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MITRAL MEASUREMENT: ALL OR NOTHING?

To the Editor:

The recent report of McCarthy and colleagues¹ highlights several important points. The authors have reminded us that the national surgical repair rate

for regurgitant mitral valves of 82% is well below rates achieved in centers of excellence. They attribute this to the complexity of the mitral repair techniques described by Carpentier, who has advocated multiple variants of leaflet resection to treat prolapsing segments and correct “excessive leaflet size.” McCarthy and colleagues noted that the surgeons in these experienced centers speak of having had to master what they refer to as not only the science but also the “art” of mitral valve repair.^{1,2} McCarthy and colleagues¹ are to be commended for their insistence on development of a quantifiable and reproducible technique to replace the need for subjective judgment.

My own experience with these techniques also led me to a reappraisal of the Carpentier approach. During the 1980s and 90s, advances in cardiac imaging revealed the adverse impact of these techniques on normal function of the “mitral complex”³ and led to my complete abandonment of leaflet resection and rigid or semirigid D-shaped rings. A multidisciplinary imaging study group was formed to focus on the development of a repair technique to restore normal physiology to all elements of the mitral complex, as documented by transesophageal echocardiography, cardiac magnetic resonance imaging, engineering studies of motion and strain patterns, and clinical outcomes.

The result was the “American correction” or “dynamic mitral repair.”⁴ Polytetrafluoroethylene neochordae were used to restore normal leaflet mobility. Fully flexible adjustable rings sized to encompass the entire circumference of

the inflated mitral annulus, including the aortic–mitral membrane, were used to achieve optimal systolic and diastolic function and avoidance of left ventricular outflow tract obstruction. All alignments were made during pressurization of the mitral complex to the early isovolumic state.

Because all elements of the mitral complex are inflated and properly aligned in their isovolumic systolic positions, and the zone of apposition is marked on the leaflets before any adjustments are made, no measurements of leaflets or annulus are needed. With precise positioning of leaflet and left ventricular outflow tract relationships, no leaflet resection is ever necessary. The technique allows for multiple points of testing by high-flow saline infusion from a mechanical irrigator. This allows accurate real-time checking and adjustment of neochordal length and annular ring physiological sizing and adjustment before unclamping. This has eliminated second pump runs. The same exact repair technique is used for all forms of degenerative disease.

This approach is the opposite to that advocated by Perier and colleagues,⁵ who used neochordae to create “an immobile buttress” from the posterior leaflet during an otherwise-classical Carpentier repair. In no way does dynamic repair resemble “respect or resect.” For those seeking a highly reproducible repair technique based solely on science and not requiring any measurements or calculations, the “American correction”⁴ offers another option.

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