



Editorial

Can we solve two problems with a TAVR?

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Severe aortic stenosis (AS) is often associated with variable grades of mitral regurgitation (MR). Several studies suggest that a significant grade of MR in AS patients undergoing isolated aortic valve replacement (AVR) is linked to worse outcomes with higher rate of mortality and reduced adverse event free survival [1–3]. Guidelines recommend AVR and concomitant mitral valve treatment in patients with AS and significant symptomatic MR [4]. However, the optimal treatment for these patients is still debated, especially in presence of moderate MR.

The removal of aortic obstruction reduces the left ventricle (LV) pressure overload, induces LV reverse remodeling and decreases mitral valve leaflets tethering, with consequent improvement of MR. However, benefits related to this mechanism seem to be associated only to functional MR [4–6].

An increasing number of patients are scheduled for transcatheter AVR (TAVR) treatment. In these patients, significant MR ranges from 2 to 30% of cases. After TAVR, MR is expected to improve because of the reverse remodeling and optimization of medical therapy. Nevertheless, data on TAVR and MR report contrasting results. Some studies have demonstrated an increase risk of early and late mortality whereas others have shown an improvement of MR after AS correction [1,3].

In the issue of this *Journal*, Ben-Assa and colleagues sought to investigate the prevalence and the impact of postoperative MR after TAVR on outcomes in an intermediate-low risk population [7]. In a propensity-matched study, authors compared the outcomes of patients with residual more than moderate and less than moderate postoperative MR. Interestingly, 25% of patients had an improvement of MR, in 19% of cases MR got worse and in 56% of patients MR did not change. Of note, 16.8% of patients had post-procedural moderate-to-severe post-operative MR. Post-operative significant MR was associated with increased mortality and reduced event free survival at 4 years follow-up. Moreover, moderate-to-severe MR was associated with poor hemodynamic outcomes at 6-month follow-up. Finally, pre-operative MR > grade II was a strong predictor of higher grade of post-operative MR.

TAVR might not produce the expected improvements on MR, because of LV dynamics and pressure fillings. In this setting, preoperative cardiac imaging and hemodynamic studies are helpful in identifying

predictors of persistency and worsening of MR. Predictors may be assessed by trans-thoracic/trans-esophageal echocardiograph, Cardiac Magnetic Resonance (MRI) and CT scan. Results of echocardiography and MRI are often discordant, and some studies report MRI is superior in detecting myocardial fibrosis and quantifying MR [8]. Nevertheless, using echocardiographic parameters, Ben-Assa and colleagues showed that patients with larger atria, lower right ventricular function and cardiac index were more likely to have postoperative moderate-to-severe MR. Other risk factors for post-procedural MR worsening are annular calcification, dilated mitral annulus and leaflet stiffness detected at the transesophageal Echocardiography and/or CT-Scans [9].

Authors suggest also that the type of prosthesis plays a role in MR worsening hypothesizing that self-expanding valves may interfere with mitral anterior leaflet. In this regard, Cortés and colleagues demonstrated that self-expandable valves are associated with increased mortality, suggesting its potential negative effect on post-operative MR [9]. Furthermore, Caballero and colleagues demonstrated that in patients with tricuspid aortic valve Balloon-Expandable valve determines low stress on mitro-aortic continuity with consequent improvement in left ventricle hemodynamics and MR [10]. Finally, other important determinants for MR worsening are LV dyssynchrony after permanent pacemaker implantation and volume overload from significant paravalvular leakage.

The wide diffusion of transcatheter aortic valve implantation procedure and its extension on intermediate and low risk patients raises the question how to deal with concomitant mitral valve regurgitation. The decision to treat or not to treat both valves is generally based on the severity and etiology of MR and patient's morbidity. Because surgical double valve treatment may increase mortality and morbidities, the adoption of hybrid strategies, such as transcatheter approaches for MR treatment, could be reasonable in high-risk patients, but to date, few experiences are reported. These techniques are not available in all centers and few patients are effectively eligible for transcatheter mitral valve intervention [10].

The use of TAVR for treatment of AS alone in patients with associated MR is reasonable in high-risk patients but requires a careful evaluation in patients with lower risk, where double valve treatment through a minimally invasive approach might be the best treatment option.

Declaration of Competing Interest

Authors have not conflict of interest to declare related to this paper.

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