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Commentary: Surgical options for right ventricular outflow tract reconstruction: Innovate or die

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Prosthesis durability remains the Achilles heel for RVOT reconstruction.

CENTRAL MESSAGE

Surgical techniques and outcomes for RVOT reconstruction remain unchanged. Prosthesis durability remains the Achilles heel. Surgical innovation and collaboration are required to advance care.

In this invited opinion article, the authors present very rational and thoughtful recommendations for right ventricular outflow tract reconstruction in children with congenital heart defects.[1] These recommendations are informed by nearly 5 decades of clinical practice and scientific investigation by the senior author. They report the relative advantages and limitations for the prosthetic options. Important points include the improved valve function of decellularized allografts over conventional allografts and the increased risk of endocarditis in bovine jugular valved conduits. They also include their indications for the use of the porcine aortic root as a conduit, a less commonly used, but durable graft, especially in the older patient. Also discussed, the valved polytetrafluoroethylene graft that has shown promising results in larger sizes but is less applicable, at least currently, to smaller children. Finally, the Holy Grail for valve replacement, the completely autologous valved conduit, is discussed.

The authors include important literature to support their recommendations for each prosthesis. The literature is quite extensive, as this is one of the most common operations and clinical decisions we face. Unfortunately, as with most clinical dilemmas in congenital cardiac surgery, there are few to no rigorous controlled trial comparing prostheses. Hence, we continue to base clinical decisions on expert opinion and cases series outcomes, with little consensus.

It seems that there are endless permutations and nuances to the strategy for right ventricular outflow tract reconstruction. Prosthesis choice is influenced by multiple factors, including primary versus secondary operation, age and size of the patient, orthotopic versus heterotopic position, physiologic and anatomic state of the distal pulmonary architecture, and the not least of all, the technical preferences of the surgeon.

In neonates and infants, smaller size of conduit has been associated with reduced durability, and bovine jugular valved conduits perform better than either pulmonary or aortic allografts. However, for patients with pulmonary atresia or patients with high pulmonary vascular resistance, the aortic allograft may perform better. Also, the risk in endocarditis may overshadow the relative benefits of the jugular venous valved conduits. However, the use of an oversized stented bioprosthesis may actually reduce durability, especially in the smaller and younger patients.

Ultimately, prosthesis durability has been the major limitation. Because of this, decisions for what prosthesis we place surgically are based on providing a suitable setup for the next less-invasive procedure, a catheter-delivered valve. We are encouraged by our cardiology colleagues to place as large a conduit or bioprosthesis so that the next valve can be catheter-based prosthesis, even if it means that the durability of the surgically placed valve is inferior. It is unclear if this is the best or most cost-effective strategy, but the transcatheter pulmonary valve replacement clearly

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has advantages and is here to stay. Driven by the market, interventional specialists have dominated the valve-replacement arena for the last several years, not only with less-invasive techniques but also with advanced prosthesis design. It is imperative that we as congenital cardiac surgeons continue to innovate our techniques and demonstrate clinical effectiveness with surgical intervention but also collaborate to provide the most effective care for children requiring valve-replacement procedures and strategies.

Reference

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