Abstract

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Predictive Value of Post-TAVI Myocardial Work Indices in Patients with Aortic Stenosis

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Introduction. Aortic stenosis (AS), characterised by aortic valve calcification and a reduced aortic valve area (AVA), leads to left ventricular outflow tract (LVOT) obstruction and increased afterload. Although TAVI offers well-established clinical benefits for patients with AS, a substantial proportion of patients continue to experience high long-term mortality following the procedure. This raises the question of whether conventionally used LV parameters, such as LVEF and GLS, are sufficient for the early detection of LV functional deterioration and reliable prediction of outcomes after TAVI, as both are load-dependent and do not account for the impact of AS on LV pressures. Novel echocardiographic assessment based on left ventricular myocardial work (LVMW) has demonstrated clinical utility in patients with AS. It may enable earlier detection of LV dysfunction, regardless of whether impaired myocardial contractility results from myocardial damage or changes in loading conditions. In the present study, we evaluated the prognostic value of LVMW parameters measured 3 months after TAVI and determined their optimal cut-off values for mortality risk stratification. Currently, considerable promise for risk stratification in patients with AS is associated with the use of LVMW indices. This study aimed to evaluate the predictive value of post-procedural LVMW indices and to determine their optimal cut-off values in patients with AS undergoing TAVI.

Methods. A total of 81 consecutive patients who were qualified for TAVI between March 2021 and November 2022 and subsequently underwent the procedure were evaluated. LVMW indices (GWI, GCW, GWW, and GWE) were assessed 3 months after TAVI, and long-term survival was analysed. Survival and associated factors were evaluated using univariate and multivariate Cox proportional hazards models, with significant variables subsequently included in the cut-off analysis.

Results. The median survival time following TAVI was 862 (596–1083) days, with a maximum follow-up period of 1506 days. All-cause mortality during follow-up was 25%. Multivariate analysis revealed that EF, GLS, GWI, and GCW assessed 3 months after TAVI were independent predictors of all-cause mortality. We identified 1747 mmHg and 1364 mmHg as optimal cut-off values for GCW and GWI,

respectively, allowing significant risk stratification for all-cause mortality.

Discussion. Low LVMW values measured 3 months after TAVI were associated with a higher risk of mortality in patients with AS. In this analysis, LVEF, GLS, GWI, and GCW assessed after TAVI were identified as independent predictors of all-cause mortality. The proposed cut-off values clearly stratified patient groups with different survival outcomes. Notably, a relatively large proportion of patients (37–45%), depending on the LVMW parameter assessed) had values below the identified cut-off thresholds associated with a higher risk of an unfavourable prognosis.

Keywords: Aortic Stenosis, Transcatheter Aortic Valve Implantation, TAVI, Myocardial Work, LVMW, Mortality

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