

This study further corroborates the idea that mechanical prosthesis are a good option for pediatric MVR whereas fixed-diameter tissue valves have currently very narrow indications. It also provokes consideration for Melody valve implantation in suitable high-risk patients with small annuli. For patients with annular size of 15 mm, a new mechanical valve has recently been approved and outcomes have been positive.⁴ While the desirable prosthesis has yet to come and final judgment must be reserved, it is crucial to take innovation to heart.

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Commentary: And the winner is...

Carl L. Backer, MD

Once a decision has been made that the mitral valve of an infant or child cannot be repaired, the next step is to decide what type of valve to implant. This decision is multifactorial and the variables evaluated are the size of the mitral annulus, what new valves are available as technology advances, the issue of anticoagulation, and surgical bias that may or may not be evidence-based. The review by Choi and colleagues¹ of a large number of infants and children undergoing mitral valve replacement adds useful and important evidence for surgeons evaluating a child requiring mitral valve replacement.

The clear overall winner is the mechanical valve. This was not only the most frequently implanted valve in this series (62% of mitral valve implants), but also the valve with the longest time to re-replacement. In this series, the median time to repeat mitral valve replacement was 11.2 years for mechanical valves. The smallest mechanical valve currently



A 15-mm mechanical valve.

CENTRAL MESSAGE

In a large series of infants and children undergoing mitral valve replacement, the best performance of an implanted valve was achieved by mechanical valves and stented bovine jugular vein valves.

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available is the 15-mm valve.² In addition, a subanalysis by the authors on bleeding and thromboembolic events concluded: "Although further investigation is necessary, these results suggest in this population mechanical valves are not at significantly higher risk for bleeding or thromboembolic events compared to nonmechanical valves."

The remaining question is, What is the best valve for patients who have an annulus that is smaller than 15 mm? The technological advance that has been previously reported but now has longer-term follow-up in this article is the use of the Melody valve (stented bovine jugular vein valve) (Medtronic, Minneapolis, Minn) in the mitral position. This valve

was originally designed to be placed percutaneously in the pulmonary position but has been modified for use as a mitral valve. A considerable advantage is that the valve can be dilated with a balloon catheter as the child grows. This has clearly been shown to be an alternative that should replace the prior use of small-valved conduits that were designed for use as right ventricle to pulmonary artery conduits but then adapted to be placed in the mitral position.

The closing forces on a mitral valve and the susceptibility to calcification appear to rapidly degrade porcine and pericardial valves. The use of these valves should probably be limited to patients who cannot tolerate anticoagulation therapy. Their longevity is quite similar to the Melody valve, but are only available in sizes where there is also a comparable sized mechanical valve.

There is still room for improvement in this arena. Technological advances should contribute to this—much as the adoption of the Melody valve to the small mitral annulus and the development of the 15-mm mechanical valve have contributed to our ability to offer more solutions to these critically ill children. Until then let’s use this data to recommend the use of mechanical or Melody valves for infants and children requiring mitral valve replacement.

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Check for updates

Commentary: Mitral valve prosthesis in children: Is it the time to change our beliefs and practice?

Mauro Lo Rito, MD, Alessandro Frigiola, MD, and Alessandro Giamberti, MD

Congenital mitral valve disease, either stenosis or regurgitation, is among the most challenging conditions to treat. Usually, the earlier in age a surgical operation is required, the more challenging it is, and less satisfactory are the results in the long term. Surgeons in this field are aware that replacement should be avoided as much as possible, also accepting not perfect repair but preserving native tissue. When mitral valve replacement is needed, prosthesis selection becomes among the essential factors to provide the best outcome possible. During the prosthesis selection process, some fixed factors play a crucial



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CENTRAL MESSAGE

Mitral valve replacement in children carries a high burden of reoperation, death, and adverse events. The perfect prosthesis currently does not exist, but valid alternative solutions are available.

role in the decision, such as prosthesis size available in the market, duration, and anticoagulation. Emani and colleagues¹ described the use of the Melody valve (Melody Transcatheter Pulmonary Valve; Medtronic, Minneapolis, Minn) in mitral position 8 years ago. Now they report their experience of mitral valve replacement showing the good result of the Melody valve in the mitral position compared with other prostheses. Choi and colleagues,² in their retrospective single-center study,

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