Multi-dimensional evaluation in patients with aortic stenosis who are candidates for cardiac surgery

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Introduction: In patients with severe aortic stenosis (AS), the presence of left ventricular systolic dysfunction is one of the main predictors of adverse events after valve replacement surgery (SAVR). However, more and more patients are being referred for surgery early on and have preserved systolic function at the time of surgery. Within this category, global longitudinal strain (GLS) has been proposed as a marker of ventricular remodeling after cardiac surgery.

Objectives: Our study aims to identify the variation of GLS in patients undergoing SAVR and any differences compared to classes of diastolic dysfunction.

Materials and methods: From June 2020 to October 2022, we analyzed 100 patients with AS with an indication for cardiac surgery treatment admitted to the cardiac surgery department of our AOU. All patients underwent an echocardiogram immediately before surgery and in the early postoperative period (mean 7 days); 52 of them were enrolled for follow-up and repeated an echocardiogram at least 3 months after surgery. In all cases, the GLS of the left ventricle was calculated and patients were divided into four classes by the degree of diastolic dysfunction (0-III) according to the most recent international guidelines; moreover, patients were divided into 2 groups: group A for grades 0-1 of diastolic dysfunction and Group B for grades 2-3. The data were analyzed with SPSS 28 software. Analysis of variance was performed with a t-test and ANOVA test.

Results: In the final analysis, 100 patients with AS were included, with a mean age of 70.8±8.27, of whom 43 were women (43%) and 57 were men (57%). In 20 patients (20%) ischaemic heart disease with an indication for coronary revascularization was also present. The mean preoperative ejection fraction was 58.98±9.5%. The mean GLS values before surgery were 15.13±4.56% with a reduction immediately post-cardiac surgery of 12.26±3.67%, p<0.0001. GLS values were comparable within the various classes of diastolic dysfunction at preoperative examination (p=0.579) and immediately postoperative (p=0.286).

At follow-up, analysis was repeated for 52 patients: an improvement in mean GLS was found: 16.09±3.64%, p<0.0001. The mean GLS in the two groups at follow-up was statistically different: 17.38±3.35% in group A vs 13.44±3.63% in group B, p<0.0001.

Conclusions: In our case series, patients with severe aortic stenosis undergoing SAVR show a significant early reduction in GLS regardless of the degree of diastolic dysfunction, while after at least 3 months of follow-up, they show a great recovery, significantly better in patients with Grades 0 or 1 diastolic dysfunction.

GLS before surgery, immediately post-surgery and at follow-up