Carotid artery stenting by direct percutaneous puncture

Leopoldo Guimaraens, MD,a Jacques Theron, MD,a Alfredo Casasco, MD,a and Hugo Cuellar, MD,b Madrid, Spain; and Shreveport, La

Carotid artery stenting is usually performed by a femoral approach. When the patient’s anatomy forbids this or other distal access to the carotids, a direct access by percutaneous puncture may be used. We present two cases in which a successful stenting of the carotids with the use of a cerebral protection device was performed. (J Vasc Surg 2011;54:249-51.)

Carotid artery stenting (CAS) is an accepted technique for the treatment of patients considered high risk for endarterectomy.1 Despite the technologic advances in catheters and guidewires, sometimes a transfemoral or even transbrachial (or radial)2 approach is not possible due to severe atherosclerotic changes, tortuosity of the aortic arch, and/or brachiocephalic trunks. Direct carotid puncture (DCP) played a historical part in the development of cerebral angiography but has since then been relegated and is no longer used unless an alternative access is not possible.3 We present two cases in which a distal approach was unsuccessful to perform CAS and a DCP was used successfully.

CASE REPORT

Case 1. A 76-year-old female with recurrent transient ischemic attacks was diagnosed with a 70% stenosis of the left internal carotid artery with an ulcerated plaque. Neuropsychological tests were abnormal, and a hemodynamic reserve test was also impaired. The patient was referred to our service for CAS. Several attempts using a femoral and radial approach proved unsuccessful in placing a guiding catheter in the left common carotid artery. After careful evaluation, the patient having refused to undergo carotid endarterectomy, the decision was made to perform CAS by DCP.

Case 2. A 75-year-old male with history of memory loss and bradypsychia with a poor hemodynamic reserve was diagnosed with an 80% concentric stenosis of the origin of the left internal carotid artery. Attempts to place a stent by a femoral and radial approach were unsuccessful. The patient declined having endarterectomy and was scheduled for a CAS by DCP.

The same technique was used in both patients. Both were on Plavix 75 mg PO and aspirin 300 mg PO as regular medication prior to CAS. The patients were placed supine on the angiography table, and the procedure was performed under general anesthesia. Following prep and drape of the anterior neck, under fluoroscopic guidance, a 16-gauge Abbocath I.V. access needle (Abbott Medical, Abbott Park, Ill) was used to access the common carotid artery. A biplane road map was performed through the Abbocath in the left common carotid artery. After careful evaluation, the patient having refused to undergo carotid endarterectomy, the decision was made to perform CAS by DCP.

Fig 1. The anterior neck is prepped and draped and a 6F sheath is placed in the common carotid artery below the bifurcation.
Fig 2. Pretreatment digital subtraction angiography run showing a high-grade stenosis of the origin of the left internal carotid artery.

Fig 3. Using road mapping for guidance, the stent is advanced across the stenosis.

Fig 4. Lateral projection showing the cerebral protection device during angioplasty.

Fig 5. Posttreatment digital subtraction angiography run showing complete patency of the internal carotid and good placement of the stent.
was advanced through the stenosis and deployed (Fig 3). Next, the sheath was advanced inside the proximal portion of the deployed stent using the pusher of the stent as support. The stent system was withdrawn and a TwinOne (Minvasys, Gennevilliers, France) cerebral protection system was advanced and placed inside the distal portion of the stent using the technique described by Theron et al. Balloon angioplasty was performed (Fig 4) with the cerebral protection device (CPD) in place and after the CPD was removed. No pre-angioplasty was needed in our patients. Final angiography control showed patency of the internal carotid artery and its branches (Fig 5). A 6F Angio-Seal device was used to achieve hemostasis. The patients were taken to the intensive care unit for 24 hours with a heparin drip of 500 UI/h for 24 hours and Plavix 75 mg and aspirin 300 mg PO. They were discharged 48 hours after the procedure asymptomatic. Follow-up Doppler ultrasound of the carotid artery was obtained 3 months after the procedure showing patency of the stent and no abnormality at the puncture site.

DISCUSSION

DCP has been used for several years as a route to access the cerebral vasculature bypassing the tortuous anatomy of the aortic arch and the brachiocephalic trunks. The main complications seen with this approach were related to hemostasis. Hematomas of the neck that could compromise the airway were among the most feared. We elected to use general anesthesia on our patients to have a secure airway in case a hemorrhagic complication at the puncture site occurred; it is also more comfortable for the patient. We present our technique of performing CAS in two patients in whom the tortuous anatomy did not allow a distal approach. Two other similar cases are published in the literature but differ from ours in key points. Matsumoto et al used a small incision to expose the carotid and used a 7F sheath and placed a balloon-expandable stent and sutured the entry point after the procedure. Perez-Arjona at al used a percutaneous approach with a 5F sheath, which only allowed him to place a balloon-expandable stent. Our technique allows the use of a self-expandable stent through a 6F sheath, and hemostatic complications can be avoided using a hemostatic device. Although this is an off-label use, we saw no complication derived from the use of this particular hemostatic device in our patients. Our group has used this particular hemostatic device for several years at the femoral artery with no complications. Although it is possible to have a thrombotic, embolic, or even hemorrhagic complication using a hemostatic device, it was not our case. The direct puncture can be made using ultrasound guidance. We elected to perform a blind access because our experience with direct carotid access is great, and our patients had a very good palpable pulse. A potential complication of this access as in any other arterial vascular access is the possibility of a dissection. This is why this access is recommended for highly trained endovascular surgeons. Although CEA is an option, our patients refused to undergo surgery. In a selected group of patients, a DCP approach might be beneficial.

DCP is still a valid access to keep in mind when performing interventional neuroradiology procedures. CAS can still be safely performed in patients that do not have a suitable distal access to the common carotid.

REFERENCES