Left ventricular pseudoaneurysm post myocardial infarction

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ABSTRACT

Left ventricular (LV) pseudoaneurysm is a rare and grave complication of acute myocardial infarction. If left undetected, it has an extremely high rate of mortality. It is complicated by a ventricular free wall rupture contained by the pericardium and is characterized by the absence of myocardial tissue in its wall. The clinical presentation of these patients is nonspecific, making the diagnosis challenging. We came across a case of LV pseudoaneurysm diagnosed by transthoracic echocardiography, but unfortunately, the patient passed away within a few hours of presentation in the emergency department. This case depicts the importance of prompt diagnosis and management of such deadly complication.

Key Words: Echocardiography, myocardial infarction, pseudoaneurysm

INTRODUCTION

Left ventricular aneurysms (LVAs) and pseudoaneurysms are two complications of myocardial infarction (MI) that can lead to serious morbidity or death. LVA is the discrete thinning of the ventricular wall (<5 mm) with akinetic or dyskinetic wall motion causing an outpouching of the ventricle which generally does not rupture after it forms.[1] A pseudoaneurysm is complicated by a ventricular free wall rupture that is contained by localized pericardial adhesions. LV pseudoaneurysm unlike a true aneurysm does not involve full thickness of the cardiac wall. The contained cavity is characterized by a narrow neck communicating freely to the left ventricle and has a tendency to expand and rupture. Given the inclination for pseudoaneurysms to rupture leading to cardiac tamponade, shock and death, accurate and prompt diagnosis of this condition is important.

CASE REPORT

A 55-year-old female was brought to emergency department (ED) with complaints of shortness of breath since the last 1 day, which was aggravated from the past few hours. She had no history of fever, chest pain, and cough with expectoration. On arrival to ED, the patient was in severe respiratory distress. She had a pulse rate of 60 beats/min; the blood pressure was not recordable, respiratory rate of 32/min, afebrile, and capillary blood glucose of 330 mg/dl. The airway was patent but threatened. Breathing was labored with crepts present bilaterally. Peripheral pulses were not felt, and the extremities were cool. Glasgow Coma Scale was 15/15 and pupils were 3 mm bilaterally, normally reacting to light. The patient was hypertensive and diabetic. She also had a history of coronary artery disease with acute posterior wall MI and LV dysfunction 2 months back. Percutaneous coronary intervention was performed at that time for the blocked left circumflex artery with a stent.

The patient was intubated and put on mechanical ventilator, intravenous fluids, and inotropes were started. Echocardiography (ECHO) was done which revealed large (6.3 cm/4.1 cm) pseudoaneurysm of the posterolateral wall [Figures 1 and 2] with LV ejection fraction of 30%. ECHO done 2 months back (during episode of acute MI) revealed no evidence of aneurysm. Cardiologist and cardiothoracic surgeon were informed, and the patient was planned to be taken up for urgent surgery but soon...
after the patient developed bradycardia followed by the cardiac arrest. Cardiopulmonary resuscitation was started as per advanced cardiovascular life support guidelines. The patient kept getting an intermittent return of spontaneous circulation but could not be resuscitated and eventually was declared dead within hours of presentation to the hospital.

**DISCUSSION**

LVAs forms as a result of a weakness of the wall that typically bulges outward during systole and has an outer layer that contains all layers of the myocardium or vessel wall. Such an entity calls for elective surgery. In contrast, pseudoaneurysms of LV are a result of rupture of the ventricular free wall but contained by the overlying adherent pericardium or scar tissue which typically has a narrow neck. Pseudoaneurysms are believed to have poor prognosis because of a high risk of rupture and hence warrants for urgent surgical repair.

Most of the LV pseudoaneurysms are considered to be a complication of MI followed by cardiac surgery, trauma, and infection. The propensity for inferior wall MI to cause LV pseudoaneurysm is in accordance with the location of pseudoaneurysm on lateral, posterior, inferior or apical surface of LV and least on anterior surface. Only about 4% of LV true aneurysm is located at diaphragmatic/posterior-lateral surface.

Patients can present with atypical complaints such as altered mental status, dizziness, and cough which decrease the suspicion of the disease. The suspicion of LV pseudoaneurysm can be complicated as most commonly reported symptoms are dyspnea, chest pain, and signs of heart failure which are similar to that of coronary artery disease. Even though the classical finding on physical examination is new to-and-fro murmur, many reports have suggested that murmurs may be distinct or absent. ECG changes are nonspecific and most commonly seen finding on chest X-ray is cardiomegaly.

Using the two-dimensional ECHO and more recently three-dimensional ECHO, the vascularity of a suspected pseudoaneurysm by detecting to-and-fro Doppler flow can be assessed. Transesophageal ECHO may allow improved detection of ventricular pseudoaneurysms diagnosed by left ventriculography. Tissue characterization by cardiac magnetic resonance imaging (MRI) makes it ideal for the evaluation of pseudoaneurysm and for distinguishing true aneurysms from pseudoaneurysm. Cardiac computed tomography, being more available than cardiac MRI provides an excellent visualization of the LV myocardium, coronary arteries, and bypass grafts but involves radiation and requires the use of intravenous dye exposure. Angiography of LV and coronaries has been historically recommended as a good tool for diagnosing LV pseudoaneurysm. Specific angiography findings that differ from a false aneurysm include lack of surrounding coronaries and saccular aneurysm formed by a narrow orifice.

Most LV pseudoaneurysms have a predisposition to spontaneous rupture which can occur from 10 days to 4-month post-MI. Recent literature states that surgical repair is associated with 25% mortality in comparison to 48% mortality after medical management. Primary repair or patch closure is usually performed for LV pseudoaneurysm, but the team must be prepared for emergency cardiopulmonary bypass in the case of sudden rupture. Covered stents have been used to occlude aneurysm and pseudoaneurysm in coronary arteries and vein grafts. Furthermore, there are reports of successful interventional percutaneous techniques of implanting septal occluder devices in atria and ventricles.
CONCLUSION

Among all the mechanical complications of acute MI, LV pseudoaneurysm is rare and probably the hardest to diagnose (“hidden time-bomb”), so one should be vigilant to look out for mechanical complications in patients presenting with delayed MI, especially, when there is a sudden change in the hemodynamic status. Advances in noninvasive imaging have improved the ability to distinguish cardiac pseudoaneurysms from other pathologies. Most pseudoaneurysms, particularly if acute or associated with symptoms, require surgical repair to reduce the risk of rupture.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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