Recurrence of aortic regurgitation after valve-sparing aortic root replacement due to dilatation of a previously implanted Valsalva graft

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CLINICAL PROBLEM

Valve-sparing aortic root replacement (David reimplantation) has been recently used for treating annulo-aortic ectasia (AAE), and is associated with excellent survival and a low risk of late aortic valve replacement (AVR). However, the associated long-term durability of the repair remains uncertain because of the complexity of the aortic root and valve function. Previous studies have reported that the incidence of recurrent moderate aortic regurgitation 10 years after David reimplantation ranges from 10 to 30%, with some

Figure 1: (A) Three-dimensional computed tomographic reconstruction images of the aortic root, with a 28-mm Valsalva graft, 1 week after the previous operation. The diameter of the prosthetic graft was 24, 30 and 27 mm at the level of the aortic valve annulus, neo-Valsalva sinus and sinotubular junction (STJ), respectively. (B) Three-dimensional computed tomographic reconstruction images at the 6-year follow-up period show the dilated Valsalva graft. On the other hand, the sizes of the aortic valve annulus and STJ of the graft remained unchanged. The diameter of the prosthetic graft was 25, 34 and 27 mm at the level of the aortic valve annulus, neo-Valsalva sinus and STJ, respectively. The discreet creases of the suture lines reflect the prosthetic graft dilatation (white arrows). The shapes of the aortic valve annulus and STJ remain unchanged.
patients requiring AVR or a secondary David reimplantation [1–3]. The mechanisms underlying aortic regurgitation progression following David reimplantation remain unclear. We describe a rare case of recurrent aortic regurgitation that developed after David reimplantation, resulting from dilatation of an implanted Valsalva graft.

CASE DESCRIPTION

A 51-year old man presented with aortic regurgitation as a result of AAE. His medical history indicated the presence of mutations in smooth muscle alpha-actin (ACTA2). Echocardiography showed moderate-to-severe aortic regurgitation, accompanied with a dilated Valsalva sinus (diameter: 51 mm). Hence, the patient underwent David reimplantation with a 28-mm Valsalva graft (Gelweave Valsalva™ graft, Vascutek Ltd, a Terumo Company, Renfrewshire, UK). Intraoperative transoesophageal echocardiography indicated trivial aortic regurgitation arising from the centre of each cusp.

Over a 6-year follow-up period, transthoracic echocardiography indicated moderate-to-severe aortic regurgitation and a left ventricular end-diastolic diameter of 56 mm. The diameter of the implanted Valsalva graft increased at the level of the neo-Valsalva sinus. The sizes of the aortic valve annulus and sinotubular junction of the graft, however, remained unchanged (Fig. 1A and B). Moreover, the patient experienced persistent dyspnoea on exertion, and his symptoms gradually deteriorated. Therefore, we planned redo surgery.

The treatment solution for recurrent aortic regurgitation will be published in a forthcoming issue of ICVTS.

Conflict of interest: none declared.

REFERENCES


Treatment solution by Seike et al.

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The treatment of choice for recurrent aortic regurgitation after David reimplantation [1] was plication of the neo-sinotubular junction (STJ) of the implanted prosthetic graft. After cardiopulmonary bypass was established with bicaval cannulation and left femoral arterial cannulation via a standard median sternotomy, the ascending aorta was cross-clamped at the level of the distal ascending aorta, and cardiac arrest was induced with cold blood cardioplegia. A horizontal aortotomy was performed approximately 1 cm above the previous distal anastomosis site. The aortic valve cusps showed slight myxomatous degeneration without any fenestration. However, the entire implanted Valsalva graft was dilated, particularly at the level of the neo-Valsalva sinus and neo-STJ (Fig. 1A). The tops of the commissures were placed in the middle of the graft bulges. Consequently, the cusp coaptation zone height in the aortic valve was reduced. Thereafter, we performed subcommissural annuloplasty using pledged 3–0 Nespilene (Alfresa Pharma Corporation, Japan) at each of the three commissures. We then performed neo-STJ plication using 2–0 Ethibond (Ethicon, Johnson & Johnson, NJ, USA) running sutures, circumferentially, for the dilated Valsalva prosthesis (Fig. 1B). Finally, transoesophageal echocardiography revealed trivial aortic regurgitation arising from the centre. The patient had an uneventful postoperative course. Postoperative transthoracic echocardiography before

Figure 1: (i) Schema of postoperative findings with colour Doppler imaging of aortic regurgitation (AR) 1 week after the previous operation. The three commissures were located along the same plane; however, they were positioned on the high portion of the sinus skirt (black arrow-A) rather than on the boundary between the sinus skirt and the graft body (1 mm below the boundary). (ii) Schema of preoperative findings with colour Doppler imaging of AR at the 6-year follow-up. The implanted Valsalva graft was dilated (black arrow-B), particularly at the level of the neo-Valsalva sinus, and the AR jet had gradually increased. (iii) Schema of neo-STJ plication. The neo-Valsalva portion of the graft was plicated at a level coinciding with the top of the commissures, using 2–0 non-absorbable running monofilament sutures (black arrow).