Research Article

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Drops in Blood Pressure Could Be a Sign of Structural Valve Failure

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Abstract

A 55-year-old man underwent aortic valve replacement (AVR) by 25mm Trifecta bioprosthesis for severe aortic regurgitation. Twenty-six months after surgery, he noticed decrease in daily blood pressure, especially in the diastolic phase. He did not have any other clinical symptoms, however, transthoracic echocardiogram showed severe aortic regurgitation with dehiscence of non-coronary cusp of the Trifecta valve. He underwent redo AVR. The Trifecta valve had a cusp tear along the non-coronary cusp. There was neither calcification nor pannus ingrowth. A 25mm Inspiris Resillia bio-prosthesis was implanted. Postoperative course was uneventful.

Keywords

Structural valve destruction, Trifecta.

INTRODUCTION

The Trifecta aortic pericardial valve (St Jude Medical, St. Paul, Minn, USA) is composed of a titanium framework covered with porcine pericardium and externally mounted bovine pericardium. Good mid-term results had been demonstrated [1-3]. However, there had been several reports regarding early structural valve degeneration (SVD) after aortic valve replacement (AVR) by the Trifecta [4-6]. Here, we present a case who underwent redo AVR 26 months after first AVR by the Trifecta due to sudden cusp tear.

CASE REPORT

A 55-year-old man underwent aortic valve replacement (AVR) by 25mm Trifecta bioprosthesis for severe aortic regurgitation. Twenty-six months after surgery, he noticed decrease in daily blood pressure, especially in the diastolic phase. He did not have any other clinical symptoms. On previous AVR, Trifecta 25mm bioprosthesis was implanted by everting mattress sutures without pledges. On admission, he had no complaint of dyspnea nor palpitation, however, a grade 3 diastolic murmur was audible along the fourth left sternal border. His daily blood pressure chart showed around 90~100/55~65mmHg which had been around 110~120/80~90 mmHg before 3 days (Table 1). Chest X-ray showed slightly widened cardio-thoracic ratio and there was no significant pleural effusion. Serum BNP level was 226.9 pg/ml, which was 34.8pg/ml 5 months ago. Trans-thoracic echocardiogram showed severe aortic regurgitation (AR), and trans-esophageal echocardiogram showed that AR was caused by dehiscence of the non-coronary cusp of the Trifecta valve (Figure 1). He underwent redo AVR. The Trifecta valve had a cusp tear along the non-coronary cusp, and there was neither calcification nor pannus ingrowth (Figure 2). A 25mm Inspiris Resillia bioprosthesis was implanted. Postoperative course was uneventful. On histopathologic examination, tissue around cusp detachment did not show any calcification nor signs of active or healed infective endocarditis.

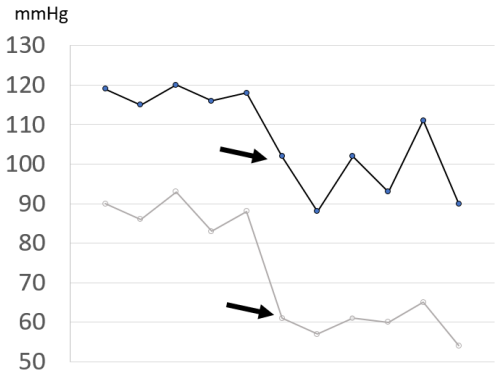

Table 1: Daily blood pressure charts by the patient himself. The day of the arrow showed drop in both systolic and diastolic pressure.

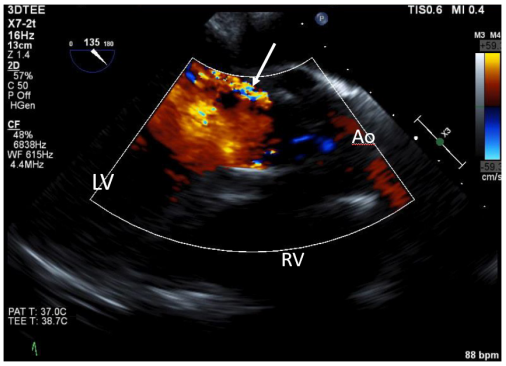

Figure 1: Transesophageal echocardiogram demonstrates aortic regurgitation (*arrow*). LV, the left ventricle; RV, the right ventricule.

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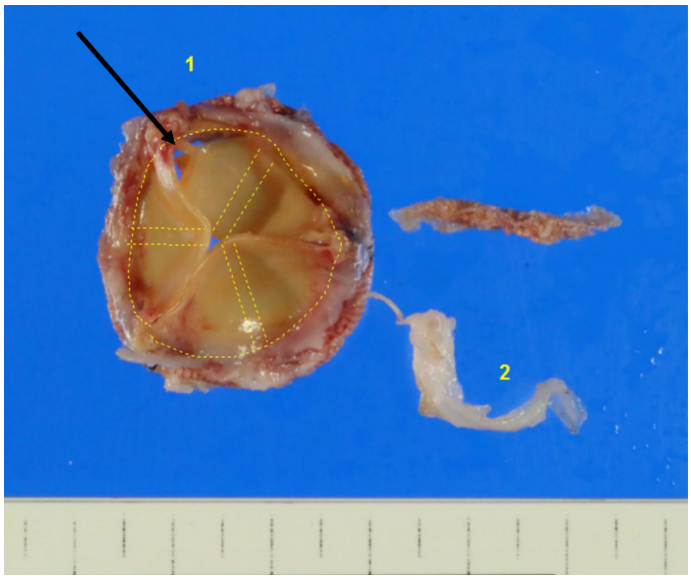

Figure 2: Tear of the suture zone between pericardia leaflet and the stent.

DISCUSSION

The use of bioprosthetic aortic valve replacement (AVR) has increased in recent years for elderly patients or young patients who do not prefer to take oral anticoagulation. Mid-term results by single-center study of 824 patients [1] and multi-center study of 710 patients [2] have shown low rate of patient prosthesis mismatch (PPM) and reoperation. Especially, good hemodynamic performance is attractive for patients with high risk of PPM by a small annulus. Colli et al. studied hemodynamic differences between the Trifecta and the Magna Ease bioprosthesis (Edwards Lifesciences, Irvine, CA, US) and demonstrated severe PPM (the indexed effective orifice area < 0.65 cm^2/m^2) occurred lower in patients with the Trifecta than with the Magna Ease (0.6% vs. 8.5%, $p < 0.001$) [7].

On the other side, early structural valve degeneration (SVD) after AVR by Trifecta bioprosthesis have been recently reported [4-6]. Fukuhara et al reviewed 1058 patients and compared Trifecta group (n=508) and control group (n=550) and showed higher occurrence of SVD in Trifecta group within 7 years (13.3% vs. 4.6%) [4]. All cases with SVD in control group showed aortic stenosis, but the pathologic features of SVD in Trifecta group were; aortic stenosis (AS) in 45.5%, aortic regurgitation (AR) in 31.8% and mixed failure in 22.7%. Kaneyuki et al. reviewed 107 implantation of Trifecta bioprosthesis and demonstrated that the incidence of early Trifecta valve failure was 3.1% in 48 months and 14.1% in 72 months [5]. Seven patients underwent redo operation due to SVD (6.5%). They demonstrated that common feature of SVD is fibrofatty tissue adherent to the inflow portion of the valve and a partial tear of the cusp which resulted in AR or leaflet calcification in both inflow and outflow portion of the valve which resulted in AR.

In conclusion, we experienced early SVD of Trifecta bioprosthesis, due to sudden cusp tear. Daily blood check was effective for early detection of SVD caused by cusp tear.

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