

Left atrial thrombus in a case of severe aortic stenosis with severe left ventricular dysfunction: An Incidental finding on transesophageal echocardiography

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ABSTRACT

Left atrial thrombus in a patient with aortic stenosis and aortic regurgitation in sinus rhythm is an infrequent finding and is most commonly associated with cases of mitral stenosis. This case report emphasizes upon the importance of suspecting the presence of left atrial thrombus in other valvular lesions when additional risk factors such as dilated left ventricle are present. The undeniable role of comprehensive perioperative transesophageal echocardiography is also depicted in this case report.

Keywords: Aortic stenosis, dilated, left ventricle, sinus rhythm, thrombus

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INTRODUCTION

A left atrial thrombus is often associated with atrial fibrillation and/or rheumatic mitral stenosis and rarely detected in patients in sinus rhythm with other valvular lesions. This report describes a case of a 25-year-old male who was diagnosed with severe aortic stenosis with aortic regurgitation with dilated left ventricle. Perioperative transesophageal echocardiography (TEE) revealed a left atrial thrombus despite the patient being in sinus rhythm.

CASE REPORT

A 25-year-old male presented with progressive exertional dyspnea with palpitation for 1 year. A month ago, he developed an episode of orthopnea, pedal edema associated with icterus that was managed conservatively. He was diagnosed on transthoracic echocardiography (TTE)

with bicuspid aortic valve with severe aortic stenosis (AS) and advised for early surgical intervention.

On the day of surgery after standard anesthesia induction, intubation, and maintenance, TEE was done with real-time three-dimensional enabled probe (X7-2t with ie33, Philips Ultrasound, Bothell, WA, USA), which revealed a severely calcified bicuspid aortic valve with severe AS, severe aortic regurgitation [Figure 1 and Video 1] with dilated left ventricle with severe left ventricular (LV) dysfunction with an ejection fraction of 18%. During routine complete examination with standard TEE views, left atrium (LA) and left atrial appendage (LAA) were found to be enlarged. Spontaneous echogenic contrast (SEC) was seen in LA. A mass was seen in the LAA with morphologically normal mitral valve. The mass was sessile with irregular borders, homogenous echogenicity

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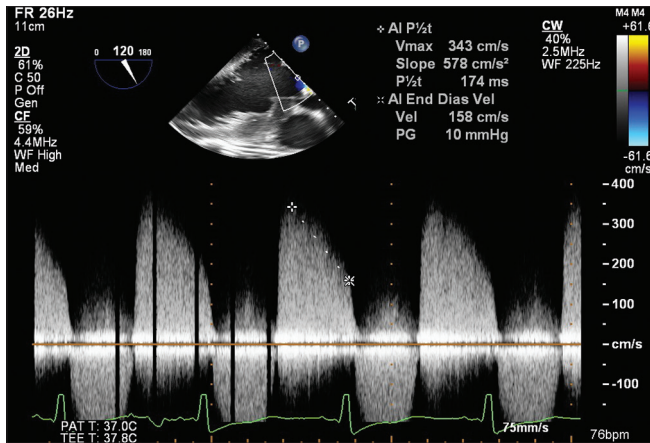


Figure 1: Two-dimensional transesophageal echocardiography image: Transgastric long axis view with continuous wave Doppler showing pressure half time of aortic regurgitation jet

measuring 2.2×1.4 cm [Figure 2a and Video 2]. Patient was in sinus rhythm. After placing patient on cardiopulmonary bypass (CPB), aortotomy was done; root cardioplegia given, and aortic valve replaced with regent mechanical valve size 25. Left atriotomy was done and the mass, which was identified grossly as thrombus, was removed and internal plication of LAA done [Figure 2b]. Patient was weaned off CPB with adrenaline, nor adrenaline, dobutamine, and milrinone support and had an uneventful postoperative course. Postoperative TEE showed an improvement in ejection fraction to 43% and a reduction in mean systolic gradient across aortic valve from 64 to 4 mmHg [Figure 3 and Video 3].

DISCUSSION

The risk factors for developing intracardiac thrombi while in sinus rhythm include the presence of LA spontaneous echo contrast, severe LV dysfunction, and mitral annular calcification (MAC) or mitral stenosis. Spontaneous echo contrast is believed to represent erythrocyte aggregation in low shear rate conditions, including atrial fibrillation, mitral stenosis, or increased left atrial dimension. It may also be seen in patients who are in sinus rhythm. In a review of 1,288 TEE studies of patients in sinus rhythm, the incidence of spontaneous echo contrast was 21%; 13% of these patients had an associated left atrial thrombus.^[1] All patients had an enlarged left atrium and reduced peak LAA emptying velocity.^[1]

In our case combination of dilated cardiomyopathy with LV failure, leading to enlarged LA and prothrombotic changes associated with hepatic dysfunction may have resulted in intracardiac thrombus formation. Raised LV end diastolic pressure with LV dysfunction in severe aortic

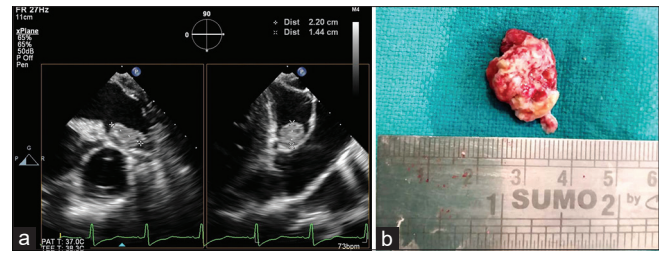


Figure 2: (a) Two-dimensional transesophageal echocardiography image: Modified Mid-esophageal aortic valve short axis view with x-plane view 90° showing mass in LAA (b) Gross specimen of thrombus after excision

valve disease can result in stasis as its size and function is influenced by LV geometric patterns.^[2]

Some reports demonstrate that patients with heart failure are hypercoagulable because of increased platelet activation and elevated coagulation markers, such as D-dimer, thromboglobulin, and thrombin–antithrombin III complexes, which could lead to thrombus formation.^[3]

Dilated LV is associated with enlarged LA and LAA size and dilatation of LV, LA, and LAA is related to high prevalence of left chamber cardiac thrombi in patients at sinus rhythm and atrial fibrillation.^[4] LAA area of >6 cm² is considered a risk factor for arterial embolic events.^[5]

The mass in our case had features consistent with thrombus on TEE. If it would have been detected in preoperative TTE as a doubtful finding, the diagnosis of LA thrombus could have been confirmed by the use of intravenous echo-contrast agent to improve the discrimination between blood and intracavitary masses. Unless thrombi are very large and spreading to the body of the left atrium, they are scarcely identified by means of TTE as the left atrium lies in the far field of the interrogating ultrasound beam. Often the thrombus resides between the trabeculae of the LAA. The ability of TTE to identify or exclude LA or left atrial appendage thrombi is limited, with a reported sensitivity of 40%–60%, due largely to poor visualization of the LAA.^[6] In contrast, TEE provides detailed visualization of the body of LA and LAA from multiple imaging planes, so offers superior assessment. It is the current gold standard diagnostic method. In one intraoperative study, the sensitivity and specificity of TEE for left atrial thrombi detection (in patients among whom the left atrium was directly examined at surgery) are 93%–100% and 99%–100%, respectively.^[6]

The scene of SEC or “smoke-like” echo, which indicates the predisposing stasis, almost always accompanies thrombus and may be helpful in the differentiation of thrombus from tumor or normal anatomy. SEC is more likely to be detected

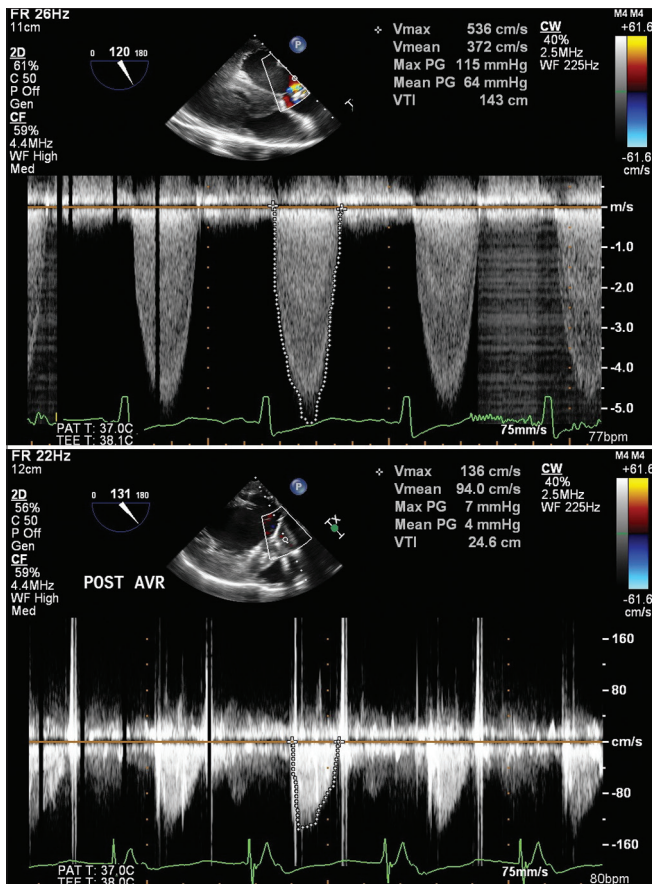


Figure 3: Two-dimensional transesophageal echocardiography image: Transgastric long axis view with continuous wave doppler showing high mean systolic pressure gradient of 64 mmHg across native bicuspid valve (upper panel) and reduced mean systolic pressure gradient of 4 mmHg across replaced mechanical valve (lower panel)

by using a high-frequency ultrasonic transducer (>5 MHz, as used in TEE) and high gain settings.^[7] A low appendage blood flow velocity is associated with the presence of LAA thrombus and denser SEC. Thrombogenic risk rises with decreasing LAA velocity. The risk of stroke increases sharply with marked reductions in blood flow velocity (<15 cm/s), particularly in the left atrial appendage or posterior left atrium.^[8]

Hence, this case report emphasises upon the role of complete, comprehensive TEE examination of any cardiac surgical patient, where TEE can become a diagnostic

modality, especially for important lesions likely to be missed on TTE. Risk of thrombus formation should be kept in mind even in patients with normal mitral valve but with other risk factors. This patient may have presented with thromboembolic stroke in postoperative follow-up, if this timely intervention was not done under perioperative TEE guidance.

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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Conflicts of interest

There are no conflicts of interest.

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