A bad trade: Mitral regurgitation for mitral stenosis and atrial fibrillation

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Mitral valve repair with a posterior annuloplasty band and artificial chordae.

Central Message

Mitral valve repair techniques should be chosen to eliminate MR and prevent MS, because elevated postrepair gradients predispose to AF.

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Atrial fibrillation (AF) and mitral valve disease travel together. In the presence of mitral regurgitation (MR), the development of AF is an indication for operation. Conversely, mitral valve surgery in those with no history of AF often engenders the development of perioperative AF. In this issue of the *Journal*, Ma and associates¹ add another chapter to this story; they demonstrate an association—presumably causal—between increased postrepair mitral gradients and the development of late AF. Surgeons have long recognized that cardiac surgery can cause transient postoperative AF, but now we must accept that our operations (and specific operative techniques) also can cause late persistent AF.

When operating for degenerative mitral valve disease, the surgeon focuses on MR rather than on mitral stenosis (MS); after all, severe MR is the surgical indication in these patients (Figure 1). The prerepair echocardiogram, choice of repair techniques, and postrepair echocardiogram all center on the assessment and treatment of MR. In particular, the postrepair echocardiogram seeks to identify any residual MR and often includes only a brief assessment of the transmitral gradient. Ma and associates¹ suggest that surgeons

should pay more attention to the transmitral gradient, because it turns out that this value affects patient outcomes.

A normal mitral valve has a transmitral gradient of 0.8 to 2.7 mm Hg.² Previous work suggests that a gradient exceeding 3 mm Hg can result in impaired exercise tolerance.² Adding to this observation, Ma and colleagues¹ found that a gradient exceeding 4.5 mm Hg substantially increases the risk of late AF. Taken together, these findings suggest that the surgeon should repair the valve using techniques that correct MR and prevent MS. Ma and colleagues¹ help with this task by identifying repair techniques associated with higher gradients.

In patients with degenerative disease, the use of a small, complete annuloplasty ring, incorporation of an edge-to-edge repair, and closure of clefts/indentations were associated with elevated transmitral gradients. In contrast, use of

FIGURE 1. Mitral valve repair with flexible band and artificial chordae by robotic approach. *Left:* Annuloplasty band in place, artificial chordae to posterior leaflet being tied. *Right:* Appearance at valve testing with saline insufflation.

an appropriately sized annuloplasty band did not cause high gradients. These findings provide guidance for the mitral repair surgeon. Given the paucity of evidence supporting the superiority of any particular annuloplasty device in patients with degenerative disease, surgeons should use a flexible annuloplasty band in most of these patients. Closing clefts/indentations can turn the posterior mitral leaflet into a tightly drawn, stiff structure; in our experience, use of artificial chordae to correct posterior prolapse generally obviates the need to close clefts and thereby avoids this outcome. Finally, the edge-to-edge repair may not be an ideal choice as a primary repair technique in patients with a relatively small valve orifice.

The implications of Ma and colleagues' work¹ extend beyond surgical repair of degenerative disease. As with aortic valve replacement, when performing mitral replacement, it may be prudent to choose the largest and most

hemodynamically efficient prosthesis to avoid elevated gradients. Likewise, percutaneous repairs that substantially reduce the mitral orifice area (eg, application of 2 or more MitraClips [Abbott, Abbott Park, Ill]) may increase the likelihood of late AF.

With this important article, Ma and colleagues¹ remind us that our goal is to repair the mitral valve rather than to trade MR for an elevated gradient (MS) that can leave our patients with reduced exercise tolerance and an increased future risk of AF.

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