ventricular FMR is intrinsically a ventricular disease, known to have limited effectiveness of MV annuloplasty, it is expected that a restrictive annuloplasty might be a definitive option in atrial FMR. Nonetheless, the lack of echocardiographic data is a strong limitation of this study in its purpose to answer the question about optimal therapy and/or eventual implications for catheter-based strategies for addressing the FMR spectrum.

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Commentary: Pathoanatomic differences in functional mitral regurgitation—a guide for future interventions?

Robert B. Hawkins, MD, MSc, and
J. Hunter Mehaffey, MD, MSc

Dr Hirji and colleagues present an analysis comparing different etiologies of functional mitral regurgitation (FMR) in this month's *Journal*.¹ They have elected to classify atrial FMR as due to atrial enlargement or heart failure with preserved ejection fraction and ventricular FMR as related to any ventricular dysfunction. Significant baseline differences are notable, reflecting the considerable heterogeneity of FMR patients. The rate of operative mortality was low and not different between the groups. After controlling for differences in demographics and comorbid conditions, ventricular FMR was a predictor of both mid-term mortality (hazard ratio

Robert B. Hawkins, MD, MSc, and J. Hunter Mehaffey, MD, MSc

CENTRAL MESSAGE

Ventricular and atrial functional mitral regurgitation are separate entities with different long-term outcomes, necessitating pathoanatomic definitions to determine optimal interventions on this heterogeneous group of patients.

[HR], 1.8) and a composite of mortality or reoperation (HR, 2.1). Although these are logical divisions, they paint an incomplete picture because they do not account for other morphological features of the heart that determine the trajectory of functional mitral regurgitation. The degree of annular dilation, ventricular dysfunction, and dilation and leaflet tethering all affect patient outcomes. Although underpowered to assess each of these features, it is a missed opportunity and should be a focus of future studies.

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Although patients with preserved ejection fractions were largely excluded from percutaneous FMR trials, the findings mirror the MitraClip trial data.² The Cardiovascular Outcomes Assessment of the MitraClip Percutaneous Therapy for Heart Failure Patients with Functional Mitral Regurgitation trial (COAPT) found a survival benefit but the Multicentre Study of Percutaneous Mitral Valve Repair MitraClip Device in Patients with Severe Secondary Mitral Regurgitation (MITRA-FR) did not.^{3,4} The patients in MITRA-FR had greater ventricular dysfunction and dilation, with resultant leaflet tethering. No strong conclusions can be made based on this data, but it would suggest this area is critical to future investigation. FMR pathoanatomic classification will help guide the utility of percutaneous interventions, but future research needs to evaluate the relative benefits compared with surgical intervention. These patients have poor long-term outcomes, making research into optimal care all the more important.

A critical area needing improvement in retrospective studies of FMR is the lack of serial echocardiographic follow-up. In this analysis, only 44% of patients had either echocardiographic or cardiology follow-up after

30 days. These studies often have few patients and low power, making surrogate endpoints, such as recurrent mitral regurgitation, helpful in determining the success of different interventions. Although not commonly performed, serial echocardiography data is best analyzed by longitudinal mixed-effects modeling.⁵ Incorporation of pathoanatomic features, improved follow-up, and comparison of surgical and percutaneous interventions are necessary to personalize interventions in a heterogeneous group of patients with functional mitral regurgitation.

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Commentary: A riddle wrapped in a mystery inside an enigma

Jay K. Bhama, MD

Hirji and colleagues¹ from Brigham and Women's Hospital report their nearly 20-year experience with mitral valve surgery in patients with atrial functional mitral regurgitation (A-FMR). The study details their experience with 94 patients who underwent mitral valve surgery in the setting of atrial fibrillation or left atrial dilatation

Jay K. Bhama, MD

CENTRAL MESSAGE

Atrial functional mitral regurgitation is an important prognostic indicator in patients being treated surgically for mitral regurgitation.

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