



## Case of Idiopathic Unilateral Hypoglossal Nerve Paralysis

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### ABSTRACT

Hypoglossal nerve palsy is usually associated with glossopharyngeal nerve, vagus nerve, and accessory nerve palsy, occurrence of isolated hypoglossal nerve palsy alone is rare. Here we report a case of a 38-year-old man who is k/c/o chronic kidney disease ESRD on hemodialysis /HTN with unilateral isolated hypoglossal nerve palsy. The patient complained of a rightward deviation of the tongue and difficulty in drinking water and swallowing food. No cause could be identified even after all comprehensive investigations. Neurologist and ENT specialist consultation was obtained. Early referral to speech and language therapist done and patient symptoms improved.

**KEYWORDS** Hypoglossal Nerve Paralysis, CKD, Hemodialysis.

### I. INTRODUCTION

The hypoglossal nerve, also known as the 12th cranial nerve, has a primary motor function. The nerve arises from the hypoglossal nucleus of the medulla oblongata. This nerve is involved in controlling the tongue movements necessary for speaking and swallowing. Damage to the nerves or the pathways that control them can affect the ability and appearance of the tongue[1]. HNP is an indicates vascular abnormalities, infections, autoimmune diseases, neuropathy, head and neck injuries, and lesions that occupy intracranial or extracranial space[2]. Idiopathic cases are reported infrequently, and the vast majority of IHNP cases are recoverable. The most common causes of nerve paralysis are traumatic or surgical injuries and motor neuron disease. Idiopathic hypoglossal nerve palsy is a rare condition characterized by isolated hypoglossal nerve dysfunction that causes weakness and deviation of the tongue. Although it has hardly been reported. Understanding this condition is important to ensure accurate diagnosis and treatment of this condition [3]

### II. CASE PRESENTATION

A 38-year-old male patient complained of slurring of speech, deviation of tongue to the right side, and difficulty drinking and eating for 15 days. He is known to have end-stage chronic kidney disease and is on hemodialysis, HTN, no history of drug abuse, no H/O for recent neck injury, His physical examination revealed an isolated hypoglossal nerve paralysis with his right tongue deviation as represented in Fig 1., no evidence of other cranial nerve damage, no muscle paralysis, no sensory loss, no evidence of meningeal irritation, cardiovascular and respiratory, or gastrointestinal system normal initial investigation including electrocardiogram, chest x-ray, complete blood count, electrolytes, renal function, blood glucose, inflammatory markers, and liver function tests were normal. Regarding CT brain, carotid angiography was performed to look for internal carotid artery dissection, stroke which was normal.



**Figure 1., Isolated hypoglossal nerve paralysis with his right tongue deviation**

Further tests such as ANA, HIV serology, syphilis serology, and vitamin B12 were all normal.. A head and neck MRI with magnetic resonance angiography (MRA) was ordered for further evaluation. No abnormalities were observed in these. CISS sequences show that the hypoglossal nerve arises bilaterally from the medulla and appears normal in terms of signal and intensity



along the path within the hypoglossal canal. Bilateral facial and vestibulocochlear nerve origin from pons along the course within the internal auditory canal normal in signals and intensity. The Neurologist and ENT surgeon consultation done. patient referred to the speech and language therapist. They recommended specific regular exercises and follow-up. Patient follow-up was done after 3 months the neurological deficient remained, and symptoms improved on speech therapy

### III. DISCUSSION

Hypoglossal Nerve, 12th Cranial Nerve. It serves primarily a somatic efferent (motor) nerve, the hypoglossal nerve primarily innervates the tongue musculature. The tongue vessels and glands in the oral mucosa [4]

There are four branches the meningeal, descending, thyrothyroid, and muscular branch. The hypoglossal nerve, which arises from the hypoglossal nucleus. The muscular/lingual branch is a general somatic efferent (GSE) branch and innervates all the muscles of the tongue (both intrinsic and extrinsic), except for the palatoglossus, which receives motor innervation from the vagal nerve (CN X). The muscular branch controls most actions of the tongue including, protruding, retracting, depressing the tongue, and changing the tongue's shape [5] [6]

The pathway of the hypoglossal nerve originates in a pair of hypoglossal nuclei below the medulla oblongata. The nerve exits the medulla oblongata and divides into two parts before passing through the hypoglossal canal of the occipital bone of the skull. Nerves form, descend through the neck to the angle of the jaw, and pass under the tongue to innervate the muscles of the tongue. [5]. The hypoglossal nerve may be damaged in the hypoglossal nucleus (nucleus), above the hypoglossal nucleus (supranucleus), or interrupted in the motor axons (subnucleus). Such damage causes paralysis, fasciculations (marked by the wavy appearance of the tongue), and eventually atrophy of the tongue muscles. When either nerve is damaged, overuse of the strong genioglossus muscle causes the protruding tongue to shift toward the damaged nerve. Supranuclear lesions occur in the cerebral cortex, the corticobulbar tract of the internal capsule, the peduncle, and the pons. Supranuclear lesions usually do not cause atrophy, but the tongue may become slow and spasmodic. Supranuclear lesions are often the result of stroke, but can also be caused by pseudobulbar palsy.

Infranuclear and nuclear lesions cause weakness of the tongue but additionally cause

ipsilateral atrophy. Lower motor neuron disease can also cause fasciculation when localized to the lower motor neurons. Unilateral lesions usually do not pose a serious problem for patients because the residual hypoglossal nerve partially offsets the damage. However, with bilateral lesions, which can cause significant function impairment. The hypoglossal nerve can be unilaterally damaged by many causes, most notably a tumour, infection or trauma. Trauma includes surgical trauma such as carotid endarterectomy (a surgery to remove plaque from the carotid artery). Rarely, radiation therapy can cause bilateral hypoglossal nerve paralysis [4]. HNP commonly occurs with other neurological abnormalities in a variety of diseases. Brain stem lesions like infarct, hemorrhage often affect the nuclei and pathways, and skull base lesions often simultaneously affect other cranial nerves [7]. Other known causes include vertebral artery dissection, nasopharyngeal cancer, Chiari malformation, and dural arteriovenous fistula [8]. These disparate etiologies emphasize the need for comprehensive medical evaluation in the case of HNP. Isolated hypoglossal nerve palsy of various aetiologies are rare and mainly reported as case reports [9]. A careful history is essential when considering these possibilities. Focused patient history, about recent head and neck trauma, infections, presence of metastatic disease at the skull base, iatrogenic cause like carotid endarterectomy and submandibular gland excision [10]. Most are idiopathic, while other causes include radiation induced neuropathy, infectious mononucleosis, metastatic disease at base of skull, sarcoidosis, vasculitis, multiple sclerosis and hypoglossal nerve schwannoma [2,11]. When a cause can be determined, one-third is due to malignancy [9,12]. In Arnold-Chiari malformation, the cerebellar tonsils and medulla are malformed and herniate through the foramen magnum causing progressive hydrocephalus with mental retardation, optic atrophy and ocular palsies, and spastic paralysis of the limbs occurred [13]. In dural arteriovenous fistula of the transverse sinus the patient may have hypoglossal palsy resulting from ischemia in the region of the hypoglossal nucleus. MRI and CT studies would aid in the diagnosis of the two latter conditions and also reveal any carotid artery dissection/aneurysm or periostitis of the hypoglossal canal (where narrowing of the hypoglossal canal would be evident). In syringobulbia, patients may present with wasting and weakness of the hands and arms with loss of pain and temperature sensation distribution [14]. MRI allows direct visualization of different segments of hypoglossal nerve and find out the



lesion. It is the investigation of choice for idiopathic hypoglossal nerve paralysis [15]. None of the above signs and symptoms were detected in our patient. Diabetes was excluded by random blood glucose and there was no history of trauma surgery. The patient had not received any intravenous treatment and the CT and MRI did not demonstrate any intracranial tumour. Basic and special hematological investigations, radiological investigations and infectious agents serology were also negative and the etiology of the hypoglossal nerve palsy remained unknown. Thus with a diagnosis of exclusion, the clinician can make a true diagnosis of idiopathic IHNP. The patient was followed up 3 months later, when he claimed to have adapted to the situation and reported no problems in swallowing, chewing or speaking.

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