

Drivers and outcomes of variation in surgical versus transcatheter aortic valve replacement in Ontario, Canada: a population-based study

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Objective

To address the paucity in the literature examining the underlying drivers of variation in rates of TAVI procedures, this study aimed to:

1. Identifying patient and hospital-level drivers associated with different TAVI and SAVR variation between hospitals
2. Explore the impact of TAVI to SAVR ratios on overall clinical outcomes

Study design

Population-based, observational, retrospective cohort study in Ontario, Canada

Materials and methods

Patients included in the study were those >18 years old, who received TAVI between April 2016 and March 2020, thereby capturing a contemporary AS population

- For **objective 1**, TAVI to SAVR ratios were defined for each hospital and were used to categorise hospitals into low, medium, and high tertiles
- Median odds ratio (MOR) and variance partition coefficients (VPC) measures how well variables in the model accounted for between-hospital variation in TAVI to SAVR ratio; MOR and VPC will decrease if an added variable explains the observed variation
- For **objective 2**, the primary clinical outcomes were all-cause mortality and all-cause readmission until maximum follow-up

Key results

- Between 2016 and 2019, the annual procedure rates per million population increased from 171 to 201, which was mainly driven by TAVI expansion; specifically, TAVI increased from 61 to 122 and SAVR decreased from 110 to 79
- For **objective 1**, the TAVI to SAVR ratios differed considerably between hospitals, from 0.21 to 3.27; the potential drivers for this are as follows:

| Patient drivers for TAVI | Hospital drivers for TAVI |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Higher age• Female patients• Increased comorbidity• More prior procedures | <ul style="list-style-type: none">• More acute care beds• Smaller overall AS volume |

- However, both the MOR and VPC increased when these factors were added to the model, meaning they do not explain the between-hospital variation in TAVI to SAVR ratio
- For **objective 2**, the TAVR/SAVR ratio was significantly associated with clinical outcomes, with higher ratio hospitals having lower mortality and readmissions

Study limitations

- Variation in conservative/medical treatment of patients may cause underestimation in the disparity between TAVI and SAVR
- Data availability limited the number of hospital factors included
- Only mortality and readmission were measured as outcomes in the study

Conclusions

- Dramatic variation in TAVI and SAVR rates between hospitals was not explained by patient or hospital factors assessed here
- This variation may be a result of greater funding for SAVR in some hospitals; funding reform is required to remove this possible disincentive for TAVI
- Another explanation for the variation is the weight of surgical or cardiology influence in hospital culture; the addition of the Heart Team should mitigate these potential influences
- Overall, it can be deduced that hospitals with a greater propensity to adopt new technologies also have greater emphasis on other quality improvement initiatives, and thus better outcomes

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