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Case Report

The Rarest Anatomical Variant: Spinal Accessory Nerve Passing Ventral to Internal Carotid Artery.

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Abstract: The aim is to make head and neck surgeons aware of a rare variation in the course of Spinal accessory nerve in relation to Internal carotid artery at higher level of neck dissection, thus minimizing anatomical surprises during neck dissection. Maxillofacial Surgeons often have to perform neck dissection to manage metastatic nodal diseases as in head and neck cancer and it is very important identifying and preserving the good and essentials while removing the pathological ones to the highest precision. Anatomy is the road map to perform a successful surgery. Knowing the variations of neck structures is important as the ignorance of the anatomical variations may lead to iatrogenic injury to vital structures during surgery thus leading to treatment failure. In this article we present a rare variation of SAN crossing ventral to the Internal Carotid Artery, found during a Supraomohyoid Neck Dissection (SOHND) of left side as a part of surgery along with Hemiglossectomy for a Squamous cell carcinoma (SCC) of left tongue. Knowledge of the rare variation of Spinal accessory nerve in neck in rerlation to its adjacent structures is important, as the major nerves and vessels play important roles as landmarks during head neck surgery. Iatrogenic injury to vital structures like Spinal Accessory Nerve (SAN) during neck dissection at Level IIb may lead to morbidity as shoulder syndrome though oncological clearance of this level of lymph nodes is of utmost importance. The SAN is considered as the landmark of the anteroinferior border of Level IIb and may cross the Internal Jugular Vein (IJV) dorsally, ventrally or through the vein. So it is important to know the variations of Spinal accessory nerve in relation to major blood vessels of neck to avoid any anatomical surprises during surgery.

Keywords: Spinal accessory nerve, Internal carotid artery, Supraomohyoid neck dissection, level IIb lymph nodes, Carcinoma of tongue

BACKGROUND

Ever since the time of George Crile (1906) who first described the Neck Dissection (ND), this surgical procedure has its important role in the management of head and neck cancers [1, 2]. The art of surgery mainly focuses on identifying and preserving the good and essentials while removing the pathological ones to the highest precision. The key to achieve this fate is the road map, i.e Anatomy. During neck dissection at upper neck, the surgical clearance of level II lymph nodes is essential as nodes of this level may be involved from 0% to 22% by metastasis in oral cavity cancer [2]. Neck level IIb can be identified by following the spinal accessory nerve as the nerve crosses this level obliquely from superoinferior to mediolateral direction, either dorsal to IJV, ventral to IJV or through the IJV, after coming out of skull base through jugular foramen, as found in english literature review [1]. This article presents a case report of rare variation of spinal accessory nerve, crossing the Internal carotid artery (ICA) ventrally while descending down to its course. This variation has never been documented till date at any English language literatures as far our knowledge is concerned.

CASE DESCRIPTION

A 55 years old female patient reported to us with a ulceroproliferative lesion of left tongue and diagnosed as squamous cell carcinoma (SCC) of tongue. This patient underwent Hemiglossectomy and Supraomohyoid Neck Dissection (SOHND) of left side. During dissection at level IIb, it was noted that the SAN is crossing the ICA ventral to it while descending down postero-laterally after coming out of jugular foramen (Fig.1).

As this finding in relation to SAN is rarest at this level of neck dissection, we felt the need to add this

variation of SAN course to the knowledge of Head and Neck Surgeons to avoid anatomical surprises during neck dissection in future.

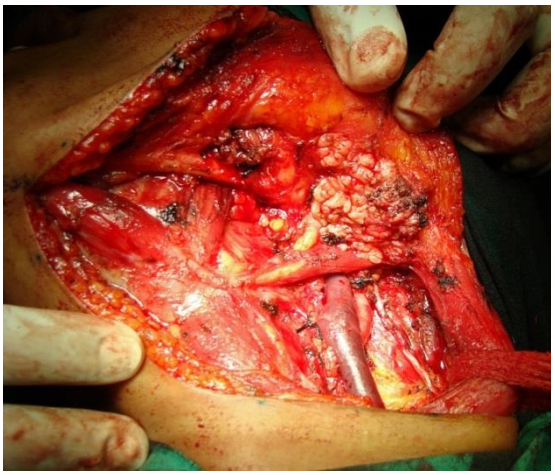

Fig-1: The SAN is crossing down ventral to ICA

DISCUSSION

It is important to understand from oncological point of view that the first objective to preserve the SAN during upper level neck dissection is to prevent the shoulder syndrome [3, 4]. The SAN makes the anteroinferior boundary of level IIb [1] and at this level the SAN passes through the "lymphatic container" of this region of neck which makes the surgeon to plan to dissect across the fibro fatty tissue [3]. As the dissection approaches, the IJV is generally encountered anteromedially, which the SAN crosses either dorsally (57.4%), ventrally (39.8%) or through the IJV (2.8%) [1]. Presence of rare variation as described here in this present case report, that the SAN is descending down ventral to the ICA, the surgeon may land upon ICA while SAN is followed during the dissection.

CONCLUSION

The exploration of major structures of neck, like SAN, IJV and ICA, along with their correlations and variations are essential for anatomical knowledge of neck. it is very important to know the possible and rare variations to choose the surgical approach by the head and neck surgeons, and for the vascular surgeons, neurosurgeons and interventional radiologists, to avoid anatomical surprises during intervening the neck region.

CLINICAL SIGNIFICANCE

This variation may confuse the surgeon to identify the Erb's point [5], where the SAN exits the posterior border of the sternocleidomastoid muscle at an average 1.53cm above the point, in a deeper layer above the investing deep fascia. Surgeons can also identify the accessory nerve at its entry point into the sternocleidomastoid muscle which is the perspective of the nerve identification during modified radical neck dissection [6]. The course of the SAN ventral to ICA as mentioned here, may lead the surgeon to dissect deeper down to identify the SAN, thus increasing the risk of iatrogenic damage to SAN, IJV or ICA during neck dissection.

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