

# Commentary: Valve-sparing root replacement in patients with bicuspid aortic valves: Long-term data are driving patient selection



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### Central Message

Valve-sparing root replacement is safely performed in patients with bicuspid and tricuspid aortic valves. Detailed analysis of long-term data will improve patient selection for this complex procedure.

See Article page 1.

In the article by Ouzounian and colleagues<sup>1</sup> in this issue of *The Journal of Thoracic and Cardiovascular Surgery*, we are presented with an analysis of long-term follow-up data comparing patients undergoing reimplantation valve-sparing root replacement (VSRR) in the setting of either a tricuspid aortic valve (TAV) or bicuspid aortic valve (BAV). Despite a significant difference in the number of patients with a BAV ( $n = 45$ ) versus those with a TAV ( $n = 288$ ), Ouzounian and colleagues<sup>1</sup> use 1:3 propensity matching to mitigate differences in these otherwise similar groups. As one would expect from the Toronto group, the perioperative outcomes and completeness of follow-up were excellent. The incidences of operative mortality and major early postoperative complications were very low, as they should be when operating on young, healthy patients with few comorbidities and good ventricles. Fortunately, their patients had a lot of postoperative echocardiograms (an average of 4 per patient), giving us a robust and detailed look at valve durability after complex VSRR in the very heterogeneous BAV population. They have also appropriately applied longitudinal analysis to assess the broadly inclusive concept of “valve-related events” in both the TAV and BAV populations. They surmised that there were no differences in outcomes when performing VSRR for either population. Long-term survival, freedom from reoperation, and freedom from valve-related events were the same in both cohorts. So if valve type makes no difference, then why are these incredibly gifted and experienced aortic root surgeons only performing this procedure in 7% of their entire population in need of aortic root replacement during the 24-year study period?

The replacement rather than repair of dysmorphic, calcified or restricted BAV leaflets seems to be the keystone for success when performing VSRR in patients with BAV. Although the percentage of patients with a BAV requiring

cuspid repair in Toronto was significantly greater than that of patients with a TAV (79% vs 45%;  $P < .001$ ), Ouzounian and colleagues<sup>1</sup> kept leaflet repair for both groups simple. Most (76%) underwent leaflet plication or free-edge reinforcement, whereas a smaller number had raphe excision. Techniques strongly associated with early BAV repair failure, such as patch augmentation and extensive leaflet decalcification,<sup>2</sup> were avoided. The annular fixation and downsizing provided by the reimplantation technique also improves leaflet coaptation and contributes heavily to the low incidence of significant aortic insufficiency or need for reoperation at 5 years. Others with extensive VSRR experience agree.<sup>3</sup> It may also account for the vastly different durability witnessed when comparing VSRR in BAV disease with BAV repair alone.<sup>4,5</sup>

The comparison of long-term outcomes for patients undergoing VSRR and BAV repair alone will require further refinement before everyone gets on the valve-sparing for BAV train. Ouzounian and colleagues<sup>1</sup> reported that there was no significant difference in the duration of follow-up for patients with BAV and TAV (5.6 years vs 8.4 years;  $P = .06$ ). I am no statistician, but 3 years seems like an eternity when analyzing data where we all understand that the early (5-year) outcomes are almost identical regardless of the chosen VSRR procedure or underlying valve type.<sup>6,7</sup> The cumulative percentage of valve-related events reported

in Table 4 and Figure 3 of this report of Ouzounian and colleagues<sup>1</sup> demonstrates a potential substantial uptick in signal as time progresses from 5 to 10 years. This is concerning for sure, especially when the patients have been selected so carefully. Further follow-up from this group will surely ensue, and it is to be hoped will assuage fears regarding the true long-term durability of VSRR in the patient with a BAV.

For now, as in this report, judicious patient selection seems appropriate (it would also be great to know what constitutes “mild” BAV calcification in the eyes of the senior authors). The data herein are a significant contribution toward a better understanding of the appropriateness of VSRR for patients with BAV. Longer, rigorous follow-up will be necessary, however, to elucidate more fully which patient with a BAV is best served by complex valve preservation rather than composite valve-graft replacement.

## References

1. Ouzounian M, Feindel CM, Manlhiot C, David C, David TE. Valve-sparing root replacement in patients with bicuspid versus tricuspid aortic valves. *J Thorac Cardiovasc Surg.* 2019;158:1-9.
2. Schneider U, Feldner SK, Hofmann C, Schöpe J, Wagenpfeil S, Giebels C, et al. Two decades of experience with root remodeling and valve repair for bicuspid aortic valves. *J Thorac Cardiovasc Surg.* 2017;153:S65-71.
3. de Kerchove L, Boodhwani M, Glineur D, Vandyck M, Vanoverschelde JL, Noirhomme P, et al. Valve sparing-root replacement with the reimplantation technique to increase the durability of bicuspid aortic valve repair. *J Thorac Cardiovasc Surg.* 2011;142:1430-8.
4. Ashikhmina E, Sundt TM III, Dearani JA, Connolly HM, Li Z, Schaff HV. Repair of the bicuspid aortic valve: a viable alternative to replacement with a bioprosthesis. *J Thorac Cardiovasc Surg.* 2010;139:1395-401.
5. Svensson LG, Al Kindi AH, Vivacqua A, Pettersson GB, Gillinov AM, Mihaljevic T, et al. Long-term durability of bicuspid aortic valve repair. *Ann Thorac Surg.* 2014;97:1539-47; discussion 1548.
6. Kari FA, Kvitting JP, Stephens EH, Liang DH, Merk DR, Fischbein MP, et al. Tirone David procedure for bicuspid aortic valve disease: impact of root geometry and valve type on mid-term outcomes. *Interact Cardiovasc Thorac Surg.* 2014;19:375-81; discussion 381.
7. Bavaria JE, Desai N, Szeto W, Komlo C, Rhode T, Wallen T, et al. Valve-sparing root reimplantation and leaflet repair in a bicuspid aortic valve: comparison with the 3-cusp David procedure. *J Thorac Cardiovasc Surg.* 2015;149(2 Suppl):S22-8.