COVER STORY

Transbrachial Approach for Carotid Artery Stenting

Treating a patient with difficult aortic arch anatomy.

BY VINAY KUMAR, MD

A 78-year-old woman was evaluated for recurrent transient ischemic attacks (TIAs), high-grade left carotid artery stenosis, and failed medical therapy. Three weeks previously, the patient was admitted with a coronary event and developed a left hemispheric TIA immediately after the coronary catheterization. Carotid duplex scanning identified a high-grade left internal carotid stenosis.

Due to a recent myocardial infarction, the patient was considered high risk for carotid endarterectomy and was elected to be medically managed with warfarin therapy. Her comorbidities included insulin-dependent diabetes mellitus, hypertension, and left hemiparesis due to a cerebrovascular accident 2 years previously after a carotid endarterectomy.

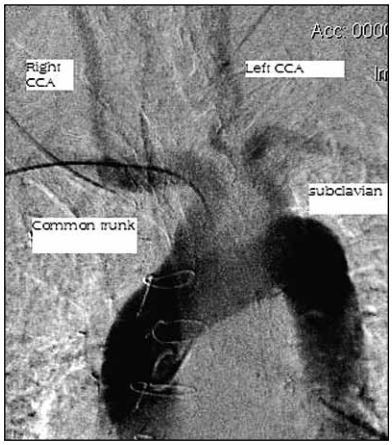

Figure 1. Transbrachial aortic arch angiogram showing common trunk origin of the great vessels.

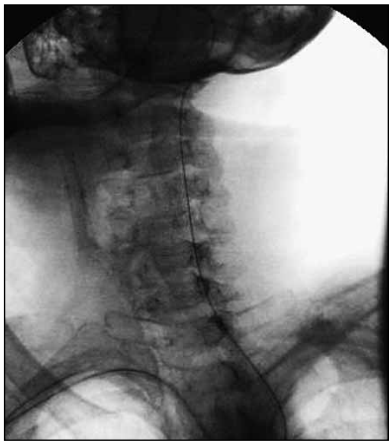

Figure 2. Hemostatic sheath in the left CCA; note the prolapse of sheath in the aortic arch.

The patient continued to have left hemispheric TIAs despite adequate anticoagulation. A carotid angioplasty was attempted at an outside hospital, but the procedure was unsuccessful due to inability to cannulate the left common carotid artery (CCA) via a femoral approach.

ANGIOGRAPHY

The original aortic arch angiography performed via a femoral approach identified the common trunk origin of great vessels and the nearly right angle origin of the left common carotid artery (Figure 1).

PROCEDURE

The carotid artery stent placement (CAS) was performed in the operating room using a neurovascular image intensifier (GE OEC 9800, GE Healthcare, Waukesha, WI). The patient was placed in the supine position with her right arm at a right angle to the body. Percutaneous access to the right brachial artery was obtained with a micropuncture kit (Cook Medical, Bloomington, IN), and a 6-F X 10-cm hemostatic Brite Tip sheath (Cordis Corporation, Warren, NJ) was placed. Five thousand units of heparin were administered intravenously, and activated clotting time was maintained above 250 seconds. A .035-inch Glidewire (Terumo Interventional Systems, Somerset, NJ) was advanced and placed in the aortic arch. Arch angiogra-

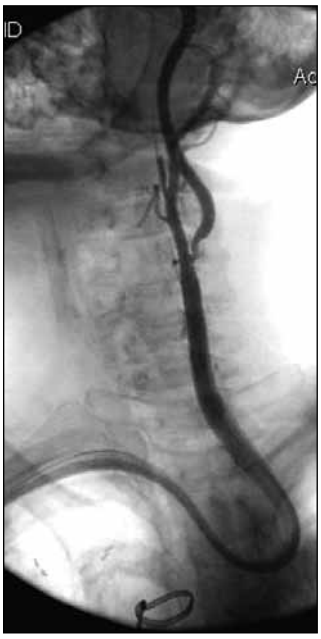

Figure 3. Left carotid angiogram through the sheath.

Figure 4. Angiogram after completed CAS.

phy was performed with a pigtail catheter, keeping the image intensifier in the left anterior oblique position. The arteriography showed a common trunk origin from the innominate artery. The origin of the left CCA was seen at a nearly right angle from the innominate artery. A 5-F Berenstein catheter (AngioDynamics, Inc., Queensbury, NY) was used to cannulate the ostium of the left CCA, and a .035-inch standard angled-tip Glidewire was advanced and positioned in the left external carotid artery. The Berenstein catheter was advanced and positioned in the left external carotid artery.

The guidewire was exchanged for a .035-inch Amplatz Super Stiff wire (Boston Scientific Corporation, Natick, MA). After withdrawing the short hemostatic sheath, a 6-F X 90-cm hemostatic sheath was advanced and positioned in the left CCA (Figure 2). During advancement of the hemostatic sheath, the Amplatz Super Stiff wire was allowed to prolapse into the aortic arch to obtain a smooth curve. The sheath maintained the desired curve after the removal of the Amplatz Super Stiff wire.

Arteriography showed 75% left internal carotid artery stenosis at the origin (Figure 3). Because the reference vessel diameter was approximately 5 mm, a 6-mm embolic protection device (Accunet, Abbott Vascular, Santa Rosa, CA) was introduced and deployed distal to the stenosis. Primary stent placement was performed, and a 7-mm X 40-mm self-expanding nitinol stent (Acculink, Abbott Vascular) was placed across the lesion. Balloon angioplasty was performed with a 5-mm X 40-mm Aviator Plus RX balloon (Cordis Corporation) with an excellent result (Figure 4). Before the inflation of the angioplasty balloon, .4 mg of atropine was administered intravenously to prevent bradycardia. There were no complications or hemodynamic changes during the procedure, and the retrieval of the Accunet was uneventful. There was no debris present. The sheath was removed at the completion of the procedure, and manual pressure was applied to achieve hemostasis. The patient was discharged home the next day on antiplatelet therapy. She has remained symptom-free for 6 months.

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COMMENTS

Common trunk origin of the great vessels is a rare anomaly wherein all great vessels originate from the innominate artery. In this case, the left CCA exhibited a right-angle origin and significant tortuosity, making it impossible to cannulate from the femoral approach. During planning stages of the case, it was the belief that a right brachial approach would offer a direct approach to the left CCA and easy access to the internal carotid artery. The possibility of kinking of the hemostatic sheath was a major concern because the .014-inch–based Accunet embolic protection device does not offer adequate support to advance the stent or angioplasty balloon. Once the Berenstein catheter was positioned in the external carotid artery and the wire was exchanged to the Amplatz Super Stiff wire, the whole assembly was gently pushed, and the wire was prolapsed into the aortic arch to achieve a smooth curve.

CONCLUSION

Although a femoral approach is commonly used for carotid artery interventions, patients with severe iliac or aortic occlusive disease, unfolding of the aortic arch, torturous aorta, or bovine aortic arch may benefit from the brachial approach. ■

Vinay Kumar, MD, is Director, Endovascular Center, South Central Regional Medical Center in Laurel, Mississippi. He has disclosed that he receives research funding from Abbott Vascular. Dr. Kumar may be reached at (601) 426-2008; vklaurel@yahoo.com.