ECM biomaterial. Consequently, much more work needs to be done to convince the congenital and adult cardiac surgery community about the efficacy and safety of the ECM tube graft technologies for valvular pathologies.

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See Article page 102.

Commentary: Pig in a poke

Edward Y. Sako, MD, PhD

In the accompanying article, Tjømild and colleagues¹ describe a technique for mitral valve replacement using a modified tube graft. Sheets of a porcine 2-ply small intestinal submucosa extracellular matrix are fashioned into a tube with one end sewn to the mitral annulus and the other attached to the tips of the papillary muscles and cutouts done in such a way as create functional leaflets of the sides of the tube. This reconstruction was performed on 8 pigs, pre- and post-procedure physiologic and echocardiographic assessments were made, and the animals were then euthanized. The immediate results, including hemodynamics and videos of the echo, appear excellent. It is not an entirely novel concept but based in part on work done by this group in tricuspid valve replacement.²

Measure twice, cut once.

CENTRAL MESSAGE

An intriguing alternative to mitral valve replacement will depend largely on the ease of implant and durability of the extracellular matrix.

The keys to the success of the technique will depend on the standardization of the methods to achieve the correct measurements to accommodate the variations in anatomy and the ultimate durability of the material. The measurements given appear rather proscriptive but given the design would likely have to be customized to the individual anatomy. Thus, the first question many surgeons will ask is how easy and replicable is the implant technique? Given the wide variation of papillary muscle anatomy and various annulus dimensions, can there be an off-the-shelf option? The discussion would indicate that this may be difficult. As would be expected, the measurements

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Disclosures: The author has a financial relationship with Medtronic, Inc.

Received for publication July 15, 2019; accepted for publication July 17, 2019; available ahead of print July 25, 2019.

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J Thorac Cardiovasc Surg 2020;160:114-5

0022-5223/\$36.00

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<https://doi.org/10.1016/j.jtcvs.2019.07.030>

are critical to the optimal functioning of the prosthesis and avoidance of complications such as systolic anterior motion.

The second question to be answered is what is the advantage of this approach? Hemodynamics superior to most other valve prosthesis is the author's response. However, this has only been shown on a very short-term basis in a model with no previous valvar disease. Finally and most importantly, durability has not been shown with this material in the specific case of leaflet replacement. Small intestinal submucosa extracellular matrix has not had a particularly good track record as a biologic replacement, and there are minimal data with its use as valve leaflet replacement.³ The authors contend that the data to date relate to the 4-ply version and that the 2-ply version has theoretical advantages. This has yet to be seen. Also related

to the durability issue will be the interaction with native tissue at the points of attachment, particularly under the potential stress applied. In summary, this is an intriguing but very early pilot study. A good deal more time will be needed to fully assess its efficacy.

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