Surgical technique for aortic regurgitation attributable to Behcet’s disease: modified aortic valve replacement with reinforcement of the aortic wall

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Abstract

Aortic regurgitation is a severe cardiovascular complication of Behcet’s disease, resulting in high mortality rates within the Asian population. Standard surgical interventions have resulted in poor results in the long term. We herein report on a modified aortic valve replacement technique coupled with reinforcement of the aortic wall. During this procedure, Teflon felts and continuous mattress stitches were used to reinforce the aortic wall in order to prevent prosthetic valve detachment and formation of an aortic pseudoaneurysm. Postoperative examinations revealed that this procedure had satisfactory mid-term results.

Keywords: Behcet’s disease • Aortic regurgitation • Valve replacement

INTRODUCTION

Aortic regurgitation (AR) attributable to Behcet’s disease is not uncommon in the Asian population. Surgical treatment is recommended for patients who have developed severe AR and decompensation to heart failure. However, standard aortic valve replacement (AVR) results in a high risk for postoperative morbidity and prosthetic valve detachment [1]. Aortic root replacement (ARR) has been recommended by some surgeons in order to prevent possible valve detachment and formation of pseudoaneurysms [2]; however, its application in the clinic requires further documentation due to the high risk of haemorrhage. In this report, we describe a modified AVR technique with reinforcement of the aortic root for such AR patients.

METHODS

A 33-year-old male was admitted to our department with a diagnosis of Behcet’s disease. Echocardiography revealed a severe AR (Grade 3/4) with a compromising ejection fraction of 40%. Since the condition of the patient was probably in the active phase as ESR increased (34 mm h⁻¹), thalidomide (50 mg per night) and prednisone (20 mg per day) were given orally 2 weeks prior to surgical palliation.

During operation, the aortic wall was thickened, with significant congestion and swelling. Neither a pseudoaneurysm nor sinus of Valsalva aneurysm was present. After establishment of cardiopulmonary bypass, a transverse incision was made on the ascending aorta 1.5 cm superior to the annulus. Dilation of the aortic annulus and prolapse of leaflets were observed. The annulus was too fragile with adhesion of small lesions and inflammatory tissue to support the prosthetic valve. After resection of the leaflets, a modified valve replacement procedure with reinforcement of the aortic root was performed. To prevent injury to the coronary arteries, a 6-Fr Fooley catheter was inserted into the lumen and served as a guide wire for subsequent mobilization of proximal areas (2 cm). Beneath the ostia of both coronary arteries, a 10.0 × 1.0 cm Teflon felt was placed and it immediately encircled the aortic root. If the aortic root was dilated, the felt acted as a band to reduce the inside diameter approximately equal to the normal ascending aorta. Using continuous mattress stitches, a double-armed 3-0 polypropylene suture line was placed 1.0 cm beneath the ostium of the left coronary artery, passing from outside to inside through the felt strip, the aortic wall and finally the sewing ring of the prosthetic valve sequentially. Stitches were then passed in a continuous line retrogradely (Fig. 1). By so doing, the aortic wall was sandwiched between the external subannular felt and the sewing ring of the prosthetic valve. Caution was taken to avoid injury to the coronary arteries, especially where stitches were passing below. Then the suture was tightened to secure the prosthetic valve at the level of the ventriculoaortic junction somewhat lower than the annulus in order to avoid possible obstruction of the coronary artery ostia (Fig. 2).

Immunosuppressive therapy was begun immediately after admission to intensive care unit. Methylprednisolone (40 mg per day) was given intravenously for 4 consecutive days. After that, oral administration of prednisolone (10 mg per day) as well as thalidomide (50 mg per day) was begun. During the 20-month follow-up period, the patient remained symptom-free, with both CRP and ESR values remaining at normal levels. Neither AR nor prosthetic valve detachment were noted during the latest echocardiography follow-up.
COMMENT

Up to 30% of patients with Behcet’s disease develop cardiovascular complications [3]. Although AR was less common in patients with Behcet’s disease, the prognosis was poor. Jeong et al. [1] reported the surgical outcomes of 19 patients during a 22-year follow-up period. Overall mortality was 47.3%. Fifteen patients (78.9%) required reoperation for valve detachment. Other studies have also indicated that standard AVR procedures seem disappointing as patients tend to develop valve detachment or pseudoaneurysms [4]. A modification of ARR reported by Azuma reported good mid-term results [5]. However, since the aortic annulus was fragile due to recurrent inflammation, whether a strengthened annulus can provide long-term support to the prosthetic valve and the possibility of subannular stenosis requires further follow-up. Our present technique chose to strengthen the aortic wall instead of the diseased annulus. By so doing, tension is mostly distributed on the felt and the sewing ring. Meanwhile, the felt could serve as a banding to prevent further dilatation and dissection. Some surgeons argued that the ARR procedure using homografts would significantly reduce reoperative risk [2]. Interestingly, most of the cases that reported on patients undergoing ARR show the development of aneurysms of the sinus of Valsalva, for which ARR is a plausible choice [1]. However, some patients, including the present case, have predominant lesions of valvulitis other than obvious aneurysm formation. This newly introduced technique might be more advisable than ARR for such cases, since ARR carries a higher risk of haemorrhage and higher medical costs than this technique.

When this technique is employed, care must be taken to prevent injury to the coronary arteries where the stitches remain. It is reported that ESR and CRP are negatively correlated with event-free periods [1]; thus, a normal ESR and CRP should be maintained as a goal for assessing the efficiency of immunosuppression. Postoperative echocardiography confirmed satisfactory short-term results using this technique. Further follow-up is still required to assess the long-term outcomes.

Conflict of interest: none declared.

REFERENCES