

Role of transesophageal echocardiography: A rare case of acute left atrial free wall dissection

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ABSTRACT

Transesophageal echocardiography (TEE) has been used routinely in the diagnosis and follow-up of cardiac cases. Left atrial dissection (LAd), an exceedingly rare complication of cardiac surgery, is most commonly associated with mitral valve surgery. A case of LAd is presented, and the pathology was accurately defined and immediately diagnosed using intraoperative TEE. This case highlights the importance of prompt diagnosis of LAd using intraoperative TEE, and a second cardiac surgery was avoided.

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INTRODUCTION

Left atrial dissection (LAd) is an exceedingly rare complication of mitral valve surgery. To the best of our knowledge, it has not heretofore been reported after mitral valve surgery. The most common cause is mitral annular disruption that extends into the left atrial free wall and then into a low-pressure chamber the left atrium (LA)—via fistulation. We report the development and successful management of an LAd that followed mitral valve replacement with the help of TEE and thus avoiding second surgery.

CASE REPORT

A 55-year-old man presented with rheumatic heart disease, severe mitral regurgitation, moderate pulmonary arterial hypertension, and good biventricular function. He was scheduled for mitral valve replacement (MVR). After applying standard monitors and preoxygenation, general anesthesia was induced with 2 mg of midazolam, 50 mg of propofol, 200 µg of fentanyl, 60 mg of lidocaine, and 8 mg of vecuronium. Anesthesia was maintained with oxygen: Air, 1% isoflurane, and intermittent doses of fentanyl. The trachea was intubated with an 8.5-mm single-lumen tracheal tube. A right femoral arterial catheter was placed for continuous blood pressure monitoring.

MVR with 29 mm St. Jude mechanical prosthetic valve with posterior mitral leaflet preservation was performed through transeptal approach on conventional cardiopulmonary bypass (CPB) and cold blood cardioplegia. The patient was weaned off CPB with the optimal inotropic support of 5 µg/kg/min of dopamine and 5 µg/kg/min dobutamine. But, the pressures were on borderline around 80/38 mmHg, and right ventricle appears to be distending with poor myocardial contractions. So, we decided to put transesophageal echocardiography (TEE) probe to see for any abnormality. To our surprise, we saw a circular hypoechoic mass in the left atrial (LA) free wall encroaching onto the mitral valve [Figure 1]. This finding was discussed with the surgeon, who decided to re-explore the LA. LA

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atriotomy was reopened, the mitral valve appeared to be well seated, and there was no evidence of dissection. Only the LA free wall appeared to have subendocardial blood collection. There were no continuities between the cavity and the LA, left ventricle, posterior pericardial space. Marsupialization of the cavity is done and opened it to the LA cavity [Figure 2].

The patient was then weaned from CPB for the 2nd time with inotropic support of 0.375 µg/kg/min of milrinone, 5 µg/kg/min of dopamine, 5 µg/kg/min dobutamine, and 0.05 µg/kg/min of nor epinephrine. The post-bypass TEE examination showed that LA dissection (LAd) wall appeared to be incised in the middle and drained out the blood.

The patient's postoperative course was complicated by intermittent periods of desaturation which required bi-level airway pressure ventilation with which he showed improvement in oxygenation. The patient was discharged from the hospital 15 days after surgery.

DISCUSSION

LAd is a rare complication of cardiac surgery. It has been defined as a false, blood-filled cavity, or lumen from the mitral annular area to the left atrial free wall or interatrial septum, creating a new chamber with or without communications into the true left atrium. The incidence has been reported to be 0.16% to as high as 0.84% of patients after MVR.^[1]

Severe calcification of the mitral annulus may be contributory.^[2] Besides from mitral procedures,

aortic valve replacement^[3] due to disruption of the noncoronary annulus in the region of aortic/mitral valve continuity, coronary artery bypass grafting,^[4] left ventricular aneurysmectomy,^[5] pulmonary vein cannulation,^[6] and cardiac mass excision,^[7] maze procedure have been associated with LAd. Partial atrioventricular (AV) separation and tissue fragility are the probable pathogenesis of LAd associated with mitral valve procedures,^[4] although nonmitral cardiac surgeries quite remote from the AV junction can cause a LAd because of the creation of a small entry tear in the left atrial endocardium. The noncardiac surgical etiologies include myocardial infarction,^[8] percutaneous coronary intervention,^[9] radiofrequency ablation (RFA),^[10] and blunt cardiac trauma.

The time of presentation has been reported to range from 1-day to 20 years.^[9] The dissection forms a large cavity causing obliteration of the LA cavity and resultant hemodynamic compromise, which almost always requires immediate surgical intervention. Almost all of the reported LAd cases have continuity between the dissected cavity and the left ventricle which is one of the reasons that LAd is closely associated with left ventricular rupture and may represent a form of type I left ventricular rupture (Treasure's classification).^[9] In the present case, however, there was no continuity between the false cavity and the heart chambers. To the best of our knowledge, such a presentation of LAd has not been published previously.

The mechanisms include: (1) Excessive traction on the sutures in the posterior annulus resulting in tearing

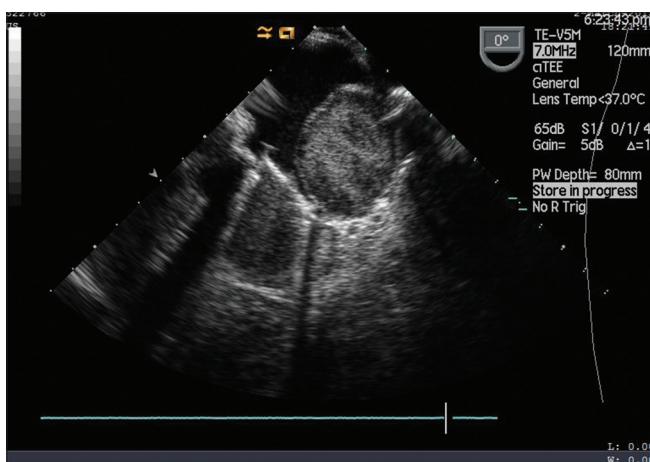


Figure 1: Midesophageal four-chambered view showing postmitral valve replacement left atrial free wall dissection (an echolucent area from the mitral annular area to the left atrial free wall, creating a new chamber without communications into the true left atrium)

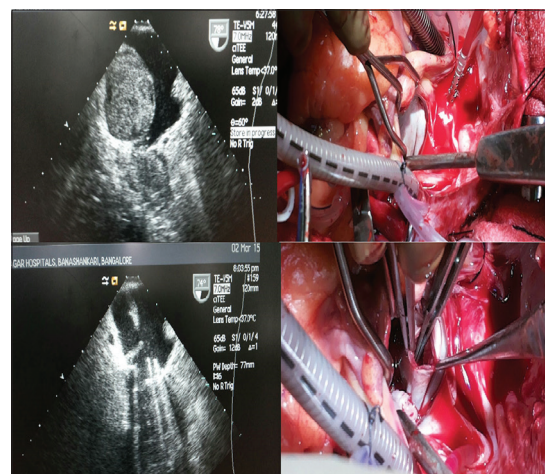


Figure 2: Transesophageal echocardiography images and corresponding surgical operating images showing left atrial dissection and its marsupialization and opening into left atrial cavity

through tissues and disruption,^[7] (2) debridement of a very calcified valve, (3) oversizing of the prosthesis, and (4) inadequate reversal of anticoagulation may exacerbate the dissection. The close proximity of the circumflex artery and coronary sinus to the posterior wall of the left atrium, AV groove and mitral annulus is another important factor for the development of LAD during coronary artery bypass grafting surgeries.^[11]

Although there are no definitive diagnostic criteria, the TEE findings can be vital, which include: (1) A gap from the mitral annular area to the LA wall or atrial septum, (2) the false chamber appears as an echolucent area causing or not causing partial obliteration of the atrial cavity, (3) mitral and tricuspid regurgitation, (4) mitral valve periprosthetic leak, and (5) pulmonary venous obstruction.^[4]

In this case, the patient developed LAD at the time of surgery, and TEE provided an immediate diagnosis. After discussing the findings with the surgeon, he made a prompt decision to re-explore and repaired the dissection based on the intraoperative TEE findings; the patient avoided a second operation.

CONCLUSION

In summary, the authors think that TEE is the best technique for the diagnosis of LAD based on published studies. The use of intraoperative TEE can provide an earlier diagnosis that can lead to earlier intervention and the avoidance of a second cardiac operation. Interestingly, this complication has also been reported after percutaneous mitral balloon valvuloplasty for mitral valve stenosis.

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Conflicts of interest

There are no conflicts of interest.

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