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See Article page 1790.

Commentary: Time to reassess valve reimplantation for root aneurysms in Marfan syndrome?

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The paper by Coselli and colleagues¹ on the role of aortic valve reimplantation (AVI) versus aortic valve replacement (AVR) for root aneurysms from a multicenter study on Marfan syndrome (MFS) is an important report that raises several questions:

1. Should reimplantation be used for patients with connective tissue disorders (CTD)?
2. Should all surgeons be expected to demonstrate competency in performing reimplantations?
3. Is there a problem with the method or methods or the graft prosthesis being used?

In summary, outcomes of AVI versus AVR done by 46 surgeons (mean of 5.2, [2.39/46] operations per surgeon) were compared at a median of 64 months of follow-up, with propensity matching showing AVI was associated with greater valve failure rate versus AVR by echocardiography but not reintervention (2 AVR vs 6 AVI). In addition,

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CENTRAL MESSAGE

Current study outcomes raise questions for further study about aortic valve reimplantation, surgeon proficiency, and graft type—specifically for patients with Marfan syndrome.

greater-volume centers had a lower mortality rate ($P = .04$), as well as a lower valve-related morbidity and mortality rate ($P = .03$). The authors tried to remove the competing risk effect of death and found similar results (see a discussion about this issue using conditional probability beyond this commentary).² Of note, by implication from the paper, as the surgeons went through the learning curve of the AVI procedure, they became more comfortable performing the operation, decreasing from 35% AVR to 6% in the last year of study. Indeed, the results likely would have been better if patients were examined for outcomes once the surgeons had gone through the learning curve.

Similar to the results in our forthcoming report, which examined the results of 568 patients with AVI with longer follow-up, out of our total of 1191 patients with AVI, as of August 2021, preoperative regurgitation grade was found to be associated with a high failure rate. We also found that

aortic root size was associated with a high failure rate but not CTD.³

As the authors acknowledge, the downside of a multicenter study with 46 surgeons is that techniques and experience may have played a role in the outcomes, so the problem of durability may not be related to myxomatous valves associated with MFS, per se, rendering questions 1 and 2 moot—namely, we cannot be sure if greater AVI failure by echocardiography is due to the valve leaflets or surgeon/surgical technique or experience.

In our own study of 178 patients with CTD, mostly for MFS, we found a 92% freedom from reoperation at 6 years, a reasonable outcome in comparison with a comparable mechanical AVR graft requiring warfarin or biological AVR graft potentially needing a later transcatheter aortic valve replacement (or, parenthetically, transcatheter aortic valve replacement for an AVI, which we have never had to do).⁴ In our update of 214 patients with CTD, there have been no 30-day deaths, and with increased experience after our initial analysis, the freedom from reoperation has considerably improved out to 10 years. Similarly, David and colleagues⁵ have reported a 96.82% 10-year freedom from reoperation with reimplantation for MFS.

Is there, then, another possible explanation, as in question 3? In this series of 239 patients with AVI, 60 had

premanufactured grafts with artificial sinuses and 98 did not. The authors do not analyze whether this was a contributing factor in difference in outcome by graft type, and they are encouraged to look at their long-term data to see if this may not be the reason for greater failure rate in this MFS series. Indeed, the Hannover group did find a greater failure rate with the premanufactured flared sinus grafts.⁶ We look forward to further updates on this interesting series of patients with MFS to clarify the role of AVI for CTD and, in particular, MFS.

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