Editorial

Vigilance in Mitral Regurgitation
Variation and the Way Forward

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The timing of surgical intervention in primary mitral regurgitation (MR) remains a subject of controversy, as the decision must balance the risks of surgery against the adverse outcomes associated with advanced left ventricular remodeling. To provide clinicians with a management framework, national standards documents identify the presence of symptoms, left ventricular dysfunction, enlarged left ventricular dimensions, and elevated pulmonary pressures as triggers for surgery in chronic severe primary MR.[1–3] Achieving optimal outcomes in primary MR rests on the timely identification of these surgical triggers, which, in turn, is incumbent on careful, longitudinal, clinical, and echocardiographic follow-up.[2] As such, specific echocardiographic follow-up intervals are recommended for mild, moderate, and severe MR by American College of Cardiology/American Heart Association/European Society of Cardiology guidelines and Appropriate Use Criteria (AUC).[1,3,4] Yet, real-world adherence to these recommendations in this group of patients is not clearly known.

See Article by Tanguturi et al

In this issue of the Journal, Tanguturi et al[5], in this cleverly designed study, assessed the echocardiographic follow-up intervals used by healthcare providers for monitoring primary MR. This work represents an important effort aiming to understand healthcare delivery and practice patterns in the care of patients with primary MR and evaluating compliance with guideline recommendations.

In the setting of a high-volume center and a reputable echo laboratory, and using a carefully selected population that eliminated most other causes for repeat studies, the investigators found that for severe MR, the mean interval for echocardiographic follow-up was 12.4 months. The mean echocardiographic follow-up intervals for less severe disease were longer: 17 months for moderate MR, 18.3 months for mild MR, and 17.4 months for trace MR. There was considerable variation in intervals based on specialty with primary care physicians in general having the longest intervals followed by cardiologists and other specialty physicians with shorter intervals. Overall, the investigators found significant variation in echo intervals with substantial overuse in trace/mild MR and worrisome underuse in severe MR compared with guidelines.

The novelty of the present study lies in its evaluation of healthcare delivery patterns in chronic MR where potential exists for both under and overutilization of echocardiographic studies. A large sample size, the linking of a large, longitudinal echocardiographic database to demographic data and provider characteristics, and insights provided into real-world practice patterns in the care of patients with MR represent unique strengths of this investigation. Similar to the large body of work by the Dartmouth Atlas Project documenting variation in the practice of medicine across the United States, the present study identifies variation in the diagnostic care of patients with MR and thus opportunities for improvement.[6]

However, there are several challenges in interpreting the findings of this study. First, the study drew its sample from a large echocardiographic database; yet, detailed delineation of indications for the echocardiographic study were lacking. This is especially important as we interpret overuse in trace/mild MR—could the echoes have been driven by symptoms that would have made the repeat echo appropriate or were the echoes ordered to screen for cardiotoxicity in a patient with cancer and not as a surveillance strategy for mild MR? Second, the study covered a long time period from 2001 to 2016, a period that has seen the refinement of guidelines, the introduction of the AUC, and reduction of reimbursement, all contributing to a cultural shift in ordering patterns by physicians. Indeed, time-trend analyses showed prolonging follow-up intervals during the period of the study, a reassuring finding that physicians can and do modify their practices in positive ways based on societal recommendations and other cues. Examining ordering intervals before and after the echo AUC publications might be another interesting way to understand test utilization patterns, trends, and opportunities for improvement. Third, a large array of exclusion criteria were applied, which, while necessary to minimize confounders, also limit the generalizability of the results of the study. Fourth, surveillance strategies are only as good as the end result achieved. Outcomes data can help understand whether there are any associations of the follow-up strategies pursued (under or over use) with subsequent changes in patient outcomes. For example, it is critical to understand surgical rates, postsurgical left ventricular function, heart failure, and survival among those with severe MR stratified by follow-up intervals. Although we might anticipate less frequent interventions and worse outcomes in those with severe MR and overly long follow-up intervals and, conversely, that those with mild MR and short follow-up procedures would more frequently have surgery but receive no benefit in terms of reduced clinical events, neither situation may exist in actual care. However, work in the area of appropriate use of diagnostic

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testing after percutaneous coronary interventions showed that higher surveillance testing rates were not associated with lower risk of myocardial infarction or death but rather an excess of repeat revascularization procedures.[7]

Finally, overall costs may also be an important consideration. At the same time, an understanding of the finer but clinically relevant iterative changes in patient management affected by the follow-up echocardiographic study such as medication changes and tuning of the subsequent follow-up interval based on the results of the first interval is needed to evaluate the value brought to patient care from the echocardiographic study. For example, in a study examining consecutive all-comer echocardiographic studies at a tertiary care center, the investigators found that most studies were appropriate and that approximately a third resulted in change in care.[8]

Notwithstanding the limitations, this study is an important step in understanding the practice patterns in surveillance of primary MR, a disease where timely surgical intervention is necessary to restore normal life expectancy. This work also represents the first step, that is, identifying the problem, in a quality assurance pathway, with data that can be used as a benchmark and metric in improving guideline adherence. In this context, multiple practice gaps have been previously highlighted in MR. The EuroHeart survey revealed that 57% patients referred for mitral valve surgery were in New York Heart Association class III or IV at the time of surgery, suggesting either emergent surgery or referral late in the course of disease.[9] A recent survey conducted by the ACC found that nearly half of the primary care provider respondents perceived uncertainty regarding timing of surgical intervention as a moderate or major barrier to providing optimal care for patients with MR. Glaring knowledge gaps were also identified in this survey where ≈20% of general cardiologists and subspecialty cardiologists did not recognize increased left ventricular end-systolic diameter and pulmonary artery pressure elevation as indications for surgery.[10]

This study adds to the literature by identifying significant variation and deviation from guidelines in transthoracic echocardiography surveillance of MR based on severity of disease and physician specialty. It nicely highlights 3 target areas for improvement, namely, (1) strengthen and harmonize recommendations regarding surveillance in MR; (2) reduce overuse of TTE in trace/mild MR; and (3) increase use in severe MR.

With clear standards of care, there should be little variation in practice but as Hlatky and DeMaria[11] note, when there is no clear evidence on the best practices, different physicians will adopt different approaches, on the basis of their beliefs, training, incentives, and the local practice style. Substantial practice variation suggests that there is a lack of consensus on the best approach, in part because the evidence is insufficient. Both the guidelines and AUC have developed expert consensus recommendations to reduce variability and provide guidance to treating clinicians. Although these efforts are admirable, it is important to note that it is Level of Evidence C that supports these recommendations. Indeed, observational outcomes studies can strengthen evidence in this area. Further, important opportunities exist for greater harmonization across the American College of Cardiology/American Heart Association/European Society of Cardiology/Appropriate Use Criteria consensus documents that may facilitate physician education and compliance.[1,3,4]

The goals to reduce utilization in trace/mild MR and increase use in severe MR are at odds, and, thus, any simple, single, pronged remedy could be potentially tricky. Administrative processes such as prior authorization, reduction in reimbursement, and introduction of AUC standards (which principally target rarely appropriate indications but are largely silent on underuse) may help to reduce overuse in trace/mild MR. Quality improvement interventions comprising education, point-of-care decision support tools, and direct feedback to providers have been previously used with modest success to reduce inappropriate use.[12] Such a multifaceted approach may be used to effectively target overuse in mild MR.

Increasing surveillance in severe MR is an area of concern and a practice gap that must be filled to improve care of patients. Previous guideline/AUC-related research has focused mostly on reducing inappropriate use. Although a small number of studies have identified underutilization of cardiovascular diagnostic testing, little work has been done in identifying or implementing strategies to improve it.[13] Regular echocardiographic follow-up required by valve disease makes it a good base case to study underutilization and added value of imaging to patient care. Provider education, automated ordering sets with triggers set by physicians or set by disease conditions, and automatic referrals based on moderate or severe findings on initial echo may be used to ensure appropriate surveillance. Last but not least, patient education about disease condition and disease follow-up expectations is an important and understudied area and must be explored to engage and put patients at the center of their disease management.

In identifying significant variation in echocardiographic follow-up of MR, Tanguturi et al have set the stage for further research and quality improvement efforts in the care of valve disease. To be successful, all stakeholders—providers, patients, payers, healthcare systems, and societies—must pitch in.

Disclosures

None.

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