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Which hospital should be selected for readmission after TAVR?

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Transcatheter aortic valve replacement (TAVR) is currently the standard of care for inoperable or high-risk patients with symptomatic severe aortic stenosis, and a treatment option for patients deemed at intermediate operatory risk [1–3]. Because of the notably comorbidities burden and the relatively high rate of periprocedural complication, up to 25% of patients undergoing TAVR refer to unplanned hospital readmissions [4,5]. Of note, hospital readmissions have been associated with a worse prognosis. In a large retrospective analysis of the Bern TAVI Registry including 868 patients undergoing TAVR, the mortality risk in those having unplanned readmission was significantly increased after re-hospitalization for any cause [4]. However, incidence, patterns, and triggers of hospital readmission are not fully evaluated. For example, readmission to hospitals in which TAVR procedure has not been performed (non-index hospitals) could result in fragmentation of care and may be associated with worse outcomes. This suggestion, supported by previous evidence on other medical conditions [6,7], has not been investigated yet in patients readmitted after TAVR implantation procedure. It is within this context that, in this issue of International Journal of Cardiology, Ando, and Colleagues, presented results from the large Nationwide Readmission Database (NRD) registry on patients undergoing TAVR and the relative risk of readmission [8]. The authors should be congratulated for undertaking this type of analysis which delineates, for the first time, the impact of different destination hospital on clinical outcomes. The NRD, released by the Healthcare Cost and Utilization Project (HCUP) of the Agency for Healthcare Research and Quality Data, is an all-payer publicly available database registry, representing approximately the 50% of all hospitalizations nationwide in the United States. The authors queried the NDR database from January 2012 to September 2015 for patients treated with TAVR and underwent unplanned hospital readmission within the following 30 days. From a total of 46,794 TAVR performed during the study period, 6808 readmissions (14.5%) have been identified, of whom 2564 (37.7%) to non-index hospitals. Several variables were strong predictors of non-index hospitalization, in particular residents in smaller counties, small bed size hospitals, metropolitan non-teaching hospitals, and hospitals at large metropolitan areas. However, there were no differences in mortality risk (6.0% vs. 5.1%, adjusted odds ratio 1.27, 95% CI 0.88–1.82) as well as, in acute myocardial infarction, pacemaker placement, stroke and acute kidney injury between the non-index and index readmission. These findings need to be put into perspective with the current evidence on related-readmission outcomes and prior reports focused on the difference between index versus non-index hospitalizations. First, the prevalence of patients readmitted to non-index hospital (37.7%) was slightly higher compared to existing studies on other medical conditions [7]. As pointed out by the authors, this difference is most likely related to the limited number of sites performing TAVR procedures until 2015 that may support the high readmission rates to non-index hospitals. Furthermore, the older age and higher comorbidity burden of patients undergoing TAVR procedure comparing to surgery, increase the possibility of an emergency or urgent scenarios, thus requiring fast intervention and may challenge the readmission to the index centers.

Second, in this analysis, the rate of adverse events observed in patients underwent index or non-index readmission is surprisingly similar if compared to previous evidence showing better outcomes in favor of the index re-hospitalization [6]. This observation may be related to the fact that several important clinical features and procedural details about TAVR implantation are missing. In particular, operatory risk stratification (Society of Thoracic Surgeons Score or Euroscore and, etc.), access site (trans-femoral, trans-apical and, etc.), antithrombotic strategy prescribed at discharge, valve types (balloon expandable or self-expandable), and distance from home to the hospitals, are not collected, despite are well recognized determinants of early hospital readmission, and could have influenced the comparison between the non-index versus index hospitals [1,2,9,10]. Furthermore, it is undoubted that patients requiring additional intervention because of valve dysfunction (clinical or subclinical valve thrombosis,

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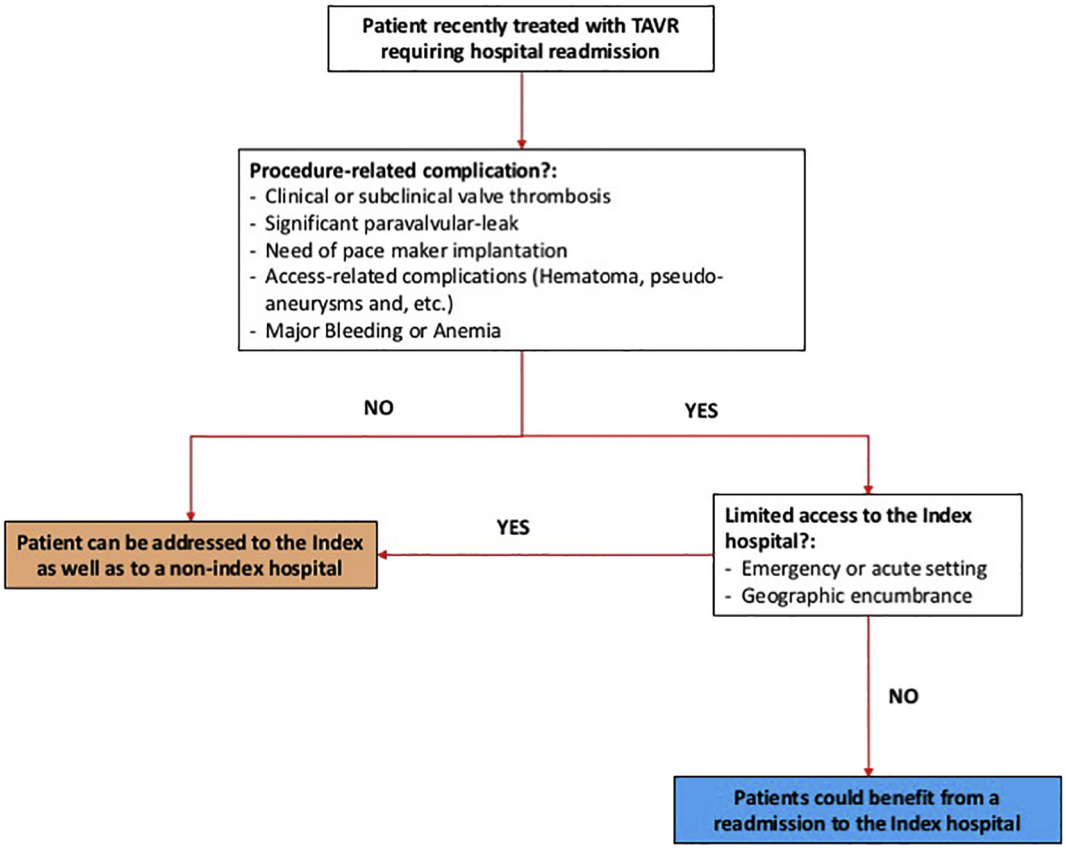

Fig. 1. Decision-making process in patients requiring hospital readmission.

significant paravalvular leak or endocarditis), or because of site access complication, bradyarrhythmias requiring the implantation of pacemaker, or other procedure-related complications, may have better outcomes if the patient is readmitted to the index hospital. This because would be easier to obtain baseline information about the patient and valve procedure that would help physicians for prompt decision-making which may not be possible if the patients have been readmitted to non-index hospitals.

In conclusion, where do we stand now regarding the type of hospital to be chosen (index versus non-index hospital) if a patient previously treated with TAVR need to be re-hospitalized? It is commonly recognized that these decisions must be individualized, taking into account the type of complication (related or not to the valve implantation), the clinical presentation, and the geographic location of the patients. If a patient that has been previously treated with TAVR, has a suspected procedure-related complication, the referring physician should prefer the institution in which the valve has been implanted. Otherwise, a patient showing complications that are not related to the procedure and/or valve themselves would also be efficiently managed in a non-index institution if the hospital is eligible for the specific complication. Lastly, if the access to the index hospital is limited by logistic issues (the index hospital is too far, unstable patient), the referring physician should avoid time delay, addressing the patient to the closest and most adequate hospital. A decision-making process in patients requiring hospital readmission is illustrated in Fig. 1. Finally, further research is needed to improve the profiling of TAVR patients undergoing unplanned hospital readmission in order to optimize the decision-making process.

References

[1] S. Sorrentino, G. Giustino, K. Moalem, C. Indolfi, R. Mehran, G.D. Dangas, Antithrombotic treatment after transcatheter heart valves implant, Semin. Thromb. Hemost. 44 (2018) 38–45.

[2] C. Spaccarotella, A. Mongiardo, S. De Rosa, C. Indolfi, Transcatheter aortic valve implantation in patients at intermediate surgical risk, Int. J. Cardiol. 243 (2017) 161–168.

[3] C. Indolfi, A.L. Bartorelli, S. Berti, P. Golino, G. Esposito, G. Musumeci, et al., Updated clinical indications for transcatheter aortic valve implantation in patients with severe aortic stenosis: expert opinion of the Italian Society of Cardiology and GISE, J Cardiovasc Med (Hagerstown) 19 (2018) 197–210.

[4] A. Franzone, T. Pilgrim, N. Arnold, D. Heg, B. Langhammer, R. Piccolo, et al., Rates and predictors of hospital readmission after transcatheter aortic valve implantation, Eur. Heart J. 38 (2017) 2211–2217.

[5] L. Nombela-Franco, M. del Trigo, G. Morrison-Polo, G. Veiga, P. Jimenez-Quevedo, O. Abdul-Jawad Altisent, et al., Incidence, causes, and predictors of early (</=30 days) and late unplanned hospital readmissions after Transcatheter aortic valve replacement, JACC Cardiovasc Interv. 8 (2015) 1748–1757.

[6] S.N. Zafar, A.A. Shah, H. Channa, M. Raoof, L. Wilson, N. Wasif, Comparison of rates and outcomes of readmission to index vs nonindex hospitals after major cancer surgery, JAMA Surg. 153 (2018) 719–727.

[7] B.S. Brooke, P.P. Goodney, L.W. Kraiss, D.J. Gottlieb, M.H. Samore, S.R. Finlayson, Readmission destination and risk of mortality after major surgery: an observational cohort study, Lancet. 386 (2015) 884–895.

[8] T. Ando, O. Adegbala, P. Villablanca, E. Akintoye, S. Ashraf, M. Shokr, et al., Incidence and predictors of readmissions to non-index hospitals after transcatheter aortic valve replacement and the impact on in-hospital outcomes: from the nationwide readmission database, Int. J. Cardiol. (2019)https://doi.org/10.1016/j.ijcard.2019.04.056 (Epub ahead of print).

[9] G. Giustino, S. Sorrentino, R. Mehran, M. Faggioni, G. Dangas, Cerebral embolic protection during TAVR: a clinical event meta-analysis, J. Am. Coll. Cardiol. 69 (2017) 465–466.

[10] C. Hengstenberg, J. Chandrasekhar, S. Sartori, T. Lefevre, G. Mikhail, N. Meneveau, et al., Impact of pre-existing or new-onset atrial fibrillation on 30-day clinical outcomes following transcatheter aortic valve replacement: results from the BRAVO 3 randomized trial, Catheter. Cardiovasc. Interv. 90 (2017) 1027–1037.