

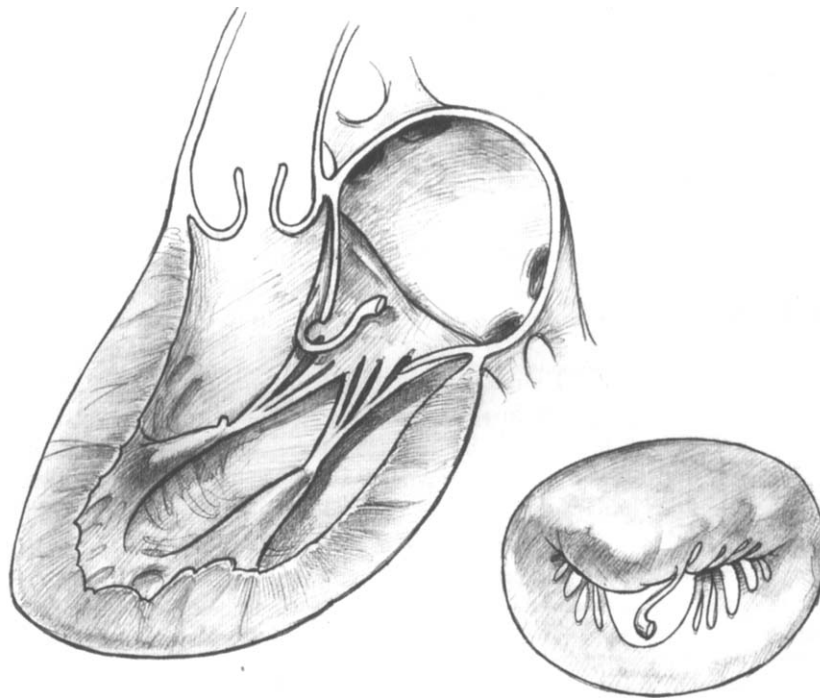
Chordal Replacement With Expanded Polytetrafluoroethylene Sutures in Mitral Valve Repair

Tirone E. David

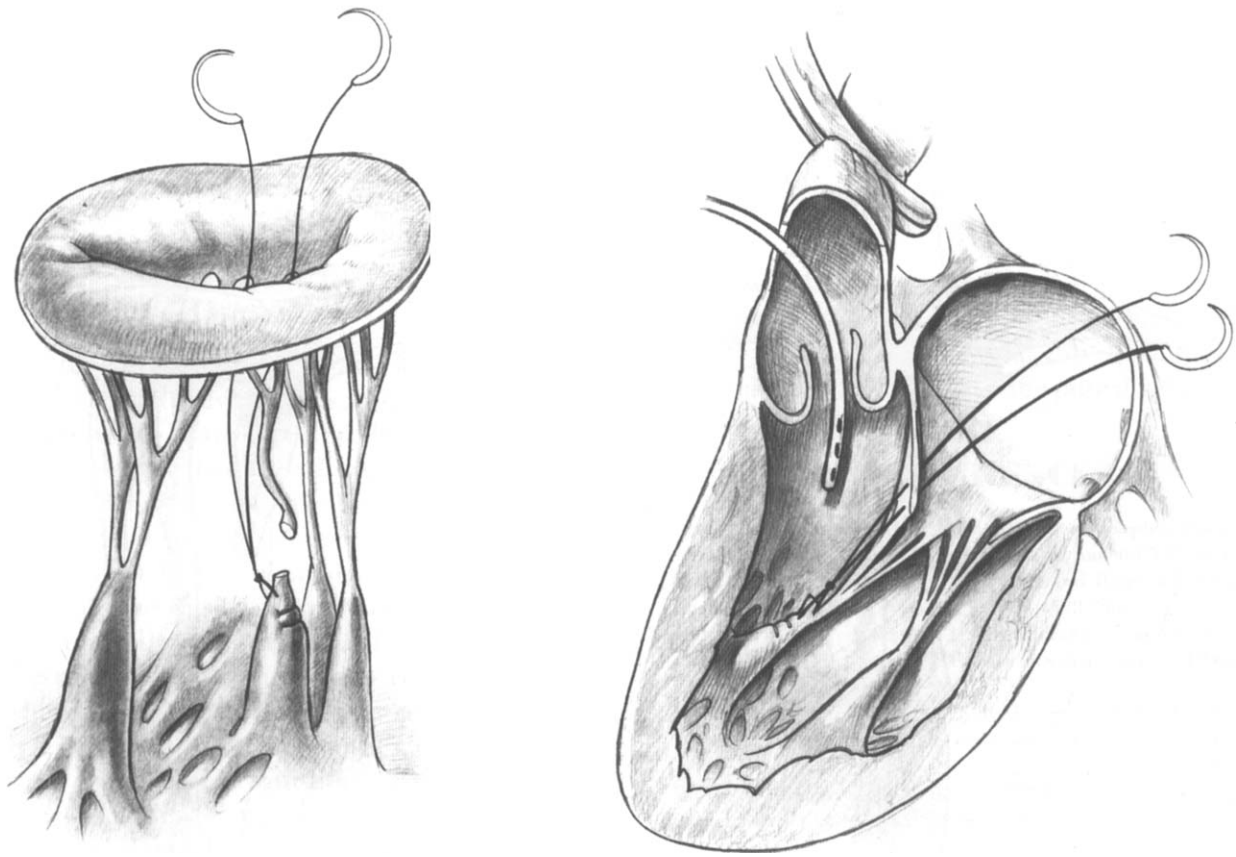
Expanded polytetrafluoroethylene sutures have been used for chordal replacement in mitral valve repair for over a decade.¹⁻³ Although this suture material can be used for chordal replacement in any mitral valve disease, most experience is with degenerative disease of the mitral valve.³ We initially used 4-0 Gore-Tex sutures (W.L. Gore & Associates, Inc, Flagstaff, AZ) for replace-

ment of chordae tendineae of the anterior leaflet of the mitral valve and 5-0 for the commissural and posterior leaflet chordae.² These sutures become covered by a fibrous sheath, which becomes quite thick around the 4-0. For this reason, during the past 5 years we have used 5-0 Gore-Tex sutures for the anterior leaflet and 6-0 for the commissural and posterior leaflet.³

SURGICAL TECHNIQUE



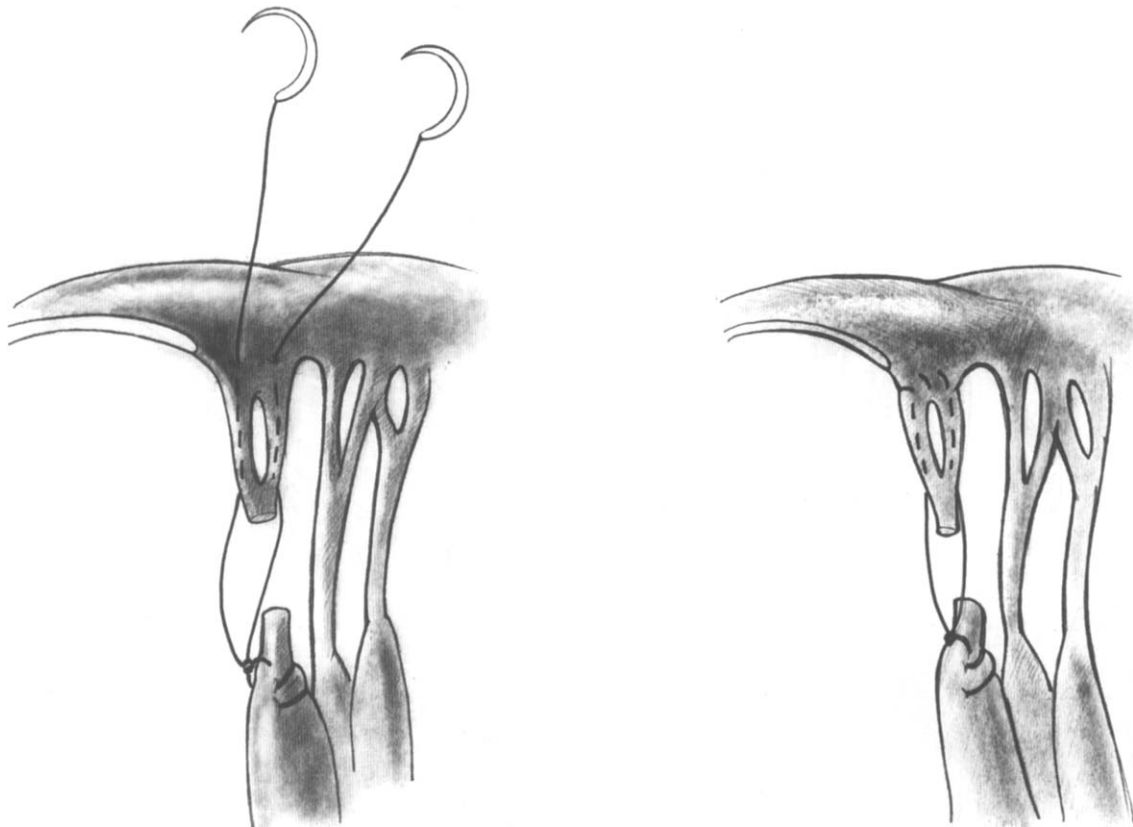
I Ruptured chordae tendineae of the anterior leaflet are easily identified by transesophageal echocardiography, as well as by direct inspection during operation. Chordal elongation is more difficult to diagnose by surgical inspection, particularly in the arrested and relaxed heart. The chordae tendineae of the lateral commissure and lateral scallop of the posterior leaflet are seldom, if ever, involved in the degenerative process and can be used as a reference point to assess prolapse intraoperatively.



2 A double-armed 5-0 Gore-Tex suture is passed two or three times through the fibrous portion of the papillary muscle head that anchors the ruptured chordae, and the ends are tied together. Three or four knots are sufficient.

Each arm of the 5-0 Gore-Tex suture is passed through the free margin of the anterior leaflet at the point where the ruptured chordae enter the leaflet. Each needle is passed twice incorporating 2 or 3 mm of leaflet tissue. The two ends should be no further than 5 mm apart.

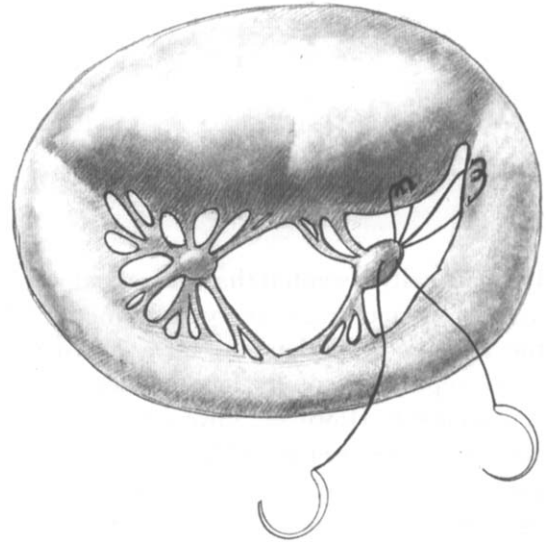
Determining the correct length of the artificial chordae can be difficult. It can be done by comparing the level of the free margin of the anterior leaflet with the coapting posterior leaflet, or by distending the left ventricle with saline or blood cardioplegic solution.



3 When the correct length of the artificial chordae is determined, the two arms of the suture are passed through the leaflet once again to place them on the ventricular side of the anterior leaflet. The ends are then tied together. At least eight knots are necessary to prevent unraveling. Gore-Tex sutures are very slippery and one must avoid shortening the artificial chordae further when the two arms of the suture are tied together.

Rupture or elongation of the anterior leaflet frequently requires two to four Gore-Tex sutures, depending on the extension of the prolapse. One 5-0 Gore-Tex suture generates two chordae, but they should not be further than 5 or 6 mm apart.

4 Prolapse of the commissural area, usually of the medial commissure, can be corrected with a single 6-0 Gore-Tex suture. It is initially passed through a fibrous portion of a papillary muscle head, and the ends are tied together. One of the arms is passed twice through the free margin of the leaflet and then passed again through the papillary muscle head. From there, the same suture is brought up to the free margin of the leaflet and the process is repeated two or three times until the prolapse is corrected. Finally, the two arms are tied together on the papillary muscle. Care must be exercised again to avoid shortening the artificial chordae excessively when the suture is tied.



COMMENTS

Although we have not used pledgets to buttress the Gore-Tex sutures in the papillary muscles or in the free margins of the mitral valve leaflets, other surgeons do.⁴ As long as the suture is anchored on the fibrous portion of the papillary muscle head, we do not believe a pledget is necessary. With regard to the free margins of the leaflet, the suture should be anchored in the area where the native chordae are attached because that is a thickened portion of the leaflet, particularly in patients with myxomatous disease of the mitral valve.

We have used Gore-Tex sutures to reinforce and to replace chordae tendineae during mitral valve repair since July 1985.² From that time until December 1993, 134 patients with mitral regurgitation resulting from myxomatous disease of the mitral valve had mitral valve repair with replacement of at least one chordae with Gore-Tex sutures.³ In that series, 51% had bileaflet prolapse and 32% had prolapse of the anterior leaflet. The freedom from recurrent mitral regurgitation necessitating reoperation was $96\% \pm 2\%$ at 8 years.³

The long-term results of chordal replacement with

Gore-Tex sutures have been so gratifying that we no longer use chordal shortening and seldom used chordal transfer in patients with mitral valve prolapse resulting from degenerative disease of the mitral valve.

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From the Division of Cardiovascular Surgery, The Toronto Hospital, University of Toronto, Toronto, Ontario, Canada.

Address reprint requests to Tirone E. David, MD, 200 Elizabeth St, 13EN219, Toronto, Ontario, Canada M5G 2C4.

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