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Commentary: Reinforcing the gold standard: A case for delaying the Ross procedure in children

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Example of reinforced Ross technique.

CENTRAL MESSAGE

Strategies such as a 2-staged approach and reinforced Ross technique may help to mitigate aortic root dilation and improve long-term outcomes after Ross operations.

The management of aortic valve disease is challenging in pediatric populations. It is a lifelong disease requiring repeated interventions. The ideal solution would provide a durable, growing valve with good hemodynamic parameters that avoid the need for anticoagulation therapy. Pulmonary autograft replacement of the aortic valve—the Ross procedure—is considered by many to be the treatment of choice for children with significant aortic valve disease. The Ross procedure has demonstrated good long-term survival and freedom from reintervention. However, the procedure is technically complex and converts a 1-valve disease into a 2-valve disease. Additionally, outcomes are worse in neonates and infants, and there are higher rates of autograft reintervention in children.¹

Hraska and colleagues² propose a comprehensive management strategy for aortic valve disease in children. The impetus for their article was a recent article by Buratto and colleagues¹ that showed that children undergoing the Ross procedure as a secondary surgery after initial aortic valve repair had improved survival and freedom from autograft reoperation when compared with their peers who underwent a primary Ross operation. These findings have been factored into their up-to-date algorithm for the management of aortic valve disease.

Neonates with aortic disease typically have aortic stenosis that can be managed by balloon valvuloplasty or

surgical valvotomy. Recent evidence seems to favor surgical valvotomy over balloon valvuloplasty in terms of lower rates of reintervention.³ Moreover, failure after balloon valvuloplasty is primarily by regurgitation, which is less preferred when considering a subsequent Ross procedure. Hraska and colleagues² suggest that the Ross-Konno procedure be reserved for infants with small left heart structures who will benefit from left ventricular outflow tract enlargement.

Beyond infancy, patients can present with aortic stenosis, regurgitation, or mixed lesions. Aortic valve repair can be performed with good immediate results, but long-term durability is limited by technical challenges and the lack of growth potential of prosthetic material used in the repair. The aortic valve reconstruction technique pioneered by Baird and colleagues⁴ has shown encouraging results in pediatric populations, but long-term data are awaited. The Ross procedure is the gold standard for aortic valve replacement in children and young adults. Autograft dilatation and regurgitation are the most common late causes of autograft failure.⁵ These can be mitigated in fully grown adolescents and adults by supporting the Ross externally to prevent dilatation.⁶ However, this so-called reinforced Ross has limited applicability in small children who still require growth of the aortic annulus to match somatic growth (Figure 1).

This is where the strategy proposed by Buratto and colleagues¹ may find its niche. They found that survival and freedom from autograft failure were better when the Ross was performed as secondary procedure following initial

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FIGURE 1. Cartoon depiction of the reinforced Ross technique showing the external support of the autograft using a Vascutek Valsalva graft (Vascutek Terumo, Renfrewshire, Scotland, United Kingdom). The pulmonary autograft is inserted into the prosthesis. The diameter of the Valsalva prosthesis (V) is 2- to 4-mm larger than the diameter of the pulmonary autograft. Modified with permission from Carrel and colleagues.⁶

aortic valve repair. They surmise that the postoperative adhesions in these patients may limit dilatation of the autograft while allowing for proportionate growth. The care of children with aortic valve disease continues to evolve with our understanding of the disease process and available therapeutic options.

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