

TCAR (Transcarotid Artery Revascularization): The Next Step in the Evolution of Carotid Revascularization

BY JEFFREY JIM, MD, MPHS, FACS

Since its introduction in the 1950s, carotid endarterectomy (CEA) has been considered the gold standard treatment option for carotid revascularization. However, in patients with high-risk anatomic and/or physiologic characteristics, CEA is associated with higher rates of adverse outcomes.¹ Transfemoral carotid angioplasty and stenting (TF-CAS) was introduced over 2 decades ago as a potential alternative. However, its effectiveness compared to CEA remains unclear, and full adoption of TF-CAS has been hindered by a higher rate of periprocedural stroke.²

Transcarotid artery revascularization (TCAR) was first introduced in the United States in 2012. TCAR is a surgically inspired procedure based upon concepts developed by vascular surgeons Enrique Criado, MD, and David Chang, MD. The technique combines direct carotid artery access and robust reversal of flow during transcarotid stent placement to provide CEA-like neuroprotection in a less-invasive approach.³ TCAR minimizes the potential for cerebral embolization by eliminating the need for aortic arch manipulation and unprotected lesion manipulation with the distal embolic protection deployment necessary in TF-CAS. Results from the prospective ROADSTER clinical trial demonstrated a periprocedural stroke rate of 1.4% for TCAR in high-risk patients.⁴ This represents the lowest reported stroke rate for any prospective multicenter trial of carotid stenting. With the result of this study, TCAR received FDA approval in 2015. Since then, additional data from the ROADSTER 2 trial (a postmarket study), large multi-institutional series, as well as real-world data from the TCAR Surveillance Project (TSP) continue to show that the results of TCAR are similar to CEA despite being performed in sicker, more frail, and high-risk patients.⁵⁻⁷ Furthermore, the minimally invasive TCAR can be safely performed without the use of general anesthesia and is associated with shorter hospital stays and lower rates of cranial nerve injury.

As the global TCAR experience continues to increase, there has been additional insight into best practices to

further enhance clinical results and maximize patient benefit. In this supplement, the reader will find a roundtable expert panel discussion on the optimal medical regimen for TCAR patients, with a focus on the ideal antiplatelet regimen, management of periprocedural antithrombotic therapy, and the importance of statin therapy. This is followed by a summary on the periprocedural hemodynamic management during TCAR to ensure robust flow reversal and avoidance of postprocedural adverse events. Finally, interviews with Drs. Jacques and Schermerhorn will address reimbursement and coverage for TCAR as well as the future research efforts of the TSP.

The growing body of evidence clearly shows that TCAR is a safe, more efficient, and patient-friendly procedure. As you adopt TCAR as a viable alternative to CEA in your patients with carotid artery occlusive disease, the authors that contributed to this supplement hope that you find the following articles valuable in your clinical practice. ■

1. Schermerhorn ML, Fokkema M, Goodney P, et al. The impact of Centers for Medicare and Medicaid Services high-risk criteria on outcome after carotid endarterectomy and carotid artery stenting in the SVS Vascular Registry. *J Vasc Surg.* 2013;57:1318-24.
2. Brott TG, Hobson RW 2nd, Howard G, et al. Stenting versus endarterectomy for treatment of carotid-artery stenosis. *N Engl J Med.* 2010;363:11-23.
3. Malas MB, Leal J, Kashyap V, et al. Technical aspects of transcarotid artery revascularization using the ENROUTE transcarotid neuroprotection and stent system. *J Vasc Surg.* 2017;65:916-920.
4. Kwolek CJ, Jaff MR, Leal JJ, et al. Results of the ROADSTER multicenter trial of transcarotid stenting with dynamic flow reversal. *J Vasc Surg.* 2015;62:1227-1234.
5. Schermerhorn ML, Jim J, Schneider PA, Macdonald S. TCAR @ Vascular Live. Presented at: Society for Vascular Surgery Vascular Annual Meeting; June 21, 2018; Boston, Massachusetts.
6. Schermerhorn ML, Aridi HD, Kashyap VS, et al. In-hospital outcomes of transcarotid artery revascularization and carotid endarterectomy in the Society for Vascular Surgery Vascular Quality Initiative. *J Vasc Surg.* 2018;67:e50-e51.
7. Kashyap VS, King AH, Foteh MI, et al. A multi-institutional analysis of contemporary outcomes after transcarotid artery revascularization versus carotid endarterectomy. *J Vasc Surg.* 2018;67:e191-192.



Jeffrey Jim, MD, MPHS, FACS

Associate Professor of Surgery
Washington University School of Medicine
St. Louis, Missouri
jimj@wustl.edu

Disclosures: Consultant to Silk Road Medical and Medtronic.