

CASE REPORT

Immediate Catheter Directed Thrombolysis for Thromboembolic Stroke During Carotid Endarterectomy

E. Fletcher^{*}, M. Kabeer, J. Sathianathan, I. Muir, D. Williams, C. Lim

NHS Dumfries and Galloway, Dumfries and Galloway Royal Infirmary, Dumfries, UK

Background: Carotid artery endarterectomy (CEA) is a common procedure undertaken by vascular surgeons with over 5,000 procedures performed annually worldwide. Published rates of perioperative stroke range from 1.3% to 6.3%.

Case report: A case is presented in which on-table intra-cranial angiography and catheter directed thrombolysis were used for a thromboembolic occlusion of the distal internal carotid artery (ICA) and proximal middle cerebral artery (MCA). An 83-year-old lady developed a dense right hemiparesis while undergoing a CEA under local anaesthetic (LA). Immediate re-exploration of the endarterectomy did not reveal technical error. Intraoperative duplex scanning of the internal carotid artery revealed no detectable diastolic flow. On-table angiogram showed complete occlusion of the distal ICA and proximal MCA. Catheter directed administration of TPA was undertaken. The entire ICA and MCA were completely clear on a completion angiogram. The patient made a full neurological recovery.

Discussion and conclusion: Prompt diagnosis and treatment with intraoperative catheter directed thrombolysis can resolve thromboembolic occlusion of the ICA/MCA. It is argued that performing CEA under LA is useful for immediate recognition of perioperative stroke. Furthermore, the advantage is highlighted of vascular surgeons having both the resources and skillset to perform on-table angiography and thrombolysis.

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INTRODUCTION

There is strong evidence to support carotid artery endarterectomy (CEA) for the prevention of stroke in patients with symptomatic or moderate to high grade carotid stenosis.¹ Unfortunately, a well-recognised complication of CEA is the very disaster the operation sets out to prevent: stroke. Reported rates range from 1.3% to 6.3%, depending on the degree of carotid stenosis, patient selection, and operative technique.² The cause of intraoperative stroke is multifactorial, with the most common cause being perioperative thromboembolism. The presence of a neurological deficit in the intraoperative or immediate postoperative period, with a suspicion of thromboembolism, is an indication for immediate re-exploration.³ This traditionally involves re-exploring the endarterectomy site with the potential to proceed to thrombectomy. However, this method does not address the possibility of a more distal arterial occlusion, either within the distal cervical or

intracranial vessels. A case is presented in which a patient developed a dense right hemiparesis while undergoing an elective left CEA. Management with on-table angiography and catheter directed thrombolytic therapy is described.

CASE REPORT

An 83-year-old woman (164 cm/74.5 kg) was admitted for a left CEA with a history of a transient ischaemic attack (TIA) affecting the patient's speech and right arm two weeks prior to surgery. Carotid duplex scanning demonstrated dense calcified atheroma at the origin of the left internal carotid artery (ICA) with high grade stenosis (>70%). CT angiogram of the carotids confirmed this, and also demonstrated severe stenosis of the right vertebral artery. Pre-existing medical conditions included hypertension, hyperlipidaemia, impaired glucose tolerance, and obesity. Preoperative antiplatelet medication consisted of clopidogrel 75 mg once daily.

The carotid endarterectomy and patch graft closure was performed under local anaesthetic (LA). LA was administered by the consultant surgeon under ultrasound guidance for both a superficial block (20 mL 1% lidocaine with adrenaline) and a deep cervical block (20 mL 0.5% chirocaine).

^{*} Corresponding author. Dumfries and Galloway Royal Infirmary, Bankend Road, Dumfries, Dumfries and Galloway DG1 4AP, UK.

E-mail address: teddy.fletcher@nhs.net (E. Fletcher).

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Heparin (5,000 units) was administered prior to clamping the carotid artery. The patient became unresponsive after clamping the common carotid, 1 hour and 5 minutes from the initiation of surgery. An arteriotomy and shunt insertion were performed, improving the patient's condition to baseline, which, combined with flushing of the stent, confirmed the stent patency. Systolic blood pressure was maintained between 115 and 130 mmHg throughout the procedure. The operation continued as usual and endarterectomy and patch graft closure (Dacron) were performed.

Shortly after completion of the patch and 2 hours and 5 minutes into the surgery, the patient developed a dense right hemiparesis and dysphasia before becoming unresponsive with seizures. The arteriotomy was re-opened and extended. No arterial dissection flap or clot was found, although feeble backflow bleeding was noted. Intraoperative duplex revealed no detectable diastolic flow in the ICA. The arteriotomy was closed and an on-table cerebral angiogram demonstrated complete occlusion of the left distal ICA and proximal middle cerebral artery (MCA) (Fig. 1A). During the above events, which prolonged the surgical time to over 2 hours, the patient was given a further 3,000 units of heparin.

A 3 Fr vertebral catheter was inserted over a 0.018 Terumo guidewire into the proximal ICA under fluoroscopic

guidance. A total of 35 mg of recombinant tissue plasminogen activator (rt-PA) was administered by the vascular surgeon via the catheter in 5 mg boluses every 10 minutes with repeated angiograms (Fig. 1B). The patient was assessed by the anaesthetist, who confirmed that the neurological status had returned to baseline (the patient remained under LA), and a completion angiogram demonstrated a fully patent ICA and MCA (Fig. 1C,D). The final operative time was 4 hours and 10 minutes.

The patient was transferred to the high dependency unit (HDU) post operatively. A computed tomography (CT) scan of the brain the following day demonstrated no newly ischemic regions. The patient made a full neurological recovery, determined by a consultant neurologist, and was discharged 1 week following surgery.

DISCUSSION

Common postoperative causes of stroke include thromboembolic event and hyperperfusion leading to cerebral haemorrhage.⁴ Intraoperative neurological deficit usually results from ischaemia after cross-clamping of the carotid, and is exacerbated by poor collateral vessels. Thromboembolic events can also occur intraoperatively, especially during manipulation of surrounding structures or during insertion of shunts. Determining the cause of stroke will dictate further management. The following discussion

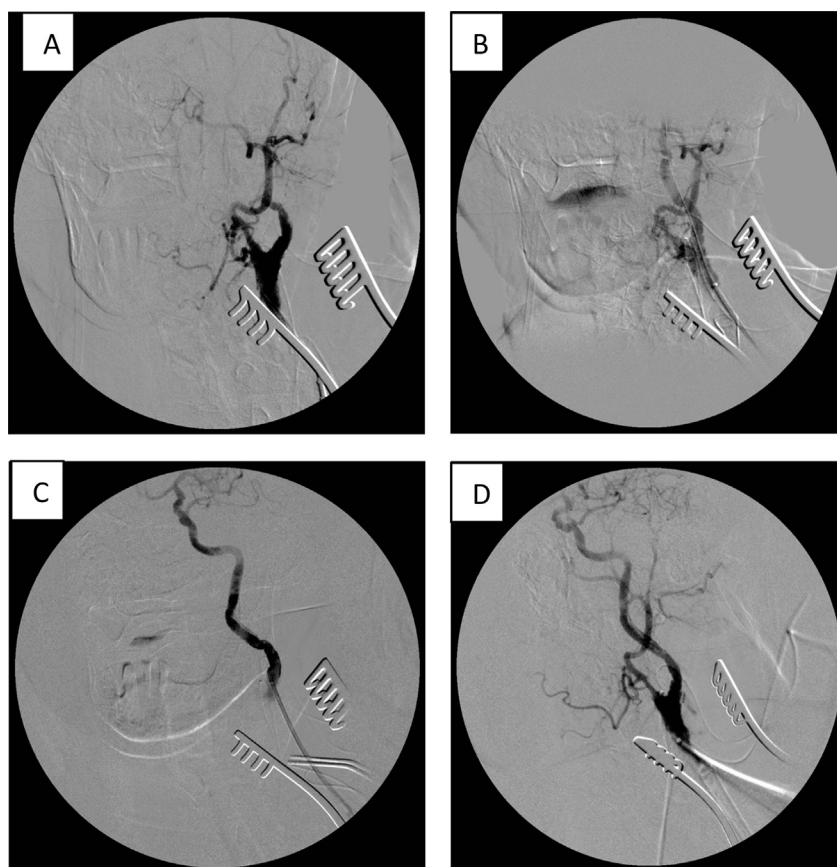


Figure 1. Sequential on-table intraoperative angiograms. (A) Initial angiogram demonstrating occlusion of distal ICA. (B) Mid-procedural angiogram after commencing treatment with rt-PA. (C) Isolated ICA angiogram at end of treatment showing newly patent ICA. (D) Completion angiogram at end of treatment.

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