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Commentary: Are the results of reimplantation of the aortic valve the same for bicuspid and tricuspid valves?

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Reimplantation of the aortic valve was originally developed to treat patients with aortic root aneurysm and dilated aortic annulus.¹ The aortic root aneurysm may have a bicuspid aortic valve (BAV) or tricuspid aortic valve (TAV). Because dilatation of the aortic annulus is frequently present in patients with incompetent BAV, de Kerchove and colleagues² suggested that reimplantation of the aortic valve is a better approach to treat patients with BAV than conventional aortic valve repair, even in the absence of an aneurysm. Those investigators recently published the outcomes of reimplantation of the aortic valve in 440 patients (177 BAV; 76 without aneurysm), and freedom from reoperation at 10 years was approximately 90% and similar for TAV and BAV.³ Other investigators have also shown that BAV had no adverse effect on the mid-term outcomes of reimplantation of the aortic valve.^{4,5}

In this issue of the *Journal*, Mokashi and colleagues⁶ from the Cleveland Clinic published their experience with reimplantation of the aortic valve in patients with BAV and compared the outcomes with TAV using propensity score analysis. From 2002 to 2017, they operated on 607 patients, 92 with a BAV. Median follow-up for the BAV was only 2.8 years, suggesting that BAV was a more recent introduction to this type of surgery. There were 5 aortic valve reoperations for severe aortic regurgitation in the BAV group with a freedom from reoperation of 94% at 5 years and 77% at 8 years, whereas there was only one such aortic valve reoperation in the TAV group with freedom from reoperation of 98%.

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Disclosures: Author has nothing to disclose with regard to commercial support.

Received for publication March 2, 2020; accepted for publication March 3, 2020; available ahead of print April 9, 2020.

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J Thorac Cardiovasc Surg 2022;163:64-5

0022-5223/\$36.00

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<https://doi.org/10.1016/j.jtcvs.2020.03.028>

Bicuspid aortic with cusps at 180° are ideal for the reimplantation procedure.

CENTRAL MESSAGE

Bicuspid aortic valves are morphologically heterogeneous and certain geometric configurations will not provide as stable valve function after reimplantation procedure as tricuspid valves do.

Clearly, patients with BAV did not do as well as those with TAV.

I believe that BAV will adversely affect long-term durability of reimplantation of the aortic valve. We introduced this operation in 1989 to treat aortic root aneurysm in patients with TAV and did not use it in BAV until the year 2000. In addition, I have been selective and used it only in patients with normal cusps.⁷ I predict that patients with Sievers' type 0 BAV (Figure 1) will have as good long-term results as patients with TAV after reimplantation of the aortic valve. Sievers' type 1 BAV probably will have inferior results, mostly because of the heterogeneity of this subgroup. First, there is no agreement on how to reimplant this type of BAV. The group from Belgium believes that realignment of the 2 commissures to a 180° is important for durability of the repair.^{8,9} Other investigators believe that the geometric configuration of the cusps should be maintained during reimplantation of the BAV.^{10,11} Longer follow-up with objective assessment of valve function is needed to determine the usefulness of reimplantation of the aortic valve in Sievers' type 1 BAV and how to align the commissures inside the graft. Aortic stenosis is rare after reimplantation of a TAV during the first 2 decades of follow up, but it is not in BAV.¹²

Finally, the long-term outcomes of aortic valve replacement or a Bentall procedure with a bioprosthesis must be weighed against the risk of reoperation after reimplantation of a BAV. The results of aortic valve replacement with

FIGURE 1. Bicuspid aortic with cusps at 180° are ideal for the reimplantation procedure.

Hancock II bioprosthesis¹³ are associated with lower reoperation rate for valve failure than the results reported by Mokashi and colleagues⁶ for reimplantation of BAV. In addition, since the advent of transcatheter aortic valve implantation into failed bioprostheses, it is probably simpler and safer to deploy a new valve inside a failed bioprosthetic valve than in a reconstructed aortic root with a BAV.

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