Iatrogenic Horner’s syndrome with abducent nerve paralysis after cervical schwannoma excision

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Abstract

Introduction
Horner's syndrome usually occurs after surgical intervention around the carotid artery. A complete intracranial course of abducent nerve prevents its injury during neck surgery. This paper reports a case of iatrogenic Horner’s syndrome with abducen nerve paralysis after cervical schwannoma excision.

Case report
We encountered an unusual complication in a 31-year-old female who underwent schwannoma excision under general anaesthesia. Patient developed Horner’s syndrome and lateral rectus palsy in immediate post-operative period. Post-operative investigations did not reveal any abnormality in abducent nerve. Patient was managed conservatively and improved. We believe that either both neural injuries occurred independently or cautery may have caused Horner’s syndrome and abducent palsy simultaneously.

Conclusion
Horner’s syndrome is known to occur in surgery near the carotid or sympathetic plexus. Although, abducent nerve palsy is rare in neck surgery the patient may be counselled in a case requiring hyperextension.

Introduction
Head and neck surgery has a potential for many complications but the majority of them are minor and managed easily.

Surgical intervention in the posterior compartment of the parapharyngeal space makes higher cranial nerves vulnerable to injury beside the sympathetic plexus around the carotid nerve. The complex anatomy of the region warrants surgical expertise for early identification structures to avoid major complications.

However, few complications are inexplicable after surgery and one such condition was encountered by us in cervical schwannoma excision. The patient developed Horner’s syndrome and abducens nerve paralysis in the postoperative period. Simultaneous presentation of Horner’s syndrome and abducens nerve palsy after neck surgery has not been reported in the literature. We present the first case report of this unusual complication, and we put forward a hypothesis to explain this neural injury.

Case report
A 31-year-old female presented with insidious onset of a lump in the right side of the neck for the past month. The lump was increasing progressively in size and causing dull pain in the neck and radiating to the right ear. There was no other contributory history.

On examination, we found a 3 x 4 cm, non-tender, firm, non-pulsatile and non-fluctuant mass just anterior to the upper part of the sternocleidomastoid. There was no other significant finding on clinical examination. We kept a possibility of lymphadenopathy and subjected the patients to investigations to clinch the diagnosis.

Fine needle aspiration cytology was performed and found features suggestive of schwannoma. Contrast enhanced computer tomography found a heterogeneously hypodense mass (50-80 HU) in the right parapharyngeal space that was displacing the external carotid anteriorly and internal carotid medially (Figure 1A & Figure 1B). These features were suggestive of schwannoma. Patient was planned for surgical excision under general anaesthesia.

Peroperatively, there was a 3 x 4 cm firm, lobulated swelling displacing the internal jugular vein laterally and appeared to be arising from cervical spine rootlets (C1).

The tumour was not adherent to the carotid sheath, and was excised with sharp dissection and monopolar cautery occasionally. The patient had comfortable immediate post-operative recovery.

On postoperative day 1, we found ptosis, miosis, facial anhydrosis, and lateral rectus palsy on the right side (Figure 2).

We kept the possibility of intra-operative sympathetic plexus injury leading to Horner’s syndrome and cerebro-vascular stroke causing abducens nerve palsy. Neurological consultation didn’t find any significant clinical feature. Magnetic resonance imaging of brain (Figure 3A & Figure 3B) also didn’t find any neural or vascular injury.

Doppler study of the neck found normal major vessels and parapharyngeal space bilaterally. The patient was started on oral corticosteroid and physiotherapy. Patients started showing improvement on the 5th post-operative day onwards.

Follow up at 10 weeks found no improvement in abducent nerve palsy but ptosis and miosis had improved.

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Discussion

The Claude Bernard-Horner's syndrome (Oculosympathetic paresis) commonly known as Horner's syndrome is due to injury to the sympathetic chain running over the carotid vessels. It is characterised by unilateral anhydrosis of the face, miosis, and ptosis. Horner's syndrome has been classified into three types: central, preganglionic and postganglionic\(^1\). Neck trauma and surgery cause pre and postganglionic Horner's syndrome.

Cervical sympathetic plexus get injured during surgery in the prevertebral fascia, paratracheal and posteromedial area of carotid vessels\(^2\). Post-surgical inflammation and haematoma can also lead to Horner's syndrome beside direct and indirect trauma to the sympathetic plexus\(^2\). Abducens cranial nerve arises in the brainstem just adjacent to the facial nerve nucleus. It exits at the pontomedullary junction, runs near petrous apex towards cavernous sinus where it is in close relation to the internal carotid artery. The long free course of abducens nerve makes it vulnerable to stretching and meningeal diseases\(^3\).

Abducent nerve paralysis after head and neck surgery is inexplicable due to its complete intracranial course. Iatrogenic abducent paralysis has been reported after maxillofacial surgery\(^4,5\), local and spinal anaesthesia\(^6,7,8\), and brainstem and spinal surgery\(^9,10,11\) but it is rare in neck surgery\(^12\). The most common mechanism of injury includes meningeal tear, stretching, and direct trauma to the skull base\(^13\).

K Tominaga reported a case of abducent nerve paralysis in a patient who underwent thyroidectomy with modified neck dissection\(^12\). This patient had contralateral internal jugular vein thrombosis and ipsilateral transverse sinus occlusion leading to pseudotumour cerebri. The author suggested that high intracranial tension in pseudotumour cerebri impaired extracranial venous flow that caused abducent nerve paralysis.

Simultaneous presentation of Horner’s syndrome and abducent nerve paralysis is known in the lesion of the posterior part of the cavernous sinus\(^14\). However; it has never been reported as a complication of neck surgery. The aetiopathogenesis of this clinical complication can be explained by reviewing the anatomy of the sympathetic nervous system. The superior ganglion of the cervical sympathetic system has lateral branches to upper spinal nerves (C1-4). Further, the internal carotid sympathetic plexus is also carried by the abducent nerve in the posterior part of the cavernous sinus\(^15\).

In the present case, the patient underwent schwannoma excision under general anaesthesia and developed Horner’s syndrome and abducent nerve paralysis in the immediate postoperative period.

Although, this abducent nerve palsy was a rare incidence and appeared to be idiopathic that we hypothesized two
mechanisms of this clinical entity: 1) Horner’s syndrome is possible in surgery of this area or C1 schwannoma while abducent palsy occurred due to hyperextension of the neck during surgery. 2) Other mode of injury could be due to monopolar cautery. Thermal effect reached abducent nerve through carotid sympathetic plexus, and caused Horner’s syndrome with abducent nerve paralysis. The normal MRI ruled out any vascular insult, and therefore first stated mechanism appeared to be the strong possibility.

Although, MR angiography could have delineated vascular injury better, in our opinion with normal MRI brain, this expensive investigation would not have changed the management or outcome of the palsy.

On review of this case report, we strongly advise for caution hyperextension and cautery use in the medial part of the parapharyngeal space as an unknown complication like abducent nerve paralysis can occur beside Horner’s syndrome.

Conclusion
Horner’s syndrome is known to occur in surgery near to carotid or sympathetic plexus. Although, abducent nerve palsy is rare in neck surgery the patient may be counselled in a case requiring hyperextension. Cautery should be avoided in the parapharyngeal area.

Consent
Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

References