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Commentary: London Bridge is falling down—how will we build it up?

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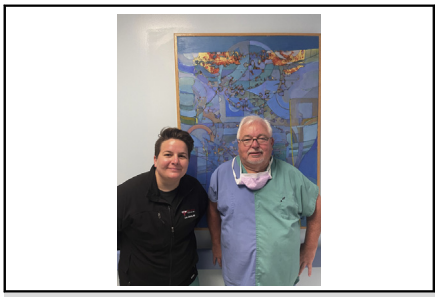

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CENTRAL MESSAGE

Supplemental repair strategies for FMR, including papillary muscle relocation, are valuable adjuncts to downsizing annuloplasty; however, durability for different size ventricles remains in question.

In this review by Pausch and colleagues,[1] supplemental repair techniques for functional mitral regurgitation (MR) are summarized. The authors tout papillary muscle relocation as a valid adjunct to downsizing annuloplasty, particularly with its immediate echocardiographic benefits in controlling leaflet tethering. However, as in the infamous nursery rhyme "London Bridge Is Falling Down," we may be able to build the mitral complex up with "stone so strong will last so long"—but the question is how long?

The 2016 randomized controlled clinical trial by Nappi and colleagues[2,3] compared patients with severe ischemic mitral regurgitation (IMR) who underwent coronary artery bypass grafting revascularization with either combined papillary muscle approximation (PMA) and restrictive annuloplasty (RA) or undersized valve repair alone. Preoperative left ventricular end-diastolic diameter was 62.7 ± 3.4 mm in the PMA group and 61.4 ± 3.7 mm in the RA group. While PMA demonstrated significant improvement in left ventricular end-diastolic diameter during follow-up, there was no statistically significant difference in clinical outcomes. Importantly, this study observed a high rate of MR recurrence in both groups: 55.9% for RA and 27% for PMA.

These findings beg the question: in which subset of patients with MR is papillary muscle relocation appropriate? The 2014 Cardiothoracic Surgical Trials Network trial randomly assigned patients with severe IMR to either repair or chordal-sparing replacement to evaluate efficacy and safety.[4] While there was no survival difference, ominously, at 2 years, the rate of recurrence of moderate or severe MR was 58.8% in the repair group (vs 3.8% in the replacement group, $P < .001$).[5]

A subset analysis by Capoulade and colleagues[6] of the 2 Cardiothoracic Surgical Trials Network trials on patients with IMR who received MV repair demonstrated that left ventricular end-systolic dimension was significantly greater in patients with recurrent MR (48 ± 8 vs 45 ± 9 mm; $P = .01$). In univariate analysis, patients with large ventricle size after MR were predicted to have 1-year recurrent MR after ring annuloplasty (odds ratio per 10-mm increase, 1.62; 95% confidence interval, 1.09-2.40; $P = .02$).[6] This re-echoes the data from Braun and reinforces that the LV ultimately holds the fate of the repaired valve.[7]

Which ventricles benefit from relocating the papillary muscles or performing other adjunct techniques to prevent recurrent MR is yet unknown. Whether functional mitral repair with subannular repair strategies is durable enough to "last so long, last so long," only time will tell.

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