

## Editorial



# Mitral Annular Velocity in Primary MR: Unveiling the Prognostic Potential of an Oldie But Goodie

Sung-Hee Shin , MD, PhD

Division of Cardiology, Department of Internal Medicine, Inha University College of Medicine, Incheon, Korea



► See the article “Mitral Annular Tissue Velocity Predicts Survival in Patients With Primary Mitral Regurgitation” in volume 54 on page 311.

**Received:** May 6, 2024  
**Accepted:** May 7, 2024  
**Published online:** May 10, 2024

### Correspondence to

**Sung-Hee Shin, MD, PhD**  
Division of Cardiology, Department of Internal Medicine, Inha University College of Medicine, 100, Inha-ro, Michuhol-gu, Jung-gu, Incheon 22212, Korea.  
Email: sshin@inha.ac.kr

**Copyright** © 2024. The Korean Society of Cardiology

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<https://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ORCID iDs

Sung-Hee Shin   
<https://orcid.org/0000-0002-8306-9622>

### Funding

The author received no financial support for the research, authorship, and/or publication of this article.

### Conflict of Interest

The author has no financial conflicts of interest.

### Data Sharing Statement

The data generated in this study is available from the corresponding author upon reasonable request.

Assessing the risk in patients with degenerative chronic mitral regurgitation (MR) is essential for optimal management. It can serve as a guide for treatment decisions, optimizing the timing of interventions including surgery, tailoring follow-up monitoring, and predicting prognosis.

Diastolic function has been shown to link to symptom status, functional capacity, and clinical outcomes in various cardiovascular diseases. Current guidelines recommend integrating several indices, including left atrial (LA) maximum volume, peak tricuspid regurgitation velocity, the ratio of early diastolic mitral inflow velocity to early diastolic mitral annular velocity ( $e'$ ) and  $e'$ , to assess left ventricular (LV) diastolic function as primary indices.<sup>1)</sup> Among these indices,  $e'$ , assessed by Tissue Doppler imaging, has been widely used in various clinical settings. Prior data have shown that  $e'$  is related to LV relaxation and decreases with age. While it appears to be less influenced by alterations in loading conditions than mitral inflow velocity, the load independence of  $e'$  is still uncertain, especially in the setting of preserved LV performance.<sup>2)3)</sup> Additionally, it cannot differentiate between active contraction and passive motion. Despite the association of diastolic function with clinical outcomes in various cardiovascular diseases, it is not widely considered when evaluating MR patients and determining the optimal timing of intervention. This may be attributed to the challenges of assessing diastolic dysfunction in MR setting, where an elevation of early transmitral inflow and a decrease in systolic pulmonary vein velocity due to regurgitant flow can complicate interpretation.<sup>4)</sup>

In this issue of *Korean Circulation Journal*, Choi et al.<sup>5)</sup> investigated the prognostic implications of septal  $e'$  velocity in patients with degenerative moderate to severe MR, all with prolapsed or flailed mitral valves. The study enrolled 404 patients (211 with moderate MR and 193 with severe MR) after excluding the individuals aged 65 years and older. They observed that reduced septal  $e'$  velocity, defined as  $<7$  cm/s, was related to both all-cause mortality and cardiovascular mortality over a median follow-up of 6 years. This predictive value persisted even after adjusting for conventional parameters typically used in surgical decision-making, such as symptoms, LV dimensions, and LV ejection fraction. They also demonstrated that the model with septal  $e'$  velocity provides additional information beyond the MIDA score, which was originally developed to predict short- and long-term survival in degenerative MR patients but predominantly included individuals with severe MR and incorporated age as a scoring factor.<sup>6)</sup>

The contents of the report are the author's own views and do not necessarily reflect the views of the *Korean Circulation Journal*.

While Choi et al.<sup>5)</sup> nicely demonstrated the clinical significance of e' velocity in degenerative MR, the intriguing results of the current study should be interpreted in the context of several limitations. First, this cohort excluded the individuals under 65 years old and included the patients with moderate MR, accounting for more than 50%. While they found no interaction between e' velocity and clinical outcomes depending on MR severity, applying e' velocity at the same value regardless of MR severity might be limited, given the uncertainty of the load independence of e'. In a similar vein, applying 7 cm/s in this population is not fully validated given the cohort's younger age and underlying MR. Secondly, uncertainty remains regarding whether surgical intervention can be guided by this scoring system, as underscored by this retrospective analysis. Furthermore, the question remains unanswered as to whether percutaneous transcatheter intervention for degenerative MR would be a better strategy compared to traditional surgery in a select group of patients with the highest score.

Recently, speckle tracking strain imaging has been proposed as another promising technique for assessing LV diastolic function.<sup>7)</sup> LV global longitudinal strain or LA strain might provide additional insights into stratifying the risk in this population.<sup>8)9)</sup> Assessing diastolic function in patients with MR remains a clinical challenge in clinical practice. Further studies are warranted to validate the current study's findings and extrapolate this risk score to a broader range of patients with MR.

## REFERENCES

1. Nagueh SF, Smiseth OA, Appleton CP, et al. Recommendations for the evaluation of left ventricular diastolic function by echocardiography: an update from the American Society of Echocardiography and the European Association of Cardiovascular Imaging. *J Am Soc Echocardiogr* 2016;29:277-314. [PUBMED](#) | [CROSSREF](#)
2. Diwan A, McCulloch M, Lawrie GM, Reardon MJ, Nagueh SF. Doppler estimation of left ventricular filling pressures in patients with mitral valve disease. *Circulation* 2005;111:3281-9. [PUBMED](#) | [CROSSREF](#)
3. Caiani EG, Weinert L, Takeuchi M, et al. Evaluation of alterations on mitral annulus velocities, strain, and strain rates due to abrupt changes in preload elicited by parabolic flight. *J Appl Physiol* 2007;103:80-7. [PUBMED](#) | [CROSSREF](#)
4. Rossi A, Cicoira M, Golia G, Anselmi M, Zardini P. Mitral regurgitation and left ventricular diastolic dysfunction similarly affect mitral and pulmonary vein flow Doppler parameters: the advantage of end-diastolic markers. *J Am Soc Echocardiogr* 2001;14:562-8. [PUBMED](#) | [CROSSREF](#)
5. Choi Y, Park CS, Rhee T, et al. Mitral annular tissue velocity predicts survival in patients with primary mitral regurgitation. *Korean Circ J* 2024;54:311-22. [CROSSREF](#)
6. Grigioni F, Clavel MA, Vanoverschelde JL, et al. The MIDA Mortality Risk Score: development and external validation of a prognostic model for early and late death in degenerative mitral regurgitation. *Eur Heart J* 2018;39:1281-91. [PUBMED](#) | [CROSSREF](#)
7. Nagueh SF, Khan SU. Left atrial strain for assessment of left ventricular diastolic function: focus on populations with normal LVEF. *JACC Cardiovasc Imaging* 2023;16:691-707. [PUBMED](#) | [CROSSREF](#)
8. Hiemstra YL, Tomsic A, van Wijngaarden SE, et al. Prognostic value of global longitudinal strain and etiology after surgery for primary mitral regurgitation. *JACC Cardiovasc Imaging* 2020;13:577-85. [PUBMED](#) | [CROSSREF](#)
9. Oh JK, Yoon YH, Roh JH, et al. Prognostic impact of left atrial strain after mitral valve repair surgery in patients with severe mitral regurgitation. *Korean Circ J* 2022;52:205-17. [PUBMED](#) | [CROSSREF](#)