TCAR: TransCarotid Artery Revascularization

The less invasive standard in stroke prevention and a favorite tool in our armamentarium.

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"Is TCAR your favorite surgery?" I was recently asked by one of my medical students after we performed three transcarotid artery revascularizations (TCAR) in one day. I paused and had to think hard before I could answer. For many of us and our trainees, carotid endarterectomy (CEA) had been the common answer whenever we were asked "what is your favorite surgery?" or "what sparked your interest in the field?" There is something elegant about the fine dissection required for CEA, and something oddly satisfactory about it when every bit of atherosclerotic plaque is removed from the carotid artery. No wonder CEA had been our favorite for years. But recently, as I had answered my medical student, "TCAR is now my favorite."

I had not always known TCAR. As a matter of fact, I did not learn how to perform TCAR until I attended "Test Drive," the hands-on training program put together by Silk Road Medical, during my second year as an attending. When I finished the program, I had a feeling that TCAR was going to change how I treated carotid disease because the procedure just made sense. The procedure starts with a neck dissection just like a CEA, although lower in the neck. A few steps later, the ingeniously developed neuroprotection device is inserted, and reverse flow is established. While the brain is protected from distal embolization, the carotid lesion is crossed and treated with balloon angioplasty and stent. With the appropriate amount of time passed and a satisfactory angiogram, the neuroprotection device is removed and the arteriotomy is closed. Hemostasis is achieved and skin closure completes the procedure. As stated in the article by Drs. Jim, Dermody, and Schermerhorn, TCAR should be considered "as the 'new' standard for carotid revascularization." Whereas it has the equivalent perioperative stroke risk as CEA, TCAR has a lower risk of myocardial infarction and cranial nerve injury. TCAR had combined the elegance of CEA with the technical savviness of endovascular procedures.

However, as with many procedures, TCAR actually does not start in the operating room; it starts when one meets the patient for potential carotid revascularization for future stroke prevention. As detailed in the article "Patient Selection in My Practice" by Drs. Divinagracia and Watch, planning is key to TCAR. Adequate imaging is necessary to assess patient anatomy, which must suit the instructions for use so that flow reversal with the neuroprotection device can be safely established and a carotid stent can be safely deployed. Once it has been determined that TCAR can be performed, one must see that the patient has high-risk surgical factors (with significant comorbidities and/or unfavorable anatomy) that are indications for TCAR. High surgical risk is also a key element to Medicare reimbursement, as detailed in Mr. Au-Yeung's article. For comprehensive planning, one must also know the limitations of TCAR. Dr. Shah mentioned in his article the anatomic limitations such as a heavy calcified lesion, and a short and deep common carotid artery. In addition, for ongoing success of TCAR, adequate dual antiplatelet therapy is a must for stent patency, which is detailed in the section on "Platelet Function Testing and TCAR."

As Dr. Shafii commented in her article, TCAR is to carotid surgery as endovascular repair of aortic aneurysm is to open aortic surgical repair. Many of us, like Drs. Aranson and Ricotta, have noticed that there is a domino effect with the adoption of TCAR in our practice. With better patient selection and a refined protocol, the outcomes of open and endovascular carotid procedures had all improved. TCAR is providing "the less invasive standard in stroke prevention," and it has become one of my favorite tools in my armamentarium. ■