Commentary: Pulmonary valve replacement—Is this the best we can do?

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Bioprosthetic pulmonary valve made of bovine pericardium showing severe calcification.

Central Message

We need to do better than just “okay” with pulmonary valve replacement.

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Many patients with congenital heart disease and right heart lesions require right ventricular outflow tract reconstruction, pulmonary valve replacement, or both. Ideally, a pulmonary valve should be structurally and functionally like a normal pulmonary valve—just as Mother Nature made it. Desirable characteristics in a valve would include that it is competent, nonobstructive, durable, nonthrombotic, noninflammatory, nonimmunogenetic, easy to implant (surgically or by transcatheter techniques), and inexpensive. Obviously, no such valve exists. We have many choices for pulmonary valve replacement; however, as with many things, if there are many suitable options, there is usually no single best option.

In their report in this issue of the *Journal*, “Stented Bovine Pulmonary Valves in the Pulmonary Position,” Pragt and colleagues¹ review their experience with the Carpentier-Edwards Perimount valve (Edwards Lifesciences Corporation, Irvine, Calif) in 45 patients aged 15 to 59 years (median, 27.8 years). Most patients had tetralogy of Fallot (69%). The median valve size implanted was 25, (range, 23-29). Mean follow-up was 5.8 years. Freedoms from reintervention were 95% at 5 years, 83% at 10 years, and 12% at 15 years. Freedoms from valve failure were 75% at 2 years, 65% at 5 years, and 57% at 10 years. These data suggest that durability (as defined by moderate stenosis or insufficiency) is an issue that occurs early, but the threshold for reintervention is not met until significantly later. Pragt and colleagues¹ conclude that valve function is adequate at 5 years; after 10 years, however, valve failure and reintervention are common.

The main goals of pulmonary valve replacement are to provide a symptom-free quality of life and preserve long-term right ventricular function. The best way to achieve this is with a durable, competent, and nonobstructive pulmonary valve. Current bioprostheses are adequate, but there is much room for improvement, especially when one considers the lifelong needs of the patient. Newer materials with improved durability and retention of desired biomechanical properties would certainly help. Newer valve designs and improved methods of implantation or delivery may also yield improved results. Mechanical valves have been used, but they place the burden of lifelong anticoagulation on the patient. Perhaps newer ways to modulate the coagulation cascade will provide benefit in this regard. With continued efforts through time, we need to do a better job than just “okay.”

Reference

1. Pragt H, Schoots MH, Accord RE, Arrigoni SC, Berger RM, Mariani MA, et al. A stented bovine bioprosthesis in the pulmonary position. *J Thorac Cardiovasc Surg*. 2020;159:1063-71.e1.