

## IMAGING VIGNETTE

## ADVANCED

## CLINICAL VIGNETTE

# An Unusual Case of Left Ventricular Outflow Tract Pseudoaneurysm



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## ABSTRACT

Left ventricular outflow tract (LVOT) pseudoaneurysm is a rare condition with a wide range of causes and various clinical outcomes. The causes range from infections, trauma to the chest wall, and iatrogenic origins. We present a unique case of idiopathic LVOT pseudoaneurysm in a patient with no obvious clinical risk factors. (**Level of Difficulty: Advanced.**) (J Am Coll Cardiol Case Rep 2023;6:101670) © 2023 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Left ventricular outflow tract (LVOT) pseudoaneurysm is an uncommon clinical entity with limited reports in the literature. The causes include, but are not limited to, infective endocarditis, myocardial infarction, cardiac surgery, and chest trauma.<sup>1,2</sup> The clinical presentation can vary from an asymptomatic presentation to chest pain, symptoms of heart failure, syncope, and potentially fatal outcomes with ventricular wall rupture or coronary artery compression due to an enlarging pseudoaneurysm.<sup>1,2</sup> Inasmuch as pseudoaneurysms are at greater risk of rupture compared with true aneurysms, early diagnosis and intervention are crucial.<sup>1</sup> Transesophageal echocardiography (TEE) and cardiac computed tomography (CT) or cardiac magnetic resonance are the diagnostic tests of choice to determine the location and extent of the pseudoaneurysm, and surgery is usually the first-line treatment unless contraindicated.<sup>2,3</sup>

A 56-year-old woman with a history of morbid obesity, diabetes mellitus type 2, and hypertension presented with new onset of lower extremity edema concerning for heart failure. Transthoracic echocardiography (TTE) showed a large 3.5 × 4 cm round echo density in the left atrium (Video 1, Figure 1A), raising concern for malignancy, infection, thrombus, or hydatid cyst. Cardiac CT showed a large, multilobulated, partially thrombosed, and narrow-necked fluid collection arising along the subvalvular LVOT posterior to the coronary sinus (Figures 1B and 1C, Supplemental Figures 1 and 2). The findings were consistent with a subvalvular pseudoaneurysm, with a volume of 14 mL and measuring 3.5 × 4 cm. The pseudoaneurysm was exerting a mass effect on the surrounding interatrial septum, tricuspid valve annulus, and lower cavoatrial junction. What was peculiar about this case is that the patient had no clear evidence of infection that would have led to this pseudoaneurysm. Owing to its size and the compression of cardiac structures, the patient was recommended for repair of the pseudoaneurysm by cardiac surgery. A preoperative coronary angiogram revealed no significant coronary artery disease, and a selective angiogram of the pseudoaneurysm revealed a well-demarcated cavity originating from the LVOT (Figure 1D, Video 2).

Intraoperative TEE revealed a 3.5 × 3.6 cm pseudoaneurysm behind the aorta in the space between the left atrium and the right atrium (Supplemental Figures 3 and 4, Video 3), intruding into the right atrium and

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Manuscript received March 23, 2021; revised manuscript received July 28, 2022, accepted August 30, 2022.

## ABBREVIATIONS AND ACRONYMS

**CT** = computed tomography

**LVOT** = left ventricular outflow tract

**TEE** = transesophageal echocardiography

**TTE** = transthoracic echocardiography

**VSD** = ventricular septal defect

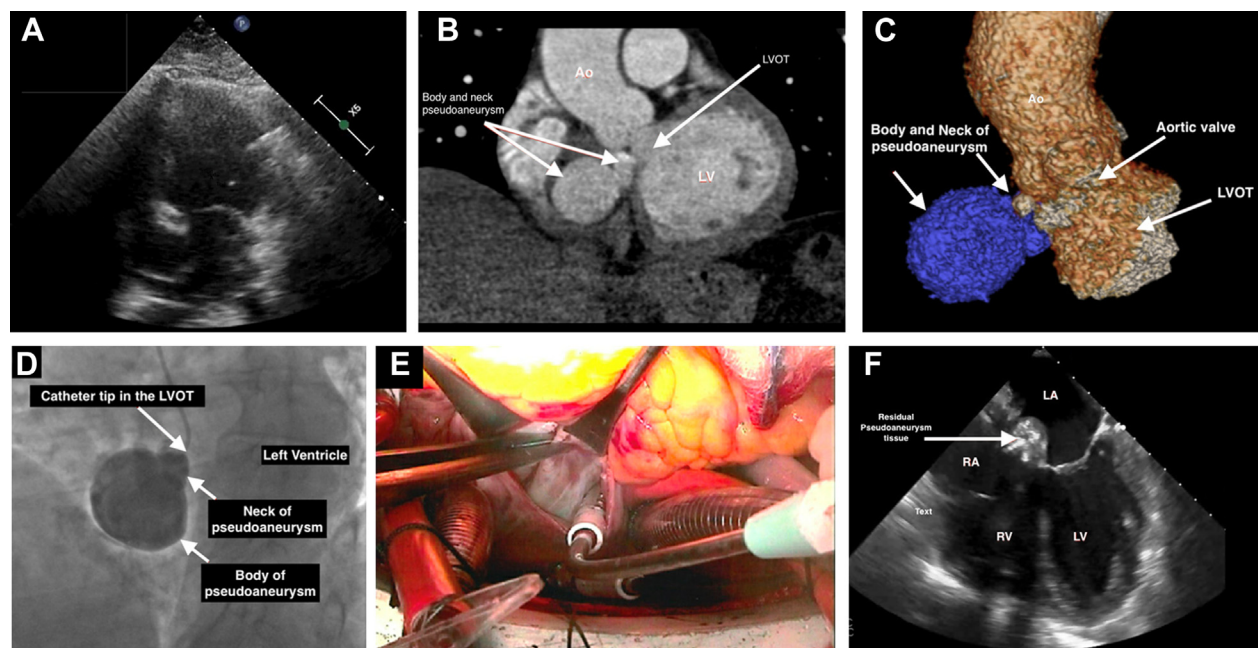
compressing the superior and inferior vena cava, which was likely the cause of her heart failure symptoms. An incision was made into the aorta, the aortic valve leaflets were retracted, just below the noncoronary sinus in the septum, an entry 2 to 3 mm in diameter was made into the cavity of the pseudoaneurysm, and the defect was securely closed. An incision was made via the right atrium into the interatrial bulge to open the cavity of the pseudoaneurysm, and a laminated clot was extracted (**Figure 1E**). The base of the pseudoaneurysm showed another opening that seemed to go into a small blind sac, which was primarily closed. After repair and drainage, post-procedural TEE and TTE revealed a small residual cavity with no obvious flow seen from the right atrial or LVOT side (**Figure 1F**, **Supplemental Figures 5 and 6**, **Videos 4 and 5**). At the 6-month follow-up visit, the patient had complete resolution of symptoms, and TTE showed some thickening but no evidence of residual pseudoaneurysm.

## FUNDING SUPPORT AND AUTHOR DISCLOSURES

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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**FIGURE 1** Left Ventricular Outflow Tract Pseudoaneurysm Imaging



Evaluation of the pseudoaneurysm with multiple advanced imaging modalities including computed tomography (CT), angiography, and echocardiography. These figures will help understand the anatomical location of the pseudoaneurysm and postprocedural outcomes. **(A)** Preoperative 4-chamber transthoracic echo showing the connection of the pseudoaneurysm to the LVOT. **(B)** Preoperative sagittal cardiac CT showing the LVOT pseudoaneurysm. The pseudoaneurysm was exerting mass effect on the surrounding interatrial septum. **(C)** 3D constructed CT of the pseudoaneurysm demonstrating the connection between the pseudoaneurysm and the LVOT. **(D)** Preoperative selective angiogram of pseudoaneurysm showing a well-demarcated cavity originating from the LVOT. **(E)** Surgical field image showing the cavity of the pseudoaneurysm. **(F)** Intraoperative 4-chamber view transesophageal echocardiogram showing the residual pseudoaneurysm. Ao = aorta; LA = left atrium; LV = left ventricle; LVOT = left ventricular outflow tract; RA = right atrium; RV = right ventricle.

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**KEY WORDS** aneurysm, false aneurysm, left ventricular outflow tract, pseudoaneurysm

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 **APPENDIX** For supplemental figures and videos, please see the online version of this paper.