Case Report

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Internal Medicine Section

An Upper Motor Neuron Lesion Causing an Isolated Unilateral Lingual Paresis: A Case Report

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ABSTRACT

A Cerebrovascular Accident (CVA) is a primary cause of mortality and morbidity globally, presenting with a diverse range of appearances contingent upon the location of the infarct. Isolated hypoglossal nerve supranuclear palsy is an uncommon clinical manifestation of ischaemic stroke, typically associated with pre-existing vascular risk factors. The neurological finding of isolated unilateral lingual paresis is rarely observed. While Lower Motor Neuron (LMN) lesions involving the hypoglossal nerve (cranial nerve XII) are extensively described, Upper Motor Neuron (UMN) aetiologies are less commonly noted. This case report discusses solitary unilateral lingual paresis resulting from an UMN infarction, emphasising the clinical manifestation, diagnostic difficulties, and underlying pathophysiology. A 62-year-old individual with type 2 diabetes exhibited dysarthria without accompanying neurological deficits. The Magnetic Resonance Imaging (MRI) revealed an acute non-haemorrhagic infarction in the left corona radiata. The patient demonstrated steady improvement while undergoing dual antiplatelet therapy, high-dose statins, and speech therapy. This case highlights a rare UMN cause of isolated hypoglossal nerve palsy.

Keywords: Cerebrovascular accident, Hypoglassal nerve palsy, Upper motor neuron lesion

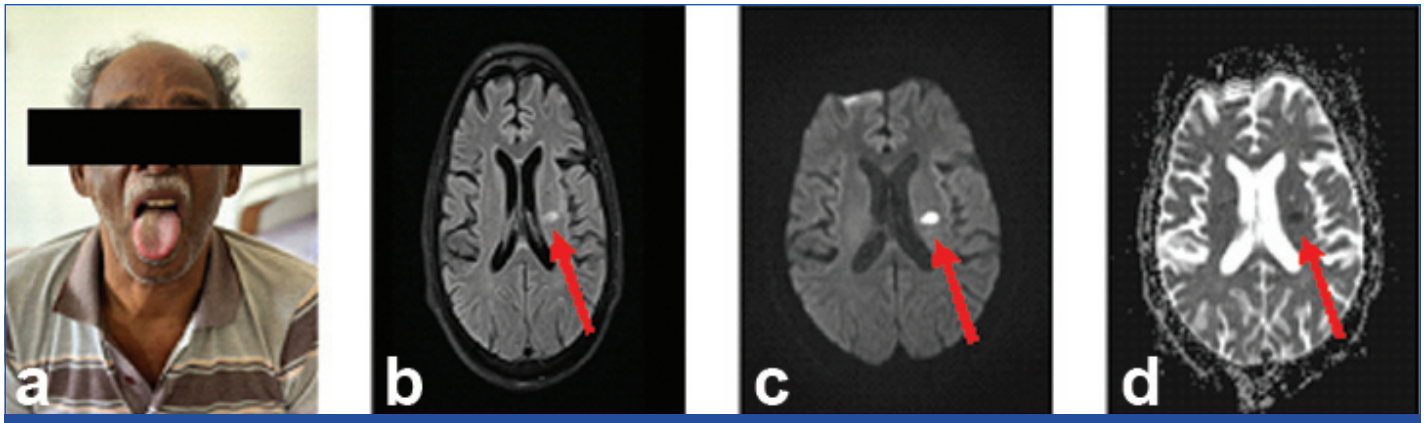
CASE REPORT

A 62-year-old male with a 15-year history of Type 2 Diabetes Mellitus (T2DM) was admitted to the hospital due to suddenly developed dysarthria. He denied experiencing symptoms such as weakness, dizziness, vision problems, sensory deficiencies, or difficulties walking. The patient had no history of hypertension, bronchial asthma, tuberculosis, or other chronic illnesses. He also denied any recent changes in his bowel and urinary habits, infections, or trauma.

On examination, the patient was conscious, oriented, and aware. His heart rate was 74 beats per minute, and his blood pressure was 160/90 mmHg. A capillary blood glucose level of 258 mg/dL indicated hyperglycaemia. Neurological evaluation revealed normal tone and strength in all four limbs, and all cranial nerves, apart from cranial nerve XII, were intact. Examination of the hypoglossal nerve showed deviation of the tongue to the right side, with no signs of atrophy or fasciculations [Table/Fig-1a]. The patient exhibited difficulty in articulating words (spastic dysarthria). The uvula and vocal cords appeared midline and symmetrical. A provisional diagnosis of supranuclear hypoglossal nerve palsy secondary to ischaemic stroke was established. Differential diagnoses, including an LMN lesion due to a compressive cause, were deemed less likely owing to the absence of muscle atrophy and the infarct's supranuclear location.

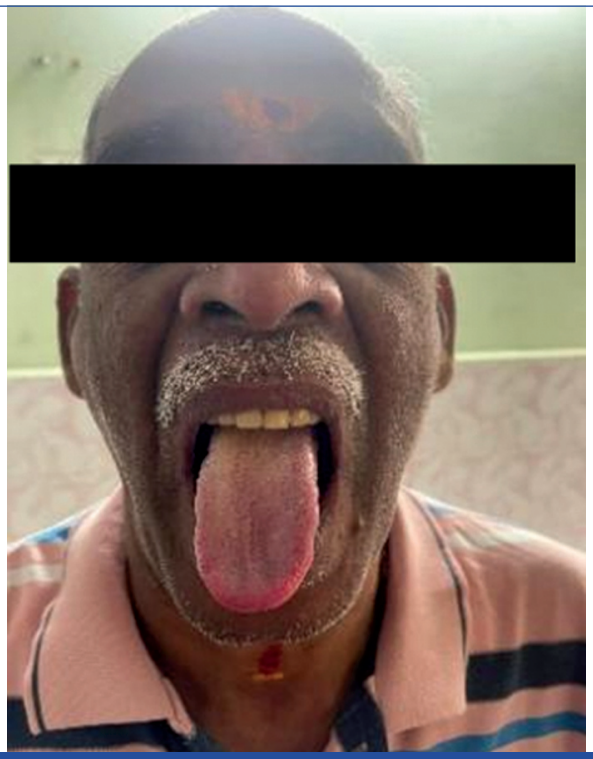
An MRI of the brain, including Magnetic Resonance Venography (MRV) and Magnetic Resonance Angiography (MRA), was performed. Imaging of the left corona radiata showed a distinct T2/Fluid-Attenuated Inversion Recovery (FLAIR) hyperintense region with diffusion restriction, consistent with an acute non-haemorrhagic infarct. A persistent lacunar infarct in the left lenticular nucleus was also discovered [Table/Fig-1a-d]. The dural venous sinuses exhibited normal signal intensity, ruling out any venous sinus thrombosis. A carotid Doppler examination revealed bilateral intima-media thickness, indicative of atherosclerotic alterations. Therefore, based on the patient's clinical presentation and imaging results, isolated hypoglossal nerve palsy and an acute non-haemorrhagic infarct in the left corona radiata were diagnosed.

Dual antiplatelet therapy (aspirin 150 mg and clopidogrel 75 mg once daily) and high-dose statins (atorvastatin 80 mg at night) were initiated for the patient immediately, with the aim of secondary prevention of ischaemic events. Speech therapy commenced on day 2 of hospitalisation and included tongue strengthening



[Table/Fig-1a-d]: In picture (a) Patient showing tongue deviation to the right-side; and (b) FLAIR image shows hyper intensity in the left corona radiate; (c&d) Diffusion Weighted Imaging (DWI) image showing diffusion restriction with corresponding low signal intensity in Apparent Diffusion Coefficient (ADC).

exercises, articulation drills, repetition tasks using high-frequency words, and oromotor coordination training. Speech was evaluated using the Frenchay Dysarthria Assessment (FDA-2) [1]. The patient initially scored low in tongue mobility and articulation subdomains, which improved significantly by week 4. Upon follow-up after two months, the patient showed marked improvement in speech clarity and tongue movement [Table/Fig-2]. A follow-up MRI was not repeated due to the patient's clinical improvement.



[Table/Fig-2]: Post-treatment.

DISCUSSION

Stroke has become increasingly common and is one of the main causes of disability worldwide [2,3]. The hypoglossal nerve, the last and often overlooked cranial nerve, primarily governs the motor innervation of the tongue, enabling mastication and articulation. Dysfunction may result from tumours, aneurysms, dissections, trauma, and various iatrogenic events, such as surgery, radiation therapy, or airway management [4]. Strokes typically present with hemiparesis, facial weakness, or speech disturbances, while isolated cranial nerve palsies are uncommon. Among these, isolated hypoglossal nerve palsy due to an Upper Motor Neuron (UMN) infarction is exceptionally rare [5]. Approximately 49% of hypoglossal nerve palsy cases are attributed to cancer, making it the most common cause. Trauma accounts for 12% of cases, while stroke is responsible for only 6%. Other identified causes of hypoglossal nerve dysfunction include multiple sclerosis (6%), surgical interventions (5%), Guillain-Barré neuropathy (4%), and infections (4%) [6].

Isolated unilateral lingual paralysis resulting from supranuclear infarction has rarely been reported in the literature. However, a few researchers have documented cases of Isolated Hypoglossal Paralysis (IHP) attributed to ischaemic infarction. Cruz PR et al., reported that IHP resulted from a lesion located in the inferior portion of the left precentral gyrus [7]. This finding suggested a supranuclear origin for the dysfunction, which is rarely observed in clinical practice. Urban PP et al., reported that lacunar infarction in the corona radiata occurred in a single patient out of seven with sudden isolated dysarthria due to a single ischaemic lesion [8]. Fukuoka T et al., reported a 66-year-old woman with isolated unilateral hypoglossal paralysis due to cerebral infarction in the centrum semiovale, while Kim J et al., described a 50-year-old woman presenting with sudden-onset dysarthria and rightward tongue deviation, with an infarct localised to the left corona radiata and basal ganglia, similar to this case [9,10]. The absence of fasciculations or atrophy, alongside normal findings on other cranial nerve examinations, confirmed the supranuclear nature of the lesion. The patient showed significant improvement within 10 days with appropriate management.

In this case, an UMN infarction resulting in isolated unilateral lingual paresis is an uncommon sign of a stroke. Rightward tongue deviation, without other cranial nerve impairments, was caused by the disruption of corticobulbar fibres that govern the right hypoglossal nerve, due to the stroke in the left corona radiata. This is an uncommon occurrence since bilateral corticobulbar innervation usually prevents hypoglossal nerve supranuclear injuries from causing overt clinical symptoms. All intrinsic and extrinsic muscles of the tongue are motorically innervated by the hypoglossal nerve (cranial nerve XII), except for the palatoglossus muscle, which receives its motor innervation from the vagus nerve. Because the tongue receives bilateral corticobulbar input, a unilateral supranuclear infarct frequently results in no discernible impairments, as the contralateral corticobulbar tract compensates [6]. Conversely, the genioglossus muscle, which is primarily responsible for tongue protrusion, is largely exposed to contralateral input. Since the intact genioglossus acts without opposition, an infarct affecting the corticobulbar tract can lead to contralateral tongue paralysis and deviation toward the affected side [4]. In this instance, the right genioglossus muscle lost contralateral innervation as a result of the ischaemia in the left corona radiata, leading to the rightward deviation of the tongue due to the unopposed activity of the left genioglossus. The absence of fasciculations or atrophy is indicative of lesions in the Lower Motor Neurons (LMNs).

The prognosis for supranuclear hypoglossal palsy is generally favourable due to the potential for neural plasticity and the intact LMN circuitry. The patient demonstrated steady recovery through targeted intervention. He was started on dual antiplatelet therapy (aspirin 150 mg and clopidogrel 75 mg daily) and high-dose statins (atorvastatin 80 mg daily) [11], in accordance with the POINT and CHANCE trials for secondary stroke prevention [12,13].

In addition, structured speech therapy significantly contributed to functional recovery. The therapy included tongue mobility and strength exercises, articulation drills, and phonation tasks (e.g., /ta/, /ka/, /la/). Progress was monitored using the Frenchay Dysarthria Assessment tool. Literature supports the use of such rehabilitative strategies to improve intelligibility and motor control following UMN-related dysarthria [1]. This case further reinforces the pattern of contralateral corticobulbar tract involvement in isolated supranuclear hypoglossal palsy. It contributes to the limited evidence base and highlights the clinical relevance of thorough neurological evaluation and neuroimaging in stroke patients with atypical cranial nerve presentations. Overall, this case illustrates how early recognition and integrated management, combining pharmacological therapy and rehabilitative interventions, can result in meaningful neurological recovery in rare stroke presentations.

CONCLUSION(S)

Isolated supranuclear hypoglossal nerve palsy is a rare clinical manifestation of ischaemic stroke. Timely diagnosis requires a high index of suspicion and a detailed neurological assessment. Neuroimaging plays a key role in lesion localisation. Early intervention with antiplatelet therapy, statins, and structured speech rehabilitation significantly improves outcomes. Clinicians should consider this rare presentation, especially in patients presenting with isolated tongue deviation and dysarthria.

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