

A vegetation on the surface of left ventricular muscle and subvalvular tissue just below the anterolateral commissure of the mitral valve without exposure to regurgitation or shunt jet

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Abstract

Bacteria can adhere to cardiac endothelium damaged by regurgitation or shunt jet; however, healthy cardiac endothelium is supposedly resistant to bacterial adhesion. Bacterial vegetations are most common on cardiac valves, but are rarely observed at other sites. We report a case of a vegetation on the surface of left ventricular muscle/subvalvular tissue without regurgitation or shunt jet. Transthoracic echocardiography did not detect the vegetation because of its unique location; however, transesophageal echocardiography (TEE) did detect. In conclusion, vegetations can form without exposure to regurgitation or shunt jet, and TEE is highly sensitive for detecting the vegetation in unusual locations.

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Running head: A vegetation in the unique location

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Abstract

Bacteria can adhere to cardiac endothelium damaged by regurgitation or shunt jet; however, healthy cardiac endothelium is supposedly resistant to bacterial adhesion. Bacterial vegetations are most common on cardiac valves, but are rarely observed at other sites. We report a case of a vegetation on the surface of left ventricular muscle/subvalvular tissue without regurgitation or shunt jet. Transthoracic echocardiography did not detect the vegetation because of its unique location; however, transesophageal echocardiography (TEE) did detect. In conclusion, vegetations can form without exposure to regurgitation or shunt jet, and TEE is highly sensitive for detecting the vegetation in unusual locations.

Keywords: infective endocarditis, vegetation, transthoracic echocardiography, transesophageal echocardiography, regurgitation, shunt jet

Case Report

A 22-year-old man with a fever was admitted as an emergency patient. At presentation, his body temperature was 40.3, and physical examination revealed no obvious cardiac murmur.

However, there was evidence of splinter hemorrhages and Janeway lesions. Although transthoracic echocardiography (TTE) revealed no obvious vegetation or significant valvular disease (Figure 1A; Movie S1), blood cultures grew gram-positive cocci in clusters, which were identified as methicillin-sensitive *Staphylococcus aureus*. Therefore, we performed transesophageal echocardiography (TEE), suspecting infective endocarditis (IE). TEE revealed a mobile vegetation measuring 15 × 7 mm on the surface of left ventricular muscle just below the anterolateral commissure of the mitral valve (Figure 1B; Movie S2), but no significant valve stenosis or regurgitation. IE was diagnosed according to the modified Duke criteria. According to the American Heart Association guidelines, early surgery is recommended for class IIa in patients with severe valve regurgitation and mobile vegetations > 10 mm in size¹. In our case, severe valve regurgitation was not seen, but the > 10-mm mobile vegetation was thought to involve a risk of embolism. Therefore, resection of the vegetation was performed on the seventh day. Surgical findings revealed that a vegetation existed on the surface of left ventricular muscle just below the anterolateral commissure of the mitral valve, which partially infiltrated subvalvular tissue (Figure 1C). A histological examination of the vegetation revealed extensive inflammatory cell infiltration with fibrin precipitation and necrotic tissue (Figure 1D).

Five days later, a new systolic cardiac murmur was ausculted. TTE and TEE showed that moderate/severe mitral regurgitation owing to anterolateral scallop flail leaflet. Chordal rupture supposedly occurred due to infiltration of the vegetation; mitral valve plasty was performed on the 19th day. Postoperatively, the patient remained stable. Penicillin G, 24 million units, was infused continuously over 24 hours, and blood cultures were consistently negative for 6 weeks. On the 26th and 27th day, we performed 18-Fluorodeoxyglucose positron emission tomography (¹⁸FDG-PET/CT) (Figure 1E) and gallium-67 scintigraphy (Figure 1F). No abnormal accumulation in left ventricular muscle was seen. The patient discharged on the 56th hospital day.

Although the normal endothelial lining of the heart is resistant to bacterial adhesion, bacteria are able to adhere to abnormal or damaged endothelium in the presence of regurgitation or shunt jet². A recent study revealed that vegetations exist mostly on the valves or pacemaker leads; less than 3% of vegetations occur at other sites³. We described a rare case of IE that a vegetation on the surface of left ventricular muscle and subvalvular tissue just below the anterolateral commissure of the mitral valve without exposure to regurgitation or shunt jet. The results of ¹⁸FDG-PET/CT and gallium-67 scintigraphy suggested that vegetation did not exist on other lesions.

According to a previous review article, in patients with suspected native valve endocarditis, TEE has a sensitivity of 90% to 100% and a specificity of 90% for detection of vegetations, and it is superior to TTE⁴. In the present case, IE could not be diagnosed by TTE because of its unique location; however, TEE made it possible to detect the vegetation. This case indicates the possibility that vegetations may form without exposure to regurgitation or shunt jet.

Acknowledgments

None.

Conflict of interests

None.

Data availability statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

Author contributions

All authors contributed to patient care and to preparing the images and writing/reviewing the manuscript. KM revised the manuscript attentively. All authors read and approved the final manuscript.

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Figure Legends

Figure 1.

- A. Apical two-chamber transthoracic echocardiography view showing no obvious vegetation.
- B. Bicommissural transesophageal echocardiography view showing a mobile vegetation (arrows) on the surface of left ventricular muscle just below the anterolateral commissure of the mitral valve.
- C. Resection of the vegetation approached from aortic valve was performed on the seventh day of hospitalization. Surgical findings show a vegetation (arrows) on the surface of left ventricular muscle and subvalvular tissue just below the anterolateral commissure of the mitral valve.
- D. A histological examination of the vegetation shows extensive inflammatory cell infiltration with fibrin precipitation and necrotic tissue (hematoxylin and eosin, original magnification x 100).
- E. 18-Fluorodeoxyglucose positron emission tomography shows no evidence of abnormal accumulation in left ventricular muscle.
- F. gallium-67 scintigraphy shows no evidence of abnormal accumulation in left ventricular muscle.

LA = Left atrium; LV = left ventricle.

Supporting information

Additional supporting information may be found online in the Supporting Information section.

Movie S1. Apical two-chamber transthoracic echocardiography view showing no obvious vegetation. LA = Left atrium; LV = left ventricle.

Movie S2. Bicommissural transesophageal echocardiography view showing a mobile vegetation on the surface of left ventricular muscle just below the anterolateral commissure of the mitral valve. LV = Left ventricle.

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Figure.pptx available at <https://authorea.com/users/727092/articles/709159-a-vegetation-on-the-surface-of-left-ventricular-muscle-and-subvalvular-tissue-just-below-the-antrolateral-commissure-of-the-mitral-valve-without-exposure-to-regurgitation-or-shunt-jet>