In conclusion, the authors should be commended for a successful initial feasibility report of the Mitral Touch device. As investigations continue, a solution with more widespread application in a broader population may involve addressing both secondary MR and the diseased ventricle to promote LV remodeling through a transcatheter/percutaneously-delivered device that can achieve a comparable impact while avoiding open surgery entirely.

References

1. Thourani VH, George I, Rucinskas K, Kalinauskas G, Janusauskas V, Zakarkaite D, et al. First in human experience with an epicardial beating heart device for secondary mitral regurgitation. *J Thorac Cardiovasc Surg.* 2021;161:949-58.e4.
2. Brescia AA, Bolling SF, Michigan Mitral Research Group (MMRG). Commentary: MR is bad! *J Thorac Cardiovasc Surg.* May 30, 2020 [Epub ahead of print].
3. Goldstein D, Moskowitz AJ, Gelijns AC, Ailawadi G, Parides MK, Perrault LP, et al. Two-year outcomes of surgical treatment of severe ischemic mitral regurgitation. *N Engl J Med.* 2016;374:344-53.
4. Michler R, Smith P, Parides M, Ailawadi G, Thourani V, Moskowitz A, et al. Two-year outcomes of surgical treatment of moderate ischemic mitral regurgitation. *N Engl J Med.* 2016;374:1932-41.
5. Stone GW, Lindenfeld J, Abraham WT, Kar S, Lim DS, Mishell JM, et al. Transcatheter mitral-valve repair in patients with heart failure. *N Engl J Med.* 2018;379:2307-18.
6. Obadia J-F, Messika-Zeitoun D, Leurent G, Iung B, Bonnet G, Piriou N, et al. Percutaneous repair or medical treatment for secondary mitral regurgitation. *N Engl J Med.* 2018;379:2297-306.
7. Raman J, Hare D, Storer M, Hata M. Epicardial cardiac basal annuloplasty: preliminary findings on extra-cardiac mitral valve repair. *Heart Lung Circ.* 2009;18:401-6.
8. Ali MW, Bolling SF. Mitral valve repair: what the ACORN trial taught us. *Curr Cardiol Rep.* 2010;12:116-21.
9. Grossi EA, Patel N, Woo YJ, Goldberg JD, Schwartz CF, Subramanian V, et al. Outcomes of the RESTOR-MV trial (randomized evaluation of a surgical treatment for off-pump repair of the mitral valve). *J Am Coll Cardiol.* 2010;56:1984-93.

See Article page 949 in the March 2021 issue.

Commentary: Old problem, new solution: Epicardial annuloplasty with left ventricular support for functional mitral regurgitation

Edward G. Soltesz, MD, MPH

Functional mitral regurgitation (FMR) remains a challenging problem for surgeons. The optimal surgical treatment is still a matter of significant debate. Over the last decade, surgeons have come to appreciate the pathophysiology of this disease process as a complex interplay

Edward G. Soltesz, MD, MPH

CENTRAL MESSAGE

The Mitral Touch annuloplasty device deserves attention as a possible solution to the problem of functional mitral regurgitation through combined annular re-shaping and left ventricular support.

between the mitral valve, including its subannular structures, and the left ventricle. In addition, recent surgical and transcatheter trials and subsequent post hoc analyses have suggested that there are in fact multiple phenotypes of FMR (ie, proportionate vs disproportionate) that respond differently to intervention directed at various components of the mitral-ventricular complex.¹⁻³ Unfortunately, many

From the Department of Thoracic and Cardiovascular Surgery and Kaufman Center for Heart Failure and Recovery, Heart and Vascular Institute, Cleveland Clinic, Cleveland, Ohio.

Disclosures: Dr Soltesz reports consulting for Abbott, Abiomed, and AtriCure.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Received for publication Dec 26, 2020; revisions received Dec 26, 2020; accepted for publication Dec 28, 2020; available ahead of print Jan 8, 2021.

Address for reprints: Edward G. Soltesz, MD, MPH, Department of Thoracic and Cardiovascular Surgery, Cleveland Clinic, 9500 Euclid Ave Desk J4-1, Cleveland, OH 44195 (E-mail: soltesz@ccf.org).

J Thorac Cardiovasc Surg 2023;165:e153-4

0022-5223/\$36.00

Copyright © 2021 by The American Association for Thoracic Surgery

<https://doi.org/10.1016/j.jtcvs.2020.12.125>

studies targeting the mitral valve alone, ventricular remodeling alone, or combinations of these have not provided a clear consensus on best practices in FMR due to the phenotypic heterogeneity of FMR in each trial. In the Cardiothoracic Surgical Trials Network randomized trials of ischemic mitral regurgitation, patients who experienced less recurrent mitral regurgitation had the greatest amount of left ventricular (LV) remodeling.^{4,5} In this group of patients, mitral subvalvular dilatation leading to leaflet tethering by the posterior papillary muscle appears to be a common reason for recurrent MR and poor outcomes.⁶ Whether this is a result of the failure of the rigid or semi-rigid downsizing annuloplasty, worsening LV remodeling, or both has still not been fully characterized. Notwithstanding these unknowns, there appears to be an opportunity for an annuloplasty device that also provides some additive posterior annular and LV support.

In a recent issue of the *Journal*, Thourani and colleagues⁷ reported the results of the first-in-human experience with the Mitral Touch off-pump external mitral annuloplasty device designed to reduce the septolateral dimension and support the posteriorbasal subannular LV. Following eligibility screening of 11 patients, 6 were excluded either pre- or intraprocedurally, and off-pump placement of the device was successfully accomplished in the remaining 5 patients with a median device implant time of 52 minutes. Biventricular remodeling was evident at 30 days and sustained to 12 months. Similarly, effective regurgitant orifice area was reduced by 47% and 43% at 30 days and 12 months, respectively. The device remained stable out to 12 months without any evidence of coronary impingement or wall erosion.

As is the case with many previous FMR trials, there is considerable variability in the phenotype of functional

mitral regurgitation of these study patients, including both severity of MR and degree of LV dilatation. Furthermore, the overall significance of coronary disease and relative contribution of concomitant coronary revascularization is not described. Finally, the compliance with pre- and postoperative guideline-directed medical therapy for heart failure is not noted. Despite these shortcomings, this first-in-human report of an external indirect annuloplasty device deserves attention as a novel arrow in the surgical quiver against FMR. A well-designed randomized trial might be able to elucidate the Mitral Touch's place in the surgical treatment of FMR and provide a clearer understanding of which patients such a device might benefit.

References

1. Grayburn PA, Sannino A, Packer M. Proportionate and disproportionate functional mitral regurgitation: a new conceptual framework that reconciles the results of the MITRA-FR and COAPT trials. *JACC Cardiovasc Imaging*. 2019;12:353-62.
2. Stone GW, Lindenfeld J, Abraham WT, Kar S, Lim DS, Mishell JM, et al; COAPT Investigators. Transcatheter mitral-valve repair in patients with heart failure. *N Engl J Med*. 2018;379:2307-18.
3. Obadia JF, Messika-Zeitoun D, Leurent G, Iung B, Bonnet G, Piriou N, et al; MITRA-FR Investigators. Percutaneous repair or medical treatment for secondary mitral regurgitation. *N Engl J Med*. 2018;379:2297-306.
4. Smith PK, Puskas JD, Ascheim DD, Voisine P, Gelijns AC, Moskowitz AJ, et al; Cardiothoracic Surgical Trials Network Investigators. Surgical treatment of moderate ischemic mitral regurgitation. *N Engl J Med*. 2014;371:2178-88.
5. Goldstein D, Moskowitz AJ, Gelijns AC, Ailawadi G, Parides MK, Perrault LP, et al; CTSN. Two-year outcomes of surgical treatment of severe ischemic mitral regurgitation. *N Engl J Med*. 2016;374:344-53.
6. Kron IL, Hung J, Overbey JR, Bouchard D, Gelijns AC, Moskowitz AJ, et al; CTSN Investigators. Predicting recurrent mitral regurgitation after mitral valve repair for severe ischemic mitral regurgitation. *J Thorac Cardiovasc Surg*. 2015;149:752-61.e1.
7. Thourani VH, George I, Rucinskas K, Kalinauskas G, Janusauskas V, Zakarkaitė D, et al. First in human experience with an epicardial beating heart device for secondary mitral regurgitation. *J Thorac Cardiovasc Surg*. 2021;161:949-58.e4.