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An Unexpectedly Discovered Large Muscular Diverticulum of the Left Ventricular Outflow Tract

A 58-year-old male presented with a history of chest pain for 1 year, which had worsened over the past 3 days. The patient had a mildly elevated troponin I level and T-wave inversions in leads V1-V4, indicative of a non-ST-segment elevation anterior wall myocardial infarction. Transthoracic echocardiography showed mildly reduced anterior wall motion of the left ventricle. Apical views incidentally revealed a muscular, diverticulum-like structure (26 × 14 mm) originating from the left ventricular outflow tract (LVOT) and extending toward the right atrioventricular groove (Figure 1 A,B). Color Doppler imaging demonstrated diastolic flow from the LVOT into the diverticulum and systolic flow in the reverse direction (Figure 1 C, D). Cardiac CT angiography confirmed that the diverticulum (red arrows) was located beneath the right coronary cusp and communicated with the LVOT through a long neck (20 mm in length, 11 mm in width; white arrows) (Figure 1 E, F), and the diverticulum contracted and relaxed synchronously with the left ventricle. Volume-rendering (VR) imaging illustrated the morphology and spatial relationship of the diverticulum (Figure 1 G, H). Coronary angiography revealed 95% stenosis of the left anterior descending artery, and 2 stents were implanted via intervention. Because the diverticulum caused no compression of surrounding structures and the patient declined surgical treatment, follow-up observation was pursued.

To the best of our knowledge, subvalvular diverticula are typically fibrous in origin, and an isolated congenital muscular diverticulum of the LVOT is extremely rare. Multimodality imaging is an effective tool for accurate diagnosis and follow-up, playing a crucial role in guiding treatment.

E-PAGE ORIGINAL IMAGE

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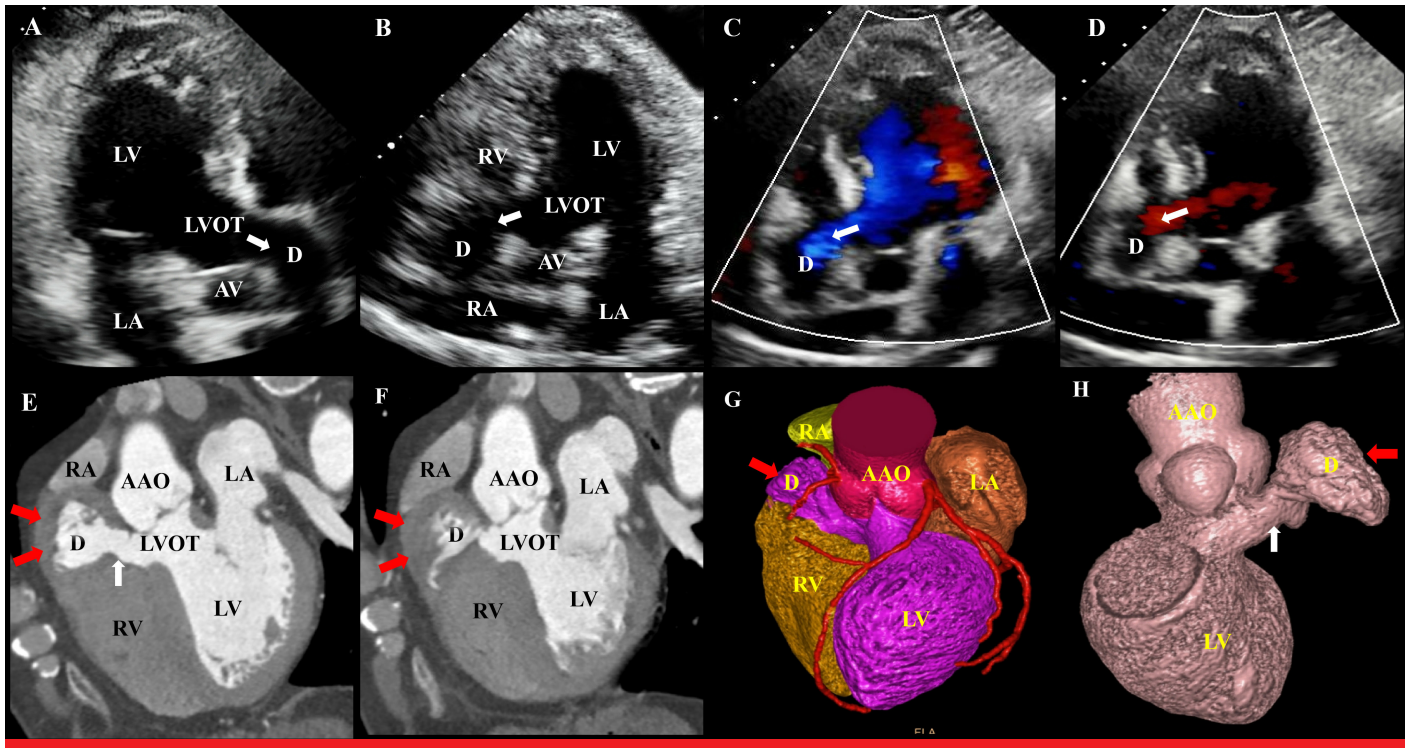


Figure 1. (A-B) Transthoracic echocardiography on apical 3- and 5-chamber views reveal a muscular diverticulum originating from the LVOT and extending toward the right atrioventricular groove. Color Doppler echocardiography reveals blood flowing from the LVOT into the diverticulum during diastole (C) and from the diverticulum into the LVOT during systole (D). (E-F) Cardiac CT angiography reveals the muscular diverticulum (red arrows) is located beneath the right coronary cusp and communicated with the LVOT through a long neck (white arrows). The diverticulum enlarges and its wall thins during diastole, while it decreases in size and and its wall thickens during systole. (G) Volume-rendered (VR) imaging clearly showed the anatomical position of the diverticulum relative to the surrounding structures. (H) Volume-rendering (VR) imaging clearly showed the morphology and origination of the diverticulum. AAO, aortic arch; AV, aortic valve; D, diverticulum; LA, left atrium; LV, left ventricle; LVOT, left ventricular outflow tract; RA, right atrium; RV, right ventricle.

Artificial Intelligence Usage Statement: Artificial intelligence was not used in this study.

Informed Consent: Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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