grafting, the optimal graft choice and design are disputed. For younger patients, the internal mammary artery (IMA), which provides excellent long-term patency,[5] is considered to be the first-choice vessel for revascularizing the left anterior descending coronary artery. However in our case, we considered that using the IMA might lead to unexpected postoperative coronary complications because the orifices of the bilateral subclavian arteries had been covered by the endograft, and IMA blood flow was provided by unnatural retrograde inflow from the aorto-subclavian bypasses. To revascularize the coronary arteries the saphenous vein was selected and anastomosed in an aorto-coronary fashion.

CONCLUSIONS

Two-stage hybrid endovascular repair seems to be a useful procedure for treating Kommerell diverticulum associated with multiple cardiac diseases and is likely to reduce the risk of fatal complications.

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Ross operation after failed valve-sparing reimplantation: Pulmonary autograft inclusion into the previously implanted Valsalva graft

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Aortic valve dysfunction after valve-sparing root replacement is rare, and the risk depends mainly on the quality of the valve at the time of surgery. If reoperation is needed, the surgical options are a valve replacement inside the graft or a Bentall procedure. Because of the young age of these patients, a Ross operation seems feasible, considering such advantages as durability and avoidance of lifelong anticoagulation treatment. Nevertheless, one must take into consideration autograft harvesting difficulties and root dissection risks.[1,2]

Moreover, dilatation of the autograft root is one the most frequent modes of failure of a Ross procedure.[2,3] Inclusion of the autograft inside a Dacron polyester fabric graft is a new technique proposed to avoid this complication.[4]

We report 2 clinical cases in which the autograft was included inside a Gelweave Valsalva graft (Vascutek a Terumo company, Ann Harbor, Mich) previously implanted for valve-sparing root replacement.

CLINICAL SUMMARY

The first patient was a man who had been 43 years old when he was operated on in 2003 for aortic root aneurysm (57 mm) and moderate bicuspid aortic valve (BAV) disease. He underwent a valve-sparing reimplantation procedure with a 30-mm Valsalva graft, along with BAV repair with pericardial patch to replace a calcified raphe. Eight years later, he needed reoperation because of symptomatic BAV stenosis.

Reoperation was carried on through a median sternotomy with aortobicaval mediated cardiopulmonary bypass. The heart was arrested with antegrade warm blood cardioplegia. A transverse aortotomy was performed through the Valsalva graft above the sinotubular junction. The BAV was removed with care to avoid damaging the Valsalva graft. After anatomic inspection of the pulmonary valve, the pulmonary autograft was harvested, with careful attention to the tight adhesions between the pulmonary trunk and the graft. The autograft was implanted in the subcoronary position. The proximal suture line was

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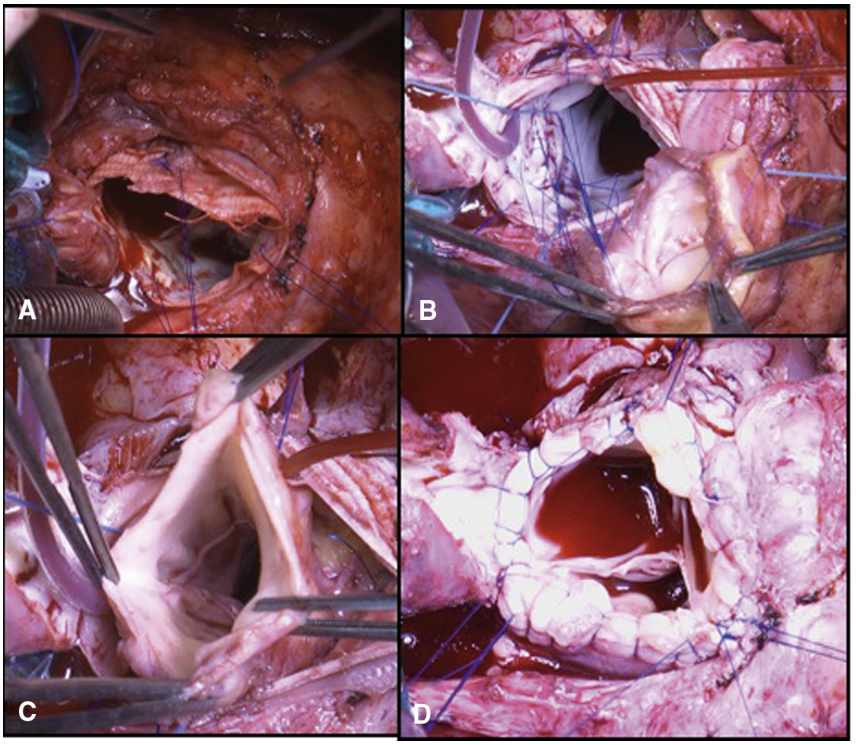

FIGURE 1. Intraoperative photograph of autograft inclusion technique in patient 2. A, Minimal Valsalva graft dissection and transversal aortotomy 1 cm above the sinotubular junction of the graft. B, Proximal suture line at the level of the aortic annulus, which equally corresponds to the proximal end of the Valsalva graft. C, Commissural implantation in a symmetric disposition, aligned with the sintotubular junction of the graft. D, Final aspect of the implanted autograft, after the distal suture line placement.

performed with a 4-0 polypropylene running suture at the level of the nadir of cusp insertion line, thus not interfering with the previous reimplantation pledgets. The 3 commissures were resuspended symmetrically to align the tip of the commissures with the sinotubular junction of the Valsalva graft. The wall of the left and right autograft sinuses was trimmed to perform the distal suture line with a running 4-0 polypropylene suture under the coronary ostia. The noncoronary sinus was preserved, and a distal suture line was placed horizontally at the level of the sinotubular junction. A cryopreserved pulmonary homograft was implanted to reconstruct the right ventricular outflow tract.

The second patient was a man who had been 37 years old when he was operated on in 2010 for mitral and aortic regurgitation (tricuspid valve) with aortic root dilatation. Both valves were found partially restrictive as a consequence of fibrous hyperplasia. He underwent mitral and aortic valve repair associated with aortic valve–sparing reimplantation with a Valsalva 32-mm graft. Nineteen months later, he needed reoperation for symptomatic recurrent aortic regurgitation. The mitral valve repair was effective.

Reoperation was carried on as in the first case, with the sole difference being that the autograft was implanted as a cylinder inside the Valsalva graft (Figure 1). After proximal suture line placement, the left and right coronary ostia were implanted with the ''button'' technique on the autograft wall without dissection of their previous anastomoses. The autograft outflow was then sutured to the sinotubular junction of the Valsalva graft. Finally, because of unavailability of a pulmonary homograft, a 29-mm Freestyle stentless xenograft (Medtronic Inc, Minneapolis, Minn) was used for right ventricular reconstruction.

Both patients had uneventful postoperative courses. Discharge echocardiography showed trivial autograft regurgitation in both patients, with peak gradients of 23 and 10 mm Hg, respectively. At 6 and 5 months, respectively, both patients remain free from valve-related events.

DISCUSSION

Among reoperations of valve-sparing reimplantations, the reoperative Bentall option, which mainly exposes the patient to risks of root and coronary ostia dissection, is associated with increased mortality.[5] Prosthetic valve replacement into the Dacron polyester fabric tube, on the other hand, is a technically simpler alternative that avoids extensive maneuvers. Our modified Ross procedure

equally avoids this extensive root dissection. Harvesting of pulmonary autograft was easily feasible despite the reoperative status, and implantation of the autograft was not much different than subcoronary or inclusion techniques into the native aortic root.

The autograft inclusion into a vascular graft to avoid long-term dilatation of the neoaortic root has already been shown to provide excellent midterm autograft function.[4] The technique we describe here mimics this modified procedure in 2 distinct phases.

CONCLUSIONS

In selected young patients with failure of a valve-sparing reimplantation, a Ross operation is feasible by inclusion of the pulmonary autograft into the previously implanted Valsalva graft. This new surgical option avoids extensive root dissection and offers thorough support of the pulmonary autograft.

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