

Unknown Left Atrial Appendage Mass! Real-time Three-dimensional Transesophageal Echocardiography Helps in Identification

Abstract

Left Atrial Appendage (LAA) is the most contractile part of Left atrium. It is also the most frequent place for thrombus formation that may lead to disastrous consequences. Complete transoesophageal echocardiography examination always includes assessing LAA but sometimes unusually placed pectinate muscle, which is a normal structure may give baffling shadow that can only be interpreted correctly by Real time 3D echocardiography.

Keywords: *Appendage, atrial, mass, three-dimensional, transesophageal echocardiography*

A 33-year-old female, presented with dyspnea on exertion New York Heart Association Class III associated with atypical chest pain and five episodes of cerebrovascular accidents over the past 4 years with complete recovery of neurological deficits after each episode. Preoperative transthoracic echocardiography showed severe mitral stenosis with severe aortic stenosis, no evidence of clot or any mass in the left atrium (LA). The patient was posted for double valve replacement. On the day of surgery, in the operation theater, the patient was induced as per our standard departmental protocol and intubated, and transesophageal echocardiography (TEE) probe was placed. During TEE examination an echo dense, round mass was identified in the center of left atrial appendage (LAA) in midesophageal four-chamber view at an angle of 36° [Figure 1 and Video 1]. The mass had an echo density similar to LAA walls. The mass was visualised in orthogonal planes, X-plane mode, and it was moving in phase during the cardiac cycle [Video 2]. On color flow Doppler blood flow could be registered all around the mass [Video 3] and the spectral pulse wave Doppler profile showed normal LAA emptying velocity in diastole. M-mode examination showed movement of the mass in synchronization with the LAA wall. The mass was then further interrogated by real-time three-dimensional echocardiography (RT 3D TEE). LAA was viewed by a perpendicular *en face* cut-plane view, and then, cropping

was done at various levels downward in transverse plane that allowed us to peep into the entire length of LAA [Video 4]. During this examination, the mass was visualized with its attachment to both the walls of LAA [Figures 2 and 3], and it was identified as hypertrophied pectinate muscle bridging across the LAA cavity. It was also confirmed during surgery by the operating surgeon.

A mass located in the LA can be a thrombus, especially when present with spontaneous atrial contrast depicting blood stasis. This low-velocity flow in LA is often associated with atrial fibrillation, enlarged atrial chamber, stenotic mitral, low-cardiac output state, and prosthetic mitral valve.^[1] LAA in LA is often the commonest site for the thrombi to develop and needs a thorough echocardiographic examination. These thrombi are usually immobile and have a wider base. LA myxomas, most common cardiac tumors mostly arise from interatrial septum, but a rare case of this tumor in LAA has been reported.^[2] In contrast to thrombi, they usually have a pedicular attachment and are highly mobile but move out of synchronization to LAA movement. Real-time perfusion contrast echocardiography can evaluate the vascular pattern of the mass, where the pectinate muscle and tumor show vascularity but thrombi are either avascular or have very low vascularity but this technique has low sensitivity.^[3] The presence of a septic vegetation at the mouth of LAA had been

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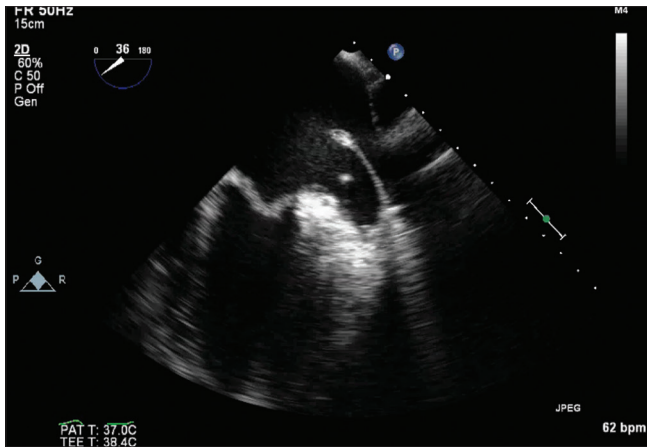


Figure 1: Mass in the left atrium appendage

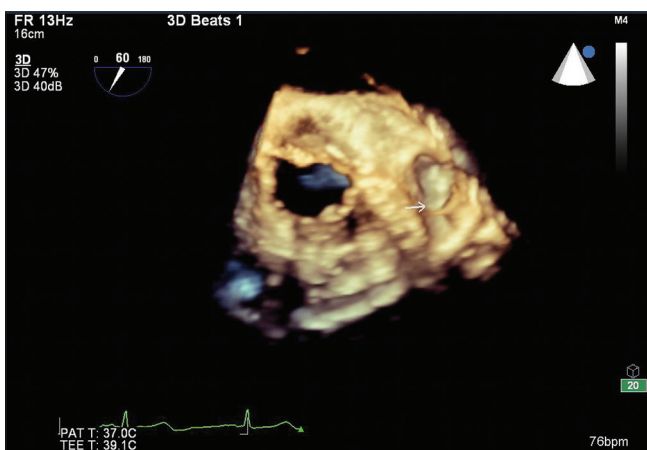


Figure 2: Left atrial appendage bridging mass with its attachments to left atrial appendage walls

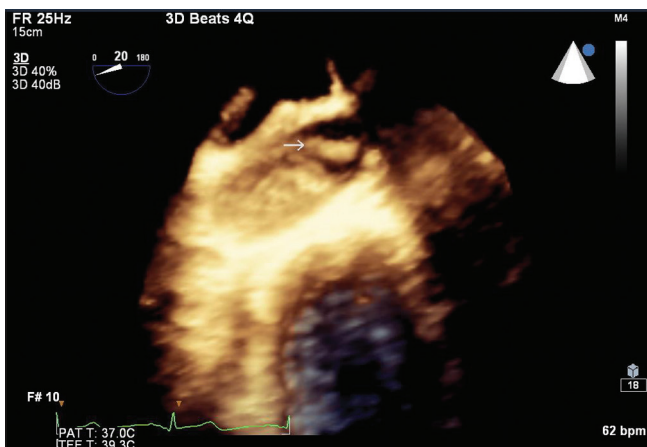


Figure 3: Elongated mass with definite connection with left atrial appendage wall on both sides across the cavity of left atrial appendage

reported that gave an exact picture of floating mass.^[4] LAA is difficult to image by echo from the transthoracic

approach, and the TEE has a greater sensitivity and high-negative predictive value for detecting mass in LAA specially thrombus. The LAA has a pyramidal shape and its geometry can be imaged by various views in 2D TEE and additional information may be obtained with RT 3D TEE using the zoom mode and iSlice technique as accurately as by cardiac computed tomography.^[5] RT 3D TEE provides a higher specificity in defining LAA pathology than 2D TEE but due to poor resolution there is less specificity than 2D TEE when exclusion of thrombus is in question.^[6] 3D echocardiography has not only improved the visualization of mitral valve but also other structures of the heart that help us in understanding the anatomy and deciphering various structures that may not be so easily visualised in 2D TEE. Advances in transducer technology and processing now allow real-time acquisition and display of 3D volumetric datasets.^[7] In our case, the features of the mass did not resemble those of tumor, thrombus, vegetation, or an artifact. The mass was identified on RT 3D TEE as a prominent tissue bridge across LAA cavity, hypertrophied pectinate muscle, and confirmed during surgery which is a normal anatomical variant and not a pathology.

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Conflicts of interest

There are no conflicts of interest.

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