

## Anatomic variations in the course of the hypoglossal nerve: A case report



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### ABSTRACT

To achieve a successful surgical anatomy a detailed knowledge of regional anatomy and anatomical variations is an important fundamental. The extra cranial hypoglossal nerve has a well described course as it traverses the neck, and is frequently identified during neck dissection. This serves a guide to the surgeon of such atypical variations in anatomy to avoid injury to important structures during dissection. We are presenting a case report which demonstrates the extra cranial variation of Hypoglossal nerve.

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### 1. Introduction

The hypoglossal nerve (CN XII) is twelfth cranial nerve and encountered during a great variety of surgical procedures in the neck and knowledge of its anatomy is paramount in preserving its function. Injury to hypoglossal nerve will disturb speech, hinder swallowing and plague the patient with tongue biting.<sup>1,2</sup> Weinstein et al studied that the normal anatomy of the hypoglossal nerve can be divided into descending, horizontal and ascending portions.<sup>2</sup> It exits through the hypoglossal canal medial to the internal jugular vein and internal carotid artery.<sup>3</sup> The hypoglossal nerve descends steeply and crosses the stylohyoid and digastrics muscles on their medial surfaces. Below the lower border of digastrics muscle the hypoglossal nerve turns in flat curve anteriorly and slightly upward. It crosses the internal and external carotid arteries medially.<sup>4</sup> It courses cephalad above the hyoid between the mylohyoid and the hyoglossus muscles accompanied by the lingual veins. Lesser's triangle is formed by the hypoglossal nerve and the two bellies of the digastric muscle with the hyoglossus muscle forming the 'floor' of the triangle. It enters the tongue by passing between anterior border of hyoglossus and genioglossus muscles.<sup>1</sup> Hypoglossal nerve palsy presented with clinical symptoms like deviation of the tongue to the same side of

injury, tongue biting, swallowing difficulty, tongue atrophy and dysarthria.<sup>5</sup>

### 2. Case report

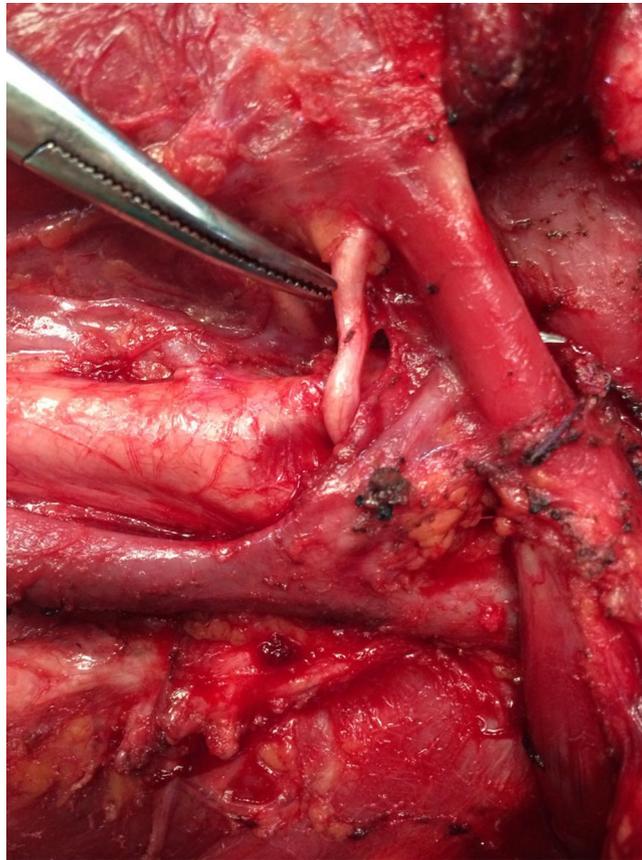
The patient is a 60 year old male who presented to us with a squamous cell carcinoma of left alveolus with palpable lymphadenopathy (T2, N1, M0). Surgery was planned and during neck dissection at level II the internal jugular vein was identified and the lymphoid tissue dissected away from its posterior border. On dissection superiorly, a nerve-like structure was noted crossing in between internal and external carotid artery just above the bifurcation. The structure was preserved and the rest of the neck dissection continued. Nerve was identified to be the hypoglossal nerve in anatomic variation (Fig. 1) and confirmed by MRI scan (Fig. 2).

### 3. Discussion

There is very few documented variation in courses of the hypoglossal nerve reported in the literature and this is one of the rarest variation of hypoglossal nerve travelling between the internal and external carotid artery. Weinstein et al. documented a single case of an inferiorly displaced hypoglossal nerve by a branch of the lingual artery.<sup>2</sup> There is three types of variations between the hypoglossal nerve and the origin of the occipital artery in 42 neck dissections which was noted by Nathan et al.<sup>6</sup> Curto et al reported in 110 neck dissections

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**Fig. 1.** Hypoglossal nerve passing between Internal and External Carotid Artery.

noted that the 12th nerve crossed superior to the carotid bifurcation in 98 specimens, at the level of the bifurcation in 11 and one passing below the bifurcation.<sup>7</sup> Lowy noted that in 8% of individuals, the 12th nerve passes behind the internal jugular vein.<sup>8</sup> M. Fokkema et al. studied patients undergoing carotid endarterectomy in the Vascular Study Group of New

England (VSGNE) between 2003 and 2011 and observed that hypoglossal nerve injured in 185 [2.7%] patient out of 9362.<sup>9</sup>

For surgeon a thorough knowledge of anatomy is mandatory to perform neck dissection and other neck procedure. Indeed, iatrogenic injury to this nerve has functional and litigious consequences. This case report serves to alert the operators.

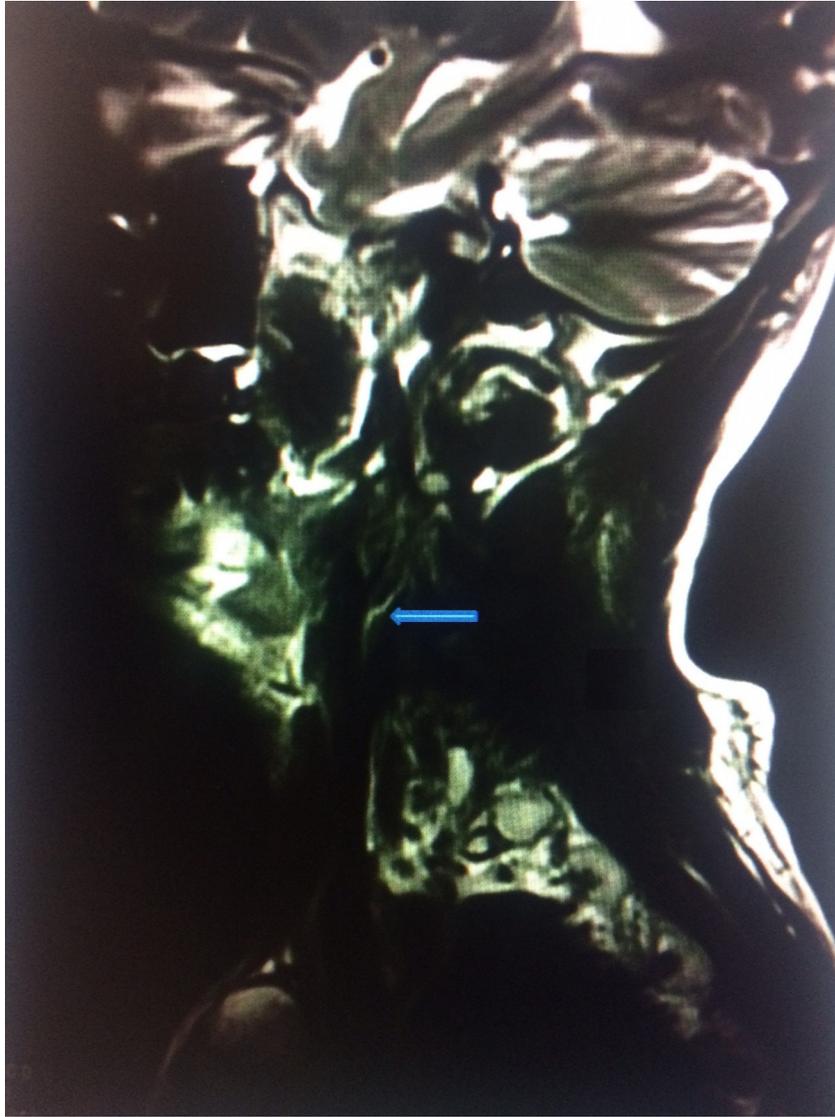


Fig. 2. Arrow showing nerve between carotids in MRI scan.

### Conflict of interest

There is no conflict of interest.

### Ethics statement/confirmation of patient permission

This is accidental finding as no prospective study was carried out. Patient identity is not disclosed and patient face, hospital no, age, sex etc has not been disclosed.

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