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Commentary: Evolution toward a “bespoke” Ross procedure

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With accumulating evidence of low perioperative mortality, favorable hemodynamics, low risk of endocarditis, long-term durability, and most importantly, a survival advantage over prosthetic valve replacement, the living pulmonary autograft is an ideal aortic valve replacement option for active young and middle-aged adult patients.¹ With long-term survival equal to the age- and sex-matched general population in most series, the arguments that favor use of the Ross procedure have become increasingly compelling.^{2,3}

Younger patients may derive the greatest long-term benefit from the Ross procedure. Yet, these selected patients often have congenital bicuspid valves, with pure aortic regurgitation (AR) and a dilated aortic valve annulus. Historical data from older Ross clinical studies show that patients with primary AR are found to be at risk for reoperation due to autograft dilation with recurrent regurgitation. This has restricted use of the Ross procedure in many patients who may benefit. Fortunately, with recent technical and perioperative care pathway innovations, the benefit for these young adults with AR may be equal to, if not greater, than older patients with aortic stenosis. In this issue, Mazine and El-Hamamsy⁴ provide an excellent overview of Ross procedure outcomes, highlighting the concerns of progressive annular dilation in patients with AR. With a thoughtful unpacking of the contributing mechanisms, this expert team offers a successful approach to address these earlier technical shortcomings. The key elements of success are use of a tailored surgical approach

CENTRAL MESSAGE

Novel technical advances that stabilize the autograft for the Ross procedure may extend candidacy to include patients with primary aortic regurgitation and improve durability.

to stabilize the autograft in addition to strict postoperative blood pressure control.

The concept of a “bespoke” Ross operation is appealing on several levels. Unlike full external support techniques with the native root inclusion technique or encasement of the autograft in a Dacron tube, the “nonwrapped” approach maintains the dynamic motion of the autograft root and optimizes hemodynamics. It is recognized that recurrent AR can result from progressive dilation of the native ascending aorta, and the autograft, at the sinotubular junction (STJ). To address this, a Dacron annuloplasty at the STJ, in patients with a dilated ascending aorta, acts to prevent dilation and AR by mitigating displacement of the autograft’s commissures. More proximally, an extra-aortic ring annuloplasty is used to prevent proximal dilation at the level of the ventriculoaortic junction (annulus). The value of an STJ annuloplasty and the effectiveness of an external ring annuloplasty, rather than subcommissural annuloplasty stitches, which are known to fail, are lessons learned through experience with aortic valve repair.⁵ These technical nuances are transferrable from aortic valve repair techniques and are a valuable component of the contemporary Ross procedure. It is reasonable to assume, based on emerging evidence, that these modifications will translate into better long-term durability of the pulmonary autograft.¹ This adds important technical detail and support for the Ross procedure as an excellent option for young and middle-aged patients, including those with AR who are not amenable to repair.

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