Recovery of Left Ventricular Mechanics Following Transcatheter Aortic Valve Implantation: Long-term Follow-up in Patients with Four Subtypes of Aortic Stenosis

INTRODUCTION

- Left ventricular mechanics are impaired in patients with severe aortic stenosis (AS).
- Global longitudinal strain (GLS) may recover differentially after relief of AS and may help identify select patients who have a higher likelihood of survival post transcatheter aortic valve implantation (TAVI).

HYPOTHESIS

- We hypothesized there would be differences in myocardial mechanics (measured by GLS) following TAVI in patients with four subtypes of severe AS, and these differences could predict survival.

METHODS

- All patients undergoing TAVI from January 2011 – March 2016 who had pre and post TAVI GLS data available.
- Speckle-tracking transthoracic echocardiography using GE Vivid E9 and E95 platforms.
- Classified by peak velocity, mean aortic gradient, LVEF and stroke volume index as:
  1) Normal flow and high gradient
  2) Normal flow and gradient with low EF
  3) “Classic” low flow and low gradient (LFLGAS)
  4) Paradoxical low flow and low gradient.

RESULTS

- Two hundred-eight patients with severe AS who underwent TAVI were analyzed (Table 1); 45 died during the 5 year study period
- No significant differences were noted in age or comorbidities. “Classic” low flow low gradient stenosis patients were more likely men
- GLS measured pre-TAVI and 0-30 days post TAVI (99% of patients, 2 patients with 30-60 day GLS assessment). (Table 2)
- Both GLS (14.0 ± 4 to -15.0 ± 4.3, p<0.001) and LVEF (56.14% to 58.15%, p=0.0003) improved significantly post TAVI.
- Across all types of AS, improvement in GLS associated with a survival benefit, with GLS recovery in alive patients (mean GLS pre-TAVI -14.2 ± 4.1 and post-TAVI -15.2 ± 4.1, p<.001) and no significant recovery in deceased patients (mean GLS pre-TAVI -14.1 ± 4.2 and post-TAVI -14.2 ± 4.4, p=0.8858) (Figure 2)
- Patients with “classic” LFLGAS showed no significant improvement post TAVI in GLS or LVEF, and had highest overall mortality rate.

CONCLUSIONS

- LVEF and GLS improved significantly post-TAVI
- “Classic” low flow, low gradient AS patients had lowest post-procedure GLS recovery and highest overall mortality in study period
- Across all types of AS, GLS recovery was noted in patients who survived, but not in patients who subsequently died.