Sex Differences in Incidence of Patient Prosthesis Mismatch Following Valve-in-Valve Transcatheter Aortic Valve Implantation

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Background

Female sex is associated with greater in-hospital mortality and 90 day readmissions following transcatheter aortic valve implantation (TAVI), without clear explanation. Female sex is a known risk factor for patient prosthesis mismatch (PPM), a complication following TAVI which negatively impacts functional status, valve longevity, morbidity, and mortality. Valve-in-valve (ViV) TAVI for treatment of degenerated bioprosthetic aortic valves has an even greater risk for PPM. There remains little evidence on sex differences in incidence of PPM following ViV-TAVI.

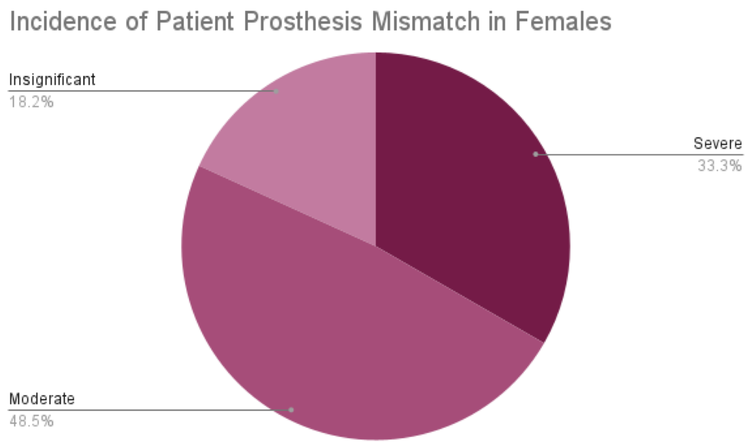
Methods

A retrospective review of patients who underwent ViV-TAVI at Kettering Health from 2025 to 2021 were selected and divided into two groups (female and male). The degree of mismatch was measured by the indexed effective orifice area (iEOA), which is equal to the effective valve orifice area divided by the patient's body surface area. Moderate PPM is defined as iEOA<0.85 cm^2/m^2 (if BMI<30 kg/m^2) or <0.70 cm^2/m^2 (if BMI>30 kg/m^2). Severe PPM is defined as an iEOA<0.65 cm^2/m^2 (if BMI<30 kg/m^2) or <0.55 cm^2/m^2 (if BMI>30 kg/m^2). The average iEOA following ViV-TAVI in females versus males was analyzed with an unpaired t-test.

Results

A total of 77 patients underwent ViV-TAVI. 57.14% (44 of the 77) were male, with an average age of 76.05 years and average BMI of 28.77 kg/m^2. 42.86% (33 of the 77) were female, with an average age of 77.63 years and average BMI of 29.09 kg/m^2. There was no statistically significant difference in average iEOA in females 0.6700 cm^2/m^2 versus average iEOA in males 0.7120 cm^2/m^2 [p=0.3704]. There was no significant difference in rates of BVF at time of ViV-TAV, 33.3% (11/33) versus 29.55% (13/44) in females versus males respectively. Severe PPM occurred in 33.3% (11/33) of females and 36.4% (16/44) of males.

Figure 1: Incidence of Patient Prosthesis Mismatch in Females and Males



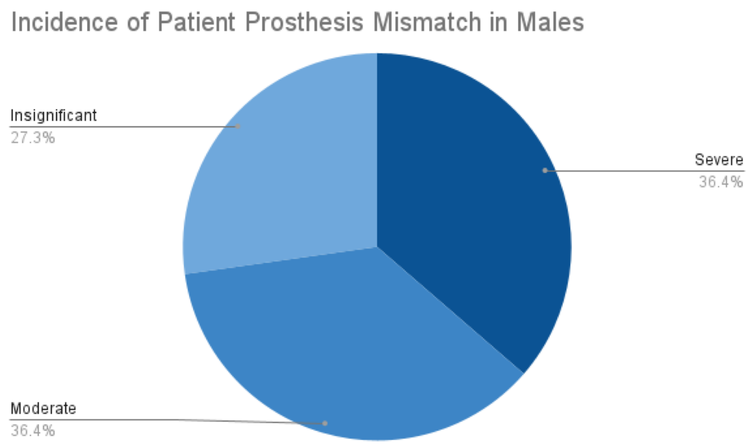
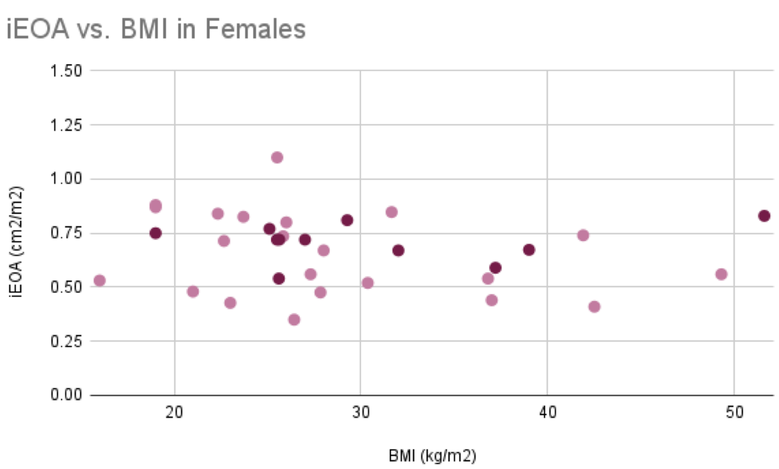
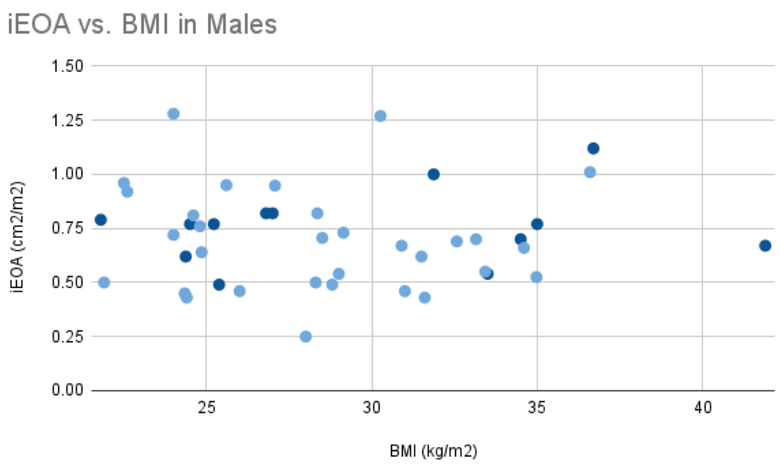


Figure 2: iEOA versus BMI in Females and Males





Conclusion

There was no statistically significant difference in iEOA following ViV-TAVI in females versus males. This suggests males and females have similar rates of PPM following ViV-TAVI supporting that appropriate selection of patient and valve size, as well as appropriate use of bioprosthetic valve fracture, plays a primary role in preventing PPM.

References

Available upon request.

The Christ Hospital Health Network