Acute occlusion of internal carotid artery: Thrombolysis and stent placement

Sir,

Endovascular treatment of the carotid artery occlusion with balloon angioplasty-stenting and intra-arterial thrombolysis is being increasingly accepted as a treatment for acute stroke.

A 61-year-old right-handed man presented with history suggestive of transient ischemic attacks 10 days ago. A clinical examination revealed no neurological deficits. An MR imaging revealed a small old lacunar infarction. Carotid angiography revealed 80% left carotid artery stenosis and 20% right carotid artery stenosis with normal intracranial circulation (Figure 1a). Two days after the procedure, the patient developed an acute onset of aphasia and right hemiplegia. Neurological examination showed a NIH stroke score of 19. Emergent angiography showed occlusion at the ICA origin (Figure 1b). No external-to-internal collaterals and leptomeningeal collaterals were present and no filling of the middle cerebral artery territory and lenticulostriate artery was observed. An exchange guidewire was passed through the diagnostic catheter and introducer was changed with 9F sheath introducer system. After a bolus of 5000 IU of heparin, a continuous heparin infusion was started. A 9F guiding catheter was placed into the common carotid artery over a 0.035-in, 300-cm guidewire positioned in the ipsilateral external carotid artery. A Tracker-18 microcatheter (Target therapeutic, Los angeles, CA, USA) was advanced over a Transend EX 0.014-in microguidewire (Boston Scientific). Microcatheter was embedded into the thrombus and a bolus of 20 mg t-PA (Alteplase) was given in 5 minutes. A partial recanalization was obtained. Before starting stenting a control angiogram showed re-occlusion. Another 20 mg t-PA was administered and recanalization was obtained (Figure 1c). The stenosis was crossed with 0.014-in exchange guidewire. Predilation of the carotid artery stenosis was not performed. Protective device was not used. A self-expandable 7 x 40 mm SMART (Cordis) stent was deployed across the carotid stenosis. Postdilation was performed with a 5-mm balloon. Final control angiogram revealed a patent ICA and good intracranial circulation (Figure 1d). Twenty-four hours later a carotid Doppler ultrasound demonstrated patent left carotid artery with normal spectral flow. Three-month follow-up showed that the ICA remained patent.

Carotid occlusive disease is responsible for approximately

Accepted on 06.11.2004.
25% of stroke cases. Angioplasty and stenting are minimally invasive techniques and are gaining wider acceptance. Angioplasty has been tempered by the increased risk of stroke resulting from distal embolization, vessel dissection, or arterial rupture. Stenting has been shown to increase the safety and efficacy of balloon angioplasty. Stent technology has evolved and new stents that have more flexibility and radial force were introduced.\(^1,2\)

Thrombolytic therapy for the occlusion of the ICA should be started within 6 hours after the onset of stroke.\(^3\) Intraarterial thrombolysis offers early recanalization with relatively low dose of t-PA. The direct application of thrombolytic drug allows a lower total dose, may reduce systemic effects and may reduce time to recanalization.\(^4\) Intracranial thrombolysis has been performed using direct thrombolysis. Intra-arterial delivery of highly concentrated drug and mechanical disruption of the thrombus by the catheter and guidewire may have advantages over the intravenous administration.\(^5\)

Reopening of the occluded carotid arteries is controversial, and neither surgical nor endovascular treatment of complete ICA occlusion has become standard practice. For patients with chronic occlusions, successful reopening of the ICA is highly unlikely. However, in acute occlusion, emergency surgery to perform a thromboendarterectomy using Fogarty catheter to pull thrombus can yield good results.\(^6\) Bellon et al have used a device to open occluded ICA to reach MCA occlusion to obtain flow.\(^6\)

PTA and stenting of the carotid arteries are associated with an obligatory release of particulate debris into the distal cerebral circulation. Although most of the emboli are small and do not cause symptomatic neurological deficit, some may be large enough to result in stroke. For this reason cerebral protection with occlusive balloon, filter, flow-reversal is used to decrease the risk of distal embolization during PTA and stenting.\(^2,7,8\)

---

**Ercument Ciftci, Husnuf Efendi*, Muhip Kanko**, Pervin Kutluay*  
Departments of Radiology, *Neurology and **Cardiovascular Surgery, University of Kocaeli, School of Medicine, 41100, Derince, Kocaeli, Turkey. E-mail: eciftcis7@hotmail.com**

---

**Letters to Editor**

Professor: We refer to the Letter to Editor of Dr. Mc Phee (Neurol India 2004; 52: 349-350) and would like to report a case of isolated internuclear ophthalmoplegia (INO) as a manifestation of an isolated inflammatory demyelinating lesion of the brainstem.

Sir,

Isolated internuclear ophthalmoplegia (INO), an uncommon clinical sign, is more frequently described in association with multiple sclerosis (MS).\(^1,2\) However in patients with MS mild to moderate INO can be missed on clinical examination.\(^3\) Detection of a lesion in medial longitudinal fasciculus (MLF) depends upon the appropriate choice of magnetic resonance imaging (MRI) sequences.\(^4\) We present a patient with isolated unilateral INO probably due to an isolated inflammatory demyelinating lesion of the brainstem.

A 34-year-old otherwise healthy lady presented with two-day history of diplopia on left gaze. Otherwise the history was unremarkable. There was no fever or vaccination before the onset of the symptoms. Clinical examination showed right-sided INO with normal convergence. She did not have any other neurologic deficit. MR imaging of the brain revealed a focal hyperintense lesion in the right midbrain tegmentum (in the region of trochlear nucleus) (Figure 1, 2). Cerebrospinal fluid analysis (CSF) showed normal biochemistry and a cell count of 5 lymphocytes. CSF was negative for oligoclonal bands. Routine blood biochemistry and hemogram including erythrocyte sedimentation rate at first hour, collagen profile were normal. Tests for retroviral serology were negative. Electrodagnostic tests, nerve conduction studies, visual, somatosensory, and brainstorm auditory evoked potentials were normal. Based on the MRI finding, she was diagnosed as a case of inflammatory demyelinating disorder and was treated with intravenous methylprednisolone, 1 g/day per 3 days. She had a partial improvement.

Isolated internuclear ophthalmoplegia is a distinct clinical sign and seen in association with a lesion in the MLF between the third and sixth cranial nerve nuclei (midbrain or pontine tegmentum). The causes of INO include MS, brainstorm stroke, brainstorm tumor, metastases, traumatic brain injury, central

---

**References**


2. Phatouros CC, Higashida RT, Malek AM, et al. Carotid artery stent placement and efficacy of balloon angioplasty. Stent technology has increased the safety and efficacy of balloon angioplasty. Stent technology has evolved and new stents that have more flexibility and radial force were introduced.\(^1,2\)


Accepted on 05.08.2004.

---

**Isolated internuclear ophthalmoplegia as a manifestation of an isolated inflammatory demyelinating lesion of the brainstem**

Sir,

Isolated internuclear ophthalmoplegia (INO), an uncommon clinical sign, is more frequently described in association with multiple sclerosis (MS).\(^1,2\) However in patients with MS mild to moderate INO can be missed on clinical examination.\(^3\) Detection of a lesion in medial longitudinal fasciculus (MLF) depends upon the appropriate choice of magnetic resonance imaging (MRI) sequences.\(^4\) We present a patient with isolated unilateral INO probably due to an isolated inflammatory demyelinating lesion of the brainstem.

A 34-year-old otherwise healthy lady presented with two-day history of diplopia on left gaze. Otherwise the history was unremarkable. There was no fever or vaccination before the onset of the symptoms. Clinical examination showed right-sided INO with normal convergence. She did not have any other neurologic deficit. MR imaging of the brain revealed a focal hyperintense lesion in the right midbrain tegmentum (in the region of trochlear nucleus) (Figure 1, 2). Cerebrospinal fluid analysis (CSF) showed normal biochemistry and a cell count of 5 lymphocytes. CSF was negative for oligoclonal bands. Routine blood biochemistry and hemogram including erythrocyte sedimentation rate at first hour, collagen profile were normal. Tests for retroviral serology were negative. Electrodagnostic tests, nerve conduction studies, visual, somatosensory, and brainstorm auditory evoked potentials were normal. Based on the MRI finding, she was diagnosed as a case of inflammatory demyelinating disorder and was treated with intravenous methylprednisolone, 1 g/day per 3 days. She had a partial improvement.

Isolated internuclear ophthalmoplegia is a distinct clinical sign and seen in association with a lesion in the MLF between the third and sixth cranial nerve nuclei (midbrain or pontine tegmentum). The causes of INO include MS, brainstorm stroke, brainstorm tumor, metastases, traumatic brain injury, central