

EDITORIAL COMMENT

The Future of Transaortic Transcatheter Aortic Valve Replacement*



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The most common approach for transcatheter aortic valve replacement (TAVR) remains access through the femoral artery (transfemoral [TF]). However, in those patients with severe peripheral vascular disease, the most common techniques for alternative access include transapical (TA) and transaortic (TAo) TAVR. Other less used access approaches include trans-subclavian, transcarotid, and transcaval TAVR. Historically, the TAo and TA approaches have been used as the default procedures when TF TAVR is not applicable, although these newer approaches remain a distant minority.

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In this issue of *JACC: Cardiovascular Interventions*, Bapat et al. (1) report on an important multicenter, prospectively collected, European registry, ROUTE (Registry of the Utilization of the TAo-TAVI Approach Using the Edwards SAPIEN Valve). This study included 301 high-risk patients who underwent TAo TAVR using a balloon-expandable valve (SAPIEN XT and SAPIEN 3; Edwards Lifesciences, Irvine, California) from 2013 to 2015. They noted a mean preoperative Society of Thoracic Surgeons Predicted Risk of Mortality score of $9.0 \pm 7.6\%$ and an actual 30-day mortality rate of 6.1%. The investigators noted excellent outcomes, with valve implantation success in 96.7%, a procedure-related mortality rate of 3.1%, and a postoperative stroke rate of 1.0%.

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This series had some limitations that are inherent to a descriptive registry. Although data for mortality are easily attainable, other postoperative morbidities, such as stroke and paravalvular regurgitation, were not adjudicated in the present study. With the limited number of patients in this trial, a multivariate analysis was not performed for 30-day mortality, and 1-year outcomes are not presented. Last, the current registry does not compare outcomes with the transapical approach, the most commonly performed alternative access route for TAVR. Therefore, it remains difficult on the basis of this study to determine the preferred technique for TAVR if femoral access is not attainable.

In a recent paper published by the Society of Thoracic Surgeons and American College of Cardiology TVT (Transcatheter Valve Therapy) Registry, the investigators compared early and 1-year survival of 4,085 TA and 868 TAo TAVR patients (2). They noted that the TAo patients had a higher median Society of Thoracic Surgeons Predicted Risk of Mortality score (TAo, 8.8%; TA, 7.4%). This was associated with an increased risk for unadjusted 30-day (10.3% vs. 8.8%) and 1-year (30.3% vs. 25.6%) mortality ($p = 0.0006$). However, after risk adjustment, they found no differences between TA and TAo access in mortality, stroke, or readmission rates for as long as 1 year after TAVR. Moreover, a recent meta-analysis including comparing TAo and TA TAVR in high-risk patients showed that the mortality was equivalent between groups (3). There was a nonsignificant trend toward a lower rate of stroke in the TAo group (0.9% vs. 2.1%). Those investigators did not find any other differences in term of conversion to surgical aortic valve replacement, paravalvular regurgitation, major bleeding, and rate of pacemaker implantation. At Emory University, for those patients who cannot undergo TF TAVR, we have traditionally chosen TA TAVR in those who have undergone prior sternotomy and TAo TAVR in those with severe lung disease or low ejection fractions.

During the initial introduction of balloon-expandable valves with the SAPIEN TAVR platform, approximately 45% to 50% of patients could not undergo TF access and instead underwent TA or TAO TAVR (4,5). However, with device iterations, the SAPIEN XT valve has been used transfemorally in 76% (6) and the SAPIEN 3 valve in about 90% of patients (7). It remains without a doubt that the future of TAVR will rely on the use of retrograde TF techniques, with only a minority of patients requiring alternative-access TAVR.

Recent techniques using the femoral vein with the transcaval TAVR procedure, which are under investigation, could further reduce the rates of TA and TAO TAVR. The success of TAVR depends on the careful selection of patients by the heart team and the optimal determination of the access route.

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