

Left ventricular mass: A tumor or a thrombus diagnostic dilemma

U. S. Dinesh Kumar, Shyam Prasad Shetty¹, K. R. Sujay¹, Murugesh Wali

Departments of Cardiac Thoracic and Vascular Anesthesia and ¹Cardio Vascular and Thoracic Surgery, JSS Super Speciality Hospital and Medical College, Mysore, Karnataka, India

ABSTRACT

Left ventricular (LV) mass is a rare condition, of which the most common is thrombus. Echocardiography is a very useful modality of investigation to evaluate the LV mass. We are reporting a case of LV mass presenting with neurological symptom. The diagnosis of this mass was dilemma as the echocardiographic features were favoring tumor as well as thrombi. Mass (a) measuring 3.8 cm × 1.9 cm attached to the left ventricle apex appeared to be pedunculated tumor and mass (b) measuring 2.4 cm × 1.8 cm attached to the chordae of anterior mitral leaflet resembled a thrombus or an embolized tumor entangled in the chordae. A differential diagnosis for the LV mass is thrombus, tumors such as fibroma, and vegetation. Preoperative detection of a thrombus leads to an alteration in surgical steps. A large and mobile thrombus with or without a hemodynamic alteration is an indication for surgical removal to prevent stroke, myocardial infarction, mesenteric ischemia, renal infarction, gangrene of the limbs, and mortality.

Received: 25-01-16
Accepted: 18-07-16

Key words: Left ventricle; Thrombus; Tumor; Vegetation

INTRODUCTION

Left ventricular mass is a rare condition, of which the most common being thrombus. Echocardiography is a very useful modality of investigation to evaluate a left ventricular mass. We are reporting a case of left ventricular mass presenting with neurological symptom.

CASE REPORT

A 44-year-old male patient presented with weakness of the left upper limb which improved over 24 h. There was no history of weakness of other limbs, speech disturbance, seizures, or loss of consciousness. No history of any other comorbid illness. Three months back, he gave a history of similar left hand weakness which had improved spontaneously. He has been a chronic smoker for last 15 years. No history of drug abuse. On examination, pulse rate - 88/min; blood pressure - 114/70 mm of Hg; cardiovascular system - S1 and S2 well-heard, and no murmur; central nervous system - no focal neurological deficit; electrocardiogram (ECG) T-wave inversion with downward ST sloping in V1–V4 suggestive of old anterolateral

myocardial infarction (MI); two-dimensional echo - ejection fraction - 50%, apical septum and apex hypokinetic. Left ventricular (LV) mass one attached to the apex and another in the LV outflow tract (LVOT) were seen. Computed tomography brain revealed acute on chronic infarct in the temporal lobe. Ultrasonography abdomen was normal. Carotid Doppler was normal bilaterally. The rest of the routine investigations were within normal limit. Tumor markers such as carcinoembryonic antigen and others were negative. In view of transient ischemic attacks (TIAs) and free-floating LV mass, it was decided

Address for correspondence: Dr. U. S. Dinesh Kumar, Department of Cardiac Thoracic and Vascular Anesthesia, JSS Super Speciality Hospital, Mysore - 570 028, Karnataka, India.
E-mail: drdinu80@gmail.com

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

Cite this article as: Dinesh Kumar US, Shetty SP, Sujay KR, Wali M. Left ventricular mass: A tumor or a thrombus diagnostic dilemma. *Ann Card Anaesth* 2016;19:728-32.

Videos Available on: www.annals.in
Access this article online Website: www.annals.in
DOI: 10.4103/0971-9784.191551
Quick Response Code: 

to excise the mass to prevent any catastrophic stroke. Intraoperative transesophageal echocardiography (TEE) Midesophageal four-chamber view showed two LV mass (a) measuring 3.8 cm × 1.9 cm attached to the left ventricle apex resembled a pedunculated tumor and (b) measuring 2.4 cm × 1.8 cm attached to the chordae of anterior mitral leaflet (AML) resembled a thrombus or an embolized tumor entangled between the chordae of the mitral valve. Both of them were homogenous, noncalcified, noncavitated, mobile; echodensity was similar to the myocardium. Apex was hypokinetic [Figure 1 and Video 1]. Midesophageal aortic valve long-axis view showed the mass attached to the AML was moving into the LVOT and obstructing the aortic valve [Figure 2 and Video 2]. The Continuous wave Doppler across the LVOT peak gradient - 7.5 mm of Hg and mean gradient - 3 mm of Hg showed there was no obstruction of the aortic valve [Figure 3].

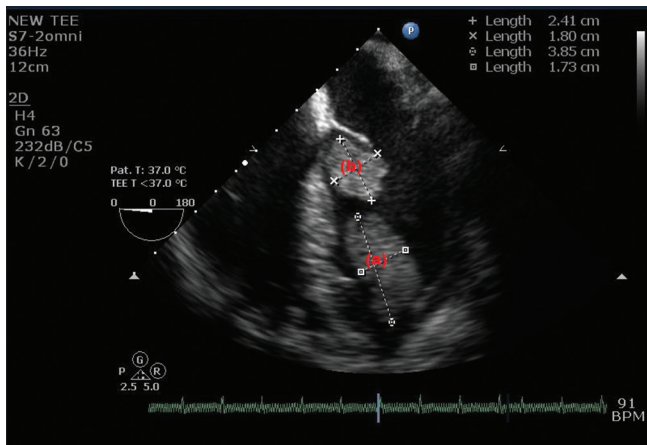


Figure 1: Midesophageal four-chamber view showing homogenous, echodense, noncalcified, noncavitated mass (a) 2.4 cm × 1.8 cm and (b) 3.8 cm × 1.7 cm in the left ventricular cavity

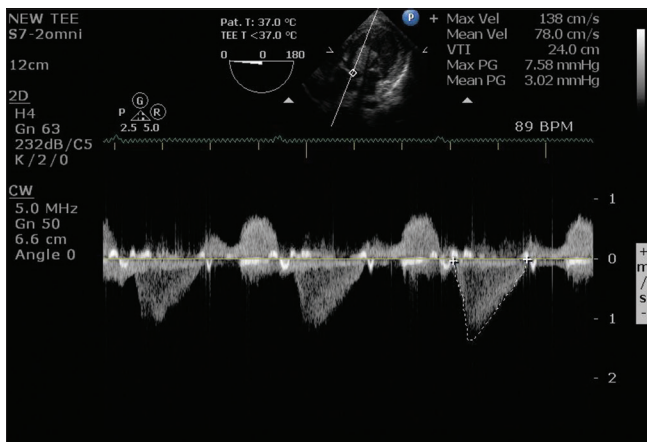


Figure 3: Gradient across the left ventricular outflow tract peak gradient - 7.5 mm Hg and mean gradient - 3 mm Hg suggesting there is obstruction to aortic valve

Transgastric two-chamber and deep transgastric aortic valve long-axis view showed LV mass (a) attached to the apex and anterior wall and (b) attached to the AML extending into LVOT and obstructing the aortic valve [Figures 4 and 5, Videos 3 and 4].

Surgical approach was through a midline sternotomy, cannulation was standard ascending aortic with bicaval venous cannulation, the minimum temperature was 32°C and using trans-left atrial approach masses were excised. Intraoperative findings were reddish white mass (a) measuring 4 cm × 2 cm × 1 cm attached to the LV apex and the anterior lateral wall and (b) measuring 3 cm × 1.5 cm × 1 cm attached to the primary chordae of the mitral valve [Figure 6]. Grossly, they resembled a benign tumor. Cardiopulmonary bypass (CPB) time was 48 min and aortic cross-clamp time was 32 min. Came off CPB without inotropes. Postexcision TEE showed a small residue attached to LV apex and the

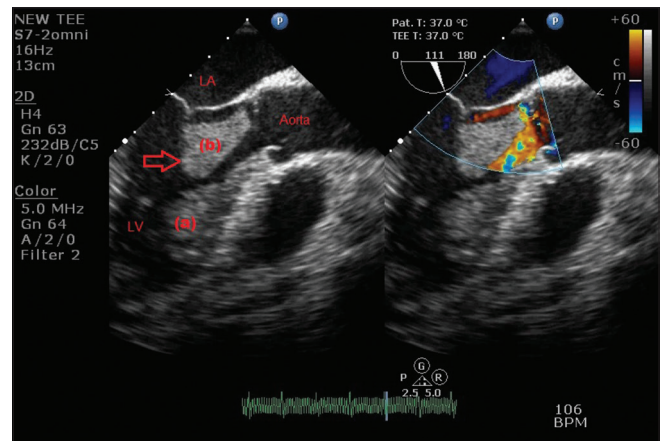


Figure 2: (a) Midesophageal aortic valve long-axis view with color Doppler showing a mass (b) obstructing the aortic valve and attached to the anterior mitral leaflet

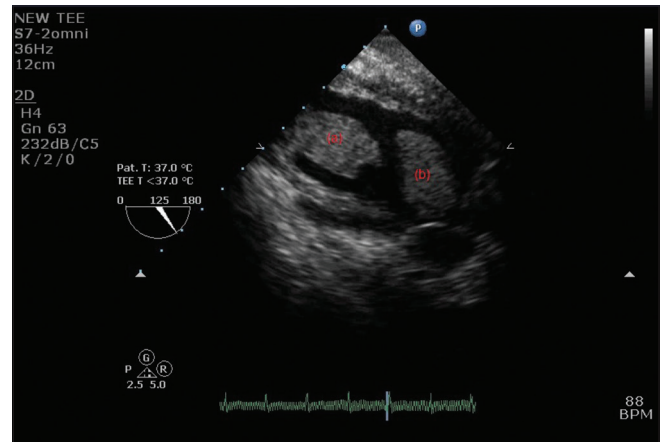


Figure 4: Transgastric two-chamber view showing pedunculated mass (a) attached to the anterior wall and mass (b) attached to the anterior leaflet of mitral valve

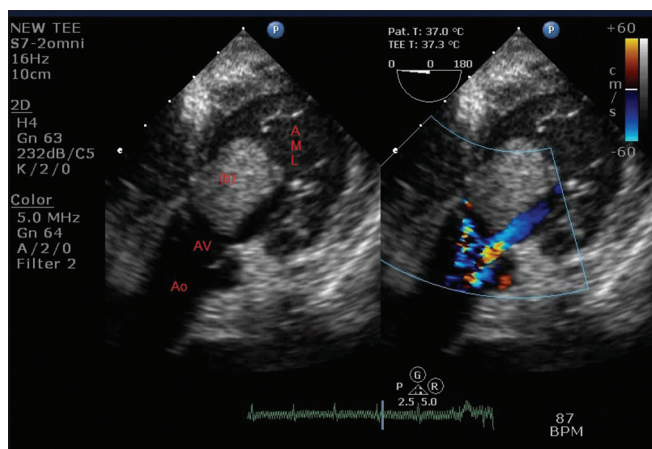


Figure 5: Transgastric aortic valve long-axis view showing mass (b) attached to the anterior mitral leaflet extending into the left ventricular outflow tract (AML - anterior mitral leaflet, AV - aortic valve, AO - aorta)



Figure 6: The gross appearance of the left ventricular masses (A) attached to the left ventricular apex and anterior wall and (B) attached to anterior mitral leaflet (LV - left ventricle, AML - anterior mitral leaflet)

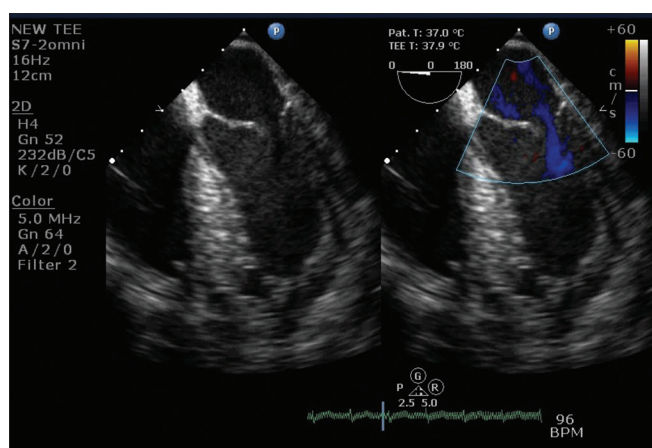


Figure 7: Midesophageal four-chamber view with color Doppler postresection

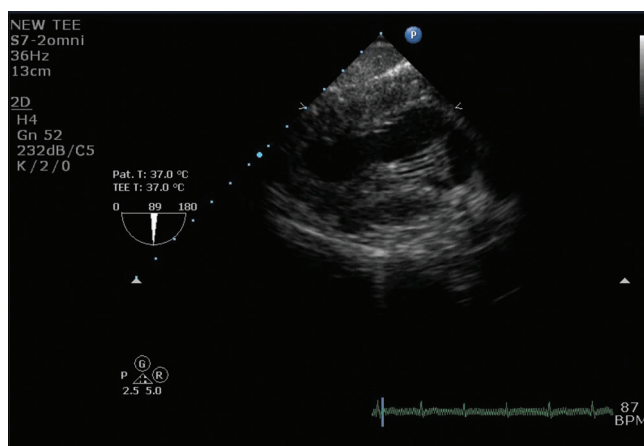


Figure 8: Transgastric two-chamber view postresection showing the chordae of anterior mitral leaflet are all intact

AML chordae. There was no injury to any of the chordae [Figures 7 and 8, Videos 5 and 6]. Mitral valve was coapting well. The postoperative histopathological examination was suggestive of thrombi [Figure 9].

Features favoring tumor are no history suggestive of coronary artery disease, normal angiogram; on echocardiography, echodensity similar to the myocardium, attachment to anterior wall, and gross appearance was similar to tumor probably due to fibrin deposition on the thrombus. Features favoring thrombus are history of smoking, ECG suggestive of old anterior wall MI, presence of wall motion abnormality on echo, and histopathological examination confirmed it as thrombi. Coronaries probably have recanalized after an MI 3 months back, during which he had the first episode of TIA. Postoperative patient recovery was uneventful and did not have any neurological deficit.

He was discharged on the 6th postoperative day on oral anticoagulants and antiplatelet therapy.

DISCUSSION

Echocardiography is an invaluable tool in the evaluation of intracardiac mass and can reliably identify mass location, attachment, shape, size, and mobility while defining the presence and extent of any consequent hemodynamic derangement.^[1] The most common causes of intracardiac mass are thrombus, tumor, and vegetation. The differential diagnosis for LV mass is thrombus, fibroma, and secondaries. They have to be differentiated from normal variants such as papillary muscles, false tendon, sigmoid septum, and apical trabeculation may be confused with a thrombus.^[1]

The thrombus is the most common cause of LV mass. LV thrombus is usually associated with coronary

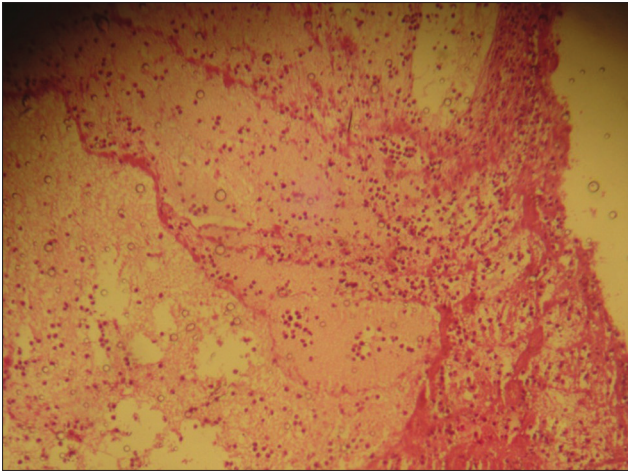


Figure 9: Histopathological image showing extensive acellular eosinophilic material with fibrin threads and erythrocytes and peripherally few benign spindle cells suggestive of thrombus

artery disease, LV aneurysm, cardiomyopathy, and myocarditis. LV thrombus is usually associated with wall motion abnormalities. Other rare causes of LV thrombus include hypercoagulable states, systemic lupus erythematosus, Sweet's syndrome, Behcet's disease, and Takotsubo cardiomyopathy.^[2-6] The greatest concern for LV thrombus is the potential for thromboembolism resulting in stroke, MI, or death. LV outflow tract obstruction is also a possibility, but is not routinely reported. Thrombus has increased echogenicity and well-delineated borders. It should be visualized in both systole and diastole, as well as in more than one view. Due to LV foreshortening in midesophageal view, it may be difficult to visualize apical clot with TEE. Use of transgastric two-chamber and deep transgastric aortic valve long-axis view may be useful to visualize the LV apical clot. It has to be differentiated from apical hypertrophy, endomyocardial fibrosis, and hypereosinophilic syndrome. Identification of apical clot may require alteration of surgical procedure to minimize manipulation during surgery or until removal of the clot. The echocardiographer must image the thrombus continuously during the procedure, particularly at times of cardiac manipulation and before the release of the aortic cross-clamp. Manipulation or instrumentation of the LV, including placement of a LV vent, should be limited and avoided when possible.

Primary cardiac tumor involving LV is rhabdomyoma and fibroma. Rhabdomyoma is seen in pediatric age group, often multiple, echodense, intramural, or intracavitary. Fibromas are intramural, involving the intraventricular septum or anterior free wall and

associated with central calcification. LV myxoma is uncommon. Primary malignant tumor of the heart most common being sarcoma usually involves the right ventricle. Secondary involvement of LV is by a direct invasion (breast carcinoma) or hematogenous spread. Secondaries may infiltrate the myocardium resulting in wall motion abnormality, arrhythmias, and heart failure.^[7]

Infective endocarditis (IE) can also present as an intracardiac mass. Vegetation appears as echodense, discrete, lobulated, or amorphous chaotically mobile mass adherent to the upstream surface of valvular leaflets or mural endocardium, usually associated with diseased native or prosthetic valves. In this case, mass attached to AML resembled a vegetation, but history and examination were not in favor of IE. The patient also did not have any risk factors to develop IE. However, there are case reports with thrombus, tumor, and vegetation in the same patient.^[8]

CONCLUSION

LV mass is uncommon. The most common causes were thrombus, fibroma, vegetation, and secondaries. Echocardiography is an important modality of investigation. An intracardiac mass should be assessed in multiple views, both during systole and diastole. Detection of a thrombus leads to an alteration in surgical steps. Intraoperative manipulation should be minimized. Organized and small thrombus can be treated medically with anticoagulants. A large mobile thrombus with or without a hemodynamic alteration, prior embolic events, and failed anticoagulation are an indication for surgical removal to prevent a stroke, MI, mesenteric ischemia, renal infarct, gangrene of the limbs, and mortality. Following surgery, this patient has to be on long-term anticoagulation and echo screening.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Dujardin KS, Click RL, Oh JK. The role of intraoperative transesophageal echocardiography in patients undergoing cardiac mass removal. *J Am Soc Echocardiogr* 2000;13:1080-3.
2. Sharma ND, McCullough PA, Philbin EF, Weaver WD. Left ventricular thrombus and subsequent thromboembolism

- in patients with severe systolic dysfunction. *Chest* 2000;117:314-20.
3. Gupta S, Kahn RA. Image in clinical medicine. Left ventricular thrombus. *N Engl J Med* 2002;346:e5.
 4. Bower CM, Morgan L, Ovbiagele B. A patient with left ventricular thrombus and recurrent stereotypic TIAs. *Neurology* 2005;65:492-3.
 5. Tatebe S, Iwaki H, Kuraoka S, Iijima S. A ball thrombus in the left ventricle in association with Sweet syndrome. *J Thorac Cardiovasc Surg* 2003;125:209-11.
 6. Kurisu S, Inoue I, Kawagoe T, Ishihara M, Shimatani Y, Nishioka K, *et al.* Left ventricular apical thrombus formation in a patient with suspected tako-tsubo-like left ventricular dysfunction. *Circ J* 2003;67:556-8.
 7. Peters PJ, Reinhardt S. The echocardiographic evaluation of intracardiac masses: A review. *J Am Soc Echocardiogr* 2006;19:230-40.
 8. Lee WC, Huang MP, Fu M. Multiple intracardiac masses: Myxoma, thrombus or metastasis: A case report. *J Med Case Rep* 2015;9:179.