A Case of Left Atrial Dissection after Mitral Valve Replacement

Abstract

Left atrial dissection (LatD) is a rare complication of cardiac surgery due to creation of a false chamber through a tear in the mitral valve annulus that extends into the left atrium wall. It is primarily associated with mitral valve surgery although other etiologies have also been defined. Perioperative transesophageal echocardiography (TEE) is a key to the diagnosis. This is a case report of management of LatD after mitral valve replacement.

Keywords: Left atrial dissection, mitral valve surgery, transesophageal echocardiography

Introduction

Left atrial dissection (LatD), defined as the forced separation of layers of the left atrial wall by blood, is a rare complication of cardiac surgery. It is primarily associated with mitral valve (MV) surgery although other etiologies have also been defined. Perioperative transesophageal echocardiography (TEE) is a key to the diagnosis. We present a case of LatD after MV surgery.

Case Report

A 54-year-old female, a known case of rheumatic heart disease with severe mitral stenosis, MV area was 0.9 cm², and moderate mitral regurgitation, was admitted to our hospital. The MV and subvalvular apparatus were calcified and there was moderate pulmonary arterial hypertension. Bilateral ventricular functions were within normal limits. She was posted for MV replacement (MVR) and informed consent was obtained. Her preoperative hematological investigations were within normal limits. General anesthesia was induced with standard medications and cardiopulmonary bypass (CPB) was established.

She underwent MVR with bioprosthetic valve 25 mm (EPIC, St. Jude Medical). Immediate post-CPB TEE showed normal functioning prosthetic valve and Doppler also revealed normal pressure gradients across the valve [Figure 1]. Her

intraoperative period was uneventful and shifted to postoperative Intensive Care Unit (ICU) with minimal doses of inotropes. Postoperative day (POD) 0 was uneventful; however, on POD 1, she developed hypotension (arterial pressure 84/50 mmHg) that required increasing doses of inotropic support. Her central venous pressure was 20 mmHg and pulmonary artery pressure was 60/38 mmHg. Arterial blood gases also revealed metabolic acidosis. Due to her hemodynamic status, she could not be weaned off the mechanical ventilation.

TEE was done to rule out cardiac tamponade and to evaluate the prosthetic MV function. It revealed a large cavitary mass occupying the whole of left atrium (LA) which was obliterating the movement of MV leaflets [Figure 2 and Video 1]. Continuous wave Doppler (CWD) showed pressure gradient (peak/mean) of 19/10 mmHg across MV [Figure 3]. However, bilateral ventricular functions were within normal limits.

Owing to her deteriorating hemodynamic condition, she was immediately shifted to the operating room. Chest was reopened and CPB was established. Opening of LA revealed dissection of the LA wall extending from the posterior annulus of the MV to the roof of LA. Clots were removed from the LA; however, the cavity again filled up. Therefore, it was decided to do the "marsupialization" for clearing of the cavity [Figure 4 and Video 2]. The bioprosthetic valve was also examined and was found to be normal. CWD also

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Figure 1: Color flow Doppler showing normal functioning prosthetic mitral valve

Figure 2: Midesophageal long-axis view showing cavitory mass in left atrium

Figure 3: Color flow Doppler showing gradient across the prosthetic mitral valve

Figure 4: ME four-chamber view showing "marsupialization" of the cavity

revealed normal gradient across prosthetic MV [Figure 5]. The patient was weaned off the CPB with low dose of inotropes. She was mechanically ventilated for 24 h and inotropes were gradually weaned off. She had longer stay in the ICU; otherwise her postoperative period was uneventful.

Discussion

LatD is a rare complication of cardiac surgery due to creation of a false chamber through a tear in the MV annulus that extends into the LA wall. Its incidence is 0.16% after cardiac surgery of which 56% are reported after MV surgery.^[1] It is reported after aortic valve replacement, coronary artery bypass grafting, blunt trauma, cardiac amyloidosis, and spontaneous etiology also.^[1] It has also been reported after percutaneous procedures such as coronary angiography, transcatheter aortic valve replacement, balloon mitral valvotomy, and radiofrequency ablation.^[2-5]

Primarily, it occurs due to aggressive debridement of the posterior annulus or subvalvular apparatus, oversizing

of the prosthesis, or inappropriate suturing or traction applied on the annulus. Moreover, inadequate reversal of anticoagulation may also cause LatD. In 80% of patients, it is located in the posterior wall of the LA as there is no fibrous tissue attachment of the posterior leaflet to the annulus and also in the atrioventricular groove which is also vulnerable to overdilation and forceful manipulation.^[1]

Clinical presentation varies from asymptomatic to serious hemodynamic deterioration. The presentation may be early (<24 h), delayed, or late (>12 years).^[1] Main cause of hemodynamic instability is low cardiac output syndrome due to obstruction of MV inflow or pulmonary vein orifice. This patient also presented with hemodynamic instability during immediate postoperative period. The differential diagnosis is left atrial mass or cardiac tamponade which can be excluded by TEE. TEE is the diagnostic modality of choice as it will help in detection of the tear and cause of hemodynamic instability.^[6-8] Moreover, it has been observed that increase in routine use of TEE in the perioperative period led to increase detection of the LatD cases.

Management of these patients depends on their clinical presentation. Prompt diagnosis is the key to treatment.

Figure 5: Color flow Doppler showing gradient across the prosthetic mitral valve after intervention

Patients with hemodynamic instability require urgent surgical intervention while hemodynamically stable patients can be managed with conservative treatment. In the literature also, surgical treatment has been used in majority (73.4%) of patients.^[1,9] Surgical management includes evacuation of the hematoma, identification of entry point, and obliteration of the false lumen with the use of BioGlue adhesive and a bovine pericardial/synthetic patch. Sometimes, explanation of the prosthesis and reimplantation with careful sizing of the valve is to be done. In this patient, immediate surgical management was done with evacuation of the hematoma and “marsupialization” of the cavity formed in LA.

In conclusion, LatD is a rare complication of cardiac surgery primarily after MV surgery. TEE is the diagnostic modality of choice and should be promptly used. Early surgical intervention should be done in hemodynamically

unstable patients while conservative approach is reasonable in stable patients.

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Conflicts of interest

There are no conflicts of interest.

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