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Modified valve-sparing reimplantation technique for para-commissural coronary ostia

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Abstract

In some patients undergoing a valve-sparing reimplantation technique, a coronary ostium may be very close to one of the commissures. This condition jeopardizes the coronary ostium patency and valve reimplantation. The authors describe a simple and safe modification of the reimplantation technique, leaving the misplaced coronary ostium attached to the commissure.

Keywords: Valve sparing • Aortic root • Aortic valve repair • Anomalous coronary ostium

INTRODUCTION

The valve-sparing reimplantation technique is widely performed for the treatment of aortic root pathology with a preservable valve. In rare cases, one of the coronary ostia may be anatomically misplaced very close to a commissure. Such a finding can compromise the reimplantation procedure due to the lack of sufficient tissue for suturing those structures if they are detached from each other. To overcome this challenge, a modification of the reimplantation procedure has already been described by Sheikh and David [1]. We review our experience with this specific revised technique.

OPERATIVE TECHNIQUE

Our standard valve-sparing reimplantation technique is described in a previous work [2]. The procedure begins by dissecting and releasing the aortic root down to the ventriculo-aortic junction. During resection of the sinuses of Valsalva, the misplaced coronary ostium is left attached to the commissure, leaving 5 mm of the aortic wall. A tunnel is created in the tissue below the misplaced coronary trunk using a right-angled forceps. The normally positioned ostium is isolated as usual (Fig. 1A). For the proximal suture line, 2/0 pledgeted Ticron stitches are placed as usual from inside to outside below the valve at the lower level of the external dissection of the aortic root. Below the misplaced coronary ostium, the two arms of the suture are placed at either sides of the coronary trunk (Supplementary Video 1). The Dacron graft (Vascutek® Gelweave Valsalva graft, TERUMO Corp., Ann Arbor, USA) is sized and prepared as usual. Modification of the technique consists in performing a vertical split from the proximal end of the graft at the level of the misplaced ostium. At the distal end of the split, in the Valsalva portion of the graft, a circular opening is created to fit the misplaced ostium (Fig. 1B). While passing the proximal suture-line stitches through the prosthesis, the two arms of the stitch

below the misplaced ostium are placed on either side of the proximal end of the incision (Fig. 2A). Then, one end of the latter suture is passed below the coronary trunk using a right-angled forceps, in order to close the split while tying the suture (Fig. 2B and C). Care must be taken to verify that the coronary trunk is not kinked or compressed and is correctly seated (Supplementary Video 2). After tying the remaining sutures of the proximal line, the three commissures are suspended to the neo-sinotubular junction of the Valsalva graft with 4/0 polypropylene suture. The valve is then reimplanted with a second suture line. This suture line follows the contour of the valve and, at the level of the misplaced coronary ostium, it follows the contour of the coronary button (Fig. 2D). The normally positioned coronary ostium is reimplanted as usual.

COMMENTS

Among the 267 patients who underwent valve-sparing reimplantation between 1999 and 2012, the modified reimplantation technique was performed in 3. The misplaced ostium was the right one in 2 patients, and the left in 1. Two patients had a bicuspid aortic valve and 1 had a tricuspid aortic valve. Cusp prolapse repair by central plication was performed in 2 patients. There was no hospital mortality or morbidity. At the 2-, 12- and 50-month follow-up, all patients are asymptomatic with no aortic regurgitation.

Coronary ostia malposition in the setting of root aneurysms is a rare anomaly generally diagnosed intraoperatively. One type of coronary ostia malposition is the high take-off of the right coronary ostia at the level of or above the sinotubular junction. This anomaly does not represent a major problem for the valve-sparing reimplantation procedure, the ostium being reimplanted respecting its position above the neo-sinotubular junction. In the other type of coronary ostia malposition, the ostium is so close to the aortic valve commissure that structures cannot be separated

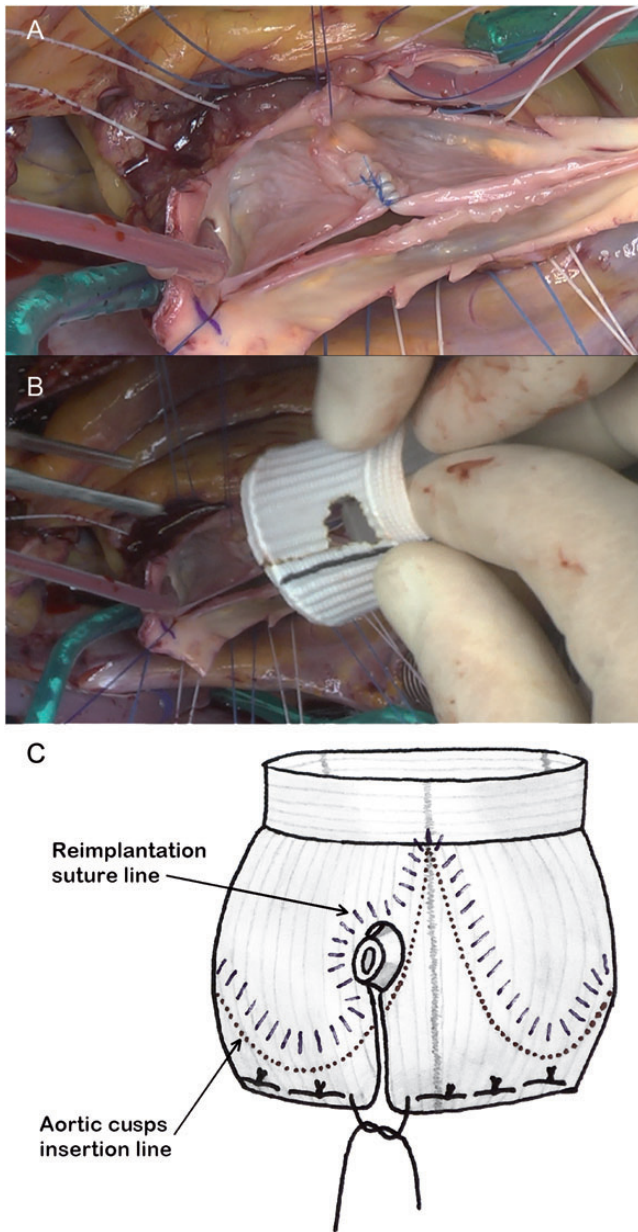


Figure 1: (A) The aortic root prepared for valve-sparing reimplantation. The valve is bicuspid with the left coronary ostium close to the posterior commissure. (B) Preparation of the Valsalva graft: an opening corresponding to the coronary ostium diameter is created with a vertical incision near the commissural landmark of the graft. (C) The coronary ostium is seated in a hole at the top of the incision in the graft. The reimplantation suture line follows the contour of the valve and the ostium. The gap in the graft is closed by tying the proximal suture.

with enough surrounding aortic wall to allow adequate reimplantation onto the graft. The modified valve-sparing reimplantation technique we used for this type of coronary ostia malposition is similar to that described by Sheikh and David [1]. Their data and ours suggest that the technique is reproducible and safe, respects valve geometry and ensures its function. A modification of the

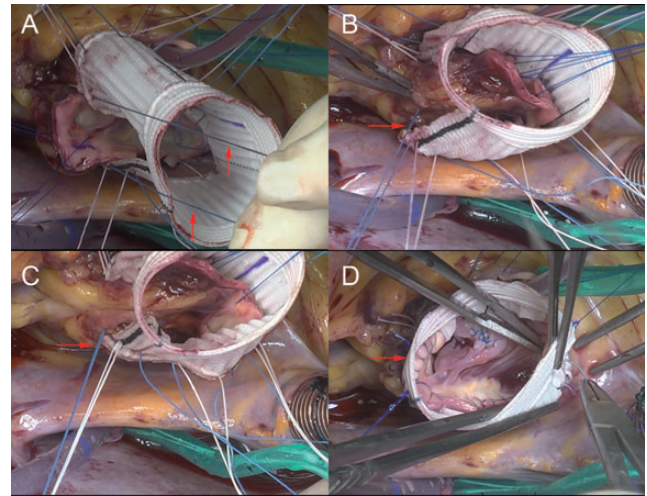


Figure 2: (A) The two arms of the suture under the ostia are placed on either side of the vertical incision of the graft. (B) One of the two arms of the suture is passed under the coronary trunk to join the other arm. (C) The suture under the ostium is tied to close the gap on the Dacron graft. (D) Reimplantation of both the valve and the misplaced ostium, following their contours.

valve-sparing remodelling technique has also been described for this type of coronary ostia malposition [3].

CONCLUSION

This modified valve-sparing reimplantation technique for patients with coronary ostia malposition close to a commissure is applicable for both the right and the left coronary ostia. It respects the coronary ostia anatomy, and ensures valve function and the quality of root stabilization.

SUPPLEMENTARY MATERIAL

Supplementary material (Videos 1 and 2) is available at [EJCTS online](http://EJCTSonline).

Video 1: Preparation of the Dacron graft and proximal suture line.

Video 2: The proximal fixation of the graft and reimplantation suture line.

Conflict of interest: none declared.

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