Progress for mitral replacement in mitral annular calcification

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Surgical management of mitral valve disease in the context of severe mitral annular calcification (MAC) is a challenge, with increased risk of paravalvular leak, injury to the left circumflex artery and atrioventricular dissociation. Various techniques have been described to “resect”^{1,2} or “respect”³ the calcium, with mortality ranging from 2% to 9%. Several authors describe alternative methods, including anchoring the prosthesis to an atrial patch, whereas Lafrenière-Bessi and colleagues⁴ describe leaving the MAC in place and securing the posterior aspect of the valve prosthesis from within the coronary sinus.

Transcatheter solutions for mitral disease with severe MAC have been challenged by left ventricular outflow tract (LVOT) obstruction, paravalvular regurgitation, cardiac perforation, and valve embolization. In a high-risk cohort, the TMVR in MAC Global Registry reported 30-day and 1-year mortalities of 54% and 25%, respectively.⁵

In this issue of the *Journal*, Russell and colleagues⁶ elegantly describe a novel surgical technique for managing mitral valve disease with severe MAC by means of transcatheter technology in 8 patients. A circumferential felt patch and multiple pledgeted anchor sutures help secure the prosthesis in the mitral annulus and minimize paravalvular leak. The anterior leaflet and subvalvular apparatus are resected to minimize LVOT obstruction. Baseline annular dimensions are not provided, so it is unclear how many of these patients would have had paravalvular leak and anchoring issues with a transseptal approach. There was no perioperative mortality, and 1 patient of mild paravalvular leak requiring a subsequent percutaneous closure procedure. Four patients who were at risk of LVOT obstruction (neo-LVOT <200 mm²) did not have LVOT obstruction develop after surgical anterior leaflet resection. Median cardiopulmonary bypass and crossclamp times were respectable at 151 and 89 minutes, respectively.

Although this is a valuable descriptive article, we cannot draw conclusions on outcomes from this small case series.

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Central Message

TMVR through an open approach shows promising results for the treatment of mitral disease with MAC. However, we have not yet achieved the goal of a percutaneous solution for this difficult problem.

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In the nonrandomized results from the MITRAL trial, the transatrial arm had a numerically higher mortality (3 of 15 patients) compared with the transseptal arm (1 of 14 patients).⁷ The 30-patient single-arm SITRAL study enrolling patients for transatrial TMVR (NCT02830204) will give further insight into this technique.

There are a number of transcatheter trials addressing the treatment of mitral disease and MAC. The Tendyne mitral prosthesis (Abbott Laboratories, Abbott Park, Ill) is a D-shaped, dedicated transcatheter device for the mitral valve, and recruitment of patients with severe MAC and mitral regurgitation has begun for the Tendyne in MAC feasibility trial (NCT03539458). The LAMPOON trial (NCT03015194) tests an entirely percutaneous anterior leaflet resection⁸ to prevent LVOT obstruction with transseptal TMVR.

We believe the procedure described by Russell and colleagues⁶ may prove a useful alternative to the existing surgical techniques. Our goal for treatment of this high-risk population, however, should be the development of a percutaneous or minimally invasive approach with avoidance of a sternotomy and cardiopulmonary bypass.

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