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Letters

Transcatheter Versus Surgical Aortic Valve Replacement in Patients With Bicuspid Aortic Valve Stenosis

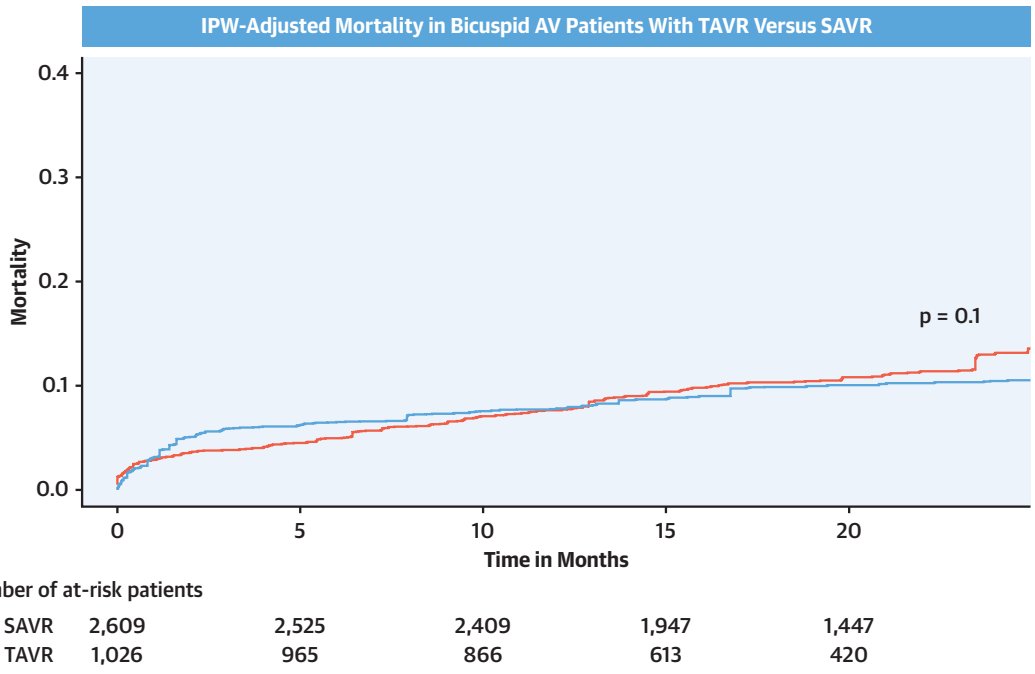
The role of transcatheter aortic valve replacement (TAVR) in bicuspid aortic stenosis (BAS) is unknown because such patients were excluded from TAVR trials (1). We compared midterm outcomes between TAVR and surgical aortic valve replacement (SAVR) among patients with BAS using a retrospective cohort. Using Medicare data (2015 to 2017), we identified all enrollees with BAS (International Classification of Diseases codes Q23.0 or Q23.1 and I35.0), who underwent TAVR or SAVR. Patients who underwent concomitant mitral surgery were excluded. The primary outcome was all-cause mortality, and secondary outcomes were hospitalization for stroke and heart failure (HF) after discharge. Dates of death were available through August 2018, and subsequent hospitalization claims for stroke and HF were available through December 2017. Propensity scores (PSs) were used to match patients undergoing TAVR and SAVR by 35 measured confounders (**Figure 1**) including a validated frailty score (2). We also performed inverse probability weighting analysis and created inverse probability weighting-adjusted Kaplan-Meier curves (3). The institutional review board of the University of Iowa approved this study with waiver for informed consent.

Overall, 3,007 and 1,054 patients with BAS underwent SAVR and TAVR, respectively. Before PS matching, patients undergoing TAVR were older (mean age, 74.7 ± 9.4 years vs. 69.9 ± 6.8 years, respectively; $p < 0.001$), with higher prevalence of most comorbidities, including HF; diabetes; hypertension; pulmonary hypertension; and coronary artery, lung, liver, and kidney disease. Patients undergoing TAVR had a higher frailty score (7.9 ± 7.3 vs. 4.8 ± 4.4, respectively; $p < 0.001$) compared with SAVR. In the SAVR group, 24% and 11% underwent concomitant coronary artery bypass grafting and ascending aorta surgery, respectively. After PS matching, there were 699 well-matched pairs of patients undergoing TAVR and SAVR. There was no difference in in-hospital mortality (2.2% vs. 2.3%; $p = 0.90$) or stroke (2.7% vs. 2.9%; $p = 0.90$) between matched patients. Patients undergoing SAVR had higher incidence of in-hospital respiratory complications (5.2% vs. 1.9%), blood transfusions (21.5% vs. 5.3%), new-onset atrial fibrillation (36.3% vs. 5.1%), and acute renal failure (21.9% vs. 10.3%) ($p < 0.001$ for all). Patients undergoing TAVR had a higher incidence of in-hospital new pacemaker implantation (12.2% vs. 7.6%; $p = 0.009$). There was no significant difference between TAVR and SAVR in 30-day mortality (2.9% vs. 2.7%; adjusted odds ratio [aOR]: 1.05; 95% confidence interval [CI]: 0.53 to 2.09; $p = 0.90$), 1-year mortality (9.0% vs. 7.4%; aOR: 1.22; 95% CI: 0.83 to 1.81; $p = 0.34$), stroke (4.0% vs. 3.7%; aOR: 1.08; 95% CI: 0.60 to 1.94; $p = 0.90$), or HF (2.3% vs. 2.9%; aOR: 0.80; 95% CI: 0.39 to 1.63; $p = 0.60$). After a median follow-up of 631 days (interquartile range: 427 to 834 days) for mortality and 397 days (interquartile range: 199 to 599 days) for stroke and HF, there was no significant difference in mortality (adjusted hazard ratio [aHR]: 1.08; 95% CI: 0.93 to 1.26; $p = 0.30$), stroke (aHR: 0.96; 95% CI: 0.69 to 1.34; $p = 0.80$), or HF (aHR: 1.13; 95% CI: 0.79 to 1.62; $p = 0.50$) (**Figure 1**). In a sensitivity analysis excluding patients who underwent concomitant coronary artery bypass graft or aortic root surgery, results were unchanged.

The current study provided a comprehensive analysis of a large cohort of patients with BAS, demonstrating no significant difference in mortality, stroke, and HF hospitalization with TAVR compared with SAVR at midterm follow-up. Limitations of our study include the observational design and lack of imaging data. Furthermore, the majority of our patients were >65 years of age, which could limit generalizability to younger patients. Nevertheless, this study provides information beyond prior retrospective analysis of TAVR in patients with BAS, which either lacked sufficient follow-up (4) or did not include a comparison between TAVR and SAVR (5).

In conclusion, TAVR is performed in higher-risk patients with BAS compared with SAVR. Although patients undergoing SAVR had higher risk of periprocedural complications, we found no significant difference in the risk of mortality, stroke, or HF at midterm follow-up. Randomized controlled trials are

FIGURE 1 IPW Adjusted Kaplan-Meier Curves of Mortality With TAVR Versus SAVR in Patients With Bicuspid Aortic Stenosis



Adjusted variables include age; sex; race; hypertension; diabetes; heart failure; coronary artery, lung, kidney, liver, and peripheral arterial disease; atrial fibrillation; stroke; pulmonary hypertension; coronary revascularization; coagulopathy; anemia; weight loss; obesity; electrolyte abnormalities; psychosis; depression; drug and alcohol abuse; connective tissue disease; hypothyroidism; lymphoma; prior bleeding; gastrointestinal bleed; prior implantable cardioverter-defibrillator or pacemaker; sleep apnea; smoking; ascending aortic aneurysm and frailty. IPW = inverse probability weighting; SAVR = surgical aortic valve replacement; TAVR = transcatheter aortic valve replacement.

needed to determine whether TAVR can replace SAVR for patients with BAS.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the *JACC* author instructions page.

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