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Case report

Undiagnosed tandem stenosis of the internal carotid artery – A case report



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ARTICLE INFO

Article history:

Received 30 May 2015

Accepted 8 June 2015

Available online 6 July 2015

Keywords:

Carotid artery

Carotid stenosis

Tandem stenosis

Carotid endarterectomy

ABSTRACT

We report a case of a 77-year-old patient with a tandem carotid stenosis diagnosed intra-operatively. Even though standard computed tomography angiography was performed before surgery, second stenosis distal to carotid bifurcation had not been detected. No recommendations or guidelines for managing tandem stenosis are available. It remains an unsolved issue in vascular surgery.

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Introduction

Early carotid endarterectomy is recommended by the European Society for Vascular Surgery Guidelines in symptomatic patients with carotid artery stenosis of over 50 percent and should be performed within two weeks of the last symptoms of ischaemic attack [1]. In rare cases this condition can be complicated by the presence of a concurrent stenosis. The case of a patient indicated for early carotid endarterectomy, in whom tandem stenosis of the internal carotid artery (ICA) was diagnosed during the surgical procedure, is presented.

Case report

A 77-year-old patient was hospitalised for recurrent transient ischaemic attacks (TIA). Computed tomography angiography (CTA) and neurosonological examination revealed a severe stenosis of the internal carotid artery at the left carotid bifurcation (Fig. 1). No other proximal or distal stenosis was found and intracranial CT findings were without signs of occlusion or stenosis. The patient was indicated for early carotid endarterectomy (CEA). The patient was educated on the expected outcomes of the treatment and informed consent had been obtained prior to surgery using standard protocols of the department. The procedure was

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<http://dx.doi.org/10.1016/j.crvasa.2015.06.001>

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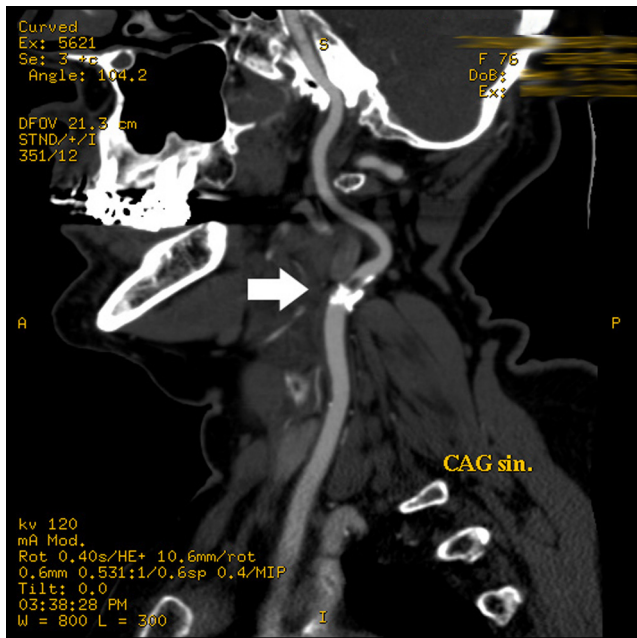


Fig. 1 – Computed tomography angiography showing severe stenosis of the left internal carotid artery at the left carotid bifurcation.

performed by a conventional method with patch closure under regional anaesthesia. During heparin neutralisation, right upper extremity paralysis and right lower extremity paresis occurred. An intra-operative transcranial Doppler examination was carried out by a neurologist. Within 15 min, right leg movement was restored spontaneously and right arm movement noticeably improved. However, transcranial Doppler examination showed reduction in blood flow by 50% in the left intracranial region as compared with the right side. This neurosonological finding was an indication for intra-operative angiography which proved that the endarterectomy site was not occluded but that another hemodynamically significant stenosis (Fig. 2) was present three centimetres above the patch.

As this stenosis had not been detected before surgery, it was thought to have developed intra-operatively due to thrombus formation. The patient then lost consciousness and was intubated. Because of the patient's clinical condition and the angiographic finding, it was decided to carry out thrombectomy of the left ICA using a Fogarty catheter. No thrombi were found in the ICA. Subsequently, transcranial Doppler examination showed considerably improved left intracranial blood flow and the patient's neurological recovery occurred spontaneously. A post-operative brain CT scan and a CTA of the carotid and intracranial arteries revealed left ICA dissection (Fig. 3) at the site where the distal stenosis was detected by intra-operative angiography (the site is surgically inaccessible). No focal brain lesions were found by native CT imaging of the brain. The CTA showed no occlusion or stenosis at the endarterectomy site and no occlusion due to the dissection. It was not possible to manage the dissection by surgical approach and no endovascular procedure was indicated by the interventional radiologist because of the high risk of potential complications. Post-operative heparin

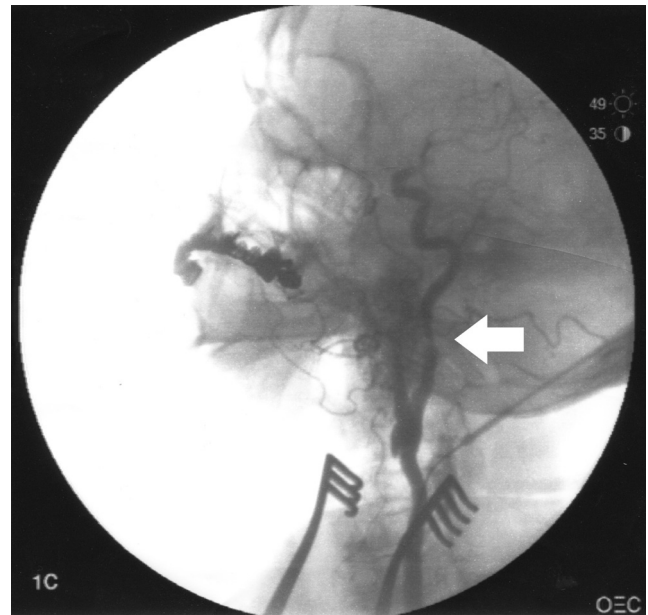


Fig. 2 – Intra-operative angiography confirming no occlusion or stenosis at the endarterectomy site but showing another hemodynamically significant tandem stenosis 3 centimetres distally to the patch.

therapy and repeated neurological and CT examinations were carried out. Before discharge from hospital, the patient was converted from heparin to anticoagulation warfarin therapy.

At the first follow-up, the patient had no problems, and her neurological status was normal without lateralisation of function or paresis. At three months, neurosonological and CTA examinations showed that the left ICA dissection persisted but was smaller in size and without thrombi; the patient had no problems and no neurological deficit. As there was no neurological indication for warfarin administration any longer, anticoagulation therapy was changed to antiplatelet therapy. The patient was followed up at our department and by the neurologist.

Discussion

The objective of carotid endarterectomy is to prevent the occurrence or recurrence of a stroke that may have serious and permanent neurological consequences [2]. The aim of surgery is to remove hemodynamically significant stenosis due to an atherosclerotic plaque – a potential source of brain artery embolisation [3]. Early carotid endarterectomy is indicated in symptomatic patients after stroke or TIA and should be performed as soon as possible after the most recent neurological symptoms [4]. Before surgery, the CTA or magnetic resonance angiography of extracranial and intracranial arteries, and a brain CT scan are performed to visualise arterial stenoses or occlusions and any cerebral ischaemic lesions. In addition, at our Department, pre-operative neurosonological examination for assessment of intracranial arterial blood flow is performed. Based on the result, the haemodynamic significance of ICA stenosis is determined

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