

# Catheter Thrombectomy to Reduce Emboli After Carotid Artery Stenting

Looking beyond distal embolic protection.

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**P**ercutaneous approaches to carotid arterial occlusive disease have evolved over the past decade from being an intervention in search of an indication to the current standard of care for the management of carotid occlusive disease in patients with high perioperative surgical risk.<sup>1</sup> Distal embolic protection devices (DEPs) have improved the safety of carotid artery stenting (CAS) and led to marked reductions in periprocedural complications.<sup>2</sup> Despite the improved procedural safety afforded by DEPs, the risks of periprocedural embolic events are not negligible.<sup>3</sup> This risk is particularly increased in highly symptomatic patients and in certain lesion subsets such as critical stenosis, ulcerated lesions, and stenting in patients over the age of 80.<sup>3</sup> Furthermore, subclinical microinfarcts despite the use of DEPs after CAS have recently been acknowledged. New procedural microinfarcts after CAS are reported to be as high as 17% as revealed by diffusion-weighted MRI.<sup>4</sup>

The Gore Neuroprotection System (GNS) (Gore & Associates, Flagstaff, AZ) is a novel proximal cerebral protection device that has demonstrated good efficacy and offers an alternative to DEPs. However, prolonged balloon occlusion with the GNS may not be tolerated in all subjects.<sup>5</sup> The use of reverse-flow devices also does not contend with atherothrombotic material, which may protrude through the stent struts.<sup>4,6</sup>

We present a case illustrating a technique that may reduce periprocedural neurologic events using the Pronto Extraction catheter (Vascular Solutions, Inc., Minneapolis, MN) as an adjunct to filter-based DEP in the setting of CAS (Figure 1).

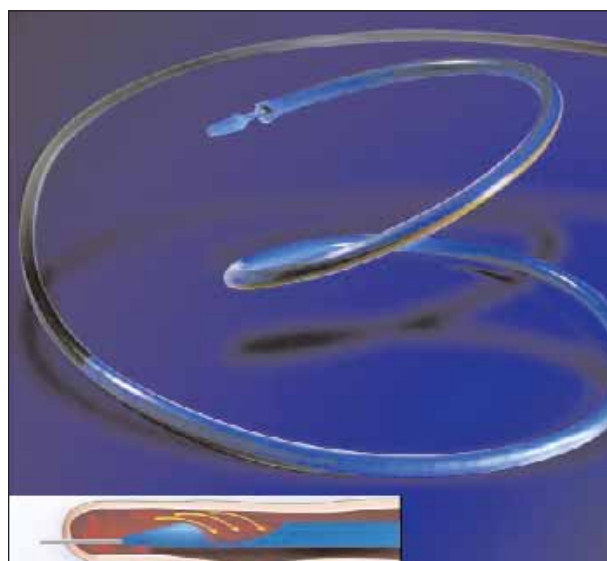


Figure 1. The Pronto aspiration catheter is a dual-lumen, rapid-exchange catheter with a large extraction lumen to facilitate mechanical aspiration.

## CASE REPORT

A 73-year-old man presented with amaurosis fugax, arterial hypertension, hypercholesterolemia, coronary artery disease, and chronic obstructive lung disease. His physical exam revealed bilateral carotid bruits. A carotid duplex study revealed a high-grade right internal carotid stenosis (peak systolic velocity of 346 cm/second and diastolic of 136 cm/second). A neurologic consultation was obtained, and diagnostic angiography was recom-



Figure 2. Angiography of the right carotid artery shows a >90% narrowing just past the bifurcation in the internal carotid artery.

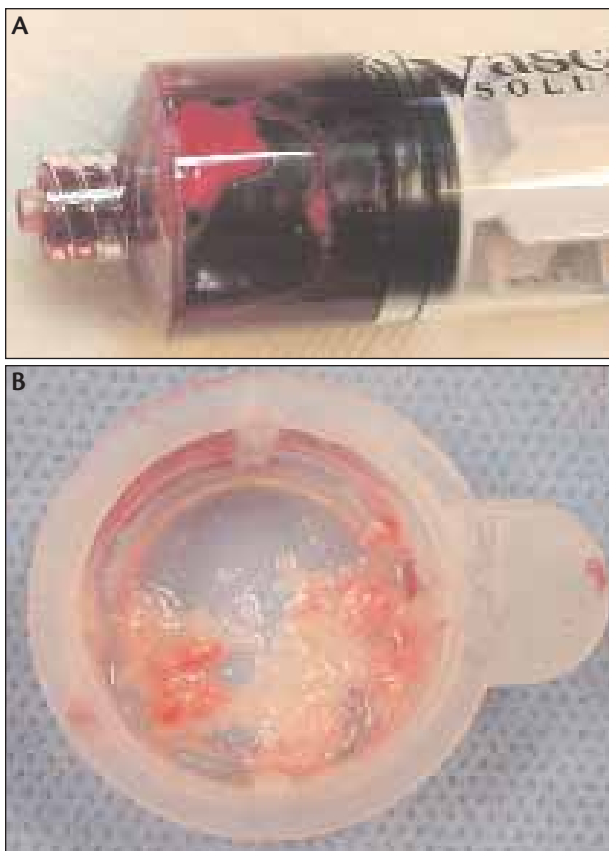


Figure 3. The extracted blood volume after mechanical aspiration (A). The extracted blood volume was then emptied into the 50-μm filter basket and visually examined for debris (B).



Figure 4. Final angiography shows minimal residual stenosis.

mended. Because of his comorbid conditions, the patient was recommended to undergo CAS.

## PROCEDURE

A 6-F, 90-cm-long Cook Shuttle Select sheath (Cook Medical, Bloomington, IN) was advanced into the thoracic aorta via a transfemoral approach. A 6.5-F Slip-Cath (Cook Medical) was then advanced into the right common carotid artery. A Shuttle Select sheath was then advanced into the common carotid artery over the Slip-Cath and a Terumo Stiff Shaft Glidewire (Terumo Medical Corporation, Somerset, NJ). Angiography was performed in a lateral projection and revealed a 90% stenosis of the right internal carotid artery (Figure 2). A 4.5-mm AccUNET (Abbott Vascular, Santa Clara, CA) distal protection device was then advanced across the right internal carotid artery stenosis and deployed distally. Predilatation of the stenosis was performed with a 4-mm X 20-mm Rx ViaTrac (Abbott Vascular) balloon after which a 6- to 8-mm X 30-mm Acculink stent (Abbott Vascular) was deployed in the right

internal carotid artery. Postdilatation was performed with a 5-mm X 20-mm Rx ViaTrac. After completion of CAS and before removal of the DEP, a Pronto V3 extraction catheter (Vascular Solutions, Inc.) was gradually advanced over the Accunet wire through the Acculink stent. Two passes were made. The extracted blood volume was then emptied into the 50- $\mu$ m filter basket and visually examined for debris. The Accunet filter was then retrieved with the Accunet retrieval device (Figure 3). Angiography after stent placement revealed an excellent result (Figure 4).

## DISCUSSION

The use of an aspiration catheter may reduce periprocedural morbidity related to distal embolization of atherothrombotic material after stenting. The atheroembolic material may protrude through the stent struts after stent deployment.<sup>6</sup> Balloon angioplasty during stent postdilatation may cause a cheese-grater effect.<sup>6</sup> Our preliminary information indicated that the use of a thrombus extraction catheter after CAS is a safe and effective means of aspirating the atheroembolic debris from within the stent. Further large-scale studies with neuropsychological testing and diffusion-weighted MRI are needed to assess whether this technique will reduce the risk of periprocedural stroke and subclinical microinfarctions after CAS and whether this technique will improve or prevent cognitive dysfunction after CAS. ■

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