Advanced echocardiography in characterization and management of patients with secondary mitral regurgitation

Namazi, F.

Chapter four
Part I

Letter to the editor: Regurgitant Volume/ Left Ventricular End-Diastolic Volume Ratio: The Influence of Aortic Stiffness

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Letter to the editor

We read with great interest the paper by Namazi et al. (1). The aim of the study was to analyze the clinical impact of mitral regurgitant volume (RV) in relation with the degree of left ventricular enlargement (RV/end-diastolic volume [EDV] ratio) in secondary mitral regurgitation. As underscored by the investigators, the focus is in line with the proposed concept of disproportionate or proportionate secondary mitral regurgitation. Analogously, the editorial comment underscores that the mitral regurgitant fraction (RF), a ratio between mitral RV and left ventricular total stroke volume, might unravel the disproportionate and/or proportionate nature of secondary mitral regurgitation (2). Although this pathophysiological approach might be intriguing, we have some concerns to reconcile. The total ventricular stroke volume includes forward stroke volume besides mitral RV; consequently, for the same value of RV, a different forward stroke volume, gives a different RF. Because of the fact that the amount of forward stroke volume is the result of both physiological requests and global ventricular and vascular functions, we have previously shown that an increased aortic stiffness for the same degree of ventricular dysfunction provides a reduced forward stroke volume (through a reduction of ventricular ejection time) (3) and increased RV, and therefore, an increased RF (4). This suggests that different factors other than degree of RV, including aortic stiffness, might affect the proportionality of mitral regurgitation. In the paper by Namazi et al. (1), those patients characterized by a higher RV/EDV ratio had a low total left ventricular stroke volume (46 ml/beat, as extrapolated from the mean value of ventricular volumes reported in Table 2), and considering the mean reported mitral RV (44 ml/beat), the forward stroke volume appeared uncommonly low. Therefore, it may be considered that the main pathophysiological feature of patients with a lower RV/EDV ratio is the remarkably low forward aortic stroke volume, possibly due to aortic stiffening, which might be the cause of the high mortality rate observed in patients treated medically (5). Considering the impact of arterial stiffness on all the main hemodynamic determinants of functional mitral regurgitation in the failing heart, its evaluation should be considered as an additional tool in the assessment of secondary mitral regurgitation, not only to better understand its pathophysiology but also to better interpret the different response to procedural and medical therapy in disproportionate or proportionate secondary mitral regurgitation.

References

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