptomatic and stable for a relatively long period of time. After the first intervention, patch dehiscence occurred, with extravasation of blood into a pericardial cavity where pre-existing adhesions were further reinforced by the prior surgical intervention.

No case of an asymptomatic ventricular pseudoaneurysm relapse after previous correction has been described in the literature. To our knowledge, only one case of a ventricular pseudoaneurysm superimposed on a true ventricular aneurysm has been described.[3] This case is remarkable because of several aspects: (1) the pseudoaneurysm nature; (2) its stability over the years and (3) the absence of symptoms despite its considerable size.

The surgical risk of the first intervention was already quite high, considering that in addition to aneurysmectomy and correction of pseudoaneurysm, an aortocoronary bypass graft surgery was also performed. In the second intervention, the risk was even higher because of the added risk inherent to a re-do surgery and the intervention in the mitral valve. Therefore, this case is also noteworthy for its demanding technical surgical aspects.

Learning points

- Left ventricular pseudoaneurysms of ischaemic aetiology are rare entities and usually follow a catastrophic evolution;
- The mortality of a pseudoaneurysm is high even with the adequate surgical treatment.
- Asymptomatic recurrence of a pseudoaneurysm is a rare finding and never reported in literature before.

Contributors The authors and their contributions in the writing of the manuscript are listed below: DC: Internal of the Specific Training in Cardiology at the Hospital and University Center of the Algarve, responsible for writing the manuscript and bibliographic research JM: Cardiologist at the Cardiology Department of the Hospital and University Center of Algarve, Assistant Cardiologist of the patient whose case is portrayed. He had a fundamental role to obtain data from the clinical history and complementary tests; IdJ: Director of the Cardiology Department of the Hospital and University Center of the Algarve, played a fundamental role in the correction of some aspects of the manuscript and giving suggestions on the structure of the manuscript; JF: Director of the Cardiothoracic Surgery Service of Santa Marta Hospital and vice Dean of the Universidade Nova de Lisboa, was the principal surgeon in the surgical reintervention to repair the recurrence of left ventricular pseudoaneurysm, and was fundamental to provide details of the surgical procedure. All authors further contributed to the final review of the manuscript.

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