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
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, dis-
tal 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 echocardi-
ographic evaluations were performed on postoperative day 4,
and they demonstrated a competent aortic valve with no re-
gurgitation, 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 fol-
low-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.

**DISCUSSION**

Surgical options in the management of aortic root dilatation
combined with aortic valve insufficiency include root replace-
ment 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 se-
lected 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. 1. Echocardiography revealed an enlarged sinus of Valsalva with aortic regurgitant jet flow (arrow). LV, left ventricle; Ao, aortic sinus.](image1)

![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.](image2)
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.

REFERENCES