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Commentary: Another tool in the toolbox for managing mitral annular calcification

Elizabeth L. Norton, MD, MS,[a] and
Kendra J. Grubb, MD, MHA, FACC[a,b]

Elizabeth L. Norton, MD, MS, and Kendra J. Grubb, MD, MHA, FACC

CENTRAL MESSAGE

Mitral annular calcification complicates treatment of mitral valve pathology. Despite a multitude of options, a lack of consensus remains regarding optimal strategy to ensure excellent outcomes.

Mitral annular calcification (MAC) presents a challenge in the surgical management of mitral valve (MV) disease. MAC, a degenerative process involving the deposition of calcium along the fibrous annulus of the MV (most commonly posterior) has been attributed to lipid metabolism, hemodynamic stress, chronic kidney disease, bone and mineral metabolism, and inflammation.[1] In a recent meta-analysis, Wang and colleagues[2] described MAC as a "risk marker" for all-cause mortality and cardiovascular events, as well as a risk factor for lesser likelihood of MV repair. MAC poses a technical challenge, and there remains a lack of consensus regarding the optimal treatment strategy.

When treating the MV with repair/replacement in the setting of MAC, the goal is to achieve leaflet coaptation and secure an annuloplasty, or accomplish complete replacement, without atrioventricular dissociation, annular disruption, or paravalvular leak (PVL).[3] Multiple surgical techniques have been described for the management of MAC, including complete decalcification, incomplete decalcification, and complete decalcification with preemptive annular reconstruction techniques with a Dacron or pericardial patch. With the trend in lithotripsy in coronary revascularization and peripheral artery disease, some speculate lithotripsy or ultrasound could be used to disrupt calcium to facilitate suture placement without disturbing the fibrous cap over MAC; work in this space is hypothesis-generating at this juncture. For poor surgical candidates, transcatheter techniques have been described using a transcatheter aortic valve replacement delivery system to position a valve within the MV annulus, deemed valve-in-MAC (ViMAC). ViMAC is feasible but represents an area of further development, as there are significant risks of left ventricular outflow tract obstruction and PVL. The initial experience produced marginal outcomes, and ViMAC often require adjunctive techniques.[4] Designated transcatheter MV replacement devices are currently under investigation, and many have a MAC cohort.

In this issue of *JTCVS Techniques*, Iacona and colleagues[5] describe partial debridement of MAC (as much as needed to seat an appropriately sized valve without violating the posterior capsule of the calcium bar) with an oval bovine pericardial patch sewn between the MAC and healthy myocardial tissue of the left ventricle, through a combined transseptal and transaortic approach. The authors emphasize the importance of tension-free sutures along the ventricular suture line of the patch, enhanced by the strength of residual calcium and intact capsule that remains following limited calcium debridement. The technique serves as another tool in the toolbox

From the [a]Division of Cardiothoracic Surgery, [b]Structural Heart and Valve Center, Emory University, Atlanta, Ga.

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Address for reprints: Kendra J. Grubb, MD, MHA, FACC, Division of Cardiovascular Surgery, Structural Heart and Valve Center, Emory University School of Medicine, 550 Peachtree St NE, 6th Floor, Atlanta, GA 30308 (E-mail: kjgrubb@emory.edu).

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in MV surgery with MAC; however, this remains a single case report, and a larger cohort study evaluating the technique is necessary.

Despite numerous techniques, the high calcium burden of MAC complicates MV surgery, as the calcium often extends from the posterior annulus to the chordae tendinae and into the left ventricle. There is increased risk of serious complications (atrioventricular dissociation, annular rupture, left circumflex artery injury, thromboembolic events, and PVL) with outcomes of the various techniques often described as "acceptable" when as a field we should be striving for much more than "acceptable."

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