The golden polytetrafluoroethylene parachute

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Mitral valve repair has been firmly established as the gold standard for addressing degenerative mitral valve pathology,¹ with reliable and standardized repair techniques of posterior leaflet prolapse. Anterior leaflet pathology still remains a formidable surgical challenge, however, and is associated with inferior long-term outcomes.² Artificial polytetrafluoroethylene chordae have been introduced to aid reconstruction of complex mitral lesions,³ but proper determination of chordal length and the number of chordae needed requires significant experience and mature judgment. In the current issue of the *Journal*, Chawla and colleagues⁴ present an expanded polytetrafluoroethylene multichordal device as a potential tool to facilitate repair of complex mitral lesions. Chawla and colleagues⁴ implanted the device in 7 pigs, with 6 surviving at least 150 days and 5 having mild or less mitral regurgitation at distant follow-up. The investigators demonstrated good biocompatibility of the polytetrafluoroethylene device and maintenance of valvular competence after transection of native marginal chordae. Chawla and colleagues⁴ are to be congratulated on an ambitious large animal project and detailed histopathologic examination of the explanted valves. Before the device beholds the goal of standardizing anterior leaflet repair, however, several questions remain unanswered. Although repeated sizing may be avoided, the proposed technique is still “hampered” by the need to properly judge neochordal length of the device. In the experiment, Chawla and colleagues⁴ used the native “reference chordae” as a guide; these were normal pig valves, however, and identifying reference chordae in complex degenerative disease is neither simple nor obvious. Chawla and colleagues⁴ propose that for complex lesions 1 or 2 devices could potentially address entire valvular pathology, but this would introduce significantly more foreign material than standard repair, perhaps negating the reduction in infectious complications that is usually associated with mitral valvuloplasty. The study did not include a control arm with

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Central Message

A novel polytetrafluoroethylene device may aid repair of complex degenerative mitral valve pathology.

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mitral repair performed with standard polytetrafluoroethylene chordae, and therefore a direct comparison of biocompatibility and clinical efficacy is not possible. The single animal that showed development of significant mitral regurgitation at distant follow-up deserves closer examination because of the dehiscence of the device at the leaflet insertion site. Chawla and colleagues⁴ attribute this event to erroneous transection of an adjacent strut chordae; however, transection of secondary chordae has been shown both clinically⁵ and experimentally⁶ not to affect valvular competence. Although leaflet stress distribution could be affected,⁷ the device should be able to withstand such fluctuations across a physiologic spectrum.

Reliable and reproducible techniques for posterior leaflet repair are a part of most surgeons' technical armamentarium, but repair of complex anterior leaflet pathology remains a formidable challenge because surgical techniques are less standardized. This report builds on the concept of artificial chordae replacement in offering a potential standard device for complex valve pathology. Chawla and colleagues⁴ have taken the first step of demonstrating safety and biocompatibility of the mitral polytetrafluoroethylene parachute; proven clinical efficacy will make it golden.

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