A Surgical Case of Prosthetic Valve Endocarditis with a Difficult Diagnosis

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Early diagnosis and treatment of prosthetic valve endocarditis (PVE) is important because it has a high mortality rate. We report a case of PVE which was difficult to diagnose. A 36-year-old man, who had undergone an aortic valve replacement (AVR) 7 years prior, was hospitalized with a high fever of unknown origin. We could not detect a stuck valve, vegetations or abscesses using echocardiography, and the peak aortic transvalvular pressure gradient had increased to 81 mmHg. We suspected PVE and initiated intravenous antibiotic therapy immediately. On day 5, echocardiography demonstrated an abnormal shadow directly under the prosthesis, and we definitively diagnosed PVE and performed an operation. Intraoperatively, the prosthesis was not vegetative, but the left ventricular outflow tract was filled with vegetation that was nearly obstructing it. After dissecting the infectious focus, we performed a re-AVR. Postoperative echocardiography showed that the peak left ventricular aortic pressure gradient decreased to 30 mmHg. Obstructive vegetation is difficult to diagnose by preoperative echocardiography.

Keywords: prosthetic valve endocarditis, infective endocarditis, obstructive vegetation, aortic valve replacement

Introduction

Prosthesis valve endocarditis (PVE) has a high mortality rate ranging from 20% to 80% of affected patients. Diagnosis of PVE is more difficult than that of native valve endocarditis (NVE), and the application of Duke criteria is less useful in this setting. We report a case of PVE that was difficult to diagnose.

Case Report

A 36-year-old man who had undergone an aortic valve replacement (AVR) 7 years prior was hospitalized with a fever of unknown origin. The temperature was 38.7°C; blood pressure, 95/67 mmHg; and pulse, 87/min and regular. Levine III/VI systolic ejection murmur was audible at the fourth intercostals space of the left sternal border. A blood test showed that white blood cell count and serum C-reactive protein levels were elevated to 10800/cm³ and 19.6 mg/dl, respectively.

Transthoracic echocardiography showed that the ejection fraction was 61%, and the peak aortic transvalvular pressure gradient was increased to 81 mmHg. Echocardiography (transthoracic and transesophageal) did not detect any prosthesis valve dysfunctions, such as a stuck valve, perivalvular leakage, vegetation or abscesses. Contrast-enhanced computed tomography revealed embolism of the spleen and kidney. We suspected PVE, but a blood culture showed negative results, and intravenous antibiotic
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therapy (2 g/day vancomycin and 120 mg/day gentamicin) was initiated immediately.

On day 5, echocardiography demonstrated an abnormal shadow directly under the prosthesis and the peak aortic transvalvular pressure gradient increased from 81 mmHg to 91 mmHg (Fig. 1). PVE was then definitively diagnosed, and we performed an operation.

Intraoperatively, the prosthesis was not vegetative, but the left ventricular outflow tract was filled with vegetation that was nearly obstructing it (Fig. 2). After removing the prosthesis, dissecting the infectious focus that permeated to the aortic annulus (from the noncoronary cusp to the left coronary cusp), and reinforcing the annulus with patch plasty using horse pericardium, a 19-mm prosthesis (Regent; St. Jude Medical, St. Paul, MN) was implanted. Postoperatively, the patient continued antibiotic therapy (1200 mg/day linezolid). Postoperative echocardiography showed that the peak aortic transvalvular pressure gradient decreased to 30 mmHg. The patient achieved complete remission and was discharged from hospital on day 85 after the operation.

Discussion

PVE is a severe complication of valve replacement and has been reported to occur in 1% to 6% of patients with a valve prosthesis. It has a high mortality rate; therefore, early diagnosis and treatment is necessary.

Pathogenesis of PVE differs according to mechanical and bioprosthetic valves. In the case of mechanical PVE, the infection usually initiates on the periannular site and involves the junction between the sewing ring and the annulus, leading to perivalvular abscess, dehiscence, pseudoaneurysms, and fistula. Regardless of the type of prosthesis and pathogenesis, large vegetations can result in both regurgitation and obstruction.

The diagnosis of PVE is more difficult in the presence of prosthetic valves and is mainly based on the results of blood cultures and echocardiography; however, both are more frequently negative in PVE than in NVE. Moreover, negative findings in echocardiography may be observed in up to 20% of patients with NVE and they are more frequent in PVE. Transesophageal echocardiography (TEE) is useful in the assessment of PVE because of its better sensitivity and specificity for the detection of vegetations, abscesses, and other perivalvular lesions.

Habib et al. suggested several reasons why PVE is
difficult to diagnose. First, vegetation is less frequent in PVE than in NVE, whereas abscesses are more frequent. Second, both sensitivity and specificity of TEE, even if better than transthoracic echocardiography, are worse in PVE. The presence of intracardiac material may make the identification of vegetations and small abscesses more difficult in some patients. Third, TEE may be initially falsely negative in true PVE, and it needs to be repeated in case of a high level of clinical suspicion.

**Conclusion**

We found that obstructive vegetation was difficult to diagnose using preoperative echocardiography. Repeated echocardiography is useful for diagnosis of PVE.

**References**