## Editorial / Editöryal Yorum

# Left ventricular function after transcatheter aortic valve replacement: When reversibility matters

## Transkateter aortik kapak replasmanı sonrası sol ventrikül fonksiyonu: Geri döndürülebilirliğin önemi

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In this issue of the Archives of the Turkish Society of Cardiology, Kılıçaslan et al.[1] published a retrospective multicenter observational study including 151 patients patients with severe aortic stenosis who underwent a transcatheter aortic valve replacement (TAVR). They evaluated the prognostic implications (impact on all-cause mortality with a mean follow-up period of 19 months) on the recovery of the left ventricular ejection fraction (LVEF) after TAVR and the pre-procedural LVEF, among other factors.

To briefly summarize the main findings, preoperative LVEF was not found to have a significant effect on predicting survival (no differences in all-cause mortality were seen between patients with baseline preserved, mildly reduced, and reduced LVEF); however, the postoperative improvement in LVEF was associated with a higher rate of survival.[1] As expected, the postoperative increase in LVEF was higher in patients with reduced LVEF at baseline; in addition, in patients with a low stroke volume index (<35 mL/m$^2$/beat) at baseline, the authors found that a cutoff value of "≤10%" for a change in postoperative LVEF had adequate sensitivity and specificity to predict mortality.[1] Therefore, they stated that the recovery in LVEF immediately after TAVR had higher prognostic implications than preoperative LVEF, highlighting the importance of the reversibility of ventricular function after intervention.

**Abbreviations:**

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| *LBBB* | *Left bundle branch block* |
| *LV* | *Left ventricular* |
| *LVEF* | *Left ventricular ejection fraction* |
| *TAVR* | *Transcatheter aortic valve replacement* |

Unquestionably, the concept of reversibility of myocardial dysfunction has a central role when addressing multiple cardiovascular conditions, including ischemic heart disease, hypertensive- or arrhythmia-induced cardiomyopathy, and toxin- or drugs-related cardiomyopathies, among others.[2-5] Supporting the authors' findings, previous reports have demonstrated that both surgical aortic valve replacement and TAVR can generate an improvement in myocardial damage (mainly explained by inadequate myocardial hypertrophy along with interstitial fibrosis) caused by persistent pressure overload in severe aortic stenosis.[6-8]

One key point that remains unclear in this investigation is the potential impact of postoperative aortic regurgitation and left bundle branch block (LBBB) in the improvement of myocardial function after TAVR. These perioperative complications were not reported in the present study,[1] and it has been previously demonstrated that post-procedural aortic regurgitation and LBBB can block reverse remodeling and are associated with poor outcomes.[8-9] Therefore, it would have been very interesting to know the impact of residual aortic insufficiency and development of LBBB in the changes in LVEF in this study.

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When addressing myocardial function, it is critical to consider that patients with severe aortic stenosis are mainly older individuals with multiple comorbidities. Therefore, different conditions can play a substantial role in myocardial dysfunction, creating complex scenarios in which the LVEF reduction could be justified by multiple mechanisms and not only by the overload pressure.[10] Owing to its frequent association with aortic stenosis, the presence of concomitant coronary artery disease is of outmost importance to understand the pathophysiology and potentially the chances of reversibility of myocardial dysfunction after an aortic valve replacement.[10] Indeed, patients with both conditions show lower values of LVEF than those with isolated aortic stenosis; and especially in patients with reduced LVEF, prior coronary artery disease can have prognostic implications.[11,12] The anatomical severity and functional implications of coronary lesions should be addressed when evaluating patients for TAVR. Stress tests with protocols adjusted for patients with valvular heart disease, fractional flow reserve, or fractional flow reserve derived from coronary computed tomography can play a role in this scenario.[13,14] To know the incidence of concomitant coronary artery disease and how it was managed would have been a very interesting additional contribution of this publication.[1]

The authors used transthoracic echocardiography solely for assessing left ventricular function in this population and did acknowledge as a limitation that they did not use more sophisticated imaging methods.[1] Although LVEF determined by transthoracic echocardiography is still the cornerstone for the estimation of systolic function in patients with severe aortic stenosis, other methods can offer advantages in specific scenarios in this population and deserve to be mentioned. The use of left ventricular global longitudinal strain has demonstrated an incremental prognostic value, particularly in patients with aortic stenosis and preserved LVEF.[15] Furthermore, a prior investigation reported that repeated strain measurements after TAVR confirmed left ventricular functional improvement following the procedure.[8] The use of cardiac magnetic resonance for evaluating aortic stenosis is expanding with the main benefit being its ability to better stratify patients according to their myocardial response in terms of fibrosis and functional cardiac alterations and to better understand the reason for left ventricular dysfunction.[16]

The timing of the evaluation of improvement in LVEF after a TAVR is also a highly interesting topic. In this study, the patients showed an improvement in systolic function in the immediate postoperative period (post-TAVR echocardiography was performed before hospital discharge).[1] It has been proposed that afterload unloading by TAVR improves left ventricular (LV) systolic function in two phases: (i) immediate (improvement after removal of increased afterload) and (ii) delayed (structural changes that reflect the ability of myocardium to recover by decreasing hypertrophy and reducing fibrosis).[8] Long-term follow-up of this population with repeated measurements of systolic function could be a very interesting future direction for research.

To conclude, we would like to highlight that this study conducted by Kılıçaslan et al. addressed a very interesting topic in an elegant manner.[1] The authors made a substantial contribution by highlighting not only the need to accurately evaluate baseline systolic function when considering patients for TAVR, but also more importantly to conduct a detailed follow-up to evaluate changes in the myocardial function. Those findings could change the patients' prognosis and maximize the benefits of the intervention.

**Conflict of Interest:** J.M.F. and A.B. have no conflicts of interest to declare. J.P.D.B. is a local proctor for Boston Scientific.

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