The Journal of Laryngology and Otology
August 1995, Vol. **109**, pp. 770–771

Tongue paralysis following head trauma

ASHUTOSH KACKER, M.D., ARNOLD KOMISAR, M.D., D.D.S., RAJESH S. KAKANI, M.D., EDWARD REICH, M.D.*
LEWIS ROTHMAN, M.D.**

Abstract
Paralysis of the tongue due to isolated bilateral hypoglossal nerve palsy is a rare occurrence. Due to a trauma the cause in our case may have been a traction injury to both hypoglossal nerves at the base of skull. In some cases a contributing factor may be malformation of the skull base. Most cases have a good prognosis for recovery.

Key words: Tongue; Hypoglossal nerve; Paralysis; Head injuries

Introduction

Isolated total paralysis of the tongue is a rare occurrence. The usual cause is due to trauma to both hypoglossal nerves at the base of skull. This is usually a traction injury where the hypoglossal nerve crosses the upper cervical vertebrae or within the hypoglossal canal. This is an extremely rare occurrence with only five other cases reported in the literature out of which three are post-traumatic (Bageant *et al.*, 1975); Macedo *et al.*, 1988; Brennan *et al.*, 1993). We present a case for its rarity and the associated malformation of the occipital bone and cervical vertebrae which may have contributed to this injury.

Case report

A 45-year-old man was admitted to Lenox Hill Hospital, New York, with severe dysarthria and dysphagia after sustaining head trauma due to a fall on the street. The patient had many episodes of vomiting after the fall. There was no loss of consciousness, and vital signs were stable on admission. On examination there were no haematomas or abrasions of the head or neck. Neurological examination revealed total tongue paralysis, with the patient unable to elevate, protrude or move the tongue from side-to-side. There was pooling of saliva in the mouth. The remainder of the cranial nerves including the bulbar cranial nerves were normal.

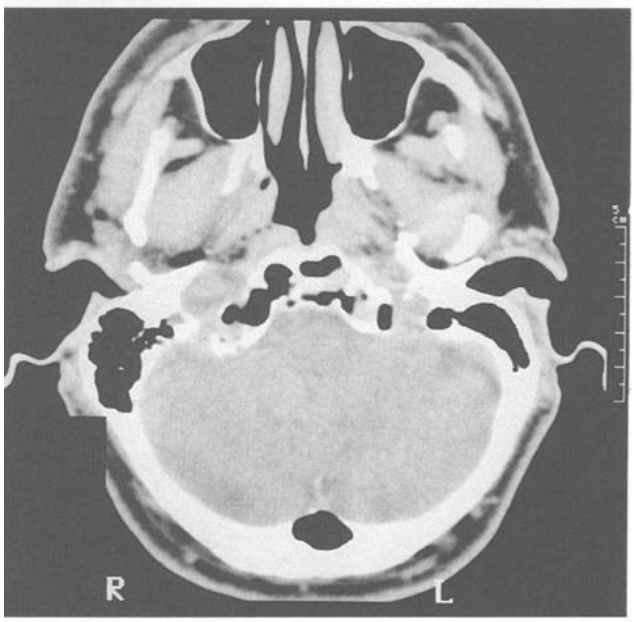

FIG. 1
Axial CT scan showing pneumatization of occipital bone.

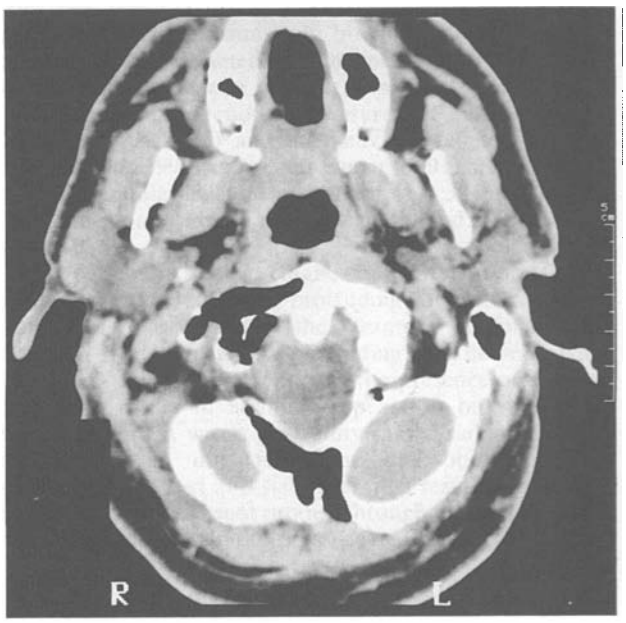

FIG. 2
Axial CT scan showing extensive pneumatization of cervical vertebra, occipital bone, petrous apex, and clivus.

From the Department of Otolaryngology, Neurology* and Radiology†, Lenox Hill Hospital, 100 E 77th Street, New York, USA.
Accepted for publication: 15 May 1995.

A CT scan revealed extensive pneumatization of the base of the skull including the clivus and bilateral occipital condyles and the cervical vertebrae (Figures 1 and 2). Magnetic resonance imaging (MRI) of the brain revealed no brain stem injury. Magnetic resonance angiography (intracranial and extracranial) revealed no vascular abnormality, aneurysm or flow disturbance. Bone scan revealed no abnormalities in the skeletal system. A bone biopsy from the cervical spine was performed to rule out a neoplastic lesion involving the spine. The biopsy was read as a lymphangioma. A diagnosis of isolated bilateral hypoglossal nerve palsy in association with a bone malformation was made. The patient was treated with intravenous corticosteroids, swallowing and speech therapy. The patient made a rapid recovery with side-to-side movement returning first followed by the ability to elevate the tongue. The patient was discharged after he had made a significant improvement in swallowing and speech, although full function had not returned after two weeks. At follow-up, at seven months, tongue function had improved.

Discussion

The hypoglossal nerve innervates the tongue and controls its functions which are swallowing and articulation. Single hypoglossal nerve paralysis is the most commonly seen injury to this nerve. Any trauma to the nerve will lead to dysphagia and dysarthria which is usually not prominent with unilateral paralysis. The more common aetiologies include cerebrovascular disease, viral infections, trauma, and iatrogenic causes (radiation and surgery), collagen vascular disorder, vascular entrapment and subluxation of the first cervical vertebra. Bilateral paralysis of the hypoglossal nerve is a very rare occurrence. The causes reported in the literature are vertical subluxation of the odontoid, carotid artery surgery, radiotherapy and head trauma (Bageant *et al.*, 1975; Kenrick *et al.*, 1977; Macedo *et al.*, 1988; Johnston *et al.*, 1989; Brennan *et al.*, 1993).

We could find only three reported cases of isolated post-traumatic bilateral hypoglossal nerve paralysis. Of these, two had complete resolution of dysarthria and one had partial resolution (Kenrick *et al.*, 1977; Brennan *et al.*, 1993). Another unusual finding in our patient was the presence of a skull base malformation, also extensive pneumatization of the occipital bone and cervical vertebrae.

There was no clear mechanism of injury to the hypoglossal nerves in this patient. Since all other nerves were spared, and the CT scan and MRI of the brain were normal, intracranial pathology was unlikely. We believe, as has been previously proposed, that in these cases the hypoglossal nerve becomes stretched across the transverse process of the first cervical vertebra during hyperextension at the cranio–cervical junction (Kenrick *et al.*, 1977; Macedo *et al.*, 1988; Brennan *et al.*, 1993). Other mechanisms such as brain stem traction, subluxation of the odontoid process and vascular compromise may also contribute to the aetiology. Additionally in our patient extensive pneumatization of the cervico-occipital area may have predisposed him to this kind of injury.

The progressive recovery of function, as shown by patients in other series suggests a neuropraxia type of nerve damage. In our patient side-to-side movement returned first before the ability to elevate the tongue.

Conclusions

Isolated bilateral hypoglossal nerve palsy is a rare finding after trauma. It is probably due to traction on the hypoglossal nerve across the transverse process of the first cervical vertebra during the hyperextension of the cranio–cervical junction. It usually recovers as it is a neuropraxia type of injury. It should be considered in patients with head injury who complain of dysphagia and dysarthria.

References

Bageant, T. E., Tondini, D., Lysons, D. (1975) Bilateral hypoglossal nerve palsy following a second carotid endarterectomy. *Anaesthesia* **43:** 595–596.

Brennan, R. J., Shirley, J. P., Comptom, J. S. (1993) Bilateral hypoglossal nerve palsies following head injury. *Journal of Emergency Medicine* **11:** 167–168.

Johnston, E. F., Hammond, A. J., Cairncross, J. G. (1989) Bilateral hypoglossal palsies: a late complication of curative radiotherapy. *Canadian Journal of Neurological Sciences* **16:** 198–199.

Kenrick, M. M., Bredfeldt, R. C., Sheridan, C. D., Monroe, A. D. (1977) Bilateral injury of the hypoglossal nerve. *Archives of Physical Medicine and Rehabilitation* **58:** 578–582.

Macedo, T. F., Gow, P. J., Heap, S. W., Wallis, W. E. (1988) Bilateral hypoglossal nerve palsy due to vertical subluxation of the odontoid process in rheumatoid arthritis. *British Journal of Rheumatology* **27:** 317–320.

Address for correspondence:
Dr Arnold Komisar, M.D., D.D.S.,
1317 Third Avenue,
New York,
NY 10021,
USA.