Large Incidental Intracardiac Thrombus in a Patient with Ischemic Heart Disease

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INTRODUCTION

Rheumatic heart disease contributes to significant cardiovascular morbidity and mortality and remains a predominant cause of cardiac morbidity in developing nations. Coronary angiography is indicated as a routine procedure in the preoperative assessment of patients with valvular heart disease, who are older than 40 years age. Though transthoracic echocardiography (TTE) is routinely done preoperative in every patient, transesophageal echocardiography (TEE) is an important imaging modality especially for the identification of thrombus. The diagnosis of associated left atrial thrombus changes the approach to the surgery, regardless of the symptoms.

Rheumatic mitral valve disease contributes to significant cardiovascular morbidity and mortality worldwide. It is the predominant cause of cardiac morbidity in developing nations. This case demonstrates incidental finding of large left atrial thrombus, diagnosed incidentally through transesophageal echocardiography in a patient who was previously diagnosed as a case of severe mitral stenosis with coronary artery disease.

PRESENTATION OF CASE

Herein we report a case of a 64-year-old woman who presented to the out-patient clinic with shortness of breath, aggravated on mild exertion (NYHA class III) worsening over the past six months and palpitations occurring with increasing severity for 2 months. On examination, her pulse was irregularly irregular with the rate of 100 beats / min and blood pressure was 138 / 90 mmHg. On auscultation, a loud S1 mid-diastolic murmur in the apical area was heard. She had no neurological deficit and reported no comorbidities.

She underwent routine preoperative blood work. Imaging studies showed cardiomegaly with left atrial enlargement and pulmonary congestion. Electrocardiogram showed that the patient had atrial fibrillation with fast rate ventricular response. Preoperative transthoracic echocardiographic examination revealed severe mitral stenosis (mitral valve area 0.8 cm^2, peak pressure gradient 28 mmHg, mean pressure gradient 16mmHg), enlarged left atrium with spontaneous echo contrast, right ventricular systolic pressure (RVSP) was 50 mmHg + RA pressure. Her TTE also showed mild anterior and anterolateral hypokinesia with ejection fraction: 50-55 %, right ventricular hypertrophy with moderate tricuspid regurgitation. No thrombus was seen on preoperative TTE.

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A routine coronary angiography was performed as a departmental policy for all patient over 40 years of age. It revealed double vessel coronary disease with 80 % - 90 % stenosis of the left anterior descending artery in the proximal segment and 80 % stenosis of the left circumflex artery (LCX) in the proximal segment. Bilateral carotid and iliofemoral doppler were normal. Subsequently, the patient was scheduled for elective mitral valve replacement with coronary artery bypass grafting.

DISCUSSION OF MANAGEMENT

Patient was taken up for surgery after obtaining a valid written informed consent. Premedication with β-blocker (inj. atenolol, 0.5 mg / kg) was done to ensure adequate heart rate control. A pulse oximeter and precordial five-lead electrocardiograph were attached. A radial arterial catheter was inserted for invasive blood pressure (BP) monitoring. Patient was pre-oxygenated with 100 % oxygen, anesthesia was induced with titrated doses of fentanyl 4 µg / kg, etomidate 0.3mg / kg, and sevoflurane. Injection vecuronium was administered to facilitate endotracheal intubation with a 7.0 mm cuffed oral endotracheal tube. Central venous access was secured by inserting a line through right internal jugular vein (IJV). Mechanical ventilation with a tidal volume (5-6 mL / kg) was started and titrated. Anesthesia was maintained with fentanyl, midazolam, vecuronium and isoflurane 0.5 - 1 % in oxygen. Intraoperative monitoring included end-tidal carbon dioxide, central venous pressure, arterial blood gases (ABG), nasopharyngeal temperature, urine output, serum electrolytes, blood glucose, activated coagulation time (ACT) and bispectral index (BIS).

Intraoperative transesophageal echocardiography was performed. It revealed a massively dilated LA (6.4 x 7.2 x 8.7 cm) in diameter. It also unexpectedly revealed a large thrombus measuring 5.3 cm x 3.9 cm, adjacent to the roof of the left atrium and the septum and completely filling the left atrial appendage (LAA) and the LA cavity.

After an uneventful sternotomy, pericardectomy was done and the heart was assessed. Patient had cardiomegaly with enlarged left atrium and regional wall motion abnormalities in the antero-lateral region. Left internal mammary artery was harvested. Patient was cannulated and cardiopulmonary bypass was initiated. After cross clamping the aorta, the heart was arrested in diastole. The finding of the large LA thrombus was confirmed surgically after opening the left atrium. The thrombus was removed and the LAA was excluded internally. Then the distal anastomosis of obtuse marginal coronary artery was performed with reversed saphenous vein graft. Mitral valve was replaced with size #29mm SJM masters mechanical mitral valve prosthesis. After completion of the mitral valve replacement and distal anastomosis of left internal mammary to LAD, the cross clamp was released. The heart began beating spontaneously. After completing the proximal graft anastomosis and adequate deairing, the patient was subsequently weaned off from cardiopulmonary bypass (CPB). Inotropic infusion of inj. Dobutamine 5 ug / kg / min, inj. Noradrenaline 0.05 µg / kg / min and inj. Nitroglycerin 0.5 ug / kg / min.

Post CPB, TEE examination confirmed no residual thrombus in LA and pressure gradient across the replaced valve was 2 mm Hg with no paravalvular leak. Aortic cross clamp and CPB time were recorded as 71 min and 110 min respectively. After chest closure, patient was transferred to the intensive care unit with endotracheal tube in situ.

Patient was mechanically ventilated overnight and extubated on post operatively day 1. Inotropes were weaned off on postoperative day 2. Hemodynamic and other vital parameters were maintained thereafter throughout post-surgical recovery period. She had an uneventful course with no neurological deficit and asymptomatic on follow-up.

Figure 1. Patient on Cardiopulmonary Bypass with Bicaval Cannulation. Large Thrombus is Visible on Opening the Left Atrium

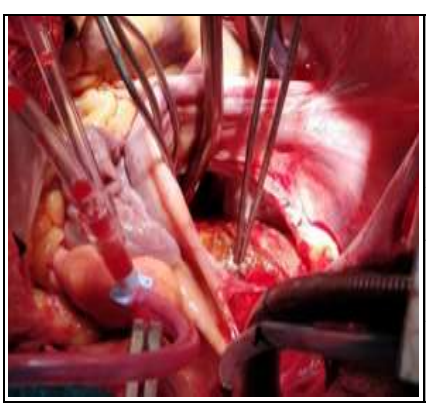

Figure 2. Organised Thrombus is Visible, Attached to the Left Atrial Wall which was Peeled Off

Figure 3. Removed Organised Thrombus from the left Atrium and the left Atrial Appendage

DISCUSSION

Severe mitral stenosis of rheumatic origin, is often associated with thrombus formation in the left atrium (LA). Risk factors for thrombus formation are multifold; atrial

arrhythmias, elderly age group, enlarged LA (> 5 cm) and low cardiac output state.[1] However, no LA thrombus was appreciated during preoperative transthoracic echocardiography in our case, most likely due to poor acoustic windows.

Though it was an incidental finding on TEE, it resulted in alteration of the surgical strategy and also made intraoperative and postoperative management more challenging with potentially higher risk of embolic complications. A study by Fazlinezhad et al. demonstrated that intraoperative TEE showed new pathological findings in 13 % of patients undergoing coronary artery bypass graft (CABG) surgery, changing the surgical approach in 5 – 6 % of these cases.[2] For perioperative monitoring, TEE has become a vital monitoring and diagnostic tool.[3] TEE is a sensitive diagnostic modality to detect LA thrombus, particularly in the LAA.[4]

Medical treatment in patients with valvular heart disease involve heart rate and rhythm control, diuretics, optimum anticoagulation to prevent thromboembolism, adequate prophylaxis against rheumatic carditis and infective endocarditis.[5] Surgical treatment is gold standard and involves mitral valve replacement with removal of thrombi and exclusion of the left atrial appendage to prevent further thrombus formation.

Anaesthetic management of such a case is challenging due to risks of embolization during induction of anesthesia and surgery. Hence, management is focused on controlling the rate, managing the ventricular preload especially in cases of diminished right ventricle (RV) and left ventricle (LV) contractile function and managing the coexisting pulmonary hypertension. Preventive measures to avoid increase in pulmonary arterial (PA) pressures should be taken. Normovolemia should maintained and fluid should be judiciously administered. Unchecked transfusion may precipitate pulmonary oedema suddenly in a patient with an elevated chronic pulmonary hypertensive vasculature.[6] Hence, maintaining optimal hemodynamic goals along with smooth extubation of these patients with a pain-free post-operative period helps in uneventful recovery.

It is not uncommon in patients with valvular heart disease to have concomitant coronary artery disease especially in patients above the age of 40 years. Hence, routine coronary angiography must be part of the preoperative investigation.

Use of TEE is important for excluding the presence of thrombus in the LAA before the starting of the surgery. This is because, manipulation of the LAA may result in embolization of the contents of the LAA.[7] Embolization of thrombus can result in stroke, resulting in neurological deficit or death. Embolization is not only restricted to the brain, it can occur to other vital organs too, like the kidney, spleen, mesenteric vessel, and the lower extremities.[8-10]

CONCLUSION

Thorough screening of cardiac patients is of paramount importance with modalities such as angiography, TEE for aiding confirmation of diagnosis whenever required to improved clinical outcomes reducing post-surgical morbidity and mortality.

The patient successfully underwent prosthetic valve replacement and grafts to the left anterior descending coronary artery and the obtuse marginal coronary artery, and had a good recovery after surgery with no neurological deficit. TEE plays a major role in adding to the diagnosis. Utmost caution should be exercised while managing a patient with a large intracardiac thrombus to prevent embolization.

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