Abstract: Preoperative global longitudinal strain is the best predictor of mortality following transcatheter aortic valve replacement

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BACKGROUND

Prognosis after transcatheter aortic valve replacement (TAVR) is variable. This might depend on preoperative evaluation of myocardial performance by other measurements than ejection fraction (EF).

PURPOSE

The aim of this study was to investigate the predictive value of preoperative global longitudinal strain (GLS) and the guidelines specified subtypes of aortic stenosis (AS) on mortality following TAVR.

METHODS

We included 511 patients with severe AS who underwent TAVR in the period July 2012 - June 2017.

Patients were divided into guidelines-specified subgroups based on EF (EF: =50 (NEF) or <50% (LEF)), peak gradient (PG: = 4 (HG) or <4 m/s (LG)) and flow status (stroke volume index (SVI): =35 (NF) or <35 ml/min/kg (LF)): (1) HG-NEF (n=228), (2) HG-LEF (n=91), (3) LG-LF-NEF (n=71) and (4) LG-LF-LEF (n=121). We also investigated the effect of replacing EF by GLS in the guideline specified subgroups (GLS =-14 (HGLS) and GLS > -14% (LGLS)).

RESULTS

Mean follow up time was 1033 days. Mean age was 80.2±7.1 years. Median overall survival was 5.3±0.3 years. Comorbidity burden was higher in patients with LF - and LEF status in terms of a higher median plasma creatinine (103 [85;135], p<0.001) and EurologII score (6.1 [3.4;9.6], p<0.001).

LG-LF-LEF AS was associated with a significantly worse outcome compared with all other groups (p<0.005, Fig 1A). High gradient status, irrespective of EF (p=0.88), was associated with the best prognosis with a median survival of 5.0±0.5 and 5.5±0.1 years for NEF and LEF, respectively.

Overall and in patients with HG-NEF, impaired GLS (>14%) was associated with poor outcome (Fig. 1B-D). There was a trend towards a poorer prognosis with GLS > -14% in LG-LF-NEF AS (p=0.10).

In an univariate analysis impaired GLS > -14% (HR 2.04, p<0.005), LG-LF-LEF status (HR 1.82, p=0.001), PG < 4m/s (HR 1.74, p=0.001) and tricuspid regurgitation gradient > 30 mmHg (HR 1.63, p<0.001) were significant predictors of mortality in contrast to EF, SVI, age, gender and plasma creatinine.

GLS > -14% emerged as the only significant outcome predictor in a multivariate analysis (HR 1.93, p<0.05).
CONCLUSION

Impaired global longitudinal strain > -14% was the best individual echocardiographic predictor of overall survival in symptomatic severe AS and could identify a subgroup of patients with HG-NEF AS with a worse prognosis.