

Unusual Mobile Structure in the Left Ventricular Outflow Tract Leading to Re-exploration After Elective Aortic Valve Replacement

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A 75-YEAR-OLD WOMAN underwent an aortic valve replacement (AVR) for degenerative aortic stenosis (AS) and coronary artery bypass graft surgery (CABG) for severe 3-vessel coronary artery disease. Before cardiopulmonary bypass (CPB), a transesophageal echocardiographic (TEE) study showed moderate AS with restricted opening of the right and noncoronary cusps but minimal calcification of the valve cusps or annular tissue. No intracardiac masses were visible. Bioprosthetic AVR and triple CABG surgery were performed uneventfully.

After separation from CPB, repeat TEE examination showed a new elongated and mobile structure in the left ventricular (LV) cavity and the left ventricular outflow tract (LVOT). On

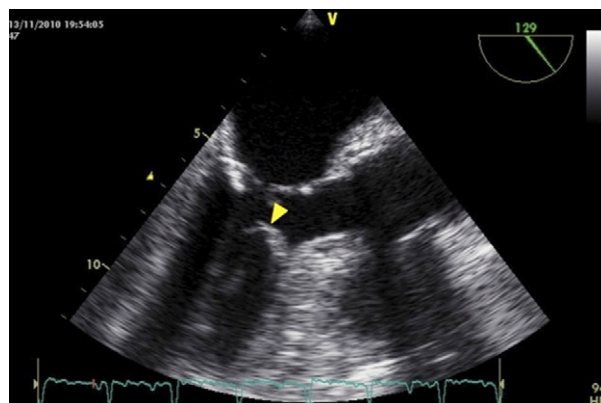


Fig 2. Movement of a structure into the left ventricular cavity during diastole (arrow). (Color version of figure is available online.)

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examination in multiple planes, the structure appeared to be attached to the basal part of the interventricular septum. It had chaotic movement as if floating or dangling within the blood flow, moving into the LVOT with every ventricular systole, and returning to the ventricular cavity during each ventricular diastole (Figs 1-3 and Videos 1-3 [supplementary videos are available online]). What is the diagnosis?

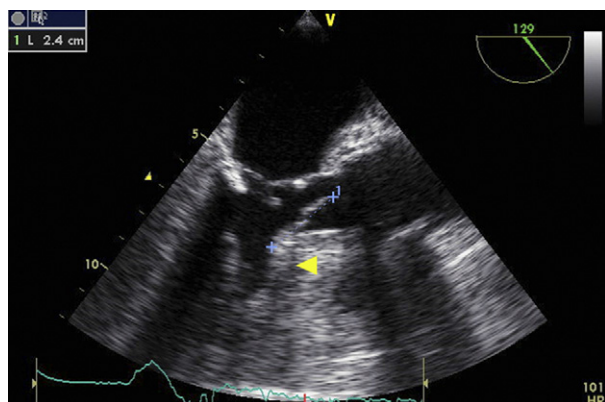


Fig 1. The postbypass midesophageal long-axis view of the LVOT showing a 2.4-cm mobile structure within the LVOT. Note the acoustic shadowing resulting from calcification of the anterior mitral valve leaflet (arrow). (Color version of figure is available online.)

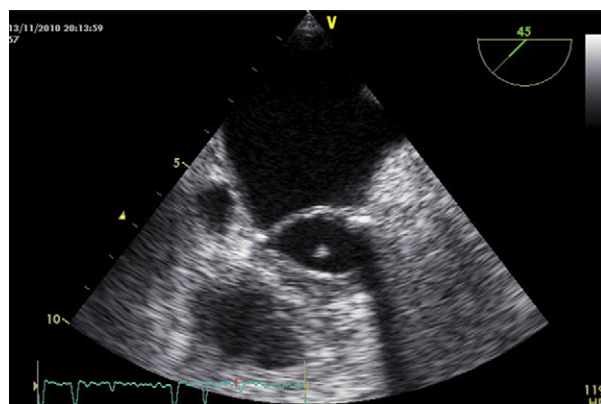


Fig 3. The postbypass midesophageal short-axis view of the LVOT and the structure within it. (Color version of figure is available online.)

DIAGNOSIS: UNUSUAL VARIANT OF AN LV BAND IN THE LVOT

In the operating room, it was considered that this mass, the nature of which was not clearly identifiable by TEE alone, represented an embolic risk, and a decision was made to explore the LVOT. After opening the aorta, the surgeon was able to see through the prosthesis into the LVOT but could not see any structure that accounted for the TEE appearance. Concerned that he possibly had caused injury to a cardiac chamber, the surgeon elected to remove the prosthesis to inspect the LVOT and ventricular cavity directly. However, on inspection, only a small laceration of the endocardium within the LVOT was visible. No mobile structure was visible despite the use of a surgical retractor to facilitate opening up the LVOT. A second aortic valve bioprosthesis then was implanted. After separation from CPB, a subsequent TEE examination showed that the structure was no longer visible although there was what appeared to be a “stump” of myocardium where the mobile structure appeared to have been attached previously. This raised the possibility that the structure had been avulsed during re-exploration (Figs 4 and 5 and Videos 4 and 5).

A number of possibilities may have accounted for the TEE appearance. An unraveled surgical suture was discounted when the surgeon found all sewing-ring sutures intact at re-exploration. An intraventricular thrombus was considered unlikely because none of the preoperative or intraoperative echocardiographic studies showed any evidence of intraventricular thrombus. The structure was not adjacent to an area of hypokinesia, akinesia, or dyskinesia, which might have indicated an LV aneurysm associated with an intraventricular thrombus.¹ The TEE appearance may have been the result of calcified endocardium or myocardium dislodged during native valve excision, but there was very little calcification of the annular or subvalvular tissue and the mobile structure itself did not exhibit the acoustic shadowing characteristic



Fig 5. The midesophageal long-axis view of the LVOT showing an apparent avulsion stump (arrow) after the second period of CPB. (Color version of figure is available online.)

of calcification. However, acoustic shadowing across the LVOT was visible because of calcification of the anterior mitral valve leaflet (Fig 1 and Video 1). Therefore, it is likely that this structure was an intracardiac abnormality that had not been identified on preoperative or intraoperative TEE. A careful review of the prebypass midesophageal long-axis view of the LVOT showed a thick band “plastered” to but clearly distinct from the basal anterior segment of the interventricular septum and attached to the ventricular surface of the aortic annulus. Additionally, with color-flow Doppler mapping, it was possible to see flow between the band and the septum. The structure was not visible on the midesophageal short-axis view of the native aortic valve (Figs 6-8 and Videos 6-8). It is possible that excision of the native aortic valve had removed one of the structure’s attachment points, which allowed it to move within the LVOT and LV cavity while maintaining its attachment to the ventricular myocardium.

LV bands, which have been referred to as trabeculations, false tendons, fibromuscular or septomarginal bands, anomalous chordae, and moderator bands,^{2,3} are found in between

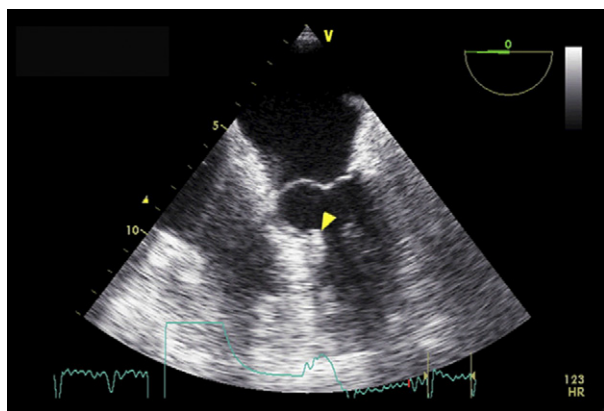


Fig 4. The midesophageal 4-chamber view showing an apparent avulsion stump (arrow) after the second period of cardiopulmonary bypass. (Color version of figure is available online.)

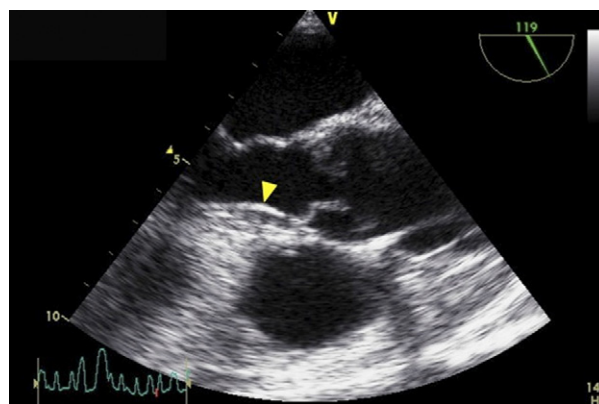


Fig 6. The prebypass midesophageal long-axis view of the LVOT with a muscle band visible in the subaortic region (arrow). (Color version of figure is available online.)

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