

Transcarotid access route: a first-choice option for nontransfemoral transcatheter aortic valve implantation

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by Hudziak et al,
see p. 31

We read with interest the study by Hudziak et al¹ that appeared in the current issue of *Kardiologia Polska* (*Kardiol Pol*, *Polish Heart Journal*).

Transcatheter aortic valve implantation (TAVI) has been increasingly used for the treatment of severe aortic stenosis. It surpasses isolated surgical valve replacement in high- and medium-risk patients and has been recently introduced also in low-risk patients with excellent outcomes in terms of long-term valve durability.²⁻⁴ Over time, several factors have been related to prognosis in patients undergoing TAVI,^{5,6} but the choice of the best access route remains one of the key points for procedural success.⁷

Transfemoral access is the safest and widely used approach for TAVI procedures and its feasibility should be assessed before choosing between TAVI and surgical valve replacement.⁸ However, despite improvement in procedural techniques and device profiles, transfemoral access cannot be performed in approximately 10% to 15% of patients because of arterial tortuosity, severe calcifications, iliofemoral arteriopathy, aortic aneurysm, or previous vascular surgery.

Alternative nonfemoral approaches have been developed, with transcarotid access representing a new and attractive one.⁹ It provides a relatively straightforward path from the common carotid artery to the aortic annulus and helps to avoid difficulties associated with the long, tortuous access of peripheral sites.

In their study, Hudziak et al¹ reported the results of a short-term comparison of 265 consecutive high-risk patients undergoing TAVI (transcarotid in 33 patients and transfemoral in 232) in their institution between 2017 and 2019. The baseline characteristics of the 2 study groups

were similar except a higher New York Heart Association functional class, more frequent peripheral artery disease, and a higher EuroSCORE II in the transcarotid TAVI group.

Periprocedural and short-term outcomes were similar in both groups, and transcarotid TAVI was associated with shorter procedural time (65 vs 90 minutes) and a more frequent use of general anesthesia (100% vs 47%). The short-term outcomes reported by Hudziak et al¹ are excellent and consistent with the results of the most recent meta-analysis of transcarotid TAVI,¹⁰ which reported a pooled 30-day mortality of 6.7% (6% in the present study), a transient ischemic attack / stroke rate of 3.1% (3% in the present study, only a single case of TIA), a permanent pacemaker implantation rate of 16.7% (15.1% in the present study); the latter still represents a significant pitfall of the TAVI procedure.¹¹ No major vascular complications or major bleedings were noted in the transcarotid TAVI group in the study by Hudziak et al,¹ while the meta-analysis showed the rates of 2.5% and 7%, respectively.¹⁰ These results confirm the safety and efficacy of transcarotid access as an alternative for patients who cannot undergo transfemoral TAVI.

Compared with other nonfemoral routes, carotid access holds its distinct benefits in selected patients: 1) it permits a direct route to the aortic valve with a shorter distance between the access point and the aortic annulus; 2) it enhances sheath delivery and catheter stability; and 3) it enables a more accurate prosthesis positioning compared with femoral access. On the other hand, the transapical approach requires thoracotomy and left ventricular puncture, it is unsuitable for patients with severe respiratory or

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left ventricular dysfunction, and it has been associated with worse outcomes.⁵ The transaortic route requires ministernotomy and it is unsuitable in patients with severe respiratory problems or those with the heavily calcified ascending aorta. The transaxillary approach represents a valid peripheral alternative to the transcatheter approach, but it remains inappropriate for patients with severe subclavian or axillary artery disease.¹² Moreover, in a recent propensity-matched study, transcatheter TAVI was associated with similar mortality and a significant reduction in stroke rates compared with the transaxillary approach.¹³

Considering the manipulation of the carotid artery, periprocedural stroke is one of the feared complications of the procedure. In addition to the well-known stroke causes in transfemoral TAVI, such as dislodgement of calcified debris or the aortic valve tissue and manipulation of catheters, transcatheter TAVI carries an additional factor contributing to stroke risk related to transient cerebral blood flow reduction and local complications involving the carotid artery. However, in their analysis, Hudziak et al¹ reported excellent results, similar to those presented in the literature and to the rate of stroke in transfemoral TAVI.^{10,12} As already underlined by the authors, a careful preoperative procedure planning with the use of computed tomography and a meticulous intraoperative cerebral blood flow monitoring with cerebral oximetry and backflow pressure measurement are mandatory to reduce the incidence of stroke, especially when general anesthesia is used.¹⁴ In fact, transcatheter access, unlike the transfemoral approach, is achieved under general anesthesia in most of the cases. Although a previous large, randomized trial showed no significant differences in stroke rates between local and general anesthesia in patients undergoing carotid endarterectomy¹⁵, local anesthesia should be encouraged also for transcatheter TAVI in order to enable the real-time assessment of neurologic status and potentially minimize cerebral hypoperfusion in high-risk patients.

Finally, vascular complications seem to be very rare after transcatheter TAVI and apparently lower compared with transfemoral TAVI.¹² These findings together with the possibility of early patient mobilization are crucial to reduce hospitalization time and achieve good outcomes using transcatheter access.

In conclusion, transcatheter access is safe and provides short-term outcomes superimposable on those of transfemoral TAVI. It may be considered a first-choice alternative approach for TAVI when transfemoral access is unsuitable. Operator expertise, periprocedural planning, and procedural monitoring are necessary to achieve good clinical outcomes. With the increasing use of transcatheter TAVI in patients with unfavorable

anatomy, there is hope that dedicated devices for transcatheter access will be designed to optimize vascular access and valve deployment. This will be of particular importance considering the expansion of TAVI to patients at lower surgical risk.

ARTICLE INFORMATION

DISCLAIMER The opinions expressed by the author(s) are not necessarily those of the journal editors, Polish Cardiac Society, or publisher.

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