ENDOVASCULAR AND SURGICAL TECHNIQUES

Endovascular Stenting of Internal Carotid Artery False Aneurysm

A. Huang¹, D.M. Baker¹, A. Al-Kutoubi² and A.O. Mansfield¹

¹Regional Vascular Unit and ²Department of Radiology, St Mary's Hospital, Praed Street, London, W2 1NY, U.K.

Introduction

Internal carotid artery aneurysms are uncommon and are potentially dangerous because they may rupture, thrombose or embolise.¹ Although satisfactory long term results have been reported,² surgical resection is technically very difficult especially if the aneurysm is near the base of the skull.³ We report a case of an internal carotid artery false aneurysm caused by trauma which was successfully managed by endovascular stenting.

Case Report

A 28-year-old motorcyclist was involved in a road traffic accident in June 1993. He sustained a hyper-extension injury to his neck and the helmet strap cut into the left side of his neck directly below the angle of the mandible. He subsequently lost consciousness and on arrival in hospital was found to have fractured his T8 vertebra, left clavicle and right wrist. He developed a large swelling on the left side of the neck which was tender and bruised. He was also noted to have a left sided Horner's syndrome with glossopharyngeal and hypoglossal nerve lesions ipsilaterally presenting as difficulty in swallowing and dysarthria. He subsequently regained consciousness and made a good recovery from his fractures. There were no signs of intracranial injury or ischaemia.

In July 1994 he suffered a left middle cerebral artery territory stroke with expressive dysphasia and right sided hemiparesis. He underwent a digital subtraction angiogram (Fig. 1) which showed a false aneurysm of the internal carotid artery just below the skull base.

*Please address all correspondence to: Dr A. Al-Kutoubi, Consultant Radiologist, St Mary’s Hospital, Praed Street, London W2 1NY, U.K.

Fig. 1. Left carotid angiogram (lateral view). There is narrowing of the lumen of the internal carotid just below the skull base and some filling of the false aneurysm (arrow).
angiogram (Fig. 1), magnetic resonance scanning of his brain and magnetic resonance angiography (Fig. 2). These revealed a 2.5 cm left internal carotid artery false aneurysm immediately beneath the skull base. The lumen of the internal carotid artery was small with thrombus almost filling the aneurysm, but with direct communication into the artery.

In April 1995 he underwent an endovascular stenting of his aneurysm at St. Mary's Hospital, London in order to prevent further cerebrovascular events and to reduce the size of the aneurysm which was compressing the glossopharyngeal and hypoglossal nerves. This was performed via a femoral artery approach using a hydrophilic wire (Naviguide, Meadox U.K.) and a balloon mounted 6 mm by 4 cm Strecker stent (Boston Scientific U.K.).

Much arterial spasm associated with headaches was encountered during both the passage of the wire and the stenting part of the procedure. Intra-arterial isosorbide dinitrate was used to overcome this. The stent was released at the site of the false aneurysm and inflated up to 6 mm. Gentle inflation of the balloon in the proximal segment of the internal carotid artery was then performed to overcome the spasm. The final images showed almost no filling of the aneurysm and excellent flow through the carotid artery. Follow-up MR angiogram (Fig. 3) and intra-arterial digital subtraction angiogram (Fig. 4) demonstrated a patent artery and total thrombosis of the false aneurysm. The patient's residual dysphasia and pharyngeal irritation improved following the procedure.

**Discussion**

Carotid artery aneurysms may be caused by atherosclerosis and fibromuscular dysplasia but may also result from trauma and surgery. Embolic episodes, compression of adjacent structures and rupture are severe potential complications. Surgical dissection of a high internal carotid artery aneurysm is fraught with danger to adjacent important structures because of its inaccessibility. Treatment of aneurysms via an endovascular approach has been recommended by some as an alternative to surgery. Although the procedure may itself be complicated by embolisation or rupture, it is less invasive than that of open surgery. It is desirable to choose a stent that will allow for the use of MR imaging in follow-up. The balloon expandable

Fig. 2. MRA. The full size of this false aneurysm is demonstrated.

Fig. 3. MRA after stenting. There is good filling of the left internal carotid.
Strecker stent is made of tantalum which is non-ferromagnetic and therefore MRI compatible. All other self-expanding commercially available stents are ferromagnetic which would have made it impossible to follow the treatment progress without repeated angiography. Intimal hyperplasia is a recognised cause of restenosis following stent placement for atherosclerotic lesions in peripheral arteries and has been described following balloon expandable, self expanding and covered stents (Therone, J. Personal communication). In a series of 79 patients treated with Strecker stents for carotid stenosis, intimal hyperplasia occurred in 4% and in all cases responded well to balloon dilatation (Therone J. Personal communication). It is possible that intimal hyperplasia may develop within the stents in this patient but he has documented filling across the circle of Willis from the other neck vessels and the purpose of the treatment here is to abolish the risk of embolisation from the false aneurysm. Should MRA indicate that development of a stenosis then angioplasty could be considered. Fabric-covered stents have been used in the treatment of a false aneurysm of the common carotid artery however the course of the involved segment in this patient and its proximity to the acute bend of the petrosal segment coupled with the rather stiff delivery system would have rendered placement difficult and possibly more risky in view of the necessity of a direct puncture of the carotid artery. We therefore believe that the Strecker stent was the appropriate choice in this patient.

The simple restoration of laminar flow in this case has resulted in isolation of the false aneurysm from the internal carotid artery and has prevented the development of further cerebrovascular events.

References


Accepted 27 March 1996

Fig. 4 Selective injection of left internal carotid (left oblique view). Patent wide lumen and no further filling of the false aneurysm.