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Commentary: Mitral valve edge-to-edge repair is still a simple solution for complex diseases

Bleri Celmata, MD, Mattia Glauber, MD, and Antonio Miceli, MD, PhD



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CENTRAL MESSAGE

Edge-to-edge repair is an additional tool for the treatment of mitral valve regurgitation in presence of complex cardiac surgical procedures.

Concomitant surgical treatment of some degree of mitral valve regurgitation (MR) in patients undergoing complex surgical procedures is controversial, and international guidelines lack data regarding this topic.¹ The evolution of untreated less-than-severe MR after cardiac surgery is difficult to predict and depends on multiple cardiac and extracardiac factors. Several studies suggest that a significant untreated grade of MR is linked to worse outcomes, with a greater rate of mortality and reduced adverse event-free survival; others have demonstrated improvement.^{2,3} As a result, the following questions arise: Should we deal with less-than-severe MR in patients undergoing complex cardiac surgery? Does this additional procedure outweigh the risk of longer cardiopulmonary bypass and crossclamp time?

In this issue of *JTCVS Techniques*, Papadopoulos and colleagues⁴ propose an alternative approach when dealing with MR for high-risk patients requiring complex surgery. Specifically, MR was addressed performing an edge-to-edge mitral valve repair via a transaortic or transventricular approach with the aim of reducing postoperative morbidity and mortality. In patients with aortic root or ventricular aneurysm, the transaortic or transventricular approach for mitral valve is facilitated due to the

structures' aneurysmatic dilatation, whereas the conventional transatrial approach is more challenging due to the presence of a relatively small and laterally dislocated mitral annulus. However, to obtain a good result, the challenge is to precisely identify the center of each leaflet, especially of the posterior one, for the good postoperative mitral valve competence.

Results from the MitraClip showed that the key of success for a good percutaneous mitral valve repair is the acutely anteroposterior mitral valve diameter reduction.⁵ The suggested mechanism is related to tensile forces exerted by the device that could alter the geometry of the mitral apparatus and that greater magnitude of leaflet grasp would better resist the tethering forces exerted by subvalvular myocardium.^{6,7}

In light of these considerations, Papadopoulos and colleagues⁴ have modified the classic edge-to-edge technique by augmenting the grasp on the posterior leaflet, displacing the first bite on the P2 level more closely to the mitral annulus. Although theoretically the results could be similar to those of the percutaneous counterpart, the authors didn't provide the anteroposterior annulus diameter before and immediately after surgery, which could have had the potential to validate this theory. Since the tensile forces on the posterior leaflet are increased, the use of a reinforced pledget stitch is required. In only one case, the reinforcement of the Alfieri stitch was performed with an autologous pericardial strip due to the presence of aortic valve endocarditis: the patient required reoperation 1 year later due to the Alfieri stitch tear-out. It is not clear whether this complication was related to the insufficient solidity provided by the

From the Minimally Invasive Cardiac Department, Istituto Clinico Sant' Ambrogio, Milan, Italy.

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Address for reprints: Antonio Miceli, MD, PhD, Dipartimento di Chirurgia miniinvasiva, Istituto Clinico Sant' Ambrogio, Vis LG Faravelli 16, Milano, Italy (E-mail: antoniomiceli79@alice.it).

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autologous pericardium to overcome the tensile forces or to the intrinsic fragility of the leaflets.

The short- and mid-term results are encouraging, with 98% procedural success. At follow-up, 9% presented with grade 3+ mitral valve regurgitation and none with grade 4+, whereas before surgery, approximately 50% of patients presented with moderate (45%) and severe (4%) MR. Nevertheless, the Alfieri stitch provoked an important intraoperative transmitral gradient increase in one case, which required mitral valve repair. Finally, despite median postoperative transvalvular gradient remaining low, the authors showed a slight peak gradient increase over time, which might have an impact on pulmonary arterial pressure.

In conclusion, the modified transventricular and trans-aortic mitral valve edge-to-edge repair mimicking MitraClip overcorrection is a promising technique to address rapidly and in a simple way less-than-severe secondary mitral valve regurgitation in high surgical risk patients with aortic root or left ventricular aneurysm. Larger studies and long-term results are required.

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