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Commentary: Late calcific fractures of expanded polytetrafluoroethylene neochordae: Blending techniques and a greater number of neochordae for durable mitral repair

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CENTRAL MESSAGE

Late calcific rupture of ePTFE is rare but reported. Combining repair techniques and more neochordae may increase durability of mitral repair.

There are multiple surgical techniques to treat leaflet prolapse in degenerative mitral valve repair. Classic Carpentier leaflet resection and sliding leaflet plasty,[1] limited leaflet resections, folding leaflet plasty, chordal transfers and shortenings, papillary muscle repositioning, and the addition of expanded polytetrafluoroethylene (ePTFE) (Gore-Tex; W.L. Gore & Associates, Inc, Newark, Del) chordae.

PTFE is a linear nonabsorbent polymer that is electronegative with a surface charge that mimics normal endothelium and less thrombogenicity. ePTFE has a porous microstructure with high breaking strength. Since testing of ePTFE in sheep[2] and its introduction to the field of mitral valve surgery,[3,4] this material has been used widely. ePFTE has been used as a single or multiple chordae, premeasured loops, loop-in-loop. It has been used in combination with leaflet resection or as sole modality. Their use is more convenient than complex resection techniques in less invasive surgical approaches to treat mitral valve prolapse. Excellent long-term durability of mitral valve repair has been reported using ePTFE chords.[5,6]

Early or late rupture of ePTFE chords is described in the literature but the overall incidence seems to be low. Causes of early rupture have been described as mechanical damage from instruments, clips, or friction; and use of CV5 ePTFE instead of CV3. Late rupture due calcific degeneration was first described by Butany and colleagues.[7] They reported on histologic study that the neochordae were laminated by host fibrosa and endothelium and calcium penetrated the interstices with possible stiffening leading to potential calcification and fracture.

Bortolotti and colleagues[8] reported a case of possible fatigue-induced late rupture of neochordae, and reviewed 4 cases of late neochordae rupture due to calcific degeneration.

Luthra and colleagues[9] describe a case of late rupture of neochord due to calcific degeneration, although there is no pathology of the ruptured ePTFE chord.

Given the low but definitive possibility of neochordae rupture, one could consider blending more than one technique to reinforce the repair and/or using more ePTFE chordae for the length of prolapsing segment for a durable mitral valve repair.[9,10] With different neochordae implantation techniques and use or lack of concurrent mitral valve repair techniques, long-term results of multiple surgeons/groups need to be studied to better understand the long-term durability of neochordae. If limited or no resection of the leaflet has been performed along with use of ePTFE chords at primary repair, re-repair more likely will be possible for recurrent mitral regurgitation due to rupture of neochordae because there could be more preserved leaflet tissue to work with.

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