HOSPITAL CHRONICLES 2013, 8(4): 186–188

IMAGES IN MEDICINE

Sinotubular Junction Remodeling with Aortic Cusp Repair. An Alternative to Bentall Operation for Ascending Aortic Aneurysm with Aortic Valve Regurgitation

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KEY WORDS: *ascending aortic aneurysm; aortic valve regurgitation; aortic valve repair; aortic valve sparing operations*

Abbreviations
AR = aortic regurgitation
STJ = sinotubular junction
STJR = sinotubular junction remodeling
TTE = transthoracic echocardiography
TEE = transesophageal echocardiography

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Manuscript received April 17, 2013; revised manuscript received July 30, 2013; Accepted September 8, 2013

ABSTRACT

A 72-year-old female patient with an ascending aortic aneurysm and aortic valve regurgitation was referred for surgery. Preoperative echocardiography demonstrated preserved aortic root dimensions, a dilated sinutubular junction (STJ) and an ascending aortic aneurysm of 59 mm in diameter, associated with a central regurgitant jet of moderate to severe aortic valve insufficiency. During surgery, comprehensive visual assessment of aortic cusp configuration revealed prolapse of the non-coronary cusp, which was repaired by appropriate techniques. Ascending aorta pathology was corrected with sinutubular junction remodeling (STJR). The combination of STJR and cusp repair is an excellent alternative to root replacement with no prosthesis-related long-term complications.

A 72-year-old female patient was presented with ascending aortic aneurysm and aortic valve regurgitation (AR). The patient was asymptomatic with known hypertension, moderate obesity and no other risk factors.

Both transthoracic (TTE) and transesophageal (TEE) echocardiography revealed an ascending aortic aneurysm with moderate to severe AR. The systolic function of the left ventricle was well preserved. Dimensions of the aorta were described as follows: aortic annulus diameter was measured at 19.4 mm, sinuses of Valsava at 37.1 mm, sinotubular junction (STJ) at 35.5 mm and ascending aorta at 59.9 mm. A Doppler echocardiography study revealed a central regurgitant jet and estimated a pressure half time of the regurgitant jet at 396 ms. The width of vena contracta of the regurgitant jet was measured at 0.52 cm. The anatomical regurgitant orifice was 0.58 cm^2 by planimetry (Figure 1). A chest computed tomography scan confirmed the diagnosis. Ascending aortic diameter was measured at 56.4 mm and 55.7 in the axial view and oblique view respectively.

The patient was operated through median sternotomy. Cardiopulmonary bypass was instituted and the aorta was transacted less than 5 mm above the sinotubular junction (STJ). Comprehensive surgical inspection of aortic cusp configuration revealed

Authors' statement: There are no financial or other relations that could lead to a conflict of interest

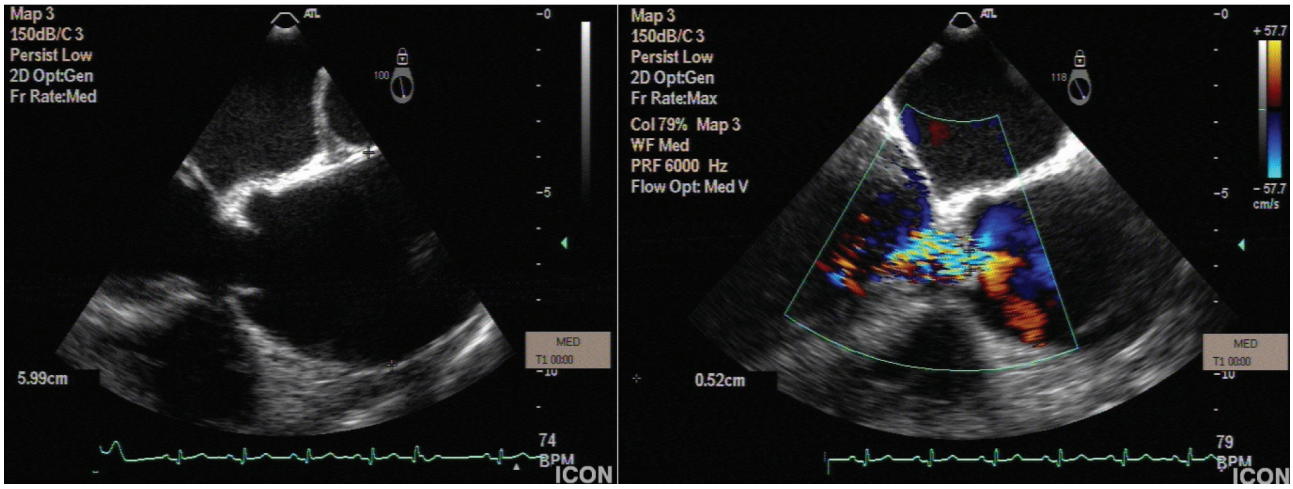

FIGURE 1.

prolapse of the non-coronary cusp and thickening of the cusp at Arantius node. "Shaving" of thickened non-coronary cusp edge and plication of the central portion of the non-coronary cusp were performed. Additionally sinotubular junction plasty was performed at the middle part of the inter-commissural segment (Figure 2). A 30-mm Dacron straight graft (Perouse Medical, France) was chosen to reduce the STJ by at least 5 mm. The dilated STJ was evenly plicated and anastomosed to the selected graft, taking care to avoid circumferential distortion of the commissures. Intraoperative TEE showed trivial aortic valve regurgitation. The coaptation length of aortic cusps measured greater than 6 mm.

The patient had an uncomplicated postoperative course and discharged on the seventh post-operative day on anti-platelet medication. A 3-month follow-up TTE revealed a well-functioning aortic valve with a maximum velocity at 1.52 m/sec, a maximum pressure gradient at 9 mmHg, a mean pressure gradient at 5 mmHg and a valve surface area of 2.8 cm^2. There was only trivial AR (Figure 3).

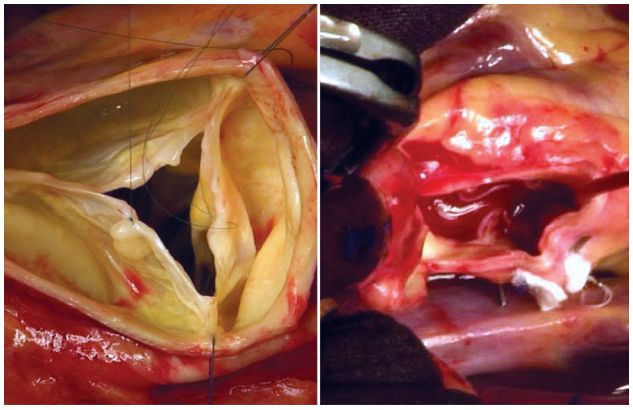

FIGURE 2.

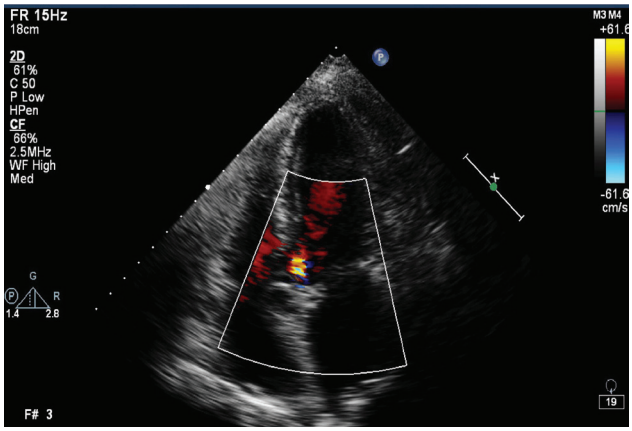

FIGURE 3.

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Ascending aortic aneurysms are frequently associated with AR. The AR is due to dilatation of the STJ, distortion of one or more sinuses of Valsava, prolapsed of aortic valve cusps, or a combination of the above. Although replacement of the aortic valve with separate or composite replacement of the ascending aorta has been considered the "gold standard" in the management of this problem, increasing efforts have been made to preserve the regurgitant aortic valve in order to avoid prosthesis-related long term complications.[1]

When the dilated STJ is primarily involved in the mechanism of AR and the aortic valve cusps are normal, the procedure of sinutubular junction remodelling (STJR) appears adequate.[2] If prolapsed of AV cusps is involved, aortic valve repair procedures should be applied concomitantly to STJR. This increases the freedom from valve related reoperation which is almost exclusively related to AR recurrence. [3,4]

Consequently, the combination of STJR and cusp repair is a useful technique in patients with moderate or severe AR and a dilated ST junction but preserved sinus dimensions. It can be performed with good results and is not associated with prosthesis-related long term complications, provided that the surgical team is familiarized with this technique.[5]

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