Aorto-Left Ventricle Fistula in Aortic Valve Endocarditis Found to Mimic Valsalva Sinus Aneurysm Rupture into the Left Ventricle: A case study

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Abstract: Aorto-cardiac fistula (ACF) is a rare condition that is often complicated by perivalvular extension of infective endocarditis. Here we report the case of 43-year-old woman with aorto-left ventricle fistula in aortic valve endocarditis, whose echocardiographic manifestations mimicked a ruptured Valsalva sinus aneurysm. The patient was treated successfully with aortic valve replacement and repair of aorto-left ventricle fistula. Based on this rare case, we analyze the factors of misdiagnosis and offer suggestions to improve the diagnostic accuracy of ACF.

Key words: Aorto-cardiac fistula; Valsalva sinus aneurysm; Echocardiography

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Case report

A 43-year-old woman with a 2-month history of dyspnea, tachypnea, and productive cough, who was initially treated for pneumonia, was admitted to our hospital with progressive chest distress. She had no history of fever. On physical examination, her temperature was 98.2°F (36.8°C), blood pressure 128/74 mmHg, and pulse rate 95 b/min. Precordial auscultation disclosed a grade 2/6 diastolic murmur along the left sternal border. The 12-lead electrocardiogram showed sinus tachycardia with ST-segment elevation and features of left ventricular hypertrophy. Chest X-ray demonstrated cardiac enlargement and pulmonary congestion. Laboratory findings were normal.

Transthoracic echocardiography (TTE) demonstrated a sac-like structure (32×16 mm) located between the left ventricular outflow tract (LVOT) and the aorta. The parasternal long-axis view of the left ventricle showed the discontinuity of the sac wall (Fig. 1C). Color Doppler flow imaging showed a large shunt from the sac to the LVOT (Fig. 1C). Continuous-wave Doppler echocardiography revealed obstruction of the aortic root in systole owing to the sac collapsing back to the aorta during systole (Fig. 1D). Doppler echocardiography also showed severe aortic regurgitation. No vegetation of the aortic valve was identified. The patient refused transoesophageal echocardiography examination. Therefore, based on her medical history and TTE results, the patient was diagnosed with Valsalva sinus aneurysm rupturing into the left ventricle.

The patient underwent open surgery. Surgery found the presence of aorto-left ventricle fistula (Fig. 2A) and vegetations attached to the aortic valve (Fig. 2B). The patient was treated successfully by aortic valve replacement with a mechanical bileaflet prosthetic LVOT during diastole and collapsed back to the aorta during systole (Fig. 1A, 1B). The parasternal long-axis view of the left ventricle showed the discontinuity of the sac wall (Fig. 1C). Color Doppler flow imaging showed a large shunt from the sac to the LVOT (Fig. 1C). Continuous-wave Doppler echocardiography revealed obstruction of the aortic root in systole owing to the sac collapsing back to the aorta during systole (Fig. 1D). Doppler echocardiography also showed severe aortic regurgitation. No vegetation of the aortic valve was identified. The patient refused transoesophageal echocardiography examination. Therefore, based on her medical history and TTE results, the patient was diagnosed with Valsalva sinus aneurysm rupturing into the left ventricle.

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valve and repair of the aorto-left ventricle fistula. The postoperative course of this patient was uneventful and her clinical symptoms improved remarkably. She was discharged in good condition two weeks after the operation. The study was approved by an institutional review committee, and she gave informed consent.

Discussion

Perivalvular extension of infective endocarditis (IE) occurs in approximately 10%-40% of native valve IE, especially aortic valves [1]. On rare occasions, perivalvular extension may cause serious complications, including perivalvular abscess, pseudoaneurysm, and further development of an aorto-cardiac fistula (ACF) [2]. ACF is a rare condition that is estimated to account for 2.2% of native valve IE [1]. It increases the risk for mortality and frequently requires surgical intervention.

Despite careful examination, our patient was misdiagnosed as having a Valsalva sinus aneurysm that had ruptured into the left ventricle, based on her echocardiographic features. Factors that might have contributed to misdiagnosis included: (1) The patient did not experience fever; (2) the results of the blood
tests obtained to assess the presence of infection were normal; (3) TTE did not show vegetation; and (4) the echocardiographic features were similar to a ruptured Valsalva sinus aneurysm.

Based on an analysis of these factors, we suggest that the accuracy of an ACF diagnosis could be improved in a number of ways. First, a detailed medical history of the patient should be obtained. Second, transesophageal echocardiography is recommended for the detection of small vegetations as well as valvular lesions to improve the diagnostic accuracy [3]. Third, the sac wall should be carefully observed in multiple views by echocardiography, given that the abscess wall is usually uneven, while a Valsalva sinus aneurysm wall is thin and fibrous [4].

To the best of our knowledge, this case may be the first report of aorto-left ventricle fistula in aortic valve endocarditis mimicking a ruptured Valsalva sinus aneurysm. Although echocardiography is a valuable tool for diagnosing aortic valve endocarditis and its complications, the medical history of the patient and other imaging examinations are essential to make the correct diagnosis.

**Conflicts of Interest**

All authors concur with the submission and have no financial & commercial conflicts of interest related to this work.

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