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) $\geq 0.2$ cm$^2$, regurgitant volume (RVol) $\geq 30$ 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 $\geq 0.4$ cm$^2$, RVol $\geq 60$ 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 $\geq 0.4$ cm$^2$, RVol $\geq 60$ ml, and RF $\geq 50\%$.[4] The 2014 ACC/AHA guidelines redefined severe secondary MR as EROA $\geq 0.2$ cm$^2$, RVol $\geq 30$ 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. A small error in measurement will be squared (EROA = $2\pi r^2 V_a/V_p$). 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 RVol 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 cm$^2$, particularly when LVEDV is normal. EROA of 0.4 cm$^2$ results in RF $>50\%$ only at very large LVEDV values. This stresses the importance of considering EROA, RVol, and RF in relation to total LV stroke volume in the assessment of MR severity. Hence, the 2017 guidelines emphasize that “EROA of $>0.2$ cm$^2$ is more sensitive and $>0.4$ cm$^2$ 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.

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Conflicts of interest

There are no conflicts of interest.

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