Limited tissue management in complex mitral valve repair: Patch augmentation

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Management of limited tissue for durable mitral valve repair can be technically challenging. Tissue paucity is common with leaflet restriction in rheumatic disease or leaflet destruction in acute endocarditis. Autologous pericardial patch augmentation may be used to address leaflet deficits of the anterior, posterior, and commissure. Examples of each are illustrated. West Virginia University Health Sciences Institutional Review Board approval was obtained with waiver of consent (Protocol #170975537, approved November 2, 2017, reapproved April 20, 2023).

CASE PRESENTATIONS

Anterior Patch Augmentation

A 39-year-old female patient presented with rheumatic mitral stenosis, failed balloon valvuloplasty, and moderate-to-severe mitral regurgitation. Significant commissural fusion and marked leaflet thickening was present (Video 1). Bicommissural release was performed to relieve obstruction and increase the effective orifice. The anterior leaflet was then divided from trigone to trigone and delivered into the ventricle to serve as the eventual coaptation surface with the posterior leaflet (Figure 1). The anterior leaflet was reconstructed by autologous pericardial patch augmentation measured to the entire valve circumference. Initial and 1-year echocardiography confirmed full orifice preservation without residual regurgitation or stenosis.

Posterior Patch Augmentation

Unlike the anterior leaflet augmentation, which opens up the outflow tract, use of posterior augmentation should be tailored to the pathoanatomy to avoid systolic anterior motion.1,2 A 27-year-old woman presented with rheumatic mitral stenosis, posterior leaflet calcium, and a small annulus at 3.1 cm. The anterior leaflet was thinned but...
pliable. Following bicommissural release, leaflet peeling was used to debulk the anterior leaflet to create additional pliability.3 To improve the posterior leaflet mobility, restrictive secondary/tertiary chordae were divided, and a significant bar of calcium was resected. The posterior annulus was incised to mobilize tissue into the ventricle, then augmented with an untreated autologous pericardial patch. The patch was extended to the tip of the preserved leaflet attached to the residual posterior primary chordae. The result was a competent valve with negligible residual gradient.

Bridging Commissural Patch Augmentation

Acute endocarditis can be particularly destructive. A patient with a large methicillin-resistant Staphylococcus aureus vegetation and annular abscess underwent thorough debridement and the commissural defect was repaired using an on-lay “bridging” patch of autologous pericardium attached to the native annulus and the edge of the posterior and anterior leaflets.

It should be noted that these techniques are primarily used for leaflet reconstruction in endocarditis or in the management of type IIIA rheumatic restriction. Given the occasionally unpredictable role of ventricular remodeling in primarily type IIIB disease, use of patch augmentation to repair should be used with caution over other durable and safe options. This noted, patch augmentation may be used in situations of mixed restrictive disease in which the role of ventricular remodeling may play less of a role in the mechanism of mitral regurgitation. Furthermore, earlier experience with glutaraldehyde-treated autologous pericardium, as well as synthetic or bovine alternatives, may expose durability limitations through late fibrosis or restriction of the patch and resultant late stenosis or regurgitation. As such, we have moved away from these options in place of fresh autologous pericardium whenever possible.

CONCLUSIONS

Patch augmentation may be used to manage limited tissue in complex mitral valve repair involving anterior leaflet,2 posterior leaflet,1,2 or commissural deficits.

Conflict of Interest Statement

The authors reported no conflicts of interest.

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References