

Rationale for Change in the Criteria for Defining Severe Ischemic Mitral Regurgitation in 2017 American College of Cardiology/American Heart Association Guidelines

Dear Editor,

This is regarding the article on ischemic mitral regurgitation (MR) by Varma *et al.*^[1] In this article, effective regurgitant orifice area (EROA) ≥ 0.2 cm², regurgitant volume (R Vol) ≥ 30 ml, and regurgitant fraction (RF) $\geq 50\%$ were considered for the quantification of severe ischemic MR based on 2014 American College of Cardiology/American Heart Association (ACC/AHA) guidelines.^[2] In the 2017 focused update on valvular heart disease, the criteria for quantifying primary and secondary MR are the same, i.e., EROA ≥ 0.4 cm², R Vol ≥ 60 ml, and RF $\geq 50\%$.^[3] What is the rationale for this change?

The American Society of Echocardiography 2003 guidelines for the evaluation of valvular regurgitation highlighted the use of multiple qualitative and quantitative parameters for the quantification of severe MR rather than “eyeball” grading of color Doppler jets. Quantitative parameters for severe MR were EROA ≥ 0.4 cm², R Vol ≥ 60 ml, and RF $\geq 50\%$.^[4] The 2014 ACC/AHA guidelines redefined severe secondary MR as EROA ≥ 0.2 cm², R Vol ≥ 30 ml, and RF $\geq 50\%$. The rationale for the changes appears to be on the basis that: (1) association of secondary MR worsens prognosis and even lower values of secondary MR can have an adverse prognosis in an already damaged left ventricle (LV) and (2) measurement of proximal isovelocity surface area (PISA) by two-dimensional Echo underestimates the true EROA due to the crescent shape of proximal convergence.^[2] There were many criticisms against the lowering of the secondary MR threshold in 2014 guidelines. Secondary MR has a biphasic pattern; with the MR maximum in early systole, reaches its nadir in mid systole and again increases before mitral valve opening. Thus, single-frame measurement of EROA may not reflect the mean EROA and dynamic changes during systole. PISA radius measurement is difficult as the exact point of flow convergence may not be clear. Hence, even small errors in measurement will be squared (EROA = $2\pi r^2 Va/Vp$). A small error in measurement can result in a patient being in mild MR (Stage B) or severe secondary MR (Stage C or D).^[5] A comparison of echocardiography with cardiac magnetic resonance imaging shows a tendency toward overestimating MR severity rather than underestimating it.^[6] Finally, there is no convincing evidence to show that surgical- or catheter-based interventions improve survival. Therefore, lowering the threshold can lead to unnecessary interventions on the mitral valve.^[7] These concerns led to a change in the current update.

EROA and R Vol are influenced by multiple factors such as LV end diastolic volume (LVEDV), LV ejection

fraction, and the pressure gradient between LV and left atrium (LA). Patients can have severe MR or RF $>50\%$ (half of the stroke volume is lost into the LA) at an EROA of 0.2 cm², particularly when LVEDV is normal. EROA of 0.4 cm² results in RF $>50\%$ only at very large LVEDV values. This stresses the importance of considering EROA, R Vol, and RF in relation to total LV stroke volume in the assessment of MR severity. Hence, the 2017 guidelines emphasize that “EROA of >0.2 cm² is more sensitive and >0.4 cm² is more specific for severe MR.” It is better to defer classifying a patient as having severe secondary MR (Stage C or D) until guideline-directed medical therapy is optimized.^[5] An integrative approach using multiple echocardiography parameters and clinical variables should be used to grade secondary MR severity and guide therapy.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Reshmi Liza Jose, Praveen Kerala Varma¹

Divisions of Anesthesiology and ¹Cardio-Thoracic Surgery, Amrita Institute of Medical Sciences and Research Center, Amrita Vishwa Vidyapeetham (Amrita University), Kochi, Kerala, India


*Address for correspondence: Prof. Praveen Kerala Varma, Division of Cardiothoracic Surgery, Amrita Institute of Medical Sciences and Research Center, Amrita Vishwa Vidyapeetham (Amrita University), Kochi, Kerala, India.
E-mail: varmapk@gmail.com*

References

1. Varma PK, Krishna N, Jose RL, Madkaiker AN. Ischemic mitral regurgitation. *Ann Card Anaesth* 2017;20:432-9.
2. Nishimura RA, Otto CM, Bonow RO, Carabello BA, Erwin JP 3rd, Guyton RA, *et al.* 2014 AHA/ACC Guideline for the management of patients with valvular heart disease: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation* 2014;129:e521-643.
3. Nishimura RA, Otto CM, Bonow RO, Carabello BA, Erwin JP 3rd, Fleisher LA, *et al.* 2017 AHA/ACC Focused Update of the 2014 AHA/ACC Guideline for the management of patients with valvular heart disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation* 2017;135:e1159-95.
4. Zoghbi WA, Enriquez-Sarano M, Foster E, Grayburn PA, Kraft CD, Levine RA, *et al.* Recommendations for evaluation of the severity of native valvular regurgitation with two-dimensional and Doppler echocardiography. *J Am Soc Echocardiogr* 2003;16:777-802.
5. Grayburn PA, Carabello B, Hung J, Gillam LD, Liang D, Mack MJ, *et al.* Defining severe secondary mitral regurgitation: Emphasizing an Integrated Approach. *J Am Coll Cardiol* 2014;64:2792-801.

6. Uretsky S, Gillam L, Lang R, Chaudhry FA, Argulian E, Supariwala A, *et al.* Discordance between echocardiography and MRI in the assessment of mitral regurgitation severity: A prospective multicenter trial. *J Am Coll Cardiol* 2015;65:1078-88.
7. Grayburn PA, Stoler RC, Mack MJ. The 2017 ACC/AHA updated valve guidelines regarding mitral regurgitation: The guidelines get it right. *Struct Heart* 2017;1:1-2, 31-3.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online	
Quick Response Code: 	Website: www.annals.in
	DOI: 10.4103/aca.ACA_51_18

How to cite this article: Jose RL, Varma PK. Rationale for change in the criteria for defining severe ischemic mitral regurgitation in 2017 American College of Cardiology/American Heart Association guidelines. *Ann Card Anaesth* 2018;21:464-5.

© 2018 Annals of Cardiac Anaesthesia | Published by Wolters Kluwer - Medknow