Case Report

Inferolateral post-myocardial infarction pseudoaneurysm. A rare case report

Pseudoaneurisma pós-infarto inferolateral. Um raro relato de caso

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Abstract

We report the case of a 76-year-old male patient with a history of ST-segment elevation myocardial infarction (STEMI) for 3 years. He was admitted to the Emergency Room with a new chest pain episode that began 40 days before and was diagnosed with left ventricular (LV) pseudoaneurysm through 3D transthoracic echocardiography and cardiac magnetic resonance imaging scans. The patient underwent angiography of the coronary arteries, identifying lesions with a multiarterial pattern. Surgical treatment and LV aneurysmectomy were performed with good clinical evolution.

Introduction

The heart presents, by anatomical divisions, the endocardium, myocardium and pericardium (visceral and parietal). Rupture of endocardial and myocardial layers, mainly secondary to ischemic heart disease (55% of the cases),[1] with containment of rupture by the presence of pericardial adherences, gives rise to what we call pseudoaneurysm.[2]

Left ventricular (LV) pseudoaneurysm is a very rare complication with unclear prognosis and is associated with high mortality rates.[3] Therefore, rapid recognition of the condition with proper establishment of the therapy is related to better survival.[1,4]

Case Report

A 76-year-old male patient, hypertensive, diabetic and former smoker, admitted to our emergency room complaining of chest tightness for 40 days.

In August 2016, patient was diagnosed with ST-segment elevation myocardial infarction (STEMI) of the inferolateral wall and did not undergo primary angioplasty or fibrinolytic therapy at the time. Patient was discharged from the hospital, with outpatient cardiac follow-up, remaining asymptomatic throughout the following period. About 40 days prior, there was recurrence of chest pain tightening associated with exertion, with improvement at rest, of lower intensity compared to the AMI pain. The patient was then submitted to echocardiography and outpatient cardiac magnetic resonance imaging that suggested diagnosis of pseudoaneurysm in the LV inferolateral wall. Patient was using Losartan 100 mg/day; Furosemide 20 mg/day; Metoprolol 100 mg/day; AAS 100 mg/day; Simvastatin 40 mg/day; Metformin 850 mg 3 times/day; Glibenclamide 20 mg/day.

Physical examination showed hypertension, blood pressure (BP) 198 x 104 mmHg, heart rate (HR) 60 bpm and normal respiratory parameters — respiratory rate 20 irpm and saturation 97%. Regarding cardiac and pulmonary workup, there were no abnormal findings on auscultation — absence of adventitious noises or cardiac murmurs, and normophonetic heart sounds were observed, with two-stroke regular rhythm. Other aspects were normal on physical examination.

No significant abnormal findings were observed on admission laboratory tests (blood count, electrolytes, renal profile and myocardial necrosis markers).

Admission ECG showed sinus rhythm, inactive zone and abnormal repolarization in the inferolateral wall (Figure 1).

Vectorcardiogram reveals, in the frontal plane, the first vector directed to the top, with clockwise rotation of the vectorcardiographic loop. Such aspect is compatible with lower inactive zone. Moreover, there is a distortion of the path of end of ventricular activation (folding phenomenon), a finding that is usually related to marked distortion of the myocyte architecture in the basal segments. In the horizontal plane, activation forces are shifted to the left and back with T loop outside the QRS loop. The T loop has a discordant secondary T-type T-wave appearance. The QRS-T spatial angle is increased.

In summary, the vectorcardiographic aspect is compatible with lower inactive zone and suggestive of inferolateral basal fibrosis (Figure 2).

3D transthoracic echocardiography revealed moderate left atrial enlargement (indexed volume: 45 mL/m^2); septum: 10 mm; posterior wall: 5 mm; aortic root: 33 mm. LV ejection fraction (LVEF) = 48% (by the Simpson's method, excluding the pseudoaneurysm area). Akinesia of middle and basal segments of the inferior wall, hypokinesia of the distal segment of inferior and inferoseptal walls. Myocardial contractility preserved in the other LV segments. Pseudoaneurysm image

Keywords

Aneurysm,False; Diagnosis; Aneurysm, False/diagnostic imaging.

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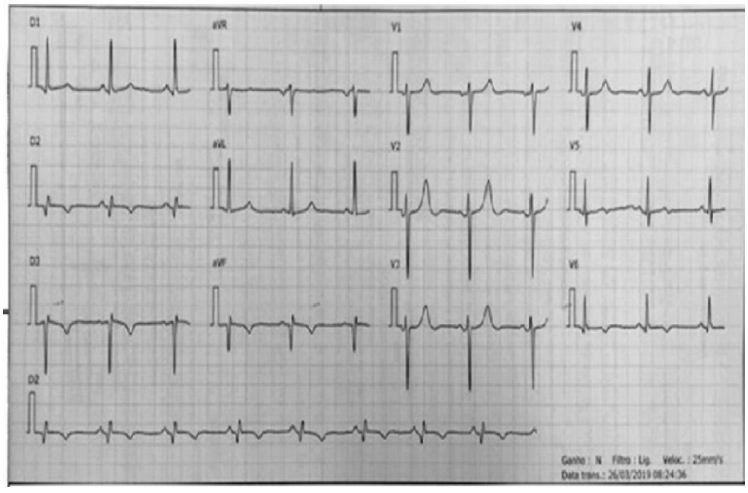

Figure 1 – *Electrocardiogram.*

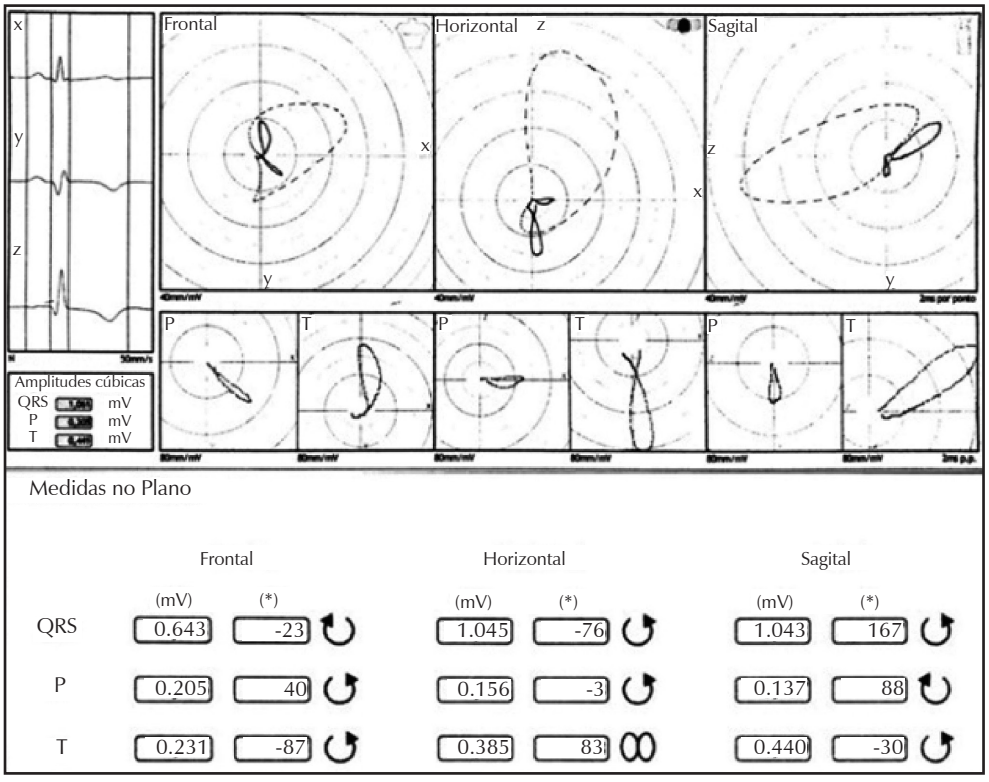

Figure 2 – *Vectorcardiogram.*

related to the inferolateral wall, below the mitral valve plane, measuring 25 mm in its neck and 45 mm in its longest length, with inner flow on Doppler and echogenic image located at its edges, suggesting thrombus. Heart valves with no significant morphofunctional abnormalities. No pericardial effusion. Three-dimensional echocardiogram enabled a better view of the pseudoaneurysm, providing high-definition images, making it easier to plan the surgical procedure and promoting greater patient safety. (Figure 3)

Cardiac magnetic resonance imaging, the most precise and accurate method, was performed because the patient remained stable and showed us very useful high-definition

images, which helped us plan the surgery procedure. CMRI revealed LV with increased dimensions and overall thickness (diastolic and systolic diameters of 80 mm and 72 mm, respectively); other cardiac cavities with preserved dimensions and overall thickness. LVEF 45%, moderate LV systolic dysfunction at the expense of large inferior and inferolateral pseudoaneurysm, with 37-mm neck, sitting 12mm away from the posterior mitral plane with thrombus lining and filling the inferior posterior portion of the pseudoaneurysm. Discreet (laminar) pericardial effusion. Presence of late coronary and transmural pattern enhancement areas (>50% of the segment area) in the inferior and inferolateral segments, suggesting myocardial fibrosis and without viability, consistent with the aneurysmal segments, compatible with previous AMI. Viability preserved in the other segments (Figures 4 and 5)

Cardiac catheterization revealed right dominance, multiarterial pattern with segmental lesion of up to 60% in the middle third of the right coronary artery, followed by occlusion in the distal middle third with recanalization aspect and 80% lesion in the distal third; anterior descending artery with 50% ostial lesion and 2nd marginal branch of moderate importance with 70% ostial lesion.

The patient underwent surgical repair of the ruptured LV portion, with double pericardial patch, without geometric LV reconstruction. Coronary arteries were not approached (unfavorable distal beds). Extubation and weaning of vasopressor drugs was performed on the 1st postoperative day (POD) with favorable hemodynamic evolution. Discharge from the intensive care unit on the 2nd POD, with hospital discharge on the 5th POD for outpatient follow-up.

Discussion

The most common pseudoaneurysm sites, evaluated by a series of case reports, are the posterolateral and inferior wall after acute myocardial infarction, which is compatible with inferior infarction (twice more common in pseudoaneurysm formation than previous infarction).[3,5] This condition is also described in the postoperative period of cardiac surgery, trauma and infections.[6]

The clinical picture presented by patients with this complication is variable. Chest pain and dyspnea are the most common conditions. Sudden death is less common (3% of the cases) and about 12% are asymptomatic. On physical examination, 2/3 of the patients present murmur, usually indistinguishable from the murmur of mitral regurgitation.[3,5]

About 95% of the cases present abnormal electrocardiographic findings, mostly non-specific. Only 20% have ST-segment elevation. [3]

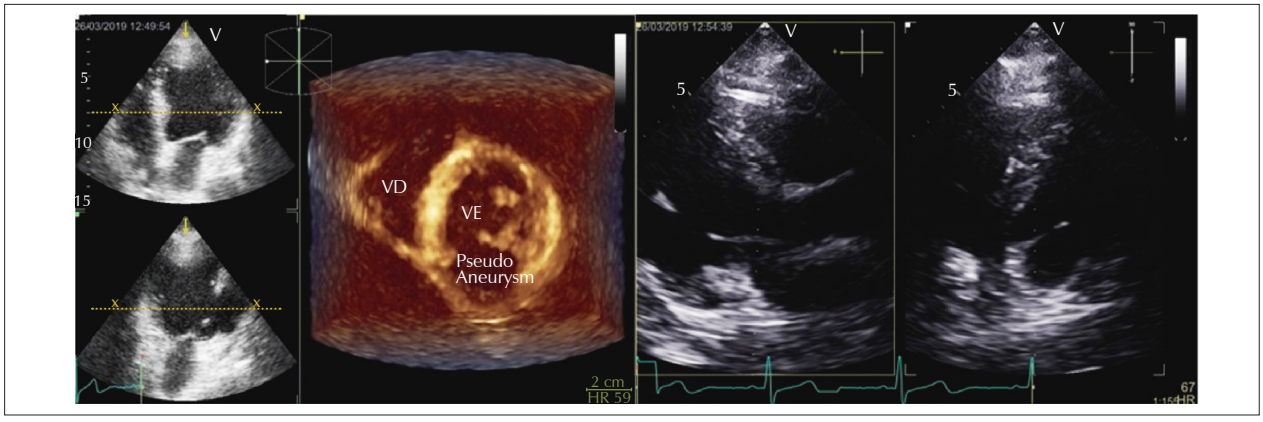

Figure 3 – *Transthoracic echocardiogram.*

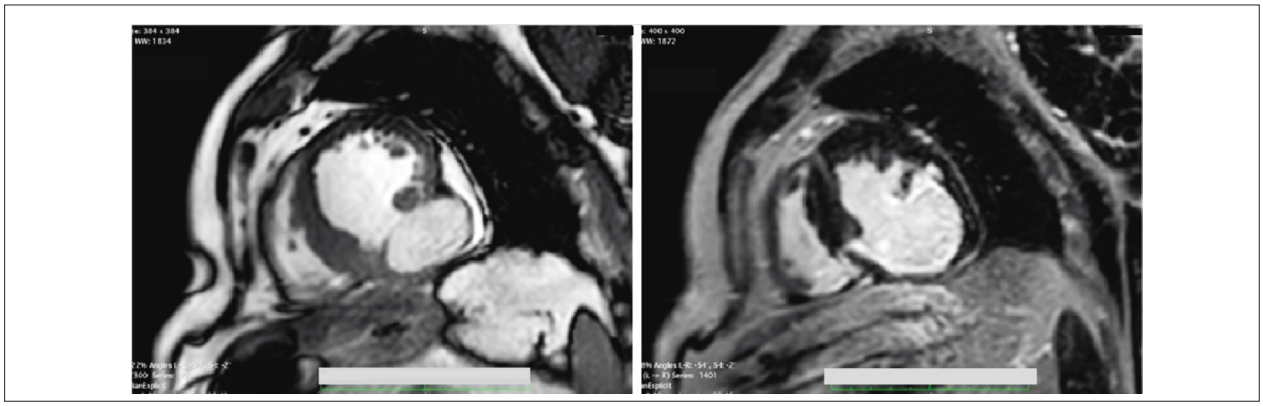

Figure 4 – *Cardiac magnetic resonance imaging – Short axis.*

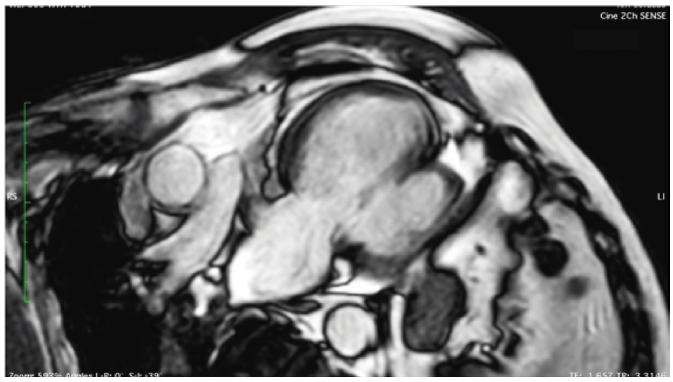

Figure 5 – *2-chamber cardiac magnetic resonance imaging.*

Noninvasive methods, such as echocardiography (especially transesophageal study, which presents greater accuracy) and magnetic resonance imaging are useful in the diagnosis of this complication and should be encouraged.[4,7–9] Angiography, however, is still the most reliable test for diagnosis.[2]

Untreated pseudoaneurysms have a risk of rupture ranging from 30–45%, with 100% mortality without specific therapy and 50% with the specific therapy established. In cases of specific therapy established before rupture, perioperative mortality is around 10%.[2]

Left cineangioventriculography is an accurate method, and when associated with coronary angiography, it allows for better surgical planning, as mitral valve dysfunction and the need for coronary artery bypass grafting are common conditions.[2]

Therefore, for diagnosis, we should be aware of a patient that had previous AMI and persists with dyspnea or chest pain or the one that had a new murmur on physical examination and should then be investigated with imaging methods that corroborate the diagnosis, so that any repair corrections can be quickly arranged.

Conclusion

Left ventricular pseudoaneurysm is a rare condition with high mortality rates when not properly treated. Rapid clinical suspicion and the support of complementary imaging methods (such as magnetic resonance imaging and 3D echocardiography) are fundamental for the diagnosis of this condition and support management. Surgical therapy is still the best method currently described for pseudoaneurysm repair and should be promptly established as soon as the diagnosis is confirmed.

Conflict of interest

The authors declare that there is no conflict of interest regarding this manuscript.

Authors' contributions:

Research creation and design: Leal GCV, Hortegal RA, Paladino Filho AT.

Data acquisition: Leal GCV. Data analysis and interpretation: Leal GCV, Hortegal RA, Paladino Filho AT. Manuscript writing: Leal GCV, Hortegal RA, Paladino Filho AT, Mora DM. Critical revision of the manuscript for important intellectual content: Ohe LN. Echocardiographic images: Barreto RBM.

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