Hemodynamic Performance of Bioprosthetic Aortic Valves: A Real-World Experience

Karla Campos-Arce, MD; Mayralexandra Barreda, MD; Roberto Cervera, MD; Ross Reul, MD; Joseph Coselli, MD; Ourania Preventza, MD; Nishant Shah, MD; Suwei Wang, MD; Raymond Stainback, MD; Stephanie Coulter, MD
Texas Heart Institute at St. Luke’s Episcopal Hospital, Houston, TX, USA, Baylor College of Medicine, Houston, TX, USA

BACKGROUND
Newer generation bioprosthetic aortic valves (AV) may confer a hemodynamic advantage over older models. Premarket data suggest that the St. Jude Medical Trifecta AV results in indexed effective orifice areas (EOAi) associated with single-digit mean pressure gradients at 1 year after AV replacement.

However, real-world hemodynamic performance data and head-to-head comparison against older models such as the Mosaic™ AV are not known.

METHODS
- Of 166 patients who underwent AV surgery, 96 patients received a Trifecta AV (mean age 74 years, 47% women, 19 to 25 mm), and 70 patients received a Mosaic AV (Medtronic, Inc, Minneapolis, MN) (mean age 69 years, 31% women, 21 to 29 mm). Table 1 shows the valve size distribution. Transthoracic Doppler echocardiography was performed in all patients after surgery (post-implant to 2 weeks).

RESULTS
Postoperative average mean and peak AV gradients for Mosaic AV were significantly higher than for Trifecta AV (Table 2). Mean gradients for the Mosaic AV were twice as high as those for Trifecta AV for valve sizes 21 mm and 23 mm (Table 3). Left ventricular outflow tract velocity-time integral for both valves was similar. The average velocity ratio was significantly higher for Trifecta AV than for Mosaic AV. There were no cases of severe mismatch in the Trifecta AV group vs. 11% for Mosaic AV (Table 4).

CONCLUSIONS
The hemodynamic Doppler indices of the Trifecta AV are outstanding compared to those of the Mosaic AV across all valve sizes with higher VR consistent with low resistance to aortic valve outflow.
REFERENCE