The Journal of Laryngology & Otology
August 2001, Vol. **115,** pp. 663–665

Bilateral aneurysms of the extracranial internal carotid artery presenting as vocal fold palsy

J. Mathews, F.R.C.S., C. C. Yeong, F.R.C.R.*, K. T. V. Reddy, F.R.C.S., S. E. Kent, F.R.C.S.

Abstract
Bilateral extracranial internal carotid aneurysms are very rare, though well documented. We report a case of bilateral extracranial internal carotid aneurysms presenting with vocal fold paralysis, which we believe to be the first.

Key words: Aneurysm; Carotid Artery, Internal; Neck; Vocal Cord Paralysis

Introduction

Extracranial aneurysms of the internal carotid artery are uncommon.[1] They may present as a pulsatile mass in the neck or pharynx, give rise to an isolated cranial nerve palsy or severe unilateral headache, cause massive haemorrhage from the oropharynx, nose and ear, or present with neurological deficits due to thromboembolic phenomena.[1–5] Bilateral extracranial aneurysms are very rare and are usually secondary to atherosclerosis. We report a case of bilateral extracranial aneurysms of the internal carotid artery presenting with a vocal fold palsy.

Case report

A 72-year-old male was referred to the ENT department with a history of a hoarse voice and a fullness of the right side of his neck of six weeks duration. He gave a history of unproductive cough but there was no history of dysphagia, dyspnoea, aspiration, nasal regurgitation, headaches, facial pain, or any other neurological symptoms. There was no history of trauma.

In his past medical history, the patient suffered from hypercholesterolaemia type 3M. He was under the care of a general surgeon and had previously undergone a left and right femoro-popliteal artery bypass in 1991 and excision and grafting of an abdominal aortic aneurym in 1992. Since the procedure he has been on warfarin and atrovastatin. Examination of the patient revealed a hard, fixed mass of about 4×5 cm in the right upper deep cervical region. There was no audible bruit. Examination of the larynx revealed a right vocal fold palsy. Examination of the ears, nose and the rest of the cranial nerves and neurological examination was normal.

Initial investigations included a fine-needle aspiration cytology (FNAC) and a computed tomography (CT) scan of the neck and chest. The FNAC was inconclusive and the CT scan showed masses on both sides which did not enhance with iodinated contrast. They were in line with the internal jugular veins and were thought to be thrombosed, dilated internal jugular veins. On re-examination of the patient, some pulsation was detected in the mass and hence an ultrasound Doppler scan was requested.

Radiology

An ultrasound scan of the neck revealed a $4 \times 3.9 \times 4.5$ cm mass due to a thick-walled aneurysmal internal carotid artery containing arterial flow through a central channel. On the left side there was also a large carotid aneurysm that was patent.

CT carotid angiograms revealed bilateral aneurysms of the carotid bulb and proximal internal carotid arteries. On the right side the aneurysm was thrombosed, with occlusion of the distal internal carotid artery. On the left side there was an aneurysm of the proximal internal carotid artery, but with no thrombus or occlusion. Both

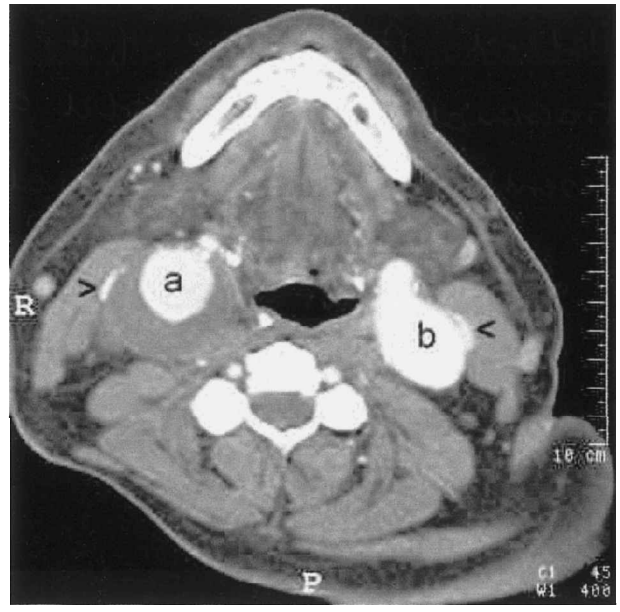

Fig. 1

Axial CT scan at the level of the aneurysms. The right common carotid aneurysm (a) is surrounded by clot, compressing the right jugular vein (>). The left common carotid aneurysm (b) is compressing the left jugular vein (<).

From the Department of Otolaryngology and Radiology*, Warrington Hospital NHS Trust, Warrington, UK.
Accepted for publication: 26 February 2001.

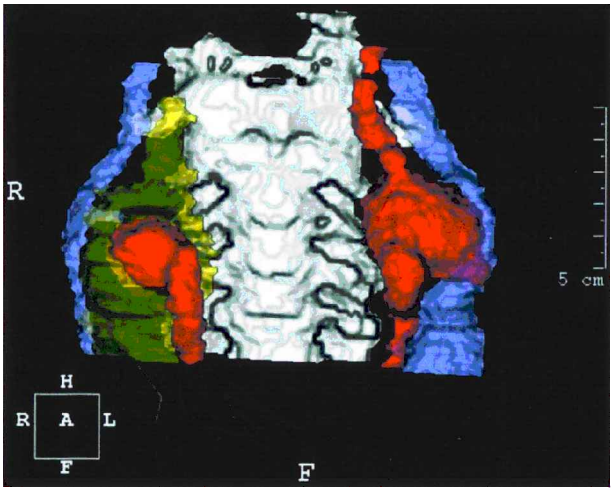

FIG. 2

3D surface shaded reconstruction. Viewed from the front, arterial blood is shown in red, clot in yellow and venous blood in blue. This shows the aneurysmal right common carotid artery containing clot. The left common carotid artery is aneurysmal at its bifurcation. Both displace and compress the jugular veins.

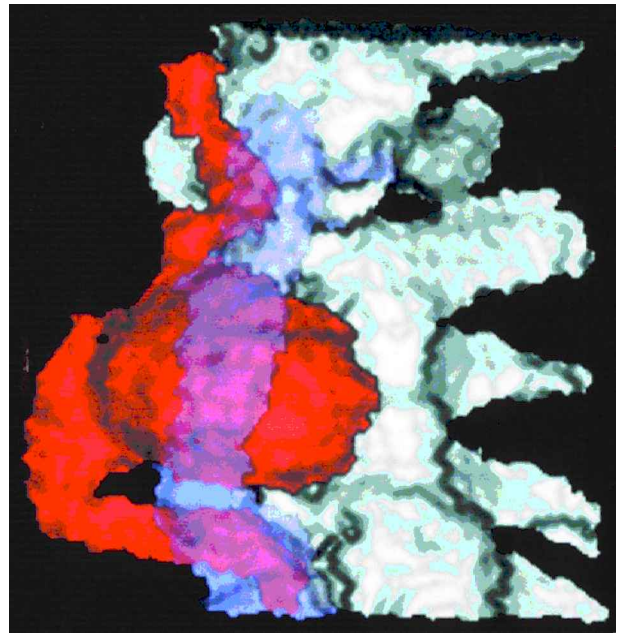

FIG. 3

3D surface shaded reconstruction, lateral view. Left carotid artery in red and left jugular vein, depicted semi-transparent, in blue. This demonstrates marked tortuosity of the left common carotid artery. The jugular vein is displaced laterally and compressed.

proximal common carotid arteries were tortuous and the aneurysm was compressing the internal jugular veins. The vertebral and external carotid arteries were patent on both sides (Figures 1–3).

Under the care of the vascular surgeons, the patient underwent an endovascular placement of a stent graft in the right carotid artery introduced via an 11F (French gauge) sheath in the right groin. The aneurysm immediately became non-pulsatile and a duplex scan the next day revealed that there was good flow through the graft with a patent external carotid artery. The fullness on the right side of the neck was reduced considerably but his voice remained the same. Six months later he underwent resection of the left carotid aneurysm with interposition of an internal saphenous graft between the internal and common carotid arteries. His post-operative recovery was uneventful. Eight months after his stent placement, his voice has not improved. Fibreoptic nasoendoscopic examination still showed a right vocal fold palsy.

Discussion

Aneurysms of the extracranial internal carotid artery are rare. According to the literature, they represent between 0.2 and 0.4 per cent of operated aneurysms.[1] The largest review of these lesions was carried out by Schechter in 1979. He reported 853 extracranial carotid artery aneurysms in 820 patients recorded in the literature from 1687 to 1977. Of these 820 patients, only 33 had bilateral aneurysms.[2] Bilateral presentation of extracranial internal carotid aneurysms are very rare.[1]

These lesions have a varied aetiology. These include atherosclerosis, trauma, congenital or developmental defects, fibromuscular dysplasia, cystic medial necrosis, pseudoxanthoma elastica or infection.[2] Bilateral aneurysms are mostly atherosclerotic in origin. Atherosclerotic aneurysms make up from 26 to 70 per cent of the reported cases. They are usually associated with additional aneurysm sites in 15 per cent of the cases.[1] Our patient had undergone surgical treatment previously for an abdominal aortic aneurysm. Depending on their size and location, these aneurysms may present as a pulsatile mass in the neck or pharynx, give rise to isolated cranial nerve palsies or cause haemorrhage from the oropharynx, nose or ear. They may present with sudden headaches or facial pain, dysphagia or upper airway obstruction due to pressure.[1–5] The clinical symptoms and signs associated with cerebral thromboembolic phenomena include amaurosis fugax, transient ischaemic attacks and fatal cerebral infarction.[4] Cranial nerve palsies include involvement of the IX, X, XI, XII cranial nerves and cervical sympathetic chain.[1,2,4,5] Neurological presentation in patients may vary depending on the site and location of the aneurysm. The most common presentation is as a pulsatile mass in the neck or features associated with thromboembolic phenomena and cerebral ischaemia.[2]

Aneurysms of the extracranial internal carotid artery presenting with hoarseness and vagal palsy, or recurrent laryngeal nerve involvement, are very rare. To our knowledge this is only the second case of an atherosclerotic aneurysm presenting in this manner.[4] There are two further reports of a dissecting aneurysm presenting with severe unilateral headache and facial pain along with a vagal palsy and one reported case of a large pseudoaneurysm following a failed patch angioplasty.[3,6] Our case is the first reported case of bilateral extracranial internal carotid aneurysms presenting with a vocal fold palsy. Some spontaneous dissections of the extracranial internal carotid artery can present with an isolated trigemminal nerve palsy.[6]

Our case emphasizes the fact that a thorough examination of the patient is important in order not to miss a rare but possible vascular cause for a vocal fold palsy. CT scan of the neck without specific targeting towards vascular assessment can lead to a mistake in diagnosis. A clot may be mistaken for soft tissue or a tortuous clotted artery for a clotted vein. The CT protocol initially used in our patient was for the evaluation of a neck mass. This used thicker collimation than is used when performing a CT angiogram. The masses were initially reported as thrombosed dilated internal jugular veins. This was due to marked tortuosity of the common carotid artery, resulting in the aneurysm

https://doi.org/10.1258/0022215011908559 Published online by Cambridge University Press

which was at the carotid bifurcation and proximal internal carotid artery lying in the line of the jugular vein inferiorly. The jugular vein at the level of the aneurysm was compressed to a slit (Figure 1). A doppler ultrasound scan is very useful for initial assessment of a suspected vascular cause. A FNAC could also have disastrous consequences due to haemorrhage from an aneurysm and so the possibility of a vascular cause should always be considered when dealing with a neck mass.[4]

It was decided by the vascular surgeons to treat both aneurysms, due to the potential complications and also to reduce the compressive effects. Conservative management of extracranial internal carotid aneurysms have resulted in a mortality of nearly 71 per cent.[1,2,7] The most likely pathogenesis of the vocal fold palsy is due to compression or stretching of the vagus nerve by the aneurysm. A less likely possibility is either a transient or a permanent interruption to the blood supply to the nerve. If it was due to compression we would have expected immediate recovery after the stenting procedure.[8] In the case we report there has been no recovery of the vocal fold palsy after eight months. There are reports that it could be from six months to three years before total nerve recovery takes place.[9] We hope this will occur in our case but have discussed with the patient the possibility of vocal fold augmentation by teflon injection or thyroplasty.

References

1 Rossi P, Mirallie E, Pittaluga P, Chaillou P, Patra P. Bilateral extracranial aneurysms of the internal carotid artery – A case report. *J Cardiovas Surg* 1997;**38**:27–31

2 Zampella EJ, Ronderos JF, Zeiger E, Brock RJ. Bilateral aneurysms of the extracranial internal carotid artery. *Alabama J Med Sc* 1988;**25**:67–70

3 Ameli FM, Provan JL, Keuchler PM. Unusual aneurysms of the extracranial carotid artery. *J Cardiovas Surg* 1983;**24**:69–73

4 Masanori I, Taizo N, Kiyoshi S, Shozo I. Cervical carotid aneurysm presenting as transient ischaemia and recurrent laryngeal nerve palsy. *Surg Neurol* 1986;**25**:346–50

5 Alexander E Jr, Wigser SM, Davis CH. Biateral extracranial aneurysms of the internal carotid artery. *J Neurosurg* 1966;**64**:437–42

6 Nusbaum AO, Som PM, Dubois P, Silvers AR. Isolated vagal nerve palsy associated with a dissection of the extracranial internal carotid artery. *Am J Neuroradiol* 1988;**19**:1845–7

7 Winslow N. Extracranial aneurysm of the internal carotid artery: history and analysis of the cases registered up to August 1925. *Arch Surg* 1926;**13**:689–729

8 Coric D, Wilson JA, Regan JD, Bell DA. Primary stenting of the extracranial internal carotid artery in a patient with multiple cervical dissections: Technical case report. *Neurosurgery* 1998;**43**:956–8

9 Chan P, Lee CP, Ko JT, Hung JS. Cardivocal (Ortner's) syndrome left recurrent laryngeal nerve palsy associated with cardiovascular disease. *Eur J Med* 1992;**1**:492–5

Address for correspondence:
J. Mathews,
4, Appleford Close,
Appleton,
Warrington WA4 3DP, UK.
E-mail: john.mathews@virgin.net

Mr J. Mathews takes responsibility for the intetgrity of the content of the paper.
Competing interests: None declared