

## Watch Out for Left Atrial Roof Thrombus

### Abstract

Rheumatic mitral stenosis is often associated with thrombus formation in the left atrium (LA), especially in patients with atrial fibrillation. Although thrombus can occur anywhere within the LA, the most common site is the left atrial appendage. Therefore, it is important to carefully screen the entire LA during perioperative transesophageal echocardiography to exclude thrombus.

**Keywords:** *Clot, left atrium, mitral stenosis, thrombus*

### Case

A 35-year-old female presented with NYHA Grade 2/3 dyspnea and palpitations with an increase in severity for 1 month. After evaluation, she was diagnosed with severe rheumatic mitral stenosis (MS) (mitral valve area 0.9 cm<sup>2</sup>) with a giant left atrium (LA) (70 cm × 82 cm) and moderate pulmonary hypertension (pulmonary artery systolic pressure 40 mmHg). However, no LA thrombus was appreciated during preoperative transthoracic echocardiography (TTE) study. The patient was in atrial fibrillation (AF) and had unfavorable valve anatomy for balloon mitral valvuloplasty. She was posted for elective mitral valve replacement surgery.

During an intraoperative transesophageal echocardiography (TEE), unexpectedly, a large thrombus was seen in the roof of the LA extending onto the interatrial septum (IAS) without involving the left atrial appendage (LAA) [Figure 1]. This finding was confirmed surgically after opening the LA. The size and organized nature of the thrombus in the presence of severe MS prevented embolization into the systemic circulation. This clot was missed by the initial preoperative TTE partly due to poor acoustic windows, the unusual location, and probable initial small size. Surgery was uneventful with complete thrombus removal and implantation of a St. Jude 25 mm mechanical mitral valve prosthesis. The patient recovered well

without any neurologic dysfunction in the postoperative period.

### Discussion

Rheumatic MS is associated with LA thrombus in patients in sinus rhythm (3%–13%)<sup>[1,2]</sup> and markedly increases in AF (~33%).<sup>[3]</sup> The presence of LA thrombus carries a risk of systemic embolization and neurologic morbidity.

TEE is a sensitive diagnostic modality to detect LA thrombus, particularly in the LAA.<sup>[4]</sup> It has a 97% sensitivity, 100% specificity, positive predictive value of 100%, and a negative predictive value of 99.6% to detect a thrombus.<sup>[5]</sup> Small thrombus can be detected using contrast echocardiography which provides contrast opacification within the cardiac chambers to delineate the “filling defect” of the thrombus.<sup>[6]</sup>

Manjunath *et al.*<sup>[7]</sup> proposed an echocardiographic classification of LA thrombus based on its location, extension, and mobility as follows:

- Type Ia: LA appendage clot confined to appendage (most common)
- Type Ib: LA appendage clot protruding into LA cavity
- Type IIa: LA roof clot limited above the plane of fossa ovalis
- Type IIb: LA roof clot extending below the plane of fossa ovalis
- Type III: Layered clot over the IAS
- Type IV: Mobile clot which is attached to LA free wall or roof or IAS
- Type V: Ball valve thrombus (free floating).

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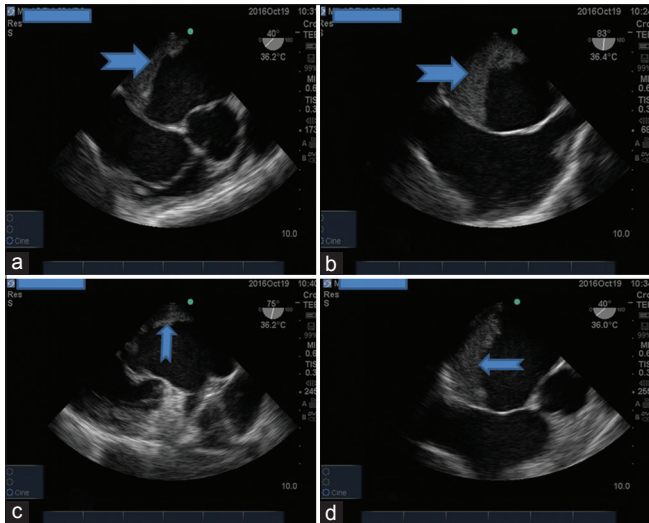
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**Figure 1:** Photograph depicts the uncommon location of a left atrium thrombus during transesophageal echocardiography examination. Thrombus (blue arrow) on the roof of the left atrium is seen in the (a) Mid-esophageal right ventricular inflow-outflow view. (b) Mid-esophageal bicaval view shows thrombus extension onto the interatrial septum above the plane of fossa ovalis and without any appreciable evidence of spontaneous echo contrast. (c) The left atrium thrombus did not appear to involve the left atrial appendage. (d) Mid-esophageal aortic valve short-axis view with the probe rotating more toward the right; denoting the extent of the thrombus

The incidence of LA thrombus according to types has been reported in a few small studies as Type Ia (64%–76%), Type Ib (9%–32%), Type IIa (3.6%–12.5%), and Type IIb (2%).<sup>[7,8]</sup> However, in this case, the LA thrombus shared characteristics of both Types IIb and III with Grade 0–1+ spontaneous echo contrast (SEC).

The risk factors for LA thrombus formation in MS include AF, previous embolic episodes, age >40 years, LA dimension >4.5 cm, and LAA emptying velocity <20 cm/s.<sup>[7]</sup> However, MS patients in sinus rhythm are also at risk of LA clot formation with an inferosuperior LA dimension >6.9 cm, mean mitral gradient >18 mmHg, and SEC Grade >3.<sup>[8]</sup>

This case again highlights the utility of an intraoperative TEE in diagnosing unreported and missed cardiac pathologies during preoperative screening.

## Conclusion

Patients with MS are at increased risk of thrombus formation anywhere within the LA irrespective of the cardiac rhythm. Accordingly, screening of the

entire LA during intraoperative TEE is of paramount importance.

## 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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Nil.

## Conflicts of interest

There are no conflicts of interest.

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