Endarterectomy of an Occluded ICA: Short Segment Occlusion with Distal Patency Maintained by an Aberrant Ascending Pharyngeal Artery

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Summary

The authors report a case in which an anomalous ascending pharyngeal artery maintained patency of the internal carotid artery beyond an occlusion. The patient presented with ipsilateral transient ischaemic attacks and was found to have an internal carotid artery occlusion on Doppler ultrasound. Subsequent angiography demonstrated retrograde flow in the ipsilateral APA, perfused by pharyngeal anastomoses from the contralateral APA with slow antegrade flow in the ipsilateral ICA distal to the occlusion. Carotid endarterectomy resulted in abolition of the TIA's.

Introduction

Patients with carotid occlusion are not normally regarded as suitable candidates for endarterectomy. However endarterectomy is possible occasionally when anatomical variants allow reperfusion of the internal carotid artery above the occluded segment¹⁻⁴. We report a case in which reperfusion occurred from the contralateral external carotid artery (ECA) through an aberrant ipsilateral ascending pharyngeal artery (APA).

Case History

A 51 year old man was referred having had four transient ischaemic attacks (TIA's) affecting his right arm and face over a four day peri-

od. He was known to have non-insulin dependant diabetes mellitus, hypercholesterolaemia and hypertension for which he was receiving pharmacological treatment. He had had coronary artery bypass grafting three years previously following which he had had no recurrence of angina. Doppler ultrasound, four weeks after his TIA's, showed significant atherosclerotic disease of the left carotid bifurcation extending into both the left ECA and internal carotid artery (ICA). No flow could be detected in the distal ICA despite the use of power Doppler ultrasound. There was minimal atherosclerotic disease in the right ICA with no velocity increase on Doppler ultrasound. The patient underwent angiography, fifteen weeks later, which confirmed occlusion of the left ICA at its origin (figure 1). On the right side there was only minimal disease at the carotid bifurcation.

During right common carotid angiography centered on the cranium late films showed contrast filling the left cervical ICA. Further angiography showed collateralisation of the left APA, across the midline, from the anterior division of the right APA. Retrograde flow in the left APA, which had an anomalous origin from the left ICA, reperfed the ICA distal to the occlusion (figure 2). With patency of the left ICA above the occlusion confirmed, left carotid endarterectomy was carried out four days after the angiogram. At operation there was a 1cm occlusion of the origin of the ICA with an anomalous APA originating from just above the

Figure 1 Left common carotid artery injection. Lateral view. Occluded left ICA (single arrow). Occipital artery (double arrow) and internal maxillary artery (triple arrow) shown for orientation.

occlusion. The operative findings were in agreement with the angiogram. He has been followed up for fifteen months during which time he has remained symptom free. Patency of the ICA at the operative site has been confirmed with ultrasound.

Discussion

Occlusion of the origin of the ICA results in thrombus formation and propagation distal to the occlusion until a point in the ICA where a collateral supply feeds retrogradely to maintain patency. Normally this occurs at the level of the ophthalmic artery and in these patients the extent of organised thrombus precludes cervical carotid artery surgery with EC-IC bypass being the only method available to increase ipsilateral blood flow where symptoms are due

to ischaemia. Collateralisation of an occluded ICA from branches of the APA, via the infero-lateral trunk, has also been observed in patients with TIA's^{5,6} and similarly these patients are not suitable for carotid endarterectomy.

Reperfusion of the ICA more proximally allowing the possibility of carotid endarterectomy has been described in association with anomalous origins of the occipital artery^{1,2} APA³ or via hypertrophied vasa vasorum⁴. In these cases collateralisation of the ICA was from the ipsilateral circulation (either vertebral artery (VA) or common carotid artery (CCA)) and the authors recommended VA angiography be included in the angiographic protocol where there is ICA occlusion and the ipsilateral APA has not already been documented. The APA supplies the pharynx, as well as part of the tympanic cavity, meninges and lower cranial nerves. The pharyngeal branches traverse towards the midline and supply the constrictor muscles, stylopharyngeus and pharyngeal mucosa. These pharyngeal branches, broadly divided into superior, middle and inferior groups, freely anastomose with their contralateral equivalent arteries which in our case allowed reperfusion of an occluded ICA. Anomalies of the origin of the APA are well recognised and it may arise from the facial, lingual, occipital (in 14% of cases)⁷ or internal carotid arteries^{1,3,8-11}. The incidence of ICA origin of the APA has not been documented. Our case confirms the value of evaluating the collateral supply in cases of ICA occlusion.

Patients with carotid occlusions have a relatively benign prognosis^{12,13} and were not included in the randomised trials comparing carotid endarterectomy with medical treatment^{14,15}. However the natural history of short "collateralised" carotid occlusion such as we describe is unknown. In long carotid occlusions symptoms may be due to hypotensive ischaemia, incidental intracranial atheromatous disease, or emboli from the occluded stump proximally may be carried to the intracranial circulation via ECA collaterals¹⁶. In cases such as ours emboli may also form distal to the occlusion, encouraged by the slow flow, in the long segment of ICA resupplied by the aberrant APA⁵. The relative roles of surgery and medical treatment in these cases has not been evaluated, but nevertheless demonstration of the anatomy of the lesion at least allows carotid endarterectomy.

Figure 2 Right common carotid artery injection. Oblique lateral (A) and frontal (B) views. The left ICA (single arrow) fills from the left ascending pharyngeal artery (arrowhead) via collaterals across the midline. Right occipital (double arrow) and internal maxillary (triple arrow) arteries shown for orientation.

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