Triple-valve treatment for prosthetic valve endocarditis occurring 20 years after implantation of a Carpentier-Edwards pericardial bioprosthesis in the aortic valve

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Abstract A 68-year-old woman had undergone aortic valve replacement and open commissurotomy 20 years previously. At the beginning of 2008, fever, cold, and heart failure symptoms were noted. On blood culture, *Streptococcus oralis* was detected three times. Surgery was performed under a diagnosis of prosthetic valve endocarditis in the aortic valve, mitral stenosis and insufficiency, and tricuspid insufficiency. Techniques consisted of additional aortic valve replacement, mitral valve replacement, and tricuspid annuloplasty. Vegetation was macroscopically and pathologically observed in the extirpated Carpentier-Edwards pericardial bioprosthesis that had been placed in the aortic valve. There was no postoperative recurrent inflammatory response. The patient was discharged 32 days after surgery.

Key words Prosthetic valve endocarditis · Reoperation · Bioprosthesis · Double valve replacement

Introduction

The incidence of prosthetic valve endocarditis (PVE) ranges from 0.3% to 1.2% per patient-year. Currently, the mortality rate related to additional valve replacement in patients with PVE remains at 20%–80%. PVE is a serious complication after valve replacement. Furthermore, it is difficult to diagnose PVE, leading to a poor prognosis and making the selection of therapeutic strategies difficult. In this study, we initially report a patient who required triple-valve treatment for PVE, which occurred 20 years after the implantation of a Carpentier-Edwards Perimount pericardial bioprosthesis (CEP; Edwards Lifesciences, Irvine, CA, USA).

Case

A 68-year-old woman complained of fever and exertional dyspnea. She had undergone aortic valve replacement (CEP, 23 mm) and open mitral commissurotomy (OMC) to treat rheumatic aortic and mitral valve stenosis 20 years previously. The reason a bioprosthetic valve was selected was unclear. Untreated dental caries had been present. At the beginning of 2008, fever, cold, and heart failure symptoms were noted. The patient consulted a local clinic, and levofloxacin was orally administered. Her symptoms did not subside, however, and she was subsequently admitted to the hospital.

Transthoracic and transesophageal echocardiography revealed sclerosis and stenosis (pressure gradient 20.5 mmHg) of the bioprosthetic aortic valve, mild aortic valve regurgitation, mild mitral stenosis, moderate mitral valve regurgitation, and severe tricuspid valve regurgitation. Neither transthoracic nor transesophageal echocardiography showed any vegetation in the valve. On transthoracic echocardiography, the ejection fraction (EF) was 62.9%. The echocardiographic findings were similar to those on periodic outpatient consultations. On blood culture, *Streptococcus oralis* was detected three times. Ampicillin and sulbactam sodium at 6 g/day were
administered taking into consideration the sensitivity test. However, the white blood cell count (WBC) was 12,400/μl, and the C-reactive protein (CRP) level was 3.22 mg/dl; the inflammatory response was not reduced. Furthermore, the New York Heart Association (NYHA) grade was evaluated as III, suggesting heart failure. The patient was then referred to our hospital.

On admission to our hospital, physical findings included Levine III/VI systolic murmurs in the third left intercostal space and edema and petechia of the lower thigh. Roth’s patch was observed in the ocular fundus. On chest radiography, the cardiothoracic ratio was 64.8%, suggesting marked cardiac dilatation and slight pulmonary congestion (Fig. 1). Electrocardiography showed chronic atrial fibrillation, with a pulse rate of 87/min, as well as monosource-related ventricular extrasystole.

Surgery was performed 4 days after the patient was referred to our hospital. Cardiopulmonary bypass (CPB) was established by cannulation of the right femoral artery and vein, and median sternotomy was performed. The aorta was clamped, after cannulation of the superior vena cava. Crystalloid cardioplegia was infused antegradely to induce cardiac arrest. The body temperature was maintained at mild hypothermia. Aortotomy was performed, and the previous prosthetic valve (CEP, 23 mm) was resected. Vegetation was observed in the bioprosthetic valve. Although valvular destruction was not noted, sclerosis was marked (Fig. 2). Inflammation did not involve the annulus. After débridement of the annulus, a 20-mm ATS AP valve (ATS Medical, Minneapolis, MN, USA) was sutured by everting mattress sutures. Subsequently, a transseptal approach was employed to reach the mitral valve, in which there was no vegetation (Fig. 3). A 27-mm ATS valve was sutured by everting mattress sutures. Annuloplasty was performed in the tricuspid valve using a 28-mm Edwards MC³ (Edwards Lifesciences).

Pathological findings of the bioprosthetic valve included atheroma with cholesterol crystals/foam cells, a fibrin mass with a bacterial mass (Gram-positive coccus)/calcification in the superficial layer, and vegetation (Fig. 4). Pathological findings of the mitral valve included vitrification/fibrosis-related thickening with partial calcification as well as slight myxoid degeneration. Vegetation was not observed. An intraoperative specimen of the bioprosthetic valve was negative for bacteriological findings.

Postoperatively, inflammation did not recur, and blood culture findings were negative. Her heart function improved, and she was referred to the previous clinic 32 days after surgery.