Echocardiographic Predictors of Elevated Gradients After Transcatheter Aortic Valve Replacement for Failing Bioprosthetic Aortic Valve Replacement

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BACKGROUND

- Valve-in-valve transcatheter aortic valve replacement (VIV TAVR) has emerged as a viable option for failing aortic bioprostheses (AVR).
- Mean gradient < 20 mmHg is considered a desirable result post procedure.

OBJECTIVES

- Evaluate the echocardiographic predictors and clinical outcomes of elevated mean gradient post VIV TAVR.
- Assess the clinical outcomes associated with elevated gradients post VIV TAVR.

METHODS

- Retrospectively reviewed detailed clinical, fluoroscopic, and echocardiographic data of patients who underwent VIV TAVR at our institution.
- All analyses were performed using SAS 9.4. Descriptive statistics of mean and standard deviation were presented for continuous variables. Categorical variables were presented as percentage and frequency.
- Comparison testing to determine univariate differences between groups based on mean residual gradient was conducted. Student’s t-test was used to compare continuous variables after ensuring that assumptions of normality were met. Chi-square analysis or Fisher’s exact test (cell size ≤ 5) was used to compare categorical variables.
- A two-sided p-value of ≤ 0.05 was considered statistically significant.

RESULTS

- Evaluated 56 high-risk patients (mean STS score 9.6 ± 5.8) who underwent VIV TAVR. Baseline patient characteristics are described in Table 1.
- Majority of subjects were male (32, 57.1%) and mean age was 77± 10.6. The primary indication for VIV TAVR was stenosis (n=35, 62.5%), regurgitation (n=12, 21.4%), and mixed disease (n=9, 16.1%).
- All patients successfully underwent VIV TAVR and noted improvement of New York Heart Association (NYHA) functional class.
- Twenty-two patients (39.3%) exhibited elevated gradient (mean>20 mmHg) within 30 days of the procedure.
- Factors associated with elevated gradient after VIV TAVR were higher baseline mean gradient (40.4 mmHg in elevated group vs 32 mmHg, p=0.040) and small TAVR (23 mm) valve size (p=0.006).
- Patient prosthesis mismatch (PPM) was not associated with elevated gradient after VIV TAVR (p=0.169).
- Elevated gradient was not associated with pre-procedure left ventricular ejection fraction, initial prosthetic valve pathology, or severity of paravalvular leak.
- Eight patients died in follow-up (3.6 months ±4). Elevated gradients were not associated with mortality or functional status at 1-month follow-up.

CONCLUSIONS

- In this single-center detailed study of echocardiographic variables, elevated gradients were prevalent post VIV TAVR.
- Elevated gradients were associated with higher gradient pre-procedure and smaller implanted TAVR size, but not the presence of PPM.
- Finally, elevated post-implantation gradients did not impact symptomatic improvement or mortality.