

Florida Sleeve Repair for Aortic Root Aneurysm

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A 74-year-old man was diagnosed with aortic root aneurysm and two-vessel coronary disease. Echocardiographic assessment revealed an enlarged sinus of Valsalva 60 mm in diameter with mild aortic regurgitation. Florida sleeve repair was performed using a vascular graft combined with coronary artery bypass grafting. The postoperative course was uncomplicated and follow-up echocardiographic evaluations showed an aortic root diameter of 38 mm without aortic insufficiency up to 1 year after surgery.

Key words: 1. Florida sleeve repair
2. Aortic valve, surgery
3. Aortic root

CASE REPORT

A 74-year-old man was referred to our hospital for surgical management of aortic root aneurysm found by echocardiography during a preoperative work-up for spinal surgery. He presented with intermittent left-sided chest pain. His vital signs and laboratory data were unremarkable on admission. His past medical history revealed hypertension requiring drug therapy and herniated nucleus pulposus at the lumbar area. Trans-thoracic echocardiography revealed an enlarged sinus of Valsalva 58 mm in diameter with mild aortic regurgitation (Fig. 1). The left ventricular ejection fraction was 60% without regional wall motion abnormality. A computed tomography (CT) scan identified severe aortic sinus dilatation and a coaptation defect in the aortic valve (Fig. 2). The maximal diameter of the aortic sinus and aortic tubular portion were 60 and 36 mm, respectively. A coronary angiography showed 80% stenosis of the proximal left anterior descending artery (LAD), and total occlusion of the distal left circumflex artery.

Thallium single-photon emission computed tomography showed fixed medium-sized moderately decreased perfusion in the basal anterolateral and basal inferolateral wall. Consequently, the patient was scheduled for concomitant aortic root surgery and coronary artery bypass grafting (CABG).

At the beginning, the patient underwent off-pump CABG (from the *in situ* left internal mammary artery to the LAD and the saphenous venous graft to the obtuse marginal branch). After establishing cardiopulmonary bypass (CPB) and aortic clamping (cardioplegic solution was delivered via the coronary sinus in a retrograde manner and concomitant antegrade infusion via saphenous vein graft to the obtuse marginal graft), the ascending aorta was transected above the sinotubular junction and the aortic root was mobilized to the aortic annular level, and the origins of the coronary arteries were mobilized. After measuring the aortic annular size, a 30-mm vascular graft (Gelweave Valsalva; Terumo Inc., Tokyo, Japan) was trimmed with two key holes (Fig. 3). Then, six anchoring sutures were made on the lowest level of the annulus, at the

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commissure and midpoint of each leaflet. After locating the graft to the patient's aortic root, a running suture was done together with the transected sinotubular junction and the graft. After confirming adequate coaptation of the aortic leaflets, distal anastomosis between the graft and distal ascending aorta was made. After CPB weaning, sternal closure was done. Aortic clamping and cardiopulmonary bypass times were 88 and 128 minutes, respectively.

The patient was extubated on postoperative day 1 and transferred to the general ward on day 2. CT and echocardiographic evaluations were performed on postoperative day 4,

and they demonstrated a competent aortic valve with no regurgitation, and a stable aortic graft without any distortion or leakage. The diameter of the sinus portion of the aorta was measured at 37 mm with excellent coaptation of the aortic valve (Fig. 4). The patient was discharged on postoperative day 8 without any postoperative complications. Serial follow-up echocardiographic assessments were performed up to one year after surgery. There was no aortic insufficiency and the stability of the sinus portion of the aorta was maintained with its diameter at 38 mm.

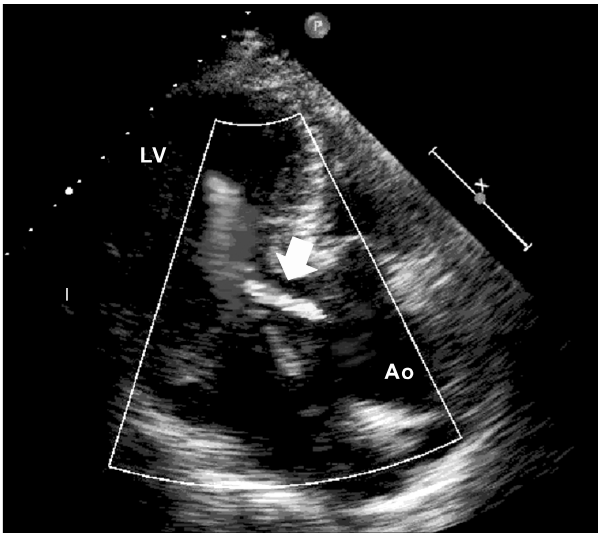


Fig. 1. Echocardiography revealed an enlarged sinus of Valsalva with aortic regurgitant jet flow (arrow). LV, left ventricle; Ao, aortic sinus.

DISCUSSION

Surgical options in the management of aortic root dilatation combined with aortic valve insufficiency include root replacement and valve-sparing root remodeling (Yacoub) or re-implantation (David procedure) [1-3]. Although the latter two techniques have been reported to show excellent results in selected patients, the valve-sparing aortic operations are not widely performed because of the technical challenge requiring a learning curve. Therefore, many centers still prefer the Bentall operation rather than the valve-sparing procedures for the aortic insufficiency associated with aortic root aneurysm.

In efforts to reduce the procedural complexity of the valve-sparing root surgery, Hess et al. [4] described a new technique for aortic root remodeling with preservation of the aortic valve, the "Florida sleeve" technique. In their follow-up

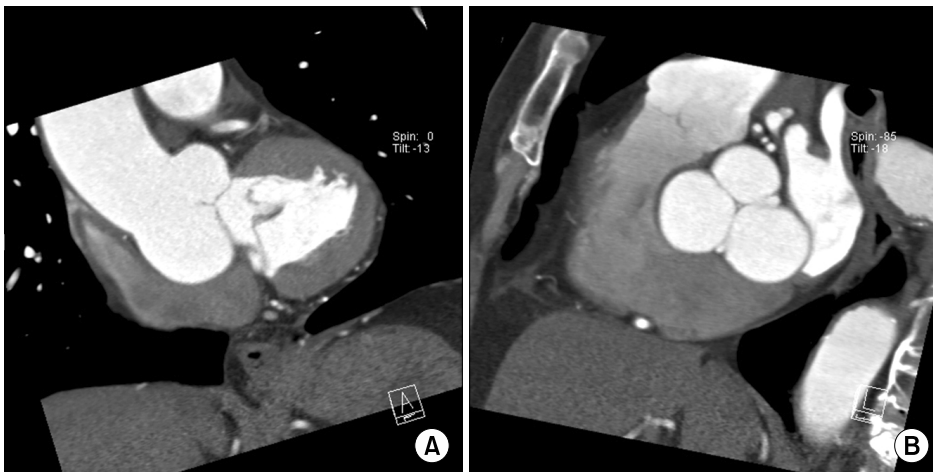


Fig. 2. (A) A computed tomography scan revealed a dilated sinus of Valsalva with a size of 60 mm. (B) At the end of the systolic period, a central coaptation defect was observed.

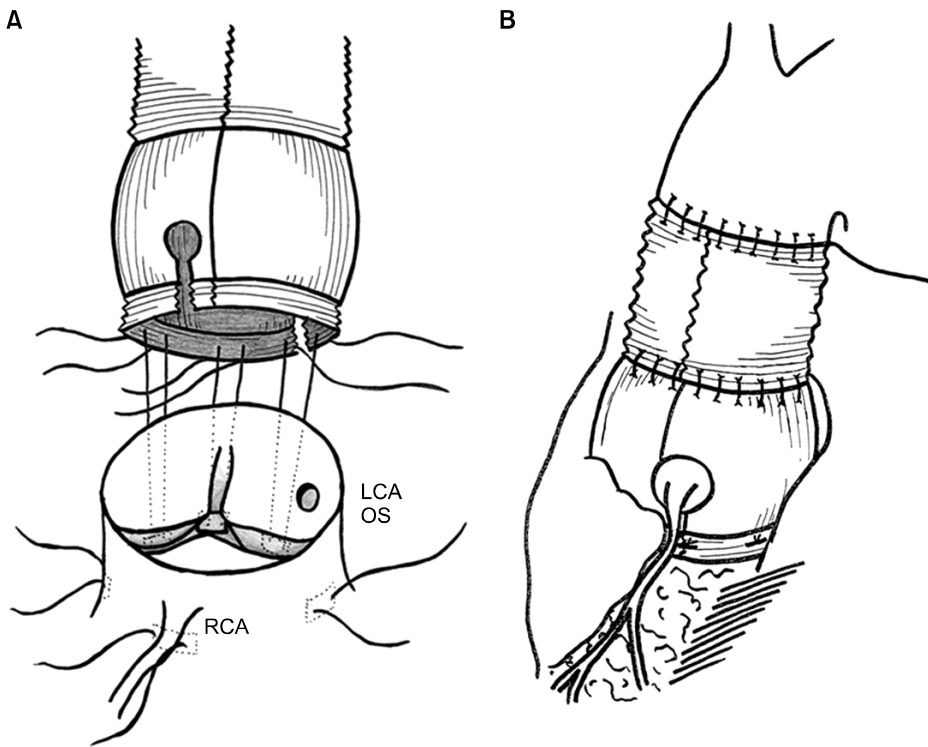


Fig. 3. Florida sleeve repair. (A) Several anchoring sutures were made at the lowest level of the annulus of commissure and midpoint of each leaflet. (B) The completed repair. LCA, left coronary artery; RCA, right coronary artery.

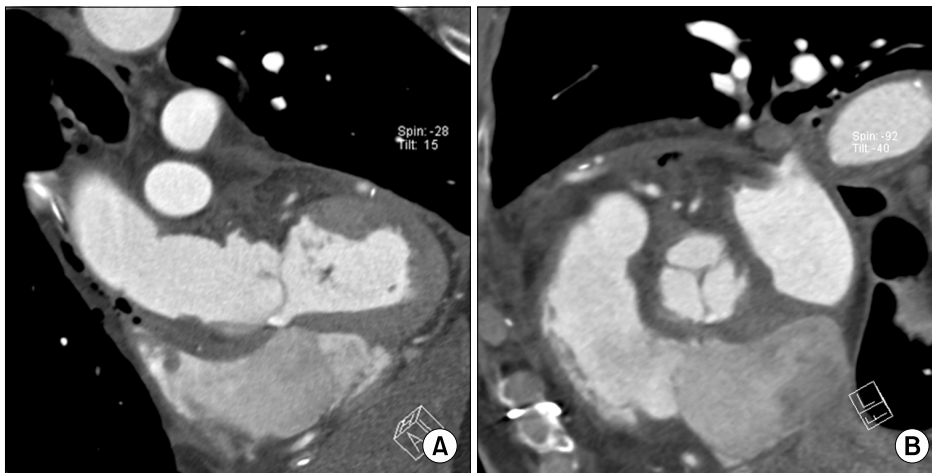


Fig. 4. Postoperative computed tomography scan. (A) The size of the sinus of Valsalva was decreased from 58 to 37 mm. (B) The central coaptation defect had disappeared.

report of 18 patients, clinical and echocardiographic outcomes showed excellent results at mid-term follow-up [5]. The most important advantage of the Florida sleeve technique is the technical simplicity, in that coronary reimplantation is not required and suture burden at the aortic root is greatly decreased without a concern for surgical bleeding. Consequently, the technique can shorten the aortic clamping, CPB, and procedural times. For these reasons, this technique may be

more easily reproducible than conventional valve-sparing aortic operations.

The Florida sleeve technique, however, has several potential drawbacks. Since the enlarged aortic sinus has to be inserted in a smaller graft, anatomical distortion of the aortic root can be created. Distortion between the residual aortic sinus and vascular graft can cause aortic insufficiency and coronary malperfusion, both of which can be fatal. Therefore,

extreme caution should be taken while tailoring the artificial graft and anchoring it to the native aortic wall. The coronary ostium should also be positioned as carefully as possible to prevent kinking or obstruction of the origins of the coronary artery.

In the present case, the surgical risks had been expected to be high because of old age and combined coronary artery disease. In order to shorten the cardiac ischemic and CPB times, we performed off-pump CABG combined with the Florida sleeve technique. Fortunately, the surgery was completed successfully without leaving any postoperative complications.

In conclusion, we report a case of aortic root aneurysm combined with coronary disease that was successfully treated with concomitant off-pump CABG and the Florida sleeve technique. In order to further verify the feasibility and reproducibility of the Florida sleeve technique, experiences in a larger number of patients with long-term follow-up are required.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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