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

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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 30-90 day GLS assessment). (Table 2)
• Both GLS (-14.0 ± 4 to -15.0 ± 4.3, p<0.0001) and LVEF (56 ± 14% to 58 ± 15%, p=0.003) 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<0.001) 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.