Is Transcatheter Aortic Valve Replacement Becoming the Standard of Care in Octogenarians?
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Degenerative calcified aortic stenosis affects 10% of people aged >80 years and is an important public health issue that will keep growing during the next decades attributable to aging of the population.1 Surgical (SAVR) and transcatheter aortic valve replacement (TAVR) are both therapeutic options in this age subset. According to current American and European guidelines,2,3 the choice between these treatments is mainly driven by the surgical risk of the patients, as estimated by a multidisciplinary heart team. Briefly, TAVR is recommended for symptomatic patients with aortic stenosis with a high or prohibitive risk for SAVR and represents a reasonable alternative to the latter in those with an intermediate surgical risk. In addition, European guidelines mention that, besides other high-risk parameters, age ≥75 years should be taken into account to favor TAVR over SAVR. Indeed, elderly patients have lower physiologic reserves, which may lead to underestimating their surgical risk, when determined by standard calculators. Thus, there is a rationale for suggesting that TAVR may be of particular interest in octogenarian patients, regardless of comorbidity burden.

In this issue of the Journal of the American Heart Association (JAHA), Sheng et al4 compared in-hospital outcomes in octogenarians who underwent TAVR or SAVR in the United States on the basis of the National Inpatient Sample, which represents a 20% stratified random sample of all hospital discharges. From 2012 to 2015, 19 145 patients received TAVRs and 9815 SAVRs. Outcomes were compared using crude and propensity score weighted analysis.

Exclusion criteria included nonelective procedures, those with combined coronary interventions, discharge against medical advice, congenital or rheumatic aortic stenosis, hypertrophic obstructive cardiomyopathy, and SAVRs performed at non-TAVR centers. As neither the Society of Thoracic Surgeons Predicted Risk of Mortality score nor the EuroSCORE II could be calculated, the Charlson comorbidity index (CCI) was used to estimate the patients’ risk profile. The following outcomes were assessed: in-hospital complications (permanent pacemaker implantation, acute kidney injury, transient ischemic attack/stroke, cardiogenic shock, cardiac arrest, bleeding, blood transfusions, and vascular complications), length of hospital stay and discharge disposition (home discharge, transfer to a short-term hospital or a skilled nursing or intermediate care facility, or death).

The main results of the study are as follow:

1. The approach for TAVR was endovascular in 85% of the cases and transapical in 15%.
2. Patients undergoing TAVR were older and had a higher median CCI score than patients undergoing SAVR. Indeed, elderly patients have lower physiologic reserves, which may lead to underestimating their surgical risk, when determined by standard calculators. Thus, there is a rationale for suggesting that TAVR may be of particular interest in octogenarian patients, regardless of comorbidity burden.
3. Overall, TAVR was associated with a lower unadjusted incidence of acute kidney injury, bleeding, blood transfusions, and cardiogenic shock but a higher incidence of pacemaker implantation and vascular complications. Incidence of transient ischemic attack/stroke and in-hospital mortality was similar in both groups. TAVR was associated with a shorter median length of hospital stay and a higher proportion of home discharge than was SAVR. The reduction in length of hospital stay, compared with SAVR, was greater in octogenarians with a higher CCI score. All other effects were consistent across the CCI.
4. The propensity score analysis included 79% of the patients undergoing TAVR and 78% of the patients undergoing SAVR. After accounting for differences in patient and hospital characteristics, compared with SAVR, TAVR was less likely to be associated with acute kidney injury, bleeding, blood transfusions, or cardiogenic shock. No

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differences were observed in the odds of pacemaker implantation, transient ischemic attack/stroke, cardiac arrest, vascular complications, or in-hospital mortality. TAVR was also associated with lower odds of transfer to a skilled nursing facility and shorter length of hospital stay.  
5. After stratifying by TAVR approach (endovascular versus transapical), only endovascular TAVR was associated with a shorter length of hospital stay, fewer acute kidney injuries, and fewer occurrences of cardiogenic shock but higher odds of pacemaker implantation, as compared with SAVR. Both endovascular and transapical TAVR had lower odds of bleeding and blood transfusion.

Although this must be interpreted keeping in mind the limitations of this study (data were obtained from administrative data not designed for statistical analyses, the rate of missing data is not reported, outcomes were not de
terative data not designed for statistical analyses, the rate of limitations of this study (data were obtained from adminis-
tration), and the presence of confounders cannot be ruled out), these results suggest a clear benefit of TAVR over SAVR in octogenarian patients. Thus, one may wonder why octogenarians should still be referred for SAVR if transfemoral TAVR is possible.

From a theoretical point of view, the main reason is the absence of high-level evidence to support this strategy so far. No randomized trial has been conducted to compare the results of TAVR and SAVR in elderly patients, regardless of their risk profile. This is astonishing because such controlled studies (PARTNER 3 [Safety and Efficacy of the SAPIEN 3 Transcatheter Heart Valve in Low Risk Patients With Aortic Stenosis], Medtronic Evolut Transcatheter Aortic Valve Replacement in Low Risk Patients) are currently ongoing in younger patients, for whom the issue of the durability of transcatheter valves is much more crucial than for octogenarians. As a consequence, the current scientific international guidelines do not clearly recommend TAVR over SAVR in low-risk elderly patients. Although physicians could be tempted to consider percutaneous options in their elderly patients, they may remain in the strict line of the recommendations because of potential medicolegal consequences of any TAVR complication occurring in a patient at low surgical risk. This latter point should be kept in mind when interpreting observational analyses like the present one. As patients still require additional comorbidity to qualify for TAVR, which is not the case for SAVR, and as not all comorbidities are captured in large databases, the baseline risk of patients with TAVRs could be higher than described.

From a practical point of view, because of this gap in evidence, most decisions regarding therapeutic options in octogenarians are made at the level of the heart teams and are influenced with regard to frailty parameters, which are not taken into account in the standard risk calculators; and the place of geriatricians within the heart teams. Finally, another parameter may largely influence the decision: the preference of the patient and his or her family. In this age subset, most well-informed patients express a clear preference for avoiding surgery with general anesthesia, extracorporeal circulation, and prolonged hospital stay and rehabilitation. However, the impact of this preference on the final decision may largely differ among medical teams.

Where Are We Now?
A recent paper by Nguyen et al5 indicated that the number of aortic valve replacements in 2015 in France was near 4000 in patients aged 80 to 84 years, well balanced between TAVR and SAVR groups, while after 85 years, the number of TAVRs was 3000, with almost no SAVRs performed. Overall, the temporal trends showed a rapid increase in the number of TAVRs and a progressive decrease in SAVRs since 2007. In the young octogenarians, the SAVR and TAVR curves crossed in 2015. Although it is difficult to affirm that this trend will continue and for how long, it is clear that, 4 years later in 2019, the majority of octogenarians receive TAVR and that SAVR becomes restricted to a minimal proportion of them.

The German experience is even more affirmative.6 Germany is undoubtedly the leader of TAVR in Europe and worldwide. Since its introduction into contemporary practice, >100 000 TAVR have been performed in this country. The main increase in annual TAVR procedures resulted from increasing numbers of octogenarians undergoing this procedure. In fact, older age is nowadays the most frequent reason for the local heart teams to select TAVR over SAVR. This explains that, in 2017, up to 95% of octogenarians subjected to invasive procedures underwent TAVR in Germany.

Where Are We Going?
As a general trend, when evaluating patient risk, age is becoming the most frequent reason to consider TAVR instead
of SAVR. After age, frailty is the second most important reason to select the less invasive treatment. However, at a country or center level, the translation of this large consensus into clinical practice still remains heterogeneous. With the expected results of low-risk TAVR randomized trials in the next few months, the continued technological improvements, and the demographic projections, there is no doubt that TAVR will rapidly and universally become standard of care in octogenarians with severe aortic stenosis.

Disclosures

Dr Himbert is a proctor for Edwards Lifesciences and Medtronic. The remaining authors have no disclosures to report.

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