

Late recurrence of a giant left ventricular pseudoaneurysm: the importance of multimodality imaging approach

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Abstract

Left ventricular pseudoaneurysms (LVP) are rare but may arise after myocardial infarction, trauma or cardiac surgery, tending to expand and rupture over the time. We show the case of a 75-year-old patient with a recurrent giant ventricular pseudoaneurysm, who presented to the emergency department with sustained ventricular tachycardia. Pseudoaneurysmatic lesion was investigated through echocardiography, angiography and Cardiac Computed Tomography, in order to evaluate the size and spatial orientation of the pseudoaneurysm and to set a tailored treatment. At emergency department, sustained ventricular tachycardia may be the first and unique clinical presentation of ventricular pseudoaneurysm late recurrence, whose management requires a multimodality imaging approach to guide surgical correction.

Introduction

Left ventricular pseudoaneurysms (LVP) are rare but may arise after myocardial infarction, trauma or cardiac surgery, leading to thromboembolism, ventricular arrhythmias, cardiac tamponade, cardiogenic shock and sudden death. We present the case of a 75-year-old patient with recurrent giant ventricular pseudoaneurysm, presenting with sustained ventricular tachycardia. Then, we will discuss the crucial role of early diagnosis through multimodal imaging techniques in current management at emergency department.

Case Report

A 75-year-old man presented to our emergency department (ED) with sustained ventricular tachycardia, in absence of signs of hemodynamic instability. Ten years before, he had an inferior myocardial infarction due to complete occlusion of right coronary artery (RCA), with subsequent development of inferior LVP. He underwent surgical ventricular repair and cardioverter-defibrillator implantation for primary prevention one year later. In the following years, the patient made an uneventful recovery.

In the ED, intravenous amiodarone bolus was effective in restoring sinus rhythm. However, echocardiography revealed a giant LVP of inferolateral wall (Figure 1 A,B), close to the previous pericardial patch. Urgent left heart catheterization showed near-occlusive lesion of distal RCA and a giant pseudoaneurysm of inferior wall (red borders) with a thrombotic layer (Figure 1C, asterisks; supplementary material Video S1). Cardiac Computed Tomography (CT) confirmed that pseudoaneurysmatic lesion (maximum diameters 12 x 5.5 x 9.5 cm) was close to the mitral valve annulus, in absence of a narrow neck (Figure 2. A,B). 3D CT reconstruction added information on the size and spatial orientation of the pseudoaneurysm, which was larger than LV chamber (Figure 2C). Taking into account the surgical risk, the patient underwent re-surgical ventricular restoration with an endoventricular bovine pericardial patch (Dor procedure). The patient made an eventful recovery and was discharged ten days after the surgical intervention. At 2-year follow-up, the patient is alive (New York Heart Association class II) and no further sustained ventricular arrhythmias were detected.

Discussion

Left ventricular pseudoaneurysm is a rare life-threatening complication following myocardial infarction (42-100% of cases

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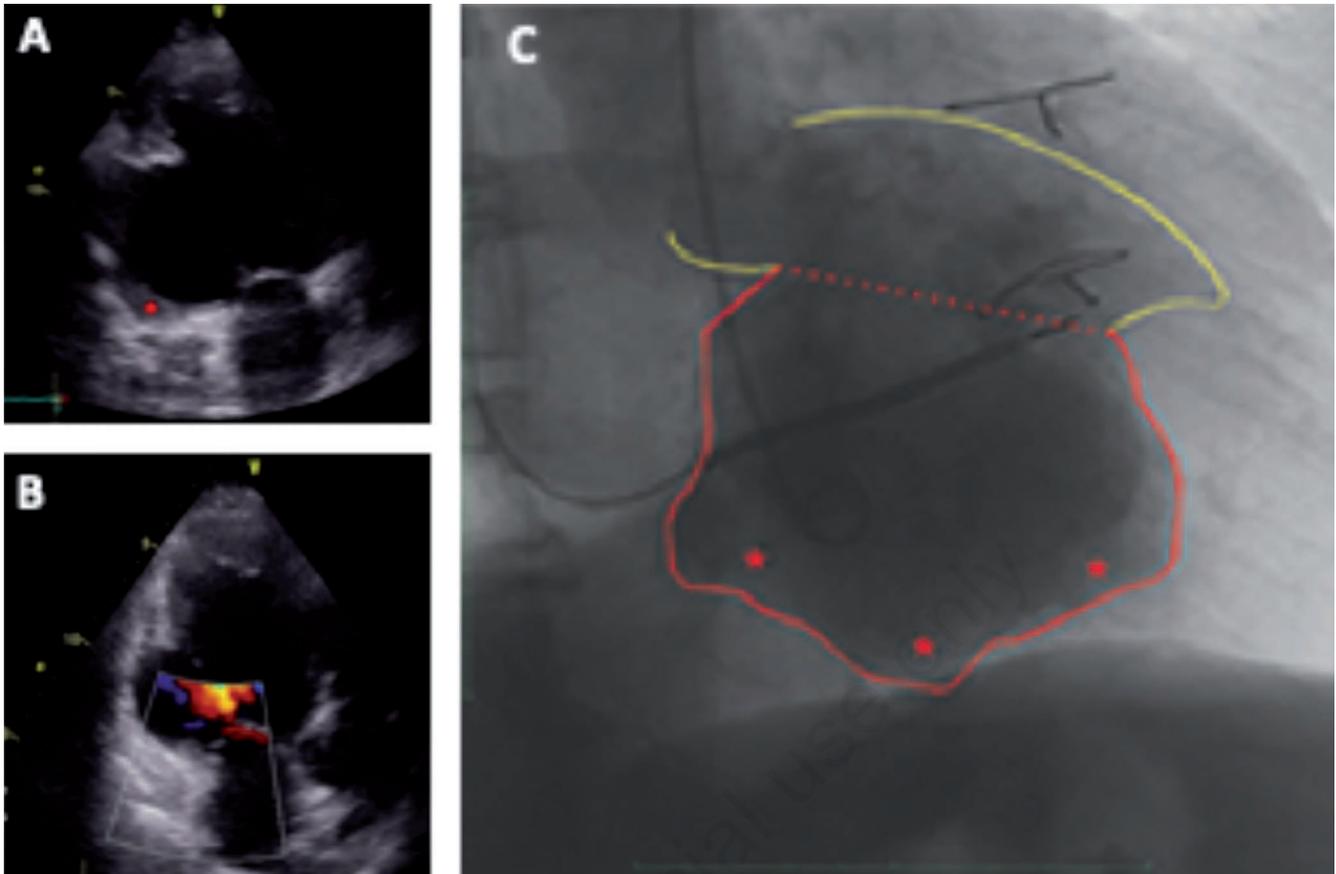


Figure 1. Multimodal imaging of left ventricular pseudoaneurysm (LVP). A) Apical 3-chamber view on transthoracic echocardiography demonstrated a large inferolateral LVPA containing thrombus (asterisk). B) Color-flow Doppler echocardiography and (C) left ventriculography showed evidence of flow across the LV wall defect.

in different case series), trauma or cardiac surgery [1-3]. Other less common causes include infective endocarditis and congenital sub-mitral aneurysm. In contrast to true aneurysms in which myocardial wall integrity is preserved, pseudoaneurysms are contained by pericardium and adherent fibrous tissue, tending to expand and rupture over the time. As described in this case, inferolateral walls are much more affected than anterior walls [3]. This seems to be related to the fact that anterior rupture leads more likely to cardiac tamponade, with subsequent cardiogenic shock and sudden death than posterior rupture (more frequently contained by pericardium). With recent improvement in coronary revascularization, the incidence of this condition is dramatically decreased. However, due to high mortality risk, it is essential an early diagnosis at emergency department in order to plan surgical treatment and improve clinical outcomes. Indeed, a conservative management of this condition carry a mortality rate of nearly 50% at 2 years [4], which is reduced to <10% by surgical correction [5].

Clinical diagnosis may be challenging, since clinical signs, symptoms and first-line assessments are frequently non-specific. At emergency department, during patient's hemodynamic stabilization, point of care trans-thoracic echocardiography is crucial, guiding early diagnosis of LVP and cardiac tamponade [6]. Then, cardiac CT and MRI represents the preferred imaging techniques to distinguish pseudoaneurysm from true aneurysm, which have a distinct pathophysiology, clinical features and surgical implications.

Even if medical treatment has been promoted in the past for patients at high surgical risk with incidental finding of LVP, surgical management represents the first-line treatment in symptomatic patients with recently diagnosed LVP or with large (>3 cm) and expanding LVP [7]. For smaller pseudoaneurysms in high-risk patients requiring re-cardiovascular surgery, percutaneous approach may be preferable [8]. In our case, the patient presented with recurrent giant LVP (maximum diameters 12 x 5.5 x 9.5 cm) in absence of a narrow neck; therefore, we decide to perform surgical ventricular restoration.

Finally, recurrent LVP after previous surgical restoration are particularly rare and literature data are limited to case-reports and small case-series [9-11]. The most common causes of LVP recurrence are infection, myocardial infarction in adjacent breakable areas and patch or suture dehiscence, as shown in our case.

Conclusions

Left ventricular pseudoaneurysm is a rare but life-threatening clinical condition. At emergency department, ventricular tachycardia may be the first and unique clinical presentation of LVP late recurrence, whose management requires a multimodality imaging approach to guide surgical correction.

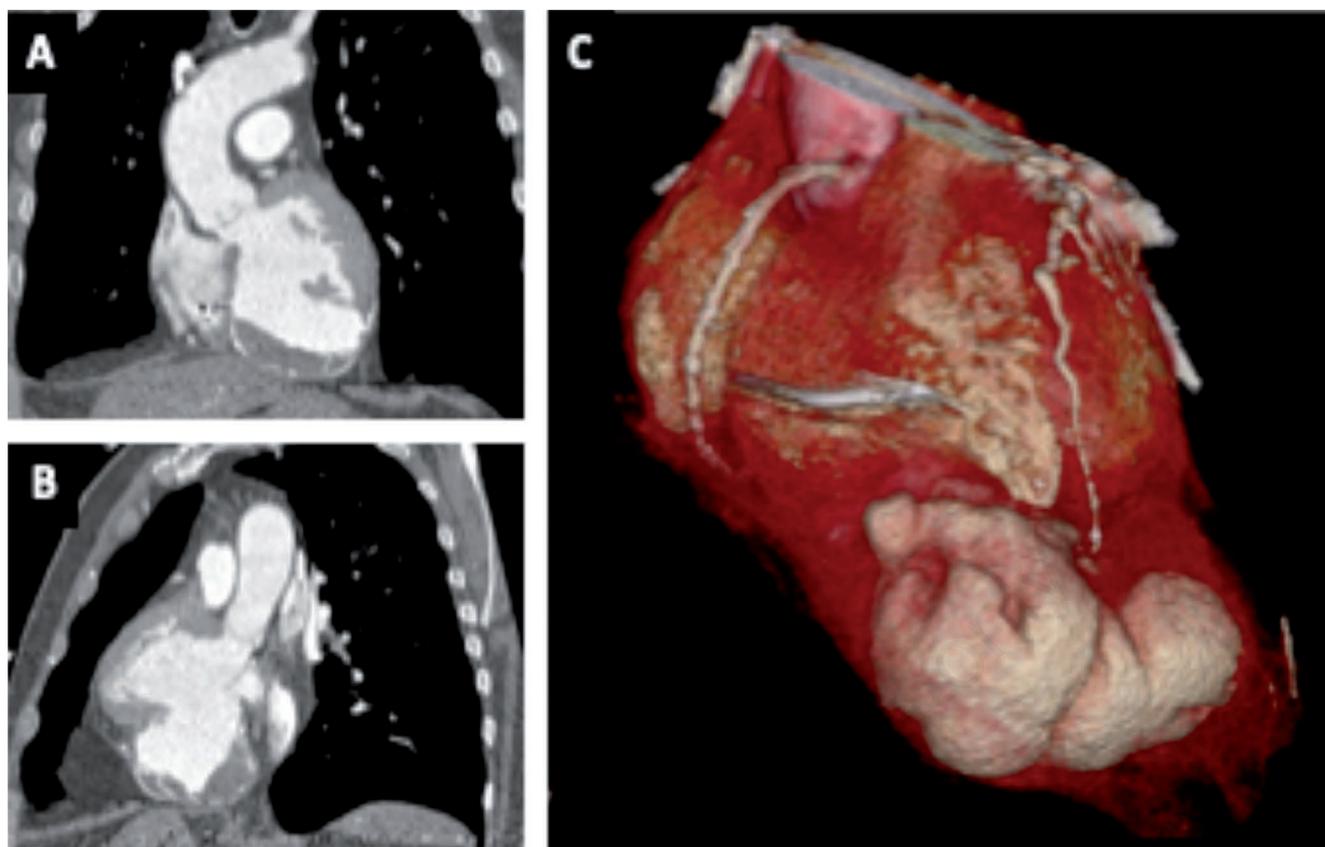


Figure 2. A,B) Volume-rendered cardiac computed tomography (CT) revealed a giant pseudoaneurysmatic lesion close to the mitral valve annulus with a thrombotic layer (asterisk). C) 3D CT reconstruction added information on the size and spatial orientation of the pseudoaneurysm.

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