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Left ventricular deformation and non-invasive myocardial work after transcatheter aortic valve replacement: a prospective echocardiographic study

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CONGRESS SESSION

Abstract Slides

Left ventricular deformation and non-invasive myocardial work after transcatheter aortic valve replacement: a prospective echocardiographic study

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Transcatheter aortic valve replacement (TAVR) has revolutionized the treatment of aortic stenosis. Nevertheless, TAVR candidates form an elderly population with multiple comorbidities, in which the main considerations of the patient selection are not well established. Moreover, current markers of left ventricular (LV) function, including speckle-tracking derived global longitudinal strain (GLS) are substantially influenced by loading conditions of the LV, therefore, they may not effectively reflect contractility in a pressure-overloaded state of the LV.

Our aim was to quantify LV function using GLS and myocardial work indices. The latter parameter adjusts LV deformation to instantaneous LV pressure, therefore, it may overcome the load-sensitivity of the traditional LV functional measures.

Thirty patients undergoing TAVR were enrolled (37% female; age: 78±6 years; aortic valve area [AVA]: 0.7±0.3 cm²). Prior to the procedure, subjects underwent a detailed echocardiographic investigation. Speckle-tracking analysis was performed and GLS was measured. LV pressure curve was estimated by adding the mean aortic valve gradient to the aortic systolic pressure. Using these measures, LV global myocardial work index (GMWI) and global constructive work index (CMWI) was quantified by commercially available software. A 6 months follow-up examination was also performed and at that time point we determined the aforementioned parameters.

As expected, AVA significantly improved after the procedure (1.8±0.4 cm²; p<0.001). GLS also significantly increased (-13.2±4.2 vs. -15.2±3.9 %; p<0.01), GMWI was significantly lower (1890±772 vs. 1573±577 mmHg%; p<0.05), while CMWI only showed a tendential decrease (2422±788 vs. 2166±640 mmHg%; p=NS) at the follow-up. Eight patients (27%) demonstrated improvement in GMWI: in these patients age, AVA and GLS at baseline did not differ from those who did not improve, while both GMWI (1261±413 vs. 2118±749 mmHg%) and CMWI (1728±468 vs. 2674±468 mmHg%) were significantly lower (both p<0.01).

The TAVR population is a complex patient group, in which the reliable estimation of LV function is of great importance. LV non-invasive myocardial work parameters show a distinct changing pattern after the procedure, which may have an additive value in the proper patient selection.

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