Ensuring proper leaflet apposition during mitral valve repair

To the Editor:

The recent contribution of Anyanwu and Adams¹ correctly emphasizes the importance of adequate mitral leaflet apposition in ensuring a low-stress, durable repair of mitral insufficiency. This is the central concept of a technique known as the “American Correction.”^{2,3} In this approach, the desired amount of leaflet apposition is marked by placing dots on each leaflet along the proposed line of apposition during the repair. Areas of prolapsed leaflet edge are corrected with polytetrafluoroethylene chordae. The length of these chordae is adjusted to produce symmetry of the leaflet edges, but the chordae are not yet tied down. The second stage of the procedure involves the adjustment of the depth of leaflet apposition. This is accomplished by displacing the posterior mitral annulus forward with stay stitches in the posterior mitral annulus (Figure 1). Simultaneously, the left ventricle is inflated with saline to simulate end-diastolic conditions. This has been facilitated by the use of a laparoscopic motorized suction irrigator device. Any fine tuning of leaflet alignment can now also be accomplished. With the final leaflet adjustment made and the chordae tied down, with the ventricle

still inflated, a flexible ring is chosen that matches the circumference of the mitral annulus. A 5- to 10-mm line of apposition is routinely achieved by this technique.

The “American Correction” has been used in more than 900 patients with up to 20 years of follow-up. A detailed description of the technique and surgical videos are available at www.geraldawriemd.com. In view of the inconvenience of having to revise a completed repair if the result is unsatisfactory, this technique provides an alternative approach that ensures that predictable leaflet apposition can be achieved during the course of the procedure.

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References

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Figure 1. Left, Leaflet edges are aligned but apposition is not yet adjusted. Right, The posterior annulus is displaced forward by the posterior annular stay stitches, producing the desired degree of apposition as shown by the position of the dots.

Reply to the Editor:

We are aware of Dr Lawrie’s approach to degenerative mitral valve repair and note that it adopts the key foundation of Carpentier’s French correction, which is the restoration of a symmetric and long line (depth) of leaflet coaptation. We have found Carpentier’s valve reconstructive techniques to be applicable in 100% of complex degenerative cases¹ and note that they are associated with excellent 25-year durability.² We await Dr Lawrie’s report on his more than 900 cases with up to 20 years’ follow-up.

We³ have previously recommended adjusting the length of polytetrafluoroethylene neochordae under saline testing and also agree that marking leaflets with ink before adjustment is useful, particularly in localized prolapse, to provide an additional visual aid to closure line symmetry. We would emphasize that we are not using the ink test to guide “revision” of a completed repair but rather as a final control of the quality of our repair before the postbypass assessment by intraoperative transesophageal echocardiography. Not only is the ink test relevant in degenerative disease (type I or type II dysfunction), but it is also helpful in the case of restricted leaflet motion (type IIIa or IIIb dysfunction).

Mitral valve repair shares some similarities to a golf swing. At the professional level of golf, how one takes the club back or starts the downswing is not what is most critical: it is the optimal relationship of club and ball at the moment of impact. Likewise, we believe it is becoming clear that the most important aspect of mitral valve repair is depth and location of the closure line between the anterior and posterior leaflets during systole and that this position be stabilized by an annuloplasty that respects the amount of leaflet tissue. How one arrives there, like the backswing in golf, is probably less important so long as an optimal coaptation line is achieved in an easily reproducible and durable fashion.

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