



Simple bicuspid valve repair

Lars G. Svensson

Department of Thoracic and Cardiovascular Surgery, Heart, Vascular & Thoracic Institute, Cleveland Clinic, Cleveland, OH, USA

Correspondence to: Lars G. Svensson, MD, PhD. Department of Thoracic and Cardiovascular Surgery, Heart, Vascular & Thoracic Institute, Cleveland Clinic, 9500 Euclid Ave/J1-227, Cleveland, OH 44195, USA. Email: svenssl@ccf.org.



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Clinical vignette

A young male presented with severe aortic valve regurgitation from a bicuspid aortic valve. He did not wish to have a mechanical valve, and was not suitable for the Ross procedure. Based on his echo, he had a 75–85% likelihood of having a successful minimally invasive aortic valve repair procedure through a “J” incision, with a 0.25–0.5% risk of death and better than 90% freedom from reoperation based on our data (1).

Surgical technique

A minimally invasive “J” incision from the sternal notch to the right fourth intercostal space was made. Standard cannulization was used and antegrade cardioplegia given, followed by ostial cardioplegia with temperature monitoring.

The valve and root were examined using the CLASS schema [Commissures (raphe), Leaflets, Annulus, Sinotubular junction and Sinuses]. Based on findings for a straightforward bicuspid repair, as shown in the video, the following steps were taken:

- (I) The raphe was resected;
- (II) Cabrol commissure valve sutures were placed to narrow the intercommissural angle;
- (III) The conjoint leaflet plicated at the incomplete fusion with a 5/0 polyester suture;
- (IV) Figure-of-eight suspensory polytetrafluoroethylene (PTFE) sutures were placed at the commissure/leaflet junction and suspended at a higher level—about 3–4 mm higher;
- (V) Symmetry and apposition were checked.

For this type of repair, if the root is enlarged, it can be replaced by a beveled graft using a remodeling operation

with the coronary ostia reattached via an inclusion technique, as illustrated at the end of the video. The advantage with this method, after the leaflet repair, is that absolute hemostasis can easily be obtained if the buttons or the anastomosis leaks at the annulus.

Comments

While this technique is easy to use, care must be taken to ensure aortic stenosis is not created by a vigorous overcorrection. Indeed, if there is a concern with an annulus smaller than 22–23 mm, a Hegar dilator should be used to check if the orifice may be too small. Also, if there is risk of long-term leaflet prolapse, a leaflet edge running suture is used, and tied down around a Hegar dilator.

In our previous report of 728 bicuspid valve repairs (1), and in another where the aorta was also replaced in 801 cases (2), the risk of death has been <0.5% and the long-term results with repair have been excellent. However, when a reimplantation operation is combined with a bicuspid valve repair, while the results are not statistically different from reimplantation for a trileaflet valve, the long-term results may not be as good for bicuspid valve reimplantation versus trileaflet valve reimplantation (3). Bicuspid valve outcomes are not statistically different now, but probably will be over time. Our overall freedom from reoperation for over 1,100 modified reimplantations is 97% at 10 years, with a 0.17% elective operative mortality risk (4). The advantages of a successful bicuspid valve repair are not needing warfarin (Coumadin), lower risk of stroke and endocarditis, and lower risk of failure of biological valves in younger patients. By contrast, there are poorer outcomes long-term with Ross procedures—particularly associated with regurgitating valves—aneurysmal aortas,

and less chance of having a good quality of life than with aortic valve replacement. We also have had no deaths for reoperation of a patient who had an original bicuspid valve repair (1).

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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