Challenging homografts as the holy grail for aortic valve endocarditis

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After the seminal contributions of Starr and colleagues¹ and Harken and associates² in introducing the ball-valve prosthesis in 1960, the first orthotopic insertions of an allograft valve were performed by Barratt-Boyes and Ross³ in 1962. Early aortic valve homografts were collected and implanted within days, but the logistic challenges gave way to clean collection and sterilization with β -propiolactone, ethylene oxide, or irradiation,⁴ and later with antibiotic sterilization.⁵ The current method of cryopreservation was introduced by O'Brien and associates⁶ in 1975. During the past 30 years, numerous authors have documented acceptable midterm durability among patients aged 20 to 30 years and older.⁷

Because of the more demanding surgical techniques involved in the implantation of aortic valve homografts compared with stented bioprosthetic and mechanical valves, coupled with the absence of readily available homograft valves at many centers, the “art” of aortic homograft surgery is often absent from the surgical repertoire of many adult cardiac surgeons. In view of the prevailing opinion among many surgical experts that aortic homografts offer the best protection against recurrent aortic root infection, many patients with aortic valve endocarditis are referred to centers with homograft expertise and availability.

The study by Kim and colleagues in this issue of *The Journal of Thoracic and Cardiovascular Surgery* is the latest in a series of reports^{8,9} challenging the incremental benefit of the aortic valve homograft in preventing recurrent infection of the aortic valve and aortic root relative to other prosthetic valve choices. This study is convincing from an analytic perspective, but propensity matching does not fully account for surgeon bias in selecting the valve substitute that he or she believes will provide the greatest protection against recurrent endocarditis. The major increase in the proportion of patients receiving homografts who had abscess formation (67% vs 41% for mechanical valve and 30% for xenograft valves; $P < .001$) or infection with methicillin-resistant *Staphylococcus* (26% vs 13% for mechanical valves and 12% for xenograft valves) leads the reader at least to consider the possibility that homografts were more likely to be used in the most severely infected patients.

Subcoronary implantation of an aortic valve homograft in an abscessed aortic root.

Central Message

Aortic homografts remain an effective tool in treating endocarditis, but standard prosthetic valves provide equivalent outcomes.

See Articles page 1239 and 1251.

See Editorial Commentary page 1249.

It is also notable in this study that 99% of the homografts were implanted as full root replacements, whereas fewer than 20% of either prosthetic valve type had root replacements. Some experienced homograft surgeons have preferred the intraaortic cylinder technique or infracoronary implantation (Figure 1),¹⁰ which avoids the short-term and longer-term complexities of full root replacement and has demonstrated long-term structural durability equivalent to that of the full root replacement.⁷

In the final analysis, experienced homograft surgeons may prefer the advantageous features of the homograft (relatively resistant to infection and easily adapted to severe root infection) for individual patients, particularly those with more severe infection with abscess formation. Of considerable importance, however, is the evidence-based conclusion that surgical referral of routine surgical aortic valve endocarditis to a center experienced with aortic homograft surgery is *not* necessary, and a justifiable expectation is that aortic valve endocarditis requiring operation can be safely and appropriately managed in centers with standard aortic valve surgery experience who do not have access to or experience with aortic valve homografts.

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FIGURE 1. A-C, Infracoronary implantation of aortic valve homograft for extensive aortic root abscess.

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