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Commentary: The Ross reversal: Should it be done, if so when?

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Weiss and Pettersson¹ provide a detailed description of the Ross reversal from preoperative evaluation to technical considerations intrinsic to a complex operation. The goal of Ross reversal is to salvage the pulmonary autograft valve from the aortic position in patients with autograft root dilation and autograft valve regurgitation and move it back to its original home in the right ventricular outflow tract. This involves the use of autologous pericardium, excised aortic tissue, or autograft tissue to repair defects from coronary ostia and a refashioning of the autograft valve to resemble the native pulmonary root.

The authors are to be commended for their detailed technical description of a complex procedure and outstanding results. In their original series, Hussain and colleagues² presented midterm data on 30 patients undergoing Ross reversal, only 8 of whom had moderate-to-severe pulmonary allograft dysfunction warranting replacement. The other 22 patients had allograft dysfunction that ranged from none to moderate. Postoperative outcomes were excellent: There were no mortalities or reinterventions at a median follow up of 4.1 years. Weiss and colleagues¹ also mention an additional 11 patients who underwent reoperations for failed Ross procedures, 6 of whom had a Ross reversal with outstanding early results.

Was Ross reversal justified in the 22 patients with only moderate allograft valve disease or less, or does severe pulmonary allograft dysfunction need to exist to justify



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Ross reversal is technically demanding and requires meticulous patient evaluation. Indications remain controversial because the long-term durability of the reversed autograft is uncertain.

replacement with a less-than-perfect refashioned autograft? Although long-term data on the durability of the reversed autograft is lacking, the long-term fate of the pulmonary allograft is also essential to addressing this question. Fricke and colleagues³ reported on pulmonary allograft function in 443 patients following a Ross procedure with excellent long-term freedom from both reintervention and moderate dysfunction of 96.6% and 78.3%, respectively, at 20 years. David and colleagues⁴ documented a series of 212 patients, 16.8% of whom had a Ross-related reoperation at 20 years. Only 8.2% required pulmonary allograft reintervention, although there was a 43% incidence of at least moderate pulmonary allograft dysfunction by echocardiogram.⁴ Not only was mild-to-moderate allograft failure well tolerated, but the need for reintervention lagged behind moderate allograft valve dysfunction.

Transcatheter pulmonary valve replacement (TPVR), although not perfect, has evolved as another component in the armamentarium to treat allograft failure. Gillespie and colleagues⁵ reported TPVR results with an 89.5% freedom from explantation at 4 years using the Melody (Medtronic, Minneapolis, Minn) TPVR. However, one cannot overlook the 10.7% incidence of endocarditis. Shahanavaz and colleagues⁶ recently reported results of patients who had TPVR using the Sapien (Edwards Lifesciences, Irvine, Calif) TPVR. Although median follow-up was only

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12 months, the incidence of explantation and endocarditis were 4.8% and 2.5%, respectively.

Although the long-term fate of the reversed autograft procedure is unknown, it is reasonable to offer Ross reversal in patients with severe pulmonary allograft dysfunction that mandates allograft valve replacement.⁷ However, there should be caution when considering Ross reversal in patients requiring reoperation with less-than-moderate allograft disease until there are long-term data on the fate of the reversed autograft procedure and as transcatheter therapies continue to improve.

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