

The Remadi's Technique: Valsalvas Reduction Plasty

Remadi JP, Szymanski C, and Nader J

Department of Cardio-Vascular Surgery Unit - Amiens South Hospital CHU Laennec Avenue 80000 AMIENS France

Correspondence should be addressed to Remadi JP, jpvmrema@gmail.com

Received: November 04, 2020; Accepted: November 22, 2020; Published Date: November 30, 2020

ABSTRACT

OBJECTIVE

To find another way to treat dilated aorta aneurysm involving the valsalvas sinuses.

METHODS

From September 2008 to May 2014, 50 patients underwent aortic valve replacement (AVR) with a Valsalva plasty with or without ascending aorta replacement by a single surgeon (Remadi's technique) at Amiens Hospital in France.

RESULTS

There was no operative death. During the follow-up, the diameters of the Valsalva sinuses were stable without any secondary aneurysm or reoperation.

CONCLUSION

This Technique (instead of the bentall procedure) can be applied to ascending aorta replacement and aortic prosthesis replacement or only to AVR when only the sinuses of Valsalva are dilated. This technic is safe with excellent immediate and mid- term results.

KEYWORDS

Surgery-aorta aneurysm; Valsalvas-

INTRODUCTION

The gold standard treatment of aortic root pathology with associated aortic valve disease and valsalvas dilatation sinuses has been the Bentall procedure since forty years. The Bentall procedure was first described by Hugh Bentall and Antony De Bono in 1969 [1]. This procedure is performed with a composite valved graft, either mechanical or biological, to replace the entire aortic root and valve followed by reimplantation of the coronary

arteries with a whole resection of the three Valsalva sinuses.

The Bentall operation has demonstrated good midterm to long-term survival, however, a potential shortcoming to this procedure is the risk of valve-related events, particularly structural deterioration for biologic valves and bleeding and thromboembolism for mechanical valves, and coronary ostia aneurysms.

Citation: Remadi JP, The Remadi's Technique. Clin Surg J 4(S5): 21-24.

The present prospective study was performed to assess outcome in a series of consecutive patients from a single institution, who underwent Valsalva plasty procedure (Remadi’s technique) for a variety of aortic root diseases, to study whether we could define a subset of patients comparable to those who might currently be considered for traditional and historical Bentall procedures.

Patients and Methods

From September 2008 to May 2014, 50 patients underwent aortic valve replacement (AVR) with a Valsalva plasty with an ascending aorta replacement by a single surgeon (Remadi’s technique) at Amiens Hospital in France [Figure 1,2].

Age(years)	63.5±15
Sexratio(M/F)	2.75
Male	37(74%)
Female	13(26%)
Bodysurfacearea(m2)	1.82±0.4
NYHA functionalclass(n)	
I	10(20%)
II	20(40%)
III	15(30%)
IV	5(10%)
Atrialfibrillation(n)	8(16%)
Aorticvalvopathology(n)	
Stenosis	18(36.7%)
Insufficiency	20(40%)
Mixedlesion	12(24%)
Etiology(n)	
Degenerative	47(94%)
Rheumatic	3(6%)
Coronaryarterydisease(n)	5(8,3%)
MechanicalAVR	15(30%)
BiologicalAVR	35(70%)

Table 1: Demographic data and surgical procedures.

The study was approved by the local ethics committee without requiring individual patient consent. Among the fifty patients, 43 had LPI prosthesis or 7 Joteck prosthesis were implanted Thirty five bioprostheses and fifteen mechanical prostheses were implanted. Mean age was 63. 5-15 years and the sex ratio was 2.75 (37 male /13 female) (Table 1). All patients were operated on through a full sternotomy with a standard cardiopulmonary bypass under

normothermia, and anterograde cardioplegia was systematically used. A reduction-plasty of dilated sinuses of Valsalva (Figure 1) were performed in all cases. The Tissue excess was excluded and secured during prosthesis implantation. A continuous suture of polypropylene 2/0 joined the annulus with the folds of the Valsalva’s. At the end of the procedure the coronary Ostia was lowered in the right place if they were too high. This procedure did not need more clamping time than the implantation of a standard prosthesis and avoided manipulation of coronaries Ostia. The Dacron prosthesis was then implanted in a supra coronary position replacing the ascending aorta. Two patients having major comorbidity or heart failure and underwent this technique.

Follow-up and statistics

All patients were discharged from hospital. Follow-up ended in December 2019. The follow-up was 100 % complete. Mean follow-up time was 106, 42, ± 7, 9 months for a total 5321 months. All patients were alive at the end of follow-up. CT scan was performed during the last 6 months of 2019.

Statistical method

Statistical analysis was performed with SPSS 22 (SPSS Inc., Chicago, IL). Continuous variables were expressed as mean ± standard deviation and compared using Student’s t test or Mann-Whitney test where appropriate. Qualitative variables were expressed as a percentage and compared by χ^2 test or Fischer’s exact test where appropriate. A p value less than 0.05 was considered statistically significant.

RESULTS

Surgical Outcome

A Complete Valsalva sinuses plication was performed for all patients (Figure 1 and Figure 2). There was no Hospital death (at 30 days) One patient was reoperated on for post-operative major bleeding. One patient had a transient

stroke, but fully recovered before hospital discharge. The atrial fibrillation (AF) was the most common post-operative complication (40%). All these AF were transient and there was no permanent AV block. The length of post-operative intensive care stay was 48 ± 23 hours. Mean hospital stay was 9.4 ± 7 days and all patients were discharged from hospital.

There was one late death. This late death was due to a neoplasm unrelated to the surgery. One patient was readmitted for a major bleeding due to a too higher INR >7 without any consequences. CT scans of the thoraco-abdominal aorta was performed for all patients. There was no thrombo-embolism, valve thrombosis, reoperation, coronary event or endocarditis during follow-up. The diameters of the Valsalva sinuses were stable without any secondary aneurysm (Table 2) or reoperation for aortic dissection.

Pre-operative			Post-operative			Follow-up		
AA*	STJ*	V*	AA	STJ	V	AA	STJ	V
49.9	47.46	45.5	34.9	36.2	36.9	35	36.4	37.16
5.47	3.69	3.1	12	4.00	2.76	6.51	3.9	2.84

Table 2: Aorta size evolution (mean value/mm)

Note: AA: Ascending aorta; *STJ: Sinotubular junction; *V: Valsalvas

DISCUSSION

The ascending aorta replacement with or without aortic valve replacement has become a standard surgical procedure. When a dilatation of the aortic Valsalvas is associated, the Bentall procedure has been the gold standard for thirty years [1]. Resection of the sinuses of Valsalva has been accepted as the best choice in those cases. Numerous studies during the last twenty years have shown better results of the Bentall procedure [2-6]. The size of the aorta, Valsalvas and sinotubular junction have been studied to evaluate the good timing for surgery. Nevertheless, the Bentall procedure presents some limitations and complications [7]. In a large Meta-analysis, Mookhoek et al. [7] show that the operative

mortality amounts to 6 %. The operative mortality of AVR associated with supra coronary ascending aorta replacement is lower amounting to 2%. The follow-up course is worse than expected with higher late mortality for the Bentall procedure [7].

In fact, this is not surprising. First, the manipulation of the coronary ostia is not harmless and provides a longer surgery procedure with added risks. When a bioprosthetic Bentall failed, the redo procedure is more complicated than an isolated redo AVR, therefore the results are worse. Numerous studies proposed a revised Bentall procedure [8-12] but all those techniques include reimplantation of the coronary ostia. Aortic valvular repair was proposed by David et al but had the same limitations about the coronary ostia reimplantation [13-15].

The technique we here present could replace the Bentall procedure in the main indications. Therefore the Bentall procedure must be performed when the sinuses of Valsalva are massively dilated with a very high coronary ostia elevation: we can avoid this technic. This situation represents very few cases of the ascending aorta dilatation. Most of the other Bentall procedure can be avoided with excellent results. The technique of Valsalva plasty-reduction (Remadi's technic) allows to exclude easily the fragile tissue. At the end of the procedure when the prosthesis is implanted, the coronary ostia is lowered about 0.5 to 1.5 cm. Each patient does not present with identical dilated sinuses of Valsalva. For instance, in some cases the three Valsalvas will be equally dilated but in most cases only 2 or even 1 sinus are dilated.

This technique can be applied to ascending aorta replacement and aortic prosthesis replacement or only to AVR when only the sinuses of Valsalva are dilated. It is safe with excellent immediate and long-term results. The coronary ostia is not manipulated and the redo procedure, if indicated during follow-up, is easier like a simple AVR redo procedure.

During follow-up no false aneurysm or aneurysm was observed, and diameters were stable. This procedure is particularly interesting for older patients and poor left ventricular function.

The continuous rolling suture is adapted to this technique to secure the valve with a simultaneous reduction of the

Valsalva tissue. Secondary aneurysm of the coronary ostia is known after Bentall procedure is due to the suture itself and to the remaining tissue [7,12-15]. When the reduction plasty of the sinuses of Valsalva is performed the remaining tissue is heavy and strong but without the coronary ostium suture which causes false aneurysm or ostium twist leading to secondary ischemia.

REFERENCES

1. Bentall H, De Bono A (1968) A technique for complete replacement of the ascending aorta. *Thorax* 23(4): 338-339.
2. Gott VL, Gillinov AM, Pyritz RE, et al. (1995) Aortic root replacement: risk factor analysis of a seventeen-year experience with 270 patients. *The Journal of Thoracic and Cardiovascular Surgery* 109(3): 536-545.
3. Tamura K, Arai H, Kawaguchi S, et al. (2013) Long-term results of modified Bentall procedure using flanged composite aortic prosthesis. *Annals of Thoracic and Cardiovascular Surgery* 19(2): 126-130.
4. Aoyagi S, Kosuga K, Akashi H, et al. (1994) Aortic root replacement with a composite graft: results of 69 operations in 66 patients. *The Annals of Thoracic Surgery* 58(5): 1469-1475.
5. Maureira P, Vanhuyse F, Martin C, et al. (2012) Modified Bentall procedure using two short grafts for coronary reimplantation: long-term results. *The Annals of Thoracic Surgery* 93(2): 443- 449.
6. Joo HC, Chang BC, Youn YN, et al. (2012) Clinical experience with the Bentall procedure: 28 years. *Yonsei Medical Journal* 53(5): 915-923.
7. Mookhoek A, Korteland NM, Arabkhani B, et al. (2016) Bentall Procedure: A systematic review and meta-analysis. *The Annals of Thoracic Surgery* 101(5): 1684-1690.
8. Kindo M, Billaud P, Gerelli S, et al. (2007) Twenty-seven-year experience with composite valve graft replacement of the aortic root. *Journal of Heart Valve Disease* 16(4): 370.
9. Gelsomino S, Masullo G, Morocutti G, et al. (2003) Sixteen-year results of composite aortic root replacement for non-dissecting chronic aortic aneurysms. *Italian Heart Journal* 4: 454-459.
10. Brandt M, Abdelkerim S, Clemm S, et al. (2004) Composite valve graft versus separate aortic valve and ascending aortic replacement. *Cardiology* 102(3):156-159.
11. Cabrol C, Pavie A, Gandjbakhch I, et al. (1981) Complete replacement of the ascending aorta with reimplantation of the coronary arteries: new surgical approach. *The Journal of Thoracic and Cardiovascular Surgery* 81(2): 309-315.
12. Kim TS, Na CY, Oh SS, et al. (2013) Long-term mortality and morbidity after button Bentall operation. *Journal of Cardiac Surgery: Including Mechanical and Biological Support for the Heart and Lungs* 28(3): 280-284.
13. David TE, Feindel CM, Bos J (1995) Repair of the aortic valve in patients with aortic insufficiency and aortic root aneurysm. *The Journal of Thoracic and Cardiovascular Surgery* 109(2): 345-352.
14. Lewis CT, Cooley DA, Murphy MC, et al. (1992) Surgical repair of aortic root aneurysms in 280 patients. *The Annals of Thoracic Surgery* 53(1): 38-46.
15. Caynak B, Sagbas E, Onan B, et al. (2009) Comparison of three different surgical methods in aortic root aneurysms: Long-term results. *Journal of Cardiac Surgery* 24(6): 710-715.