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

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Chapter four
Part II

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

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Reply to the editor

We thank Dr. Maffeis and colleagues for their interest in our study that evaluated the association of the ratio of mitral regurgitant volume (RV) to left ventricular (LV) end-diastolic volume (EDV) in patients with significant secondary mitral regurgitation (MR) and all-cause mortality (1). A multiparametric approach is recommended for quantification of MR. However, current recommendations do not take LV dimensions as a continuous variable into consideration. As previously described by Gaasch et al. (2), RV is influenced by LVEDV, and therefore, the use of an absolute value of RV is limited in defining severe MR. A new concept of indexing RV for LVEDV was proposed that in essence takes into account the interplay between RV and LV remodeling (LVEDV) and reflects the impact of the RV on the LV. In our study, patients with a RV/EDV ratio ≥20% more frequently underwent mitral valve (MV) intervention and when the MR was resolved, these patients had a better outcome compared with their counterparts (RV/EDV ratio <20%). This might suggest, in these patients, that the degree of MR contributed more to their underlying disease than the LVEDV. The concept that aortic stiffness may affect forward stroke volume and RV in patients with heart failure and significant secondary MR is of interest (3), and as previously shown, it may affect clinical outcomes (4). A previous study showed that in patients with heart failure, increased aortic stiffness was independently associated with the composite endpoint of all-cause death and heart failure hospitalization after correcting for LV ejection fraction, transmitral early wave peak velocity, LV stroke volume, systolic blood pressure, and heart rate (4). An increased aortic stiffness may affect the forward stroke volume; however, the calculation of the forward stroke volume, based on 2-dimensional measurement of the LVEDV and RV calculation, which is based on proximal isovelocity surface area (PISA) needs to be considered with caution because the method has important limitations (5). In secondary MR, the regurgitant orifice is usually elliptical or crescent shaped, and therefore, the quantification of the effective regurgitant orifice area based on the PISA method may lead to significant underestimation. In addition, patients with heart failure present with low-flow status, which may lead to reduced RV. Other methods to quantify RV have been proposed, but they also have limitations (5). Selection of patients with heart failure and severe secondary MR who may benefit from intervention remains challenging, and assessment of the severity of MR is only one part of the evaluation. The clinical condition of the patients, associated comorbidities, and optimization of heart failure therapy (including cardiac resynchronization therapy and coronary revascularization) need to be considered. Aortic stiffness is not assessed routinely, but as previously shown (4), it is an important factor to be addressed in the treatment of patients with heart failure.

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