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CASE REPORT

BEGINNER

CLINICAL CASE

Left Ventricular Pseudoaneurysm Complicated With Very Late Rupture 5 Years After Myocardial Infarction

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ABSTRACT

This is a case of a chronic left ventricular pseudoaneurysm after inferior myocardial infarction that remained clinically silent for 5 years before presenting with sudden rupture, leading to hemopericardium and cardiac tamponade. We discuss the importance of surveillance for left ventricular pseudoaneurysms, the limitations of echocardiography, and the critical role of computed tomography angiography imaging to establish the diagnosis and guide therapy. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2019;1:569–72) © 2019 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

A 54-year-old man presented to the emergency room with sudden onset, severe, tearing, retrosternal chest pain radiating to the back that started during sexual intercourse 20 min before arrival. On physical examination, he appeared distressed and diaphoretic with cold clammy peripheries. He was tachycardic with a regular heart rate of 110 beats/min and hypotensive with a blood pressure of 60/35 mm Hg with elevated jugular venous pressure and muffled distant heart sounds. There was no murmur nor any added sound on cardiac auscultation. The lungs were clear to auscultation bilaterally. A 12-lead electrocardiogram showed evidence of an old inferior myocardial infarction (MI) without acute ischemic changes. Bedside transthoracic echocardiography demonstrated a large pericardial effusion with evidence of diastolic collapse of the right ventricle, indicating cardiac tamponade. Because the patient was hemodynamically unstable, emergent pericardiocentesis was performed. Only a small amount of hemorrhagic fluid was aspirated, resulting in a significant improvement in blood pressure and mental status of the patient.

LEARNING OBJECTIVES

- Left ventricular pseudoaneurysm is associated with high mortality rates, and diagnosis can be challenging due to nonspecific symptoms. Routine echocardiographic follow-up should be the standard of care.
- Advanced noninvasive cardiovascular imaging with cardiac computed tomography angiography and magnetic resonance imaging are indispensable to further characterize the pseudoaneurysm size, location, extension, and anatomic relationship to surrounding structures.
- Surgical repair of left ventricular pseudoaneurysms is superior to conservative therapy and should be the first-line therapy.

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Informed consent was obtained for this case.

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ABBREVIATIONS AND ACRONYMS

CTA = computed tomography angiography

LV = left ventricular

MI = myocardial infarction

PAST MEDICAL HISTORY

The patient had a history of an inferior MI with late presentation 5 years ago that was treated with percutaneous coronary intervention to the right coronary artery. His echocardiogram at that time showed mildly depressed left ventricular (LV) systolic function with an ejection fraction of 50% and an akinetic basal to midinferior wall. There was no follow-up echocardiogram since then.

DIFFERENTIAL DIAGNOSIS

Hemorrhagic pericardial effusion can be acute or chronic. The differential diagnosis of acute effusion includes mechanical complications of MI (i.e., free LV wall rupture and pseudoaneurysm rupture), aortic dissection, chest wall trauma, and iatrogenic. Chronic hemorrhagic effusions can be related to infections (e.g., tuberculosis), malignancy, renal failure, and anticoagulation. Our patient presented with acute hemopericardium, and in the absence of trauma or recent percutaneous or surgical intervention, the most likely diagnosis was either a mechanical complication of MI or acute aortic dissection.

INVESTIGATIONS

In the context of hemodynamic stability after pericardiocentesis, the patient underwent computed tomography angiography (CTA) (**Figure 1**), which ruled out aortic dissection but showed the presence of a large basal inferior LV pseudoaneurysm (asterisk) in addition to a large hemorrhagic pericardial effusion (**Figures 1A and 1B**, arrows). Multiplanar reconstruction imaging showed the pseudoaneurysm, measuring 34 × 33 mm in its widest dimension (**Figure 1C**). A 3-dimensional-rendered image demonstrated the typical morphological appearance of a pseudoaneurysm and its anatomic relationship to the surrounding structures (**Figure 1D**).

MANAGEMENT

The patient underwent successful patch repair with bovine pericardium (**Figures 1E and 1F**).

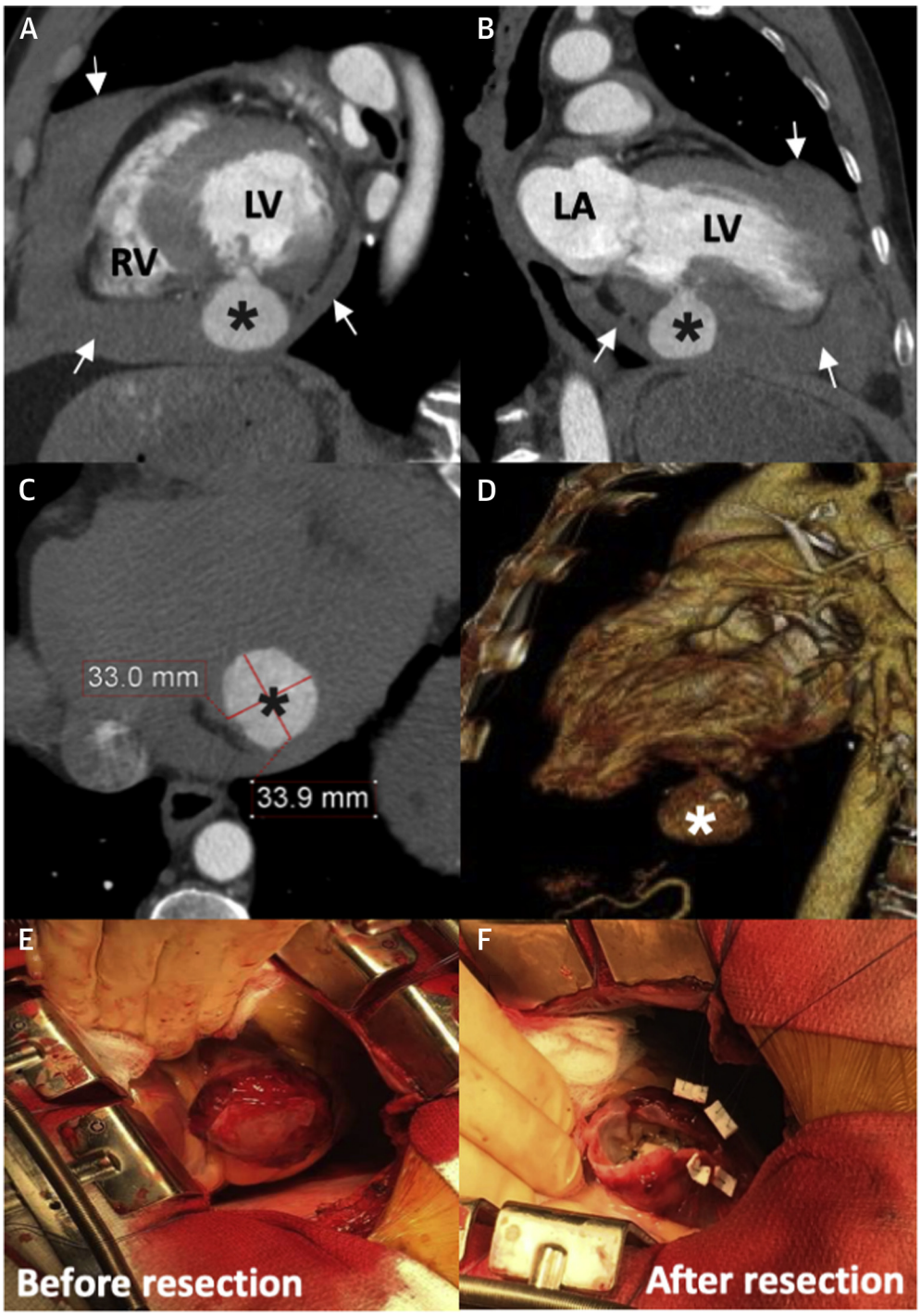
DISCUSSION

LV pseudoaneurysms form when free wall rupture is contained by adherent pericardium or scar tissue. Although LV pseudoaneurysm may occur after cardiac surgery, trauma, or infective endocarditis, the most common cause is MI. The incidence of LV pseudoaneurysm after MI is 0.2% to 0.3% (1). Although no robust data are available, the incidence has been decreasing in recent years because of advancements in medical therapy and revascularization (2). The most common location of LV pseudoaneurysm is the inferior or inferolateral walls. The major risk factors for the development of an LV pseudoaneurysm after MI include advanced age, female sex, hypertension, first transmural MI, lack of collateral circulation, late presentation of MI, and delayed or no revascularization (3). As in our case, cardiologists need to be vigilant and keep a low index of suspicion for short- or long-term mechanical complications of MI in patients with late presentation.

The mean interval between index MI and diagnosis of the pseudoaneurysm is 7 months (range between 1 and 11 months) (4). Although chronic LV pseudoaneurysms after MI have been previously reported (5), to the best of our knowledge, this is the first report of chronic LV pseudoaneurysm presenting with very late rupture after MI.

Diagnosis of LV pseudoaneurysm is usually challenging because symptoms might be nonspecific. Congestive heart failure, chest pain, and dyspnea are the most frequently reported symptoms, but >10% of patients are asymptomatic. Physical examination reveals a murmur in 70% of patients. The majority of patients have electrocardiographic abnormalities (usually nonspecific ST-segment changes), and only 20% of them have ST-segment elevation. In more than 50% of patients, the LV pseudoaneurysm may appear as a mass on a chest x-ray, which provides an important clue to diagnosis (6). Echocardiography is usually the first-line (but not the most sensitive) test to diagnose an LV pseudoaneurysm and rule out other important differential diagnoses. Morphologically, the pseudoaneurysm lacks myocardial tissue and communicates with the LV cavity through a narrow neck, with a diameter <50% of the maximum internal dimensions of the aneurysm, ragged edges, and turbulent bidirectional flow (3). Contrast and 3-dimensional echocardiography enhance the ability of echocardiography to diagnose LV pseudoaneurysms (7). A left ventriculogram has been historically recommended as a good tool for diagnosing LV pseudoaneurysms, but it is not widely used nowadays (8). Advanced noninvasive imaging modalities, including cardiac magnetic resonance, are indispensable in diagnosing LV pseudoaneurysms and distinguishing true aneurysms from pseudoaneurysms. Cardiac CTA can provide excellent and rapid visualization of the aneurysmal cavity and LV wall rupture at the point of care. In our case, CTA was the ideal test to diagnose the LV pseudoaneurysm given the patient's hemodynamic instability and concern for aortic dissection.

FIGURE 1 **Left Ventricular Pseudoaneurysm**



Left ventricular pseudoaneurysm **(*)** in **(A)** short and **(B)** longitudinal axis associated with a large hemorrhagic pericardial effusion **(white arrows)**. **(C)** The pseudoaneurysm measured 34 mm × 33 mm in its widest dimension. **(D)** A 3-dimensional-rendered image demonstrated the pseudoaneurysm with a typical narrow neck **(white asterisk)**. Perioperative pictures **(E)** before and **(F)** after resection of the pseudoaneurysm. LA = left atrium; LV = left ventricle; RV = right ventricle.

Untreated LV pseudoaneurysms are prone to rupture. The risk of rupture has been reported as high as 30% to 45%, although advances in imaging have increased the diagnosis of "incidental" pseudoaneurysms in asymptomatic patients, possibly reducing the risk for rupture (9). Surgery is the first-line treatment associated with significantly lower mortality compared with conservative therapy (23% vs. 48%). Recent advances in surgical techniques appear to further decrease the perioperative mortality to ≤10% (10).

FOLLOW-UP

The patient was discharged home in a stable condition. He was seen in the cardiology clinic in follow-up and has been doing well since then.

CONCLUSIONS

LV pseudoaneurysm is a rare but serious mechanical complication of MI that requires prompt diagnosis and treatment. We describe a case of LV pseudoaneurysm after MI, presenting with very late rupture leading to hemorrhagic pericardial effusion. Definite diagnosis was made by CTA, and the patient underwent successful surgical repair.

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