

The Evolution of TCAR Into First-Line Therapy for Carotid Revascularization

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Since transcarotid artery revascularization (TCAR) was added to our armamentarium in 2012, we now have three options for carotid revascularization. Carotid endarterectomy (CEA), now into its 8th decade, arguably remains the gold standard therapy.^{1,2} Transfemoral carotid artery stenting (TFCAS), now into its 4th decade, continues to demonstrate higher periprocedural stroke risk compared with CEA.³ TCAR results continue to compare favorably against both TFCAS and CEA.⁴

Stroke reduction is the goal for any carotid revascularization therapy. This reduction is achieved with a program that must include best medical therapy (BMT)—antiplatelet/statin/blood pressure control/smoking cessation—in addition to optimal revascularization procedural technique. CEA has excellent neuroprotection (clamping), as demonstrated by low rates of diffusion-weighted (DW) MRI embolic new white lesions. TFCAS is limited by the need to actually traverse the aortic arch and cross the carotid stenosis before establishing neuroprotection with a filter. This has led to much higher rates of new DW MRI lesions as compared with CEA. A major advantage of the TCAR technique is the ability to avoid the aortic arch with direct carotid access and to establish excellent neuroprotection with robust flow reversal before any manipulation of the lesion itself occurs. This is again confirmed by the low periprocedural stroke rates in addition to the new DW MRI lesion rates that are equivalent to CEA.⁵

The continued impressive results of TCAR by an increasing number of unique operators is a testament to not only the procedure itself, but also to the excellent training paradigm that has been established for this technique. Although none of the steps of this hybrid procedure are unique, the technical details and the sequence of steps for lesion management are critical to the success of TCAR. TEST DRIVE is a unique opportunity for qualified surgeons and proceduralists to spend a day learning didactics of patient selection, BMT, pre/postprocedure care, and of course the TCAR procedure itself. The hands-on portion of the day includes a wet lab with the opportunity to perform TCAR on a simulated tissue model. This 1-day training is then enhanced with case support from clinical specialists and physician proctors, if needed. The results are speaking for themselves, as we continue to see the same low rates of stroke that were observed in the hands of a few ROADSTER 1 operators (1.4%) now being observed in the hands of hundreds of operators enrolling in the Vascular Quality Initiative (VQI) database (1.4%).^{6,7}

Patient satisfaction and procedural efficiency are also becoming increasingly important. TCAR is quicker than CEA and has a shorter hospital stay, which translates into better patient satisfaction as well as a potential better margin for the hospital. The current limitation on patients that will qualify for TCAR is the requirement for meeting one high-risk criterion as defined in the National Coverage Decision (NCD) by the Centers for Medicare & Medicaid Services (CMS).⁸ However, from retrospective review of all carotid interventions in the VQI data set, it is estimated that 70% of patients would meet at least one high-risk criterion. Under the current NCD that covers both TFCAS and TCAR outside of clinical studies, the patient is required to have a $\geq 70\%$ symptomatic stenosis. However, the VQI TCAR Surveillance Project has afforded those who participate in the carotid module of the VQI the ability to offer TCAR to patients with an 80% asymptomatic carotid stenosis (most patients undergoing carotid revascularization in the United States) or a 50% symptomatic stenosis.

TCAR continues to demonstrate stroke rates that are better than TFCAS and equivalent to CEA. Patient satisfaction and physician efficiency, along with potential financial advantages to the institution, add to the positives of this exciting procedure. Are we moving to TCAR first as the strategy for carotid revascularization? The contributors to this supplement will present the case that we are. ■

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