Redo an Aortic Valve Replacement for Bioprosthetic Valve Destruction in a Patient Developing Streptococcus Bacteremia Three Years After the Initial Operation

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A 66-year-old man with a bioprosthetic aortic valve developed Streptococcus bacteremia and was treated with antibiotics. He responded well to this therapy, and no evidence of bioprosthetic valve endocarditis (BVE) was detected at this time. One-and-a-half years after the antibiotic therapy for bacteremia, the patient was referred to our department with a diagnosis of acute cardiac failure. Transthoracic echocardiography revealed torn bioprosthetic valve leaflets with severe aortic regurgitation. A redo aortic valve replacement was undertaken, followed by antibiotic therapy for 6 weeks after the surgery. A histopathological examination of the surgically resected valve suggested a healed infective BVE. No recurrence of bacteremia has been noted since the reoperation. (Ann Thorac Cardiovasc Surg 2010; 16: 210–212)

Key words: bioprosthetic valve endocarditis, bioprosthetic valve destruction, bacteremia, aortic valve replacement

Introduction

One of the most severe complications of prosthetic valve replacement is prosthetic valve endocarditis, which may cause prosthetic valve destruction and is associated with high mortality. We report a case of bioprosthetic valve destruction caused by prolonged bioprosthetic valve endocarditis (BVE).

Case

A 66-year-old man underwent aortic valve replacement (AVR) 5 years ago with a bioprosthetic valve for severe aortic stenosis and regurgitation. Three years after this operation, he developed a high fever and received antibiotic therapy because Streptococcus species was detected in blood cultures. Transthoracic echocardiography and multidetector computed tomography (CT) revealed no findings suggestive of BVE (e.g., vegetations). The patient responded well to the antibiotic therapy and was discharged. However, one-and-a-half years after this medical treatment for bacteremia, he was referred to our department with the diagnosis of acute cardiac failure. The physician who referred the patient to us had detected a sudden increase in loudness of the diastolic murmur over the left edge of the sternum. On admission, the patient was afebrile, but in respiratory distress. The peripheral white blood cell count and C-reactive protein concentration were within normal range. No bacteria were isolated on blood cultures. Transthoracic echocardiography revealed torn bioprosthetic valve leaflets with severe aortic regurgitation (Fig. 1). The cardiac failure was managed by medical treatment, and a redo AVR with a bioprosthetic valve was performed electively. During the operation, no vegetations or actively infected tissues suggestive of active endocarditis were detected. The central coaptation zone of the three leaflets, whose...
edges were calcified, was torn (Fig. 2). Histopathologically, these torn parts showed necrotic fibrous tissue and calcification with inflammatory cell infiltration, and histological examination of Gram’s stained sections (×40) showed numerous gram-positive dots, suggestive of extinct gram-positive spherobacteria (Fig. 3). The day after the operation, the endotracheal tube was extubated, and physical rehabilitation was commenced. Following additional antibiotic therapy for 6 weeks, the patient was discharged and left the hospital walking unassisted. No further recurrence of bacteremia has been observed.

Discussion

The incidence of endocarditis among patients with a prosthetic valve and bacteremia is quite high. Some reports have suggested that approximately half of the patients with a prosthetic valve and Staphylococcus aureus bacteremia may develop prosthetic valve endocarditis. Furthermore, prosthetic valve endocarditis is associated with a high mortality. Therefore the possibility of bioprosthetic valve endocarditis must be considered in patients with a bioprosthetic valve showing any signs of bacteremia.

In patients showing a deterioration of BVE, it is often difficult to determine the optimal timing of redo surgery because of the presence of a variety of comorbidities preoperatively. Since medical treatment does not yield satisfactory outcomes because of the presence of comorbidities, early diagnosis is indispensable. Transthoracic echocardiography is a commonly used modality to detect BVE, but its diagnostic accuracy for endocarditis is not satisfactory. Transesophageal echocardiography is a more effective tool for the diagnosis of prosthetic valve endocarditis. Multidetector CT is also useful for the detection of vegetations.

In our present patient, it can be supposed, based on the results of the histopathological investigation, that BVE caused by Streptococcus bacteremia produced tears of the bioprosthetic valve leaflets. Although the mechanism of this valve destruction remains speculative without repeated investigations following the medical treatment for bacteremia, one possibility is to assume that the incomplete medical treatment for bacteremia resulted in residual endocarditis. This subsequently made the tips of the leaflets frail and directly resulted in the destruction of the valve leaflets. Another possibility is that acute BVE was successfully treated medically, but in the chronic phase the inflammatory changes persisted and developed into calcified and fragile tips of leaflets, which abruptly blew away. In this...
case the latter seems quite probable; it is consistent with operative findings and the result of histological examinations. A sudden increase in the loudness of the diastolic murmur also suggests abrupt valve destruction in the chronic phase.

At the time of detection of the Streptococcus bacteremia, echocardiography and CT revealed no evidence of BVE (vegetation and/or valve destruction); however, the repeated and more-detailed investigations for BVE have remained insufficient. We wish to emphasize the necessity of repeated and detailed investigations for BVE and possible valve destruction in patients with a bioprosthetic valve presenting with bacteremia.

**Conclusion**

We successfully performed a redo AVR for a torn bioprosthetic valve because of a healed BVE. Detailed and repeated investigations for BVE must be performed in patients with a bioprosthetic valve presenting with bacteremia.

**References**