Recurrent or Persistent Mitral Regurgitation After Transcatheter Edge-to-Edge Repair: It Is a Big Deal!

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Once mitral transcatheter edge-to-edge repair (MTEER) was approved by the US Food and Drug Administration for commercial use in patients with severe symptomatic primary mitral regurgitation (MR) who are also at prohibitive surgical risk, the Centers for Medicare & Medicaid Services National Coverage Determination was issued in 2014. In 2019, the US Food and Drug Administration expanded the labeled indication to include patients with moderate to severe or severe secondary MR who have heart failure symptoms, though the Centers for Medicare & Medicaid Services National Coverage Determination wasn't issued until early 2021. Since the initial approval, the number of MTEER cases has witnessed significant growth with an almost 10-fold increase in cases in the first 5 years and the growth appears to be continuing. Though this increase is partially related to the expanded indication for MTEER, it is likely even more so, related to the increased use of MTEER in complex anatomy that was not likely fully evaluated in the pivotal trials. Consequently, real life MTEER experience has resulted in a rate of persistent severe MR of ≈5% and recurrent severe MR of 6% to 15% of patients after transcatheter edge-to-edge repair (TEER) and it carries poor prognosis.

Medical, surgical, or percutaneous interventions have all been proposed as potential solutions for this problem. Medical treatment is often more challenging after failed MTEER because of potentially functional mitral stenosis, and the resultant pulmonary hypertension. Percutaneous interventions with redo-MTEER, leaflet laceration, and concomitant transcatheter mitral valve replacement (TMVR), or vascular plugs have all been described with various levels of success. Finally, surgical interventions have been reportedly associated with high mortality close to 10% in a recently published analysis from the Society of Thoracic Surgeons (STS) database.

In this issue of the Journal of the American Heart Association (JAHA), El Shaer et al. present a retrospective observational study of patients who are symptomatic with persistent or recurrent severe MR after MTEER who were ineligible for a redo-MTEER in a single high volume high expertise center. In this review, 142 patients who presented with symptomatic severe MR after TEER were either treated with surgical mitral valve replacement or medical therapy. The primary outcome observed was all-cause mortality. Among the included patients, 86% of them presented for recurrent mitral regurgitation post-MTEER of which ≈50% had initial primary MR and ≈34% of them had mixed cause MR; 44 (31.0%) patients underwent mitral surgery. Patients who underwent surgery were

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The application of this discussion to patients with secondary MR remains to be seen as the data presented in this paper only included ≈16% of patients with secondary MR. In this population of patients, surgical mitral valve repair and replacement have not resulted in a decrease in hospitalization or death for patients with secondary MR and have been associated with a significant risk of complications.\(^8\) The 2 recent trials that have evaluated the role of MTEER in secondary MR are the MITRA-FR (Multicenter Study of Percutaneous Mitral Valve Repair MitraClip Device in Patients With Severe Secondary Mitral Regurgitation—France) trial and the COAPT (Cardiovascular Outcomes Assessment of the MitraClip Percutaneous Therapy for Heart Failure Patients With Functional Mitral Regurgitation) trial. They evaluated outcomes of mitral repair with the TEER device compared with medical therapy in patients with reduced left ventricular ejection fraction, secondary MR, and symptomatic heart failure versus optimal medical therapy alone.\(^9,10\) Much has been written about why these 2 trials arrived at divergent outcomes. However, the 2020 American College of Cardiology/American Heart Association guidelines suggest that mitral TEER may be considered in severe secondary MR based on the COAPT inclusion criteria, which include left ventricular ejection fraction from 20% to 50%, left ventricular end-systolic dimension ≤70 mm, pulmonary artery systolic pressure ≤70 mm Hg, and persistent symptoms while on optimal medical therapy.\(^7\) It remains to be seen how real world performance of MTEER in this patient population impacts long-term outcomes particularly in patients who have recurrent or persistent severe MR after MTEER.

Surgical repair after failed TEER requires proficiency in mitral valve surgery, and optimal results are most likely to necessitate experienced mitral surgeons and perioperative care teams. Concomitant surgery was performed in 100% of cases and involved atrial septal defect closure, atrial fibrillation ablation, tricuspid repair, or coronary bypass surgery. Over 50% of this cohort had greater than moderate TR at the time of their surgery and the majority had concomitant tricuspid surgery indicating the complexity of these patients and the importance of understanding the full etiology of their valvular heart disease, optimizing their medical therapy and including the experienced heart teams in their management at the time of their initial presentation, recommendation for surgery versus TEER, and when/if MTEER fails.

Finally, novel technologies will likely be available in the near future that will offer alternative therapies for patients with severe primary or secondary mitral regurgitation especially for patients who are not expected to have good outcome after MTEER. Options would include medical therapy beyond what was studied in COAPT, interventional devices for heart failure, and
newer TEER and repair devices. TMVR has also shown excellent MR reduction in early trials for patients with complex mitral valve anatomy and mitral annular calcification. Unfortunately, most of these trials are suffering from high anatomical screen fail rates, small number of patients, and significant long-term mortality.11 For patients with failed TEER, many devices are under development to evaluate the feasibility of leaflet laceration or TEER device retrieval with simultaneous TMVR. The increased safety of TMVR devices especially the transfemoral systems might be a paradigm shift for some of these patients especially those with complex anatomy and high likelihood of TEER failure or suboptimal TEER results.12,13 Meanwhile, as demonstrated by this study, surgical mitral valve replacement after failed MTEER remains a good option for a selected groups of patients and can be associated with favorable outcomes when performed at experienced centers. This study again reinforces the value of the knowledgeable multi-disciplinary heart team to direct the right patient to the right pathway at the time of their initial MR presentation and subsequently if they fail MTEER.

ARTICLE INFORMATION

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