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REIMPLANTATION SHOULD BE THE GOLD STANDARD TO TREAT THE REGURGITANT BICUSPID AORTIC VALVE

To the Editor:

Mokashi and associates[1] have recently shared the Cleveland Clinic's intermediate-term experience with reimplantation of tricuspid aortic valves (TAV) and bicuspid aortic valves (BAV). In a propensity score–matched analysis, the authors demonstrated excellent 5-year outcomes with 100% survival in the BAV and 98% survival in the TAV group. Freedom from reoperation in the BAV and TAV cohort was 94% and 98%, respectively. Although both procedures were done with equal safety and short-term outcomes, the authors were concerned due to greater transvalvular gradients and less ventricular reverse remodeling in the BAV cohort, as well as less freedom from reoperations in the BAV cohort at 8 years (77%). These concerns reached an extent that during the 2019 Annual Meeting of The American Association for Thoracic Surgery, where this manuscript was presented and discussed, the senior author Dr Svensson mentioned that mechanical aortic valves should be the gold standard in patients with BAV,[1] a sentiment that we don't necessarily share.

Although there is considerable variability within the spectrum of BAVs, they generally have one normal (nonfused) and one abnormal (fused) cusp.[2,3] The fused cusp is typically prolapsing in cases of aortic regurgitation (AR), but it can also be restricted in the presence of a fibrous raphe. In addition, the cumulative free margin length is shorter than in TAVs. Consequently, these last 2 factors contribute to greater transvalvular gradients in BAV.

When repairing BAVs, one of the key maneuvers is to improve the mobility of the fused cusp, to increase valve opening area and alleviate the transvalvular gradient as much as possible. Our 180° reimplantation technique accomplishes these goals, through increasing the relative free margin length of the fused cusp (and hence increased fused cusp mobility), and through relatively increasing the valve orifice area, which is covered by the normal and more mobile nonfused cusp.[2] In addition to this, we often perform raphe detachment from the aortic wall and thinning of the raphe, thinning of free margins, commissurotomies, etc, to further increase the mobility of the fused cusp, as well central cusp plications to close the line of fusion and to treat the prolapse. Our learning curve has taught us to avoid patch material and free margin resuspension with polytetrafluoroethylene, due to the accelerated valve degeneration.

Following these principles, we have been able to achieve excellent long-term results. Until 2018, we had performed 340 BAV repairs, of which 190 were performed with our 180° reimplantation technique,[4] which is a modification of the David 1 procedure, with reimplantation of the commissures at 180° and a selective annuloplasty.[2] At 12 years, survival was 94% and freedom from reoperation and AR>2+ were 91% and 97%, respectively.

Nonetheless, we also do observe a slow increase of gradients over time in some patients (up to 2.6%), which ultimately leads to late valve stenosis.[4] However, considering the excellent outcomes of the Cleveland Clinic with TAV reimplantation, the decreased freedom from reoperation in the BAV cohort is somewhat puzzling and not consistent with our experience (77% at 8 years vs 91% at 12 years, respectively). Although it's not entirely clear from the Cleveland Clinic data, it appears to be mainly driven by greater recurrence of AR in the BAV cohort. As we are trying to learn from everyone's experience, the question naturally arises whether this was driven by recurrent cusp prolapse or annular dilatation.

Even so, outcomes of aortic valve repair irrespective of phenotype are superior to prosthetic valve replacements. Long-term survival curves are superimposed on survival curves of the general population,[4] results that to date have not been achieved with any of the valve replacement therapies, except for the pulmonary autograft.[5] We therefore recommend repairing any BAV, whenever feasible. The reimplantation technique has yielded excellent long-term results in our experience and should therefore be the gold standard. The question is not if we should use mechanical valves instead, but how we can teach cardiac surgeons the necessary skills to achieve consistent repair results, regardless of BAV phenotype.

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