Commentary: Valve sparing in aortic root aneurysms—An old promise or a concrete chance?

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Aortic root aneurysm.

Central Message

Valve-sparing procedures are a valid alternative to composite valve-graft prostheses and provide excellent short- and long-term results without prosthesis-related complications.

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The restoration of the normal dimension and geometry of aortic root, in particular in patients with genetic collagen disorders, improves survival and reduce incidence of adverse aorta-related events.¹ For many years, the standard treatment for patients with aortic root aneurysm consisted in aortic root replacement with composite mechanical valve conduit and coronary reimplantation.² Inspired by the mitral experience, reconstructive methods of sparing the aortic valve, associated with replacement of the other component of the aortic root, have been developed with the aim of reducing the risk of thromboembolic and endocarditis events while restoring the normal life expectancy and quality of the life.³

In this issue of the *Journal*, Kuniyama and colleagues⁴ report Japanese Cardiovascular Database outcomes of more than 5000 patients undergoing aortic root replacement with valve-sparing root replacement (VSRR) techniques or composite graft-valve (CGV) procedures with mechanical or biological prostheses. Even though VSRR procedures (remodeling and reimplantation techniques) had longer cardiopulmonary bypass and crossclamp times, Kuniyama and colleagues⁴ concluded that aortic valve-sparing root replacement was associated with lower morbidity and mortality than CGV. Specifically, the CGV group had a significantly higher incidence of postoperative stroke and prolonged ventilation (>72 hours). Finally, in-hospital mortality was significantly higher in the CGV group than in the VSRR group.⁴

This article by Kuniyama and colleagues⁴ offers an important contribution regarding the dilemma of whether replacing the aortic valve is better than sparing it when aortic root replacement is required. With a large sample size, after matching, Kuniyama and colleagues⁴ confirm data that VSRR can reduce valve-related complications. Avoiding lifelong oral anticoagulation, valve-sparing procedures reduce the hemorrhagic or thromboembolic adverse events seen with mechanical CGV. Moreover, VSRR may reduce valve dysfunction and reoperation rate

relative to bioprostheses.⁴ The intuitive message that preservation of the native valve is better than replacement has been consistently supported by David and colleagues.⁵ As Kuniyama and colleagues⁴ state, in most cases, aortic valve cusps are normal or stretched from annuloaortoectasia, and the valve can recover its normal function once normal root geometry has been restored.

Concerns remain about valve-sparing surgery, however, with regard to indications, reproducibility, success rate, and duration. Since David and Yacoub developed the reimplantation and remodeling techniques,^{6,7} VSRR procedures gained great popularity but never reached a widespread diffusion, with operations on the aortic root not exceeding 15% of surgical procedures.⁸ These strategies actually remain technically demanding and require a deep knowledge of aortic root and valve geometry, anatomy, and dynamics.⁹ Unsatisfactory VSRR could lead to an early failure. The most common pitfalls are represented by incorrect graft sizing with residual prolapse or restrictive motion of the cusps, organic cusp alterations, or residual prolapse uncorrected or undercorrected.⁹ Schäfers and colleagues¹⁰ have proposed to address this issue with a dedicated caliper to restore cusp effective height up to 8 to 10 mm. It has been suggested to treat aortic annular base with an internal or external ring, to avoid the risk of new aortic regurgitation, especially in the setting of remodeling technique.

Finally, this article of Kuniyara and colleagues⁴ lacks data regarding echocardiographic information and long-term follow-up. Such information is essential in supporting the conclusion that VSRR has better outcomes than CGV even at long-term.

Historically, the Achilles' heel of valve-sparing operations was long-term durability of these procedures, but now VSRR can be performed with very good intermediate and long-term results. Aortic valve—sparing procedures have been associated with excellent results up to 20 years, especially in young patients.¹¹ Similar results have been reported by Lansac's and El Khoury's groups for bicuspid and tricuspid valves.^{12,13}

VSRR is a very promising technique, and it is becoming more and more standardized. Its systematic application in the case of aortic root aneurysm with a reparable valve represents the ideal solution, especially for young patients with long life expectancy. A potential failure at long term does not necessarily require an aortic valve replacement.⁹ A new aortic valve repair is possible, offering the chance to minimize the risk of prosthesis-related complications.

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