CHALLENGING ALLOGRAFT USE FOR AORTIC VALVE INFECTIVE ENDOCARDITIS: IS IT THE ALLOGRAFT OR THE SURGEON?

To the Editor:

We read with interest and some concern the recent paper by Kim and colleagues¹ and its accompanying editorials, which concluded that there was no significant benefit to allograft use with regard to resistance to reinfection after surgery for aortic valve infective endocarditis (IE). With wider ramifications to current surgical practice, they concluded that such surgery can be safely and appropriately managed in centers with standard aortic valve surgery experience, without access to or experience with allografts.

Hospital mortality after aortic valve IE surgery remains high (20% for allografts in Kim and colleagues¹; 22% overall, 25% for allografts, and 21% for nonallograft root replacement in Jassar and colleagues²; and 21% nationwide according to Society of Thoracic Surgeons data³). Similar to other studies, Kim and colleagues¹ primarily used allografts for extensive, severe IE: root abscess (67% vs 41% for mechanical prostheses, 21% for xenografts), prosthetic valve IE (58% vs 39% for mechanical prostheses, 21% for xenografts), and methicillin-resistant *Staphylococcus aureus* (26% vs 13% for mechanical prostheses, 12% for xenografts). Root replacement was performed in only 19% of patients receiving a mechanical prosthesis and in 11% receiving a xenograft.

One rationale for using allografts is to prevent early persistent or recurrent IE (Figure 1).^{4,5} Studying this requires (1) an adequate number of early postoperative events and (2) sufficient early events in other prostheses to establish a difference. We surmise from Kim and colleagues' actuarial figure¹ that 8 recurrent IE events occurred in the allograft group, less than the 10 usually required for comparative effectiveness (in Jassar and colleagues,² there were only 5 adjudicated cases of prosthetic valve IE, 2 in the allograft group). When applying propensity scores, effective sample size is further diminished—

FIGURE 1. Hazard function for recurrent endocarditis in patients who underwent aortic valve replacement for infective endocarditis at an Australian center, stratified by mechanical prostheses and xenografts versus allografts. Early risk peaks within 6 weeks for the mechanical and xenograft group, compared with a low, constant risk in the allograft group. Dashed lines enclose 70% confidence limits. (Modified with permission from: McGiffin DC, Galbraith AJ, McLachlan GJ, Stower RE, Wong ML, Stafford EG, et al. Aortic valve infection. Risk factors for death and recurrent endocarditis after aortic valve replacement. *J Thorac Cardiovasc Surg.* 1992;104:511-20. Copyright Elsevier 1992.) In contrast, patients who were treated for aortic prosthetic valve infective endocarditis with surgical debridement of infected tissue and aortic root replacement with a commercial cryopreserved aortic allograft at an American center had a late-peaking risk at approximately 9 months (inset). Dashed lines enclose 68% confidence limits. (Modified with permission from: Sabik JF, Lytle BW, Blackstone EH, Marullo AG, Pettersson GB, Cosgrove DM. Aortic root replacement with cryopreserved allograft for prosthetic valve endocarditis. *Ann Thorac Surg.* 2002;74:650-9; discussion 9. Copyright Elsevier 2002.)

both cohort size and event size. Inverse weighting appears to retain all patients but in fact only retains a variable fraction of each patient. Thus early events in all groups were probably few, insufficient to draw a firm conclusion.

Surgery for IE carries the highest risk of any valve surgery, and outcomes vary widely among centers and surgeons. Centers of excellence need to figure out how to lower operative mortality for IE with invasive pathology and report these findings, so that results such as those from Sabik and colleagues⁴ (3.9% mortality with allograft for prosthetic valve IE, a reference notably absent in Kim and colleagues' article and its accompanying editorials) are reproducible. Like other high-risk operations such as the Norwood procedure, however, operations for invasive IE remain highly variable. Not every surgeon and team can achieve low mortality.

Allografts have a role in treating advanced aortic valve IE, where the primary concerns are early survival and cure of infection. Considering the variable but generally high operative mortality of IE surgery, we still recommend that centers managing IE patients have allografts available to treat advanced disease—we consider it premature and

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risky to recommend otherwise. This is in addition to a devoted, skilled multidisciplinary IE team with advanced clinical assessment capabilities and surgeons experienced in complex aortic valve IE surgery.

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AORTIC VALVE HOMOGRAPHS: EXPERIENTIAL ATROPHY SPAWNS EVOLUTION OF STANDARDS

Reply to the Editor:

I read with interest the recent letter by Hussain and colleagues,¹ written in response to an article by Kim and colleagues,² which puts forth the assertion that variability in outcomes with homograft aortic valves for infectious endocarditis may relate to differences of expertise in the surgical implantation of homografts. As a longtime proponent of homografts and avoidance of foreign bodies (such as the prosthetic sewing ring of mechanical or bioprosthetic valves) in the infected aortic root, I am

sympathetic to their comments. The virtues of the homograft as a surgical tool include its relative resistance to infection^{3,4} (as nicely shown in the hazard curves in the Hussain correspondence), the acceptable durability in patients older than about 40 years, and its applicability in a wide array of geometric distortions of the aortic root after removal of infected tissue.⁵

Despite the hazard curves indicating a more favorable profile of susceptibility to infection (or reinfection),^{3,4} however, the analysis by Kim and colleagues² and those of others^{6,7} suggest that comparable freedom from reinfection can be achieved with alternative valve substitutes. It is worth noting that the two hazard plots in the Hussain correspondence are 14 and 24 years old.^{3,4} Without deprecating the value of these depictions, the current era (during the past decade) has seen an increased emphasis on more extensive excision of infected tissue^{7,8} and possibly improved antibiotic regimens. Thus these comparative hazard depictions may not completely reflect current experience.

This discussion is important because despite my personal preference (and that of Hussain and colleagues¹) for aortic valve homografts in the infected aortic valve or root, most practicing cardiac surgeons are not well versed in the technical nuances of homograft surgery. This in part follows a general movement of opinion away from the use of aortic homografts. They are now rarely used in many congenital heart surgery centers; homograft tissue is less often used for neonatal arch reconstruction, in part because of the known propensity for anti-HLA antibody formation with homografts (which confounds potential suitability for a future heart transplant). More attractive valved conduits are available for right ventricle-to-pulmonary artery reconstruction, conduits that have less tendency toward extensive calcification and are more suitable for subsequent percutaneous valve implants. In aortic root surgery for patients wishing to avoid chronic anticoagulation, aortic valve or root replacement with a stentless porcine valve prosthesis is a simpler procedure than homograft implantation.

An additional issue is the expense of aortic homografts (they are typically more than twice as expensive as other valve substitutes) and the cost of maintaining a supply of cryopreserved valves. Furthermore, if all patients with endocarditis were referred preferentially to centers with ongoing expertise in and support for homograft surgery, many if not most patients' families would suffer additional economic hardships in travel, lodging, and time away from home.

In summary, although my personal bias toward homografts for the infected aortic valve or root is concordant with the stated view of Hussain and colleagues,¹ I believe that available evidence is consistent with the