

Use of allogeneic tissue to treat infective valvular disease: Has everything been said?

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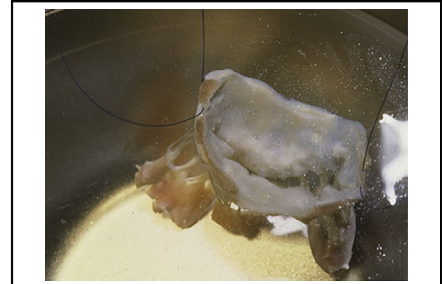
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Heart surgery does not always walk forward. It occasionally stops, sometimes retraces its steps. Recently, after the appearance of some interesting reports on the use of homografts for aortic infective endocarditis (IE), it has made quite a jump backward, returning to the situation faced at least 15 years ago. Kim and colleagues¹ questioned the benefit of homografts in aortic position based on the results of a propensity-matched analysis comparing homografts, xenografts, and mechanical prostheses in the setting of IE showing no demonstrable benefit in terms of mortality and resistance to reinfection in the homograft group.

The use of allograft substitutes or autografts is not uniform across European and American units and is greatly dependent on surgeons' individual experience and training. Indeed, as mentioned by Kim and colleagues¹ and in a subsequent editorial by Kirklin,² the technical challenge and the lack of training in these techniques over the last 10 years, coupled with the absence of readily available homograft valves at many centers, has restricted the widespread use of this substitute, confining the "art" of homograft surgery to the hands of a small group of surgeons.² Regardless of these caveats, however, it is undeniable that when such factors as the severity of the destructive process or its extension to the mitral valve are involved, the balance in the choice of the most suitable substitute is critically weighted toward homografts over conventional stented or mechanical prostheses.

The study by Kim and colleagues,¹ although a notable and well-designed contribution, bases its conclusions on a maximum follow-up of 72 months. This hardly compares with the 15- or 20-year follow-up in the studies by Musci and colleagues³ and Yankah and colleagues,⁴ which is of significance when comparing homografts with xenografts or mechanical valves, given that the actual clinical benefit from the use of homografts is expected to emerge in the long term rather than in the short term (ie, better hemodynamics, no warfarin-related complications). In addition,



Mitral homograft before implant.

Central Message

Better a short-term solution or a long-lasting procedure in infective endocarditis? Reconsider homografts.

there was a significant imbalance in the indication for use of homografts, xenografts, and mechanical valves, with the homografts implanted in patients with significantly more serious and complex conditions, including annular abscess, mitral valve involvement, aortomitral junctional abscess, and prosthetic IE. In their propensity score matching analysis, homograft use did not produce a significant benefit in terms of mortality.

The foregoing results seem to challenge the idea introduced by Barratt-Boyes in 1967, and subsequently refined by Ross, Jacoub, and O'Brien, on the use of homografts in patients with IE.⁵⁻⁹ Indeed, for similar patients with IE with differing degrees of extension of the lesion and aggression of the aortic valve, several pivotal observational studies have shown that the use of cryopreserved homograft provides a survival benefit over conventional valve replacement. Successful treatment of circumferential annular abscess root replacement or aortomitral junction abscess using aortic homografts has been reported.¹⁰⁻¹² In 2002, Yankah and colleagues⁴ reported on a 10-year follow-up of 816 patients presenting with complex aortic root IE with periannular abscess and implanted with cryopreserved homografts, showing a survival of 91% with a reinfection rate of 3.6% at 10 years. The authors concluded

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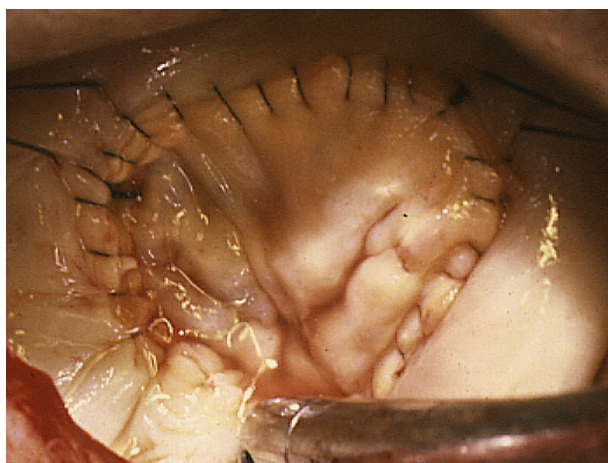


FIGURE 1. Total homograft replacement of the mitral valve after destructive endocarditis with involvement of the entire mitral annulus.

that a properly inserted homograft could provide excellent hemodynamics with reduced risk of reinfection, and that only an undersized mismatch was an actual determinant of reoperation risk.⁴ In 2010, Musci and colleagues,³ in a series including patients with native valve endocarditis, prosthetic valve endocarditis (PVE) and aortoventricular dehiscence, demonstrated satisfactory early and long-term results with a similar low risk of infection recurrence. This was thought to be related to the complete eradication of the infection that is possible with homograft implantation. The use of homografts also would be appropriate in cases of severe destructive endocarditis with aortoventricular dehiscence when reconstruction of the left ventricular outflow tract is required. Musci and colleagues³ reported significantly better outcomes in patients with native valve endocarditis compared with those with PVE. In the context of PVE, Perrotta and colleagues¹³ recently reported their 20 years of experience with homografts and compared outcomes with those of mechanical and biological valves, and documented no significant difference in early mortality or 10-year survival rate, but a statistically significantly lower rate of infection recurrence, with homografts.

This finding supports the widely accepted assumption that antibiotics are more effective in living and well-vascularized tissue, explaining the higher incidence of recurrent infection in patients who received synthetic derivatives compared with those who received biological allogeneic substitutes. In particular, some strains of *Staphylococcus aureus* and *Streptococcus viridans* are known to be extremely aggressive, with the latter being difficult to detect even with the use of sophisticated techniques, such as mpB genotyping and matrix-assisted laser desorption/ionization time-of-flight systems.¹⁴ In the study by Kim and colleagues,¹ *S. viridans* was isolated in the 38% of the patients who received a mechanical valve. In these

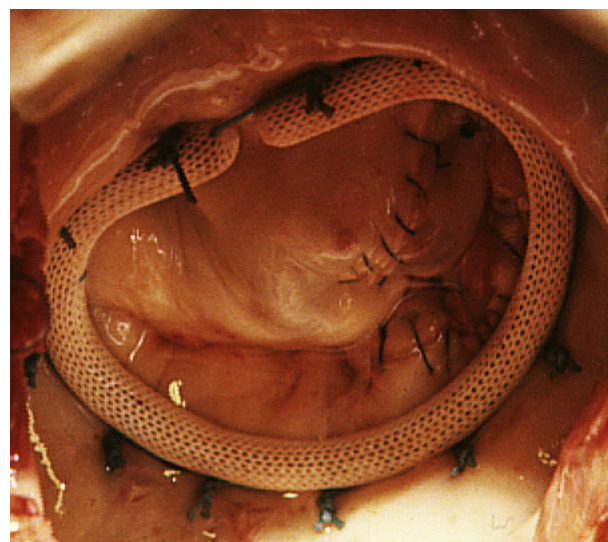


FIGURE 2. Partial homograft replacement of the mitral valve after extensive endocarditis with commissural lesion.

conditions, the decision to implant a mechanical valve should be carefully considered given the high rate of recurrence and the elevated risk of mortality after reinfection. In this context, an interesting study conducted in a community hospital serving a highly diverse population in New York City, which captured a real-life picture of patients with IE based on modified Duke criteria, revealed a mortality rate of 27.7% in patients with prosthetic heart valves, compared with only 8.11% in patients with native heart valves.¹⁵

ENDOCARDITIS EXTENSION AND MITRAL VALVE INVOLVEMENT

Another important question is related to the complexity and extension of the infection in IE. If in cases of localized leaflet involvement with vegetations smaller than 10 mm, the question of whether a standard aortic valve replacement will suffice instead of a more destructive approach remains reasonable, then in cases of large abscess formation and extensive annular disease, the need for an appropriate clearance of the infected tissue and adequate reconstruction of the aortic root is more compelling. Kim and colleagues¹ treated more than 40% of patients presenting with abscess formation with mechanical prostheses, which on one hand provides a relatively quick and uncomplicated solution in the short-term, but on the other hand implies accepting the long-term risk of valve reinfection in this more complex operation. In this light, what is the actual benefit of limiting immediate surgery to valve replacement and extending it to more difficult procedures in the long-term?

A similar question might be posed in cases of IE involving the mitral valve alone or in combination with aortic structures. An analysis of the profiles of IE and surgical procedures published by Kim and colleagues (their

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