CASE REPORT

LEFT VENTRICULAR APICAL PSEUDOANEURYSM: A CASE REPORT INCIDENTAL DIAGNOSIS AND MANAGEMENT

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Abstract: Left ventricular pseudoaneurysm (LVPA) is a rare and life-threatening condition characterized by "an outpouching resulting from a rupture in the ventricular free wall." We present a case with a history of myocardial infarction and left ventricular (LV) apical thrombus who presented with worsening dyspnea. Echocardiography revealed LVPA with bidirectional flow, confirmed by cardiac CT. He underwent successful surgical repair of LVPA and coronary artery bypass grafting. LVPA is associated with significant morbidity and mortality, so early diagnosis is crucial. This case report highlights the successful management of LVPA, underscoring the importance of prompt diagnosis and multidisciplinary care.

Keywords: left ventricle pseudoaneurysm; myocardial infarction; echocardiography

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INTRODUCTION

Left ventricular pseudoaneurysm (LVPA) is a critical condition where "an outpouching forms due to a rupture in the ventricular free wall." This outpouching is confined by the attached pericardium or scar tissue, posing a significant risk of complications.[1] Left ventricular (LV) outpouchings are a group of congenital or acquired entities that can present as diverticula, aneurysms, and pseudoaneurysms. However, cardiac diverticula and aneurysms both contain all three layers of the cardiac wall and display synchronous contractility with the rest of the ventricle, unlike pseudoaneurysms.[2] LV pseudoaneurysm is a severe complication that can occur after myocardial infarction, inflammation, cardiac surgeries, trauma, or infection. Although, patients with left ventricular pseudoaneurysm can be completely asymptomatic. However, in many instances, patients can present with nonspecific symptoms that include dyspnea, chest pain, congestive heart failure, arrhythmia, and occasionally systemic embolism.[3] The Occurrence of LV pseudoaneurysm in patients with MI ranges from 0.2%-0.3%, specifically in elderly males with large infarcted territory.[4] Transthoracic echocardiography is generally used to establish the diagnosis, but it is confirmed by magnetic resonance imaging. Urgent surgical correction is the treatment of choice due to the risk of embolization and rupture of the aneurysm.[5]

This case report highlights the remarkable role of multimodality imaging and the success achieved in repairing a left ventricular apical pseudoaneurysm, an exceedingly rare yet potentially fatal condition. Despite the surgical challenges involved, the procedure demonstrated outstanding results, offering renewed hope for patients afflicted by this life-threatening disorder. The findings underscore the efficacy of repairing left ventricular pseudoaneurysms, emphasizing that with appropriate expertise and care, it is possible to achieve favorable outcomes in most cases

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45-year-old male, known diabetic with a 2-year history of anterior wall myocardial infarction that was not revascularized. He also had an LV apical thrombus with severe LV dysfunction, for which he was started on antiplatelet, ACE inhibitors, statins, diuretics, and beta blockers, after which the patient was lost to follow-up. Written consent was obtained from patients for the publication of this case report.

Currently, he presented with the complaint of worsening dyspnea from the past two weeks with no other symptoms. On arrival, his vitals included blood pressure of 100/84 mmHg, respiratory rate of 23 breaths/min, and pulse rate of 85 beats/min. ECG showed Q waves in lead II, III, and avf with ST elevation of 1 mm in v2 and v3 with inverted T waves (Figure 1).

Chest examination revealed bilateral fine crepitations, while cardiovascular examination revealed an additional to and fro murmur, and the rest of the examination was unremarkable. Laboratory workup showed mild troponin leak of 100-110 ng/L. Echocardiography was performed, which showed akinetic LV apex, anterior IVS, and anterior wall with

moderate LV systolic dysfunction with pseudoaneurysm of LV apex with bidirectional flow (Figure 2).

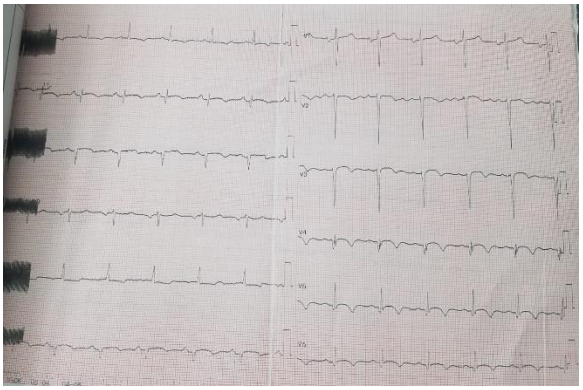

Figure 1: Baseline ECG Q waves in lead II, III, and avf with ST elevation of 1mm in v2 and v3 with inverted T waves

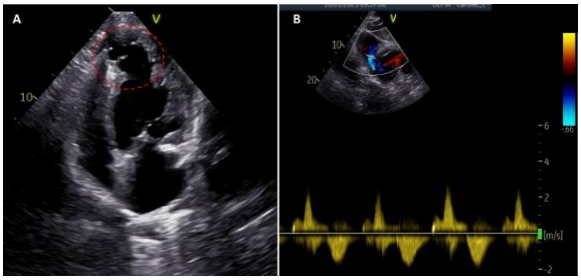

Figure 2: Apical four-chamber view showing pseudoaneurysm of LV apex (A) and color Doppler showing bidirectional flow across the pseudoaneurysm (B)

The patient was immediately admitted to the coronary care unit. Cardiac CT was performed that showed huge outpouching from the LV apex (neck 6.2 mm, mid cavity 70×86mm) with the irregular surface without wall calcification/thrombus; these findings were suggestive of pseudoaneurysm (Figure 3).

The cardiac thoracic surgery team was consulted and opted for a plan involving left heart catheterization and subsequent surgical repair of the pseudoaneurysm. However, the patient experienced an episode of acute pulmonary edema, unresponsive to noninvasive ventilation, necessitating intubation. After four days of intensive treatment optimization, the patient was successfully extubated. Subsequently, the patient encountered an infection caused by Methicillin-Resistant Staphylococcus Aureus (MRSA), which was effectively treated using vancomycin.

During the further hospital stay, CMR was also performed that showed rupture in the inferior wall of LV apex with the formation of two pseudoaneurysms largest one 57 ×99.8mm (thin-walled contained in pericardium) and a layer of small thrombus (Figure 4).

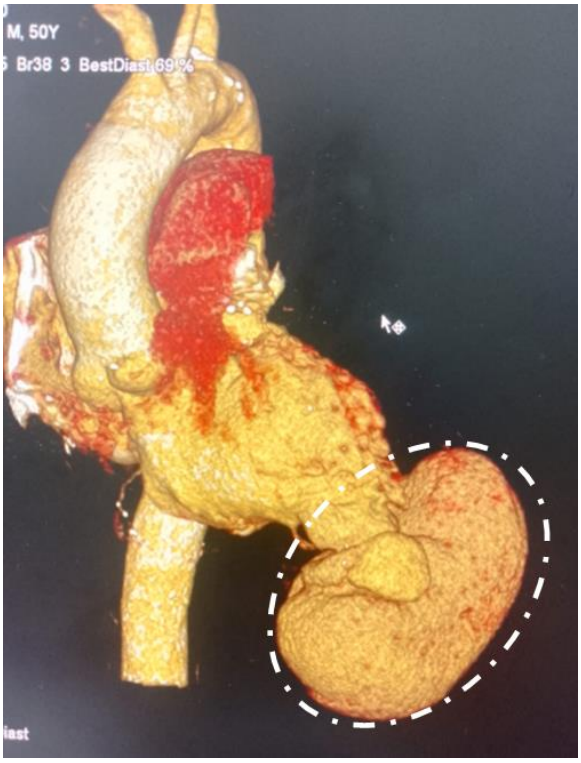

Figure 3: Showing Cardiac CT images demonstrating huge LV apex pseudoaneurysm

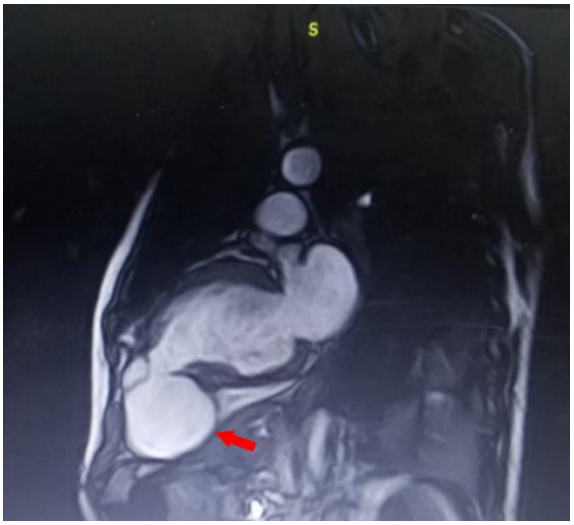

Figure 4: CMR demonstrating large LV apex pseudoaneurysm

His LHC showed 3VCAD. He underwent pump coronary artery bypass grafting (SVG to LAD and OM 1) and repair of pseudoaneurysm. Due to non-dominant RCA, no graft was placed for severe diseases in RCA. LV ruptured site closed with bovine

pericardial patch. IABP was also placed through the left femoral artery. A post-surgery echo revealed improved LVEF and an intact repair patch with no residual shunt.

Postoperatively, inotropic support was tapered off, and he was successfully extubated on the next day of surgery. IABP was also removed on the same day. The patient was discharged to home on the 5th postoperative day on Dual antiplatelets, statins, beta-blockers, ACE inhibitors, and aldosterone antagonists with lifestyle modification and follow-up in the clinic.

DISCUSSION

LV Pseudoaneurysms have contained ruptures. More than two-thirds of the LV pseudoaneurysm develop after Inferior and posterolateral MI.[6] That's why pseudoaneurysms are more frequently seen at the inferolateral and inferior walls, but rarely, they may form at the apical segment of the left ventricle.[7,8] Most LV pseudoaneurysms develop after cardiac surgery or myocardial infarction. In a study of 290 cases, 55% were after MI, 33% after surgery, and 7% after trauma.[1] Old age, female sex, hypertension, first transmural MI, lack of collateral circulation, delayed presentation of MI, and delayed or no revascularization can contribute to the development of LVPA.[9] Symptoms of LV pseudoaneurysm are the same as ischemic heart disease, like dyspnea and chest pain, which may lead to a delay in diagnosis. Physical examination reveals a new to-and-fro murmur, but many reports have suggested that murmurs may be distinct or absent. ECG findings are nonspecific, and cardiomegaly is the most common finding on chest X-rays.[10] Early diagnosis is essential in the management and prognosis of patients with LVPs. Transthoracic echocardiogram, cardiac computed tomography scan, and cardiac MRI are noninvasive modalities used for diagnosis

Mortality due to rupture of LVPA reaches up to 48% after medical treatment and 23% after surgical treatment. Therefore, pseudoaneurysms should be treated surgically.[11] Advancements in surgical technique may have reduced the perioperative mortality rate to ≤10%.[12]

In conclusion, this case report emphasizes the successful management through prompt diagnosis, multimodality imaging, and surgical intervention". Despite the multiple risks associated with LVPA, the patient's improved left ventricular function following coronary artery bypass grafting and repair of the rupture site highlights the potential for favorable outcomes in treating this life-threatening condition. However, these patients can have a tendency to lose follow-up; prioritizing patients to understand the severity of their condition and the importance of ongoing medical care can help mitigate the risk of missed appointments or lack of treatment adherence, ultimately improving long-term outcomes.

AUTHORS' CONTRIBUTION

SN, MN, PA, and SB: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be accountable for all aspects of the work. SN, MN, PA, and SB: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

Conflict of interest: Authors declared no conflict of interest.

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