LETTER TO THE EDITOR

To The Editor

Concurrent Carotid Endarterectomy and Flow Diverting for Supraclinoid Artery Aneurysm

Keywords: Supraclinoid artery aneurysm, Carotid endarterectomy

A 72-year-old right-handed female was electively admitted for carotid endarterectomy and flow diversion for an enlarging supraclinoid internal carotid artery (ICA) aneurysm. The patient had undergone computed tomography (CT) cerebral imaging following coronary artery bypass grafting 8 years previously which demonstrated an incidental right-sided, wide-necked, supraclinoid ICA aneurysm measuring approximately 11 mm and right ICA stenosis of 60% by North American Symptomatic Carotid Endarterectomy Trial (NASCET) criteria at the carotid bifurcation in the neck at that time. Ophthalmological and cranial nerve exams were both normal. Follow-up imaging since the original scans had shown growth of the aneurysm to 15 mm and progression of the carotid stenosis to near occlusion by NASCET criteria (Figure 1). Anterior communicating artery was patent and provided cross flow. Ipsilateral posterior communicating artery was widely patent and of normal configuration. The decision was made to treat the aneurysm as it was dynamic and undergoing growth. The neck of the aneurysm was calcified and there was some concern that clipping would not adequately occlude the aneurysm due to this. The decision was also made to treat the carotid stenosis via a carotid endarterectomy to both reduce the ongoing risk of stroke and concern that accessing the aneurysm for placement of a flow diverter would be impeded by the degree of stenosis. Carotid stenting was considered but given the heavily calcified nature of the vessel, it was decided that endarterectomy would provide a safer and more widely patent result. We elected to perform carotid endarterectomy and then flow diversion under the same anesthetic. There is no consensus in the literature as to the likelihood of increased risk of aneurysm rupture post-carotid revascularization. Kapelle et al. presented a subgroup of the NASCET trial in which they ascertained that 3.1% of all patients had a concurrent cerebral aneurysm, with one of these rupturing 6 days post-endarterectomy; however, 96% of these were less than 10 mm.[1] Given our patient presented with an aneurysm of 11 mm and this grew to 15 mm, we felt that this was a dynamic lesion worthy of treatment. Khan et al. have published a review and meta-analysis of this situation and document a number of cases of aneurysmal rupture around the time of carotid surgery, although conclusions are hampered by under-reporting and potentially publication bias.[2]

The patient was already taking aspirin of 81 mg and clopidogrel of 75 mg daily and we did not modify this. The patient was placed supine in the hybrid angiogram suite and a standard carotid endarterectomy was performed under general anesthetic with the measurement of stump pressure. Heparin 5000 IU was administered 5 minutes prior to the clamping of the common carotid artery (CCA), external carotid artery (ECA), and ICA. The arteriotomy was closed primarily. Prior to this suture arteriotomy closure, the CCA was punctured with a micro-puncture kit and the Seldinger wire was advanced into the ICA beyond the arteriotomy under direct vision. The neck incision was left open and a 6-Fr short sheath was placed via Seldinger technique with fluoroscopic guidance (Figure 2). This facilitated placement of a Navien guide catheter (Micro Therapeutics, Irvine, California) proximal to the cavernous carotid and a Phenom microcatheter (Micro Therapeutics, Irvine, California) was placed through this to deploy a 4 mm x 25 mm pipeline shield flow diverter with shield (Medtronic). Following final imaging, the sheath was withdrawn from the carotid and the puncture site was closed primarily with Prolene sutures. We elected not to reverse the heparin with protamine as we would routinely with carotid endarterectomy given the newly placed flow diverter. Postoperative course was unremarkable. The patient was discharged well

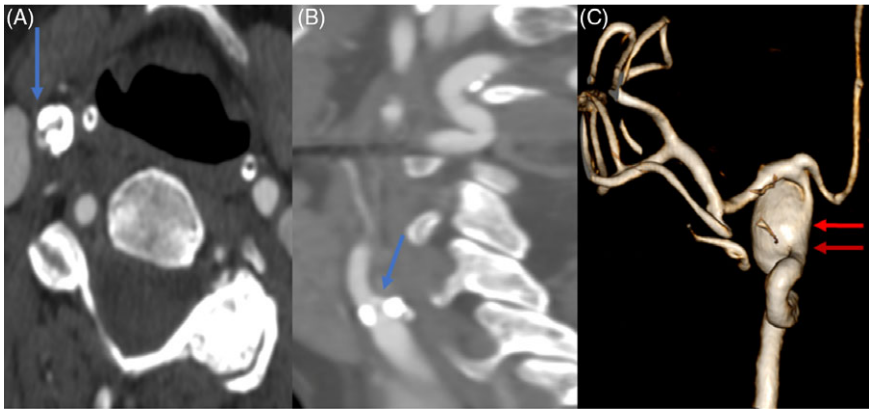

Figure 1. *Neck CT angiography in axial (A) and sagittal reformat (B) demonstrating severe stenosis of the right ICA by calcified atherosclerotic plaque (blue arrow A and B). Cerebral angiogram 3D reformat (C) demonstrating right ICA – supraclinoid aneurysm with wide neck (arrow).*

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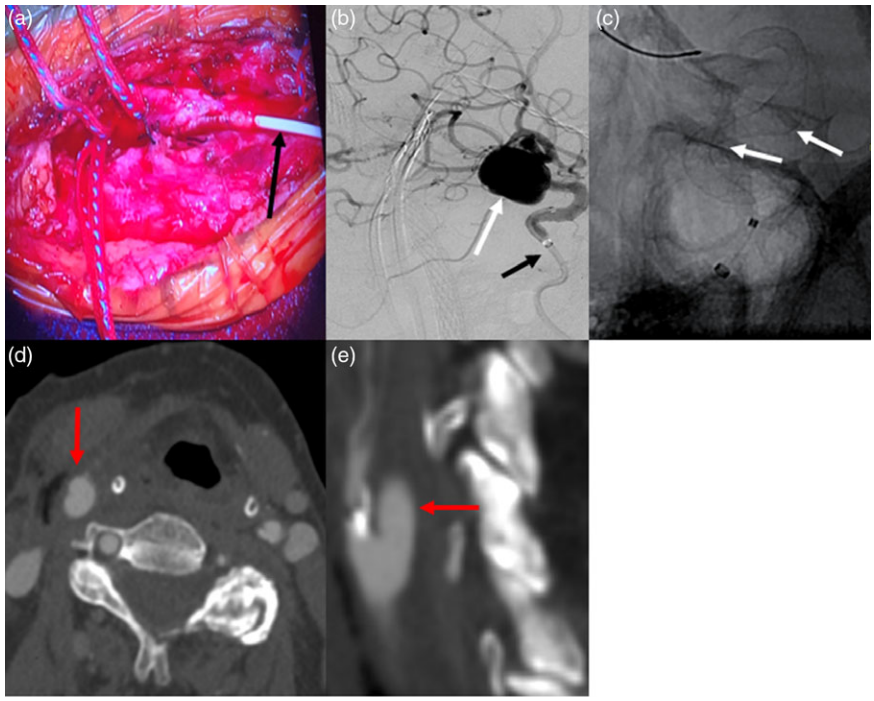

Figure 2. *(A) Intraoperative image after the endarterectomy closure demonstrating the vascular sheath inserted into the right internal carotid artery (black arrow), (B) cerebral angiogram through the guide catheter (black arrow) demonstrating the supraclinoid aneurysm (white arrow), (C) unsubtracted image demonstration of the flow diverter device (double white arrows). Day 1 postoperative CTA in axial (D) and sagittal reformat (E) demonstrating widely patent ICA (red arrow).*

the day following surgery. Review at 6-week postoperative clinic demonstrated good wound healing.

Flow diversion for wide-necked, supraclinoid aneurysms is a widely practiced and published technique with excellent outcomes reported.[3,4] The technique of direct carotid puncture to place access sheath and guide catheters has previously been reported due to excessive common carotid or ICA tortuosity.[5,6] To our knowledge, this is the first described instance of concurrent endarterectomy to provide access for deployment of flow diverting stent. We would advocate for the placement of the Seldinger wire under direct vision to avoid blindly crossing the fresh endarterectomy.

Statement of Authorship

RK wrote the manuscript, AJ and BJ provided the intraoperative images and details, and AJ and MB made revisions and approved the final version.

Disclosures

The authors have no conflicts of interest.

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