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Key Words: bicuspid aortic valve, aortopathy, surgery, and outcomes

EDITORIAL COMMENTARY

Knife saves life

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Although it is the most common congenital anomaly of the heart, much remains unknown about bicuspid aortic valve (BAV), and substantial new information continues to be revealed and debated. One example is the conflict regarding the guidelines on the aortic diameter threshold for surgical intervention for BAV-associated ascending aneurysms. The 2013 Society of Thoracic Surgeons practice guidelines recommend that 5.0 cm be used as the threshold, whereas the 2014 American Heart Association/American College of Cardiology guidelines suggest a threshold of 5.5 cm (although the 2010 guideline from these 2 institutions was much more aggressive, suggesting a cutoff of 4.5 cm).^{1,2} Development of an evidence-based consensus on this issue calls for sound additional information.

Masri and colleagues³ reported long-term follow-up outcomes on BAV patients. The included patients were carefully followed, and those who had developed the guideline-recommended indications underwent surgical interventions. Although most of their findings are confirmatory, rather than novel, this study stands out among others because of its large sample size (1890

consecutive patients). During the observation period of approximately 8 years, many patients (approximately 50%) required surgical therapy, and the associated aortic dilation was common: 35% of the root and 42% of the ascending aorta.

The authors³ added a unique perspective by addressing the effect of the surgical interventions on the long-term outcomes of their cohort. The BAV patients who underwent aortic valve surgery with or without ascending

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Central Message

Bicuspid aortic valve patients can undergo surgery safely, with survival similar to that in the general US population.

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and/or root replacement had significantly lower death and/or dissection rates, compared with those who did not undergo surgical intervention. In fact, the Kaplan-Meier curves suggest that the surgical group has the same survival as a healthy age- and gender-matched group from the US population. Another view of these results is that the no-surgery group (who did not exhibit the guideline-recommended surgical indications during their follow-up period) had worse outcomes than those found in the general US population.

This finding from Masri and colleagues³ (especially for the no-surgery group) does not seem to be the result of obvious selection biases, such as the no-surgery group including many patients who were deemed to be inappropriate as candidates for surgery. Rather, the finding could be attributable to under-recognition of progression of BAV disease, as well as its associated aortopathy. This observation highlights the importance and feasibility of careful follow-up, as well as the validity of aggressive surgical therapy for this cohort. One might interpret the results as a challenge to the current guidelines.

The interpretation of the study, however, is not so straightforward, and the conclusions should be interpreted with caution. Among the limitations of the study, which are well stated in the discussion section of the article,³ are 2 potential biases. The first is that results for the study cohort may not be generalizable, given that they were from a single, tertiary referral center. Otherwise-healthy patients with normally functioning BAV are unlikely to be referred to their institution. Most studies that have attempted to address the natural or clinical history of BAV are compromised by this bias, except for 2 community population-based studies by Michelena and colleagues.^{4,5} This would bias the results toward overestimation of disease pathology; in fact, the rate of intervention for the study cohort seems higher, compared with the BAV

natural history study by Michelena et al⁴ (918 of 1890; 49%) during an 8.1-year follow-up versus 142 of 642 (22%) during a 9-year follow-up period, respectively.

The second issue of the study is in the results section: Immediate postoperative mortality occurred in only 0.4% of their patients. This rate was far lower than the Society of Thoracic Surgeons–predicted mortality of 2.2 ± 3 in the surgical group. The types of the surgical procedures ranged from isolated AVR to valve-sparing aortic root replacement with ascending aorta (and maybe hemi-arch) replacement. More details on the surgical interventions can be found in their previous report.⁶

Obviously, none of the superior long-term outcomes in the surgery arm could be achieved without these surgical results; thus, the findings and conclusions of the present study might not be generalizable. At the same time, we surgeons should be encouraged by the finding that BAV patients could enjoy normal longevity IF WE DO A GOOD JOB!

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