Access for Carotid Stenting

A case report involving a new device option.

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Carotid stenting (CAS) has become an acceptable alternative to carotid endarterectomy (CEA) in symptomatic patients with >80% stenosis of the carotid artery in the presence of anatomic or medical risk factors. Since the inception of CAS approximately 12 years ago, stents have undergone many design changes. Embolic protection has also been integrated as a standard part of the procedure. There have been many design changes in filter protection devices, and research continues in this area. The primary reason for failure of the procedure is inability to gain access into the common carotid artery with a guide catheter or guide sheath. In addition, passing the access system is likely an independent risk factor because of trauma to the aortic arch and proximal great vessels. Access may also be limited by severe aortoiliac disease. We describe a case in which a unique deflectable-tip guide sheath, the Morph (BioCardia, Inc., South San Francisco, CA), was successfully used via the brachial approach in a patient who was not a surgical candidate and had no femoral access due to severe aortoiliac disease (Figure 1).

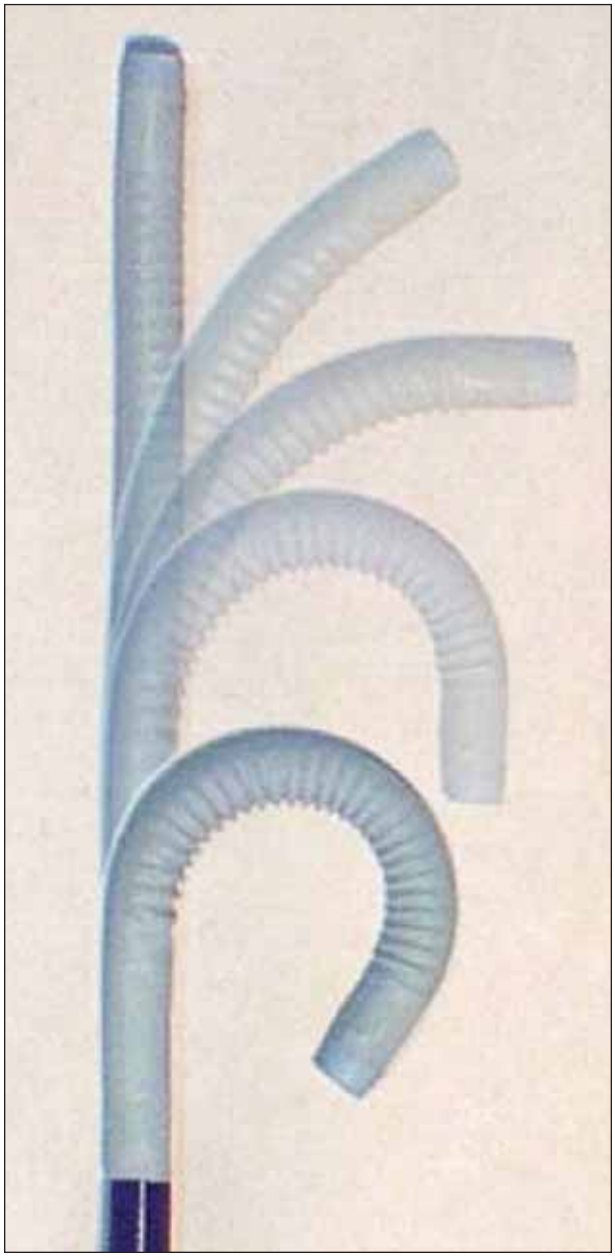

Figure 1. The Morph deflectable guide sheath.

CASE REPORT

A 66-year-old woman presented with a transient ischemic attack of the right hemisphere. Carotid duplex imaging revealed an 80% to 99% stenosis of the right internal carotid artery and complete occlusion of the left internal carotid artery; MRI confirmed these findings. She had a history of severe aortoiliac disease, coronary artery disease, and obesity. Several years before, laryngeal carcinoma was treated with radical neck dissection and radiotherapy. A vascular surgeon referred the patient for possible carotid stent placement.

Noninvasive evaluation, including arterial duplex and MRI, confirmed complete occlusion of the distal abdominal aorta as well as the left subclavian artery. The right brachial artery was accessed via an open cutdown using the standard Sones technique. A 5-F Simmons I diagnostic catheter (Cordis Corporation, a Johnson & Johnson company, Miami, FL) was used to perform angiography of the

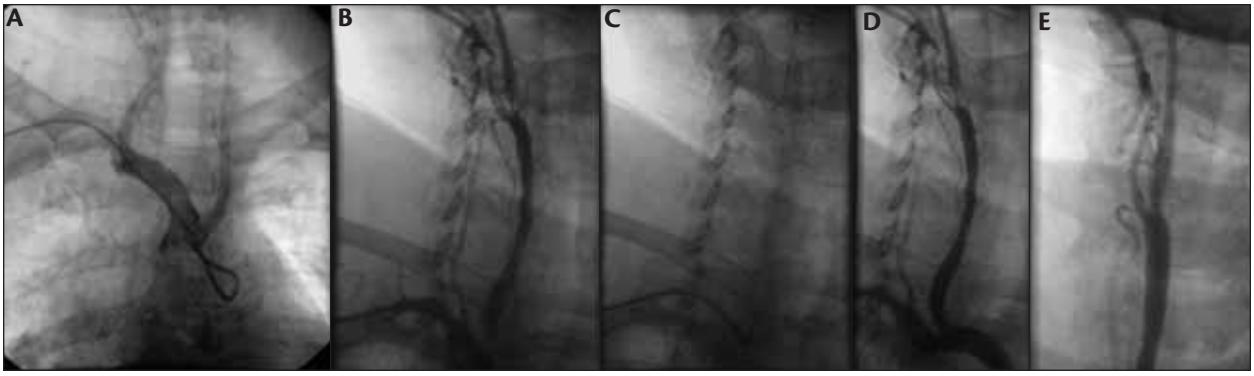

Figure 2. Anteroposterior view of the proximal great vessels (A). Angiogram demonstrating 90% stenosis of the proximal right internal carotid artery (B). Anteroposterior view of the Morph engaged into the proximal right common carotid artery (C). Before intervention, an angiogram of the right common carotid artery using the Morph guide sheath (D). Final angiogram showing minimal residual stenosis (E).

right carotid artery system, confirming 90% stenosis of the proximal right internal carotid artery (Figure 2A, B). The left internal carotid artery was known to be occluded. Intracranial right to left collateralization was present. Attempts at advancing a variety of guide catheters and guide sheaths were unsuccessful. Ultimately, an 8-F Morph deflectable-tip guide sheath was successfully engaged into the ostium of the right common carotid artery (Figure 2C, D). Heparin had already been administered to attain an activated clotting time >250 seconds. An EPI embolic protection device (Boston Scientific Corporation, Natick, MA) was advanced through the Morph catheter (inner diameter, 6.1 F; outer diameter, 8 F) and passed easily across the stenosis. The Morph deployment mechanism is a slotted nitinol tube, tendon actuated by a single lever at the handle, controllably deflecting a 3-cm section of the tip between 0° and 180°. Upon deployment, flow was excellent. The lesion was predilated using a 4-mm X 20-mm Quantum Maverick balloon catheter (Boston Scientific). An 8-mm X 30-mm stent was then passed through the system and deployed successfully. The lesion was postdilated using a 5.5-mm X 15-mm Viatrac balloon catheter (Abbott Vascular, Redwood City, CA) with an excellent final result. Less than 10% residual stenosis was present (Figure 2E).

DISCUSSION

This patient, in addition to being very symptomatic, had multiple medical and anatomical risk factors. The lack of femoral access presented a further challenge. We have encountered similar patients in the past in whom brachial access was utilized to accomplish a successful intervention. Such cases, however, are often particularly difficult technically due to the lack of a dedicated guide catheter/guide sheath system. The Morph system proved to be very useful, allowing simple engagement into the common carotid ostia by way of the deflectable tip. There was also ample support in the passage of the filter protection device, predilatation balloon, and stent. This was done with minimal catheter manipulation. We have utilized this system as well from the femoral approach, with similar success, significantly reducing catheter manipulation in diseased aortic arches (often believed to be an independent risk factor for neurologic complications).

CONCLUSION

Since the inception of CAS, there have been many improvements in stent and embolic protection designs. Guide catheters and sheaths have received much less attention despite their crucial function. The deflectable-tip Morph system offers an option that we have found to be most helpful in unfavorable anatomy. This device may also warrant further consideration for more routine cases. ■

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