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Editorial

Interpreting Administrative Data About Transcatheter Aortic Valve Replacement Effects on Hospitalisation Outcomes: The Devil's in the Details

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See article by Czarnecki* et al., *pages 1616–1623 of this issue.

Transcatheter aortic valve replacement (TAVR) is the standard of care for prohibitive- or high-risk patients with symptomatic aortic stenosis (AS).[1] This paradigm shift in the treatment of AS has raised concerns about health care resource utilisation owing to the procedural costs and subsequent hospitalisations in this patient population. Rates of rehospitalisation at 30 days and 1 year are high, 15% and 45% respectively, leading to increased health care expenditure.[2,3] An analysis by Vemulapalli et al. of TAVR cases performed in the United States, with the use of data from the American College of Cardiology (ACC)/Society of Thoracic Surgeons (STS) Transcatheter Valve Therapy (TVT) registry and linked administrative data from Medicare claims, sheds further light on hospital admissions in this cohort.[4] They highlighted a reduction in heart failure (HF) hospitalisations after the intervention but higher all-cause, noncardiovascular, and bleeding hospitalisation rates in the year following TAVR compared with the year preceding the intervention. This cohort included patients who underwent TAVRs from 2011 to September 2014, with 61.1% of cases performed via transfemoral access.

Similarly, in this issue of the *Canadian Journal of Cardiology*, Czarnecki et al. present an evaluation of hospitalisations before and after TAVR in the province of Ontario from April 1, 2013, to March 31, 2017.[5] The data were obtained from the CorHealth Ontario TAVR registry and were linked to the Canadian Institute for Health Information (CIHI) Discharge Abstract Database for hospital admissions and the Registered Persons Database for vital status. Hospitalisation rates per person-year were calculated and compared for each of the following analogous time periods before and after the index TAVR: 1-30 days, 31-90 days, 91-365 days, and 1-365 days.

The final patient cohort of this study consisted of 2547 patients; 125 patients (4.6%) were excluded owing to death during the index hospitalisation. The patient population was consistent with the current indications for TAVR: elderly high-risk patients with symptomatic AS. Mortality at 30 days was 5.4% (n = 143), based on those who died during the index hospitalisation and after discharge. In the year preceding the TAVR intervention, 60.2% of the patients (n = 1534) were hospitalised compared with 45.9% (n = 1170) in the 365 days after the intervention. All-cause hospitalisations were highest in the 30 days before TAVR, followed by the 30 days after TAVR. Interestingly, the 3 most common diagnoses for hospital admission before and after TAVR were as follows: HF, AS, and ischemic heart disease before; and HF, gastrointestinal bleeding, and atrial fibrillation after.

This Canadian perspective on hospitalisations before and after TAVR adds to the existing literature and provides additional insights into the burden that AS places on patients and the health care system in Canada. The administrative data provided from Ontario clearly shows that TAVR reduces all-cause hospitalisations, but almost half of the population was rehospitalised following the intervention. The challenge lies in digging beneath the surface of administrative data to understand the true meaning of these findings.

The ability to use provincial administrative data has advantages and disadvantages for patients undergoing TAVR. The primary advantage lies in the ability to follow a population that is unlikely to relocate and as a result provincial resource utilisation is likely to capture all admissions or deaths that occur in the province. Unfortunately, the granularity of the data on admissions may be lacking. Although CorHealth does capture important patient demographic and comorbidity data which assists evaluation of risk, the data obtained from CIHI are subject to the challenges of International Classification of Diseases coding. For example, a discharge diagnosis may be recorded as AS but the cause of the admission may be coronary angiography or other examinations to facilitate workup for eventual intervention.

This is important to understand when trying to interpret the high rates of hospital admission before the TAVR

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intervention. The data from Czarnecki et al. illustrate a significant reduction in hospitalisations after TAVR except for the 0-30 days after TAVR. In addition, there was a higher rate of hospitalisation for patients 0-30 days before and after TAVR. What is the etiology of these admissions? The authors report that the most common diagnoses before TAVR were HF, AS, and ischemic heart disease. Are these diagnoses related to patient decompensation while waiting for their TAVR, or are they related to required diagnostic examinations? Unfortunately, this degree of data granularity was not available.

The authors do state that the majority of TAVR procedures were elective and the median wait time was 116 days. Of note, this is longer than what is currently recommended in the Canadian Cardiovascular Society (CCS) transcatheter aortic valve implantation position statement.[7] It is conceivable that prolonged wait times may contribute to further deterioration of patients with AS. Long wait times for TAVR have already been associated with negative consequences, including patient mortality, morbidity, repeated hospitalisations, and functional deterioration.[6] Given that the majority of HF hospitalisations occur in the 90 days before the TAVR procedure, a reduction in the wait time for TAVR intervention could potentially decrease the additional risk of hospitalisation and may improve cost-effectiveness and patient outcomes. The recently published CCS position statement for transcatheter aortic valve implantation emphasizes the need for wait time categories (emergent, urgent, or elective) and treatment time goals.[7] Paradoxically, data are showing a global increase in wait time for TAVR in Canada, with important provincial disparities likely related to varying provincial funding for TAVR.[8]

Hospitalisations after TAVR were reduced in this study but remained high. This is another area where more data granularity would be helpful. The absence of data on procedure-related complications may result in underestimation of the relationship to early rehospitalisations (in the first 30 days). The most common diagnoses after TAVR were HF, gastrointestinal bleeding, and atrial fibrillation. The persistence of HF as the leading cause of hospitalisation after TAVR may support considering TAVR at an earlier stage, before the occurrence of extensive cardiac damage resulting in an alteration in ejection fraction. The ongoing Early TAVR trial, evaluating the 2-year composite of all-cause death, all stroke, and unplanned cardiovascular hospitalisation in asymptomatic severe AS undergoing TAVR vs medical surveillance,[9] may help answer this question. The diagnoses of gastrointestinal bleeding may be related to antiplatelet therapy after TAVR or anticoagulation for new-onset atrial fibrillation. Further clarity is required to implement strategies to target the causes of these admissions in a proactive fashion.

The paper by Czarnecki et al. has shed light on the fact that although hospital admissions are reduced after TAVR, they remain high for reasons that may be procedure related. In addition, admissions 30 days before the intervention are also very high and related to the underlying disease but perhaps also to prolonged wait times and investigations for the intervention itself. These administrative data are important but the devil's in the details, and any attempts to improve these rates will require more information and a better understanding of the true causes to effectively intervene.

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