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Significance of Duplicated Internal Jugular Vein in neck dissections; a rare Case Report

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ABSTRACT

Introduction: This presentation aims to report an unusually duplicated Internal Jugular Vein that presents a significant surgical difficulty.

Case Presentation: A 45-year-old woman diagnosed with squamous cell carcinoma of the lower gingivo-buccal sulcus on her right underwent right modified radical neck dissection type II with reconstruction using pectoralis major myocutaneous flap, followed by broad local excision of the lesion with right Hemi-mandibulectomy. The right side's IJV duplication into the anterior and posterior divisions was discovered during level IV dissection in MRND. After surgery, nothing unusual happened. To avoid iatrogenic harm to IJV during neck dissections, it is helpful to be aware of the many IJV abnormalities. After a contrast-enhanced CT scan, IJV abnormalities are only described in a few cases.

Conclusion: When dissecting lymph nodes in MRND, a meticulous anatomical delineation combined with a preoperative evaluation of contrast-enhanced CT images of the face and neck is quite helpful.

Keywords: IJV duplication; IJV anomaly; Neck dissections; MRND

INTRODUCTION

The primary vein supplying the head and neck tissues, the internal jugular vein (IJV), has anatomic abnormalities that are not often recognised. To the best of our knowledge, 29 instances of duplicated IJV with a 0.9% prevalence have been documented to date [1]. Based on morphological features, Nayak et al. (2017) divided duplicated IJV abnormalities into Types A, B, and C [2]. Two of the five type C IJVD cases that have been documented are bilateral [2]. We have another example of this kind, which is our case—a type C categorisation with unilateral duplication. The purpose of this presentation is to describe an uncommon

duplicated IJV that presents significant surgical challenges and necessitates delicate dissection and more time to avoid damage and catastrophic haemorrhage.

CASE REPORT

We report the case of a 45-year-old female patient who came to our institute in July 2024 with squamous cell carcinoma of the right lower gingivo-buccal sulcus in the T4a N2c M0 stage **(Figure 1)**.

Figure 1: squamous cell carcinoma of the right lower gingivo-buccal sulcus in the T4a N2c M0 stage

She had right hemi-mandibulectomy and right modified radical neck dissection (MRND) type II for extensive local excision of the lesion, conserving the spinal accessory nerve and the inferior ischium, and sacrificing the sternocleidomastoid with reconstruction using the pectoralis major myo-cutaneous flap (PMMC) **(Figure 2)**.

Figure 2- shows the postoperative image of a patient who underwent wide local excision of the lesion with right Hemi-mandibulectomy and right modified radical neck dissection and pectoralis major myo-cutaneous flap.

Duplicate IJV was not known to our operational staff. On the right side, duplication of IJV into anterior and posterior division was seen after level IV dissection in MRND **(Figure 3)**.

Figure 3- duplication of IJV into anterior and posterior division was noted on the right side.

IJV duplication began in the vicinity of the hyoid bone. The anterior and posterior divisions of the IJV initially flowed into the right subclavian vein, but the two divisions remained distinct. The vagus nerve and accessory nerve both continued along their regular anatomical paths. Even after the IJV's anterior and posterior divisions were preserved, adequate lymph node clearance was still achievable. Determining the architecture and course of IJV took longer than normal because the duplication was previously unknown. Recovery from surgery went smoothly. There was no incident throughout the recovery time. On the fourteenth postoperative day, the patient was released with satisfactory clinical progress. To prevent damage to the vascular structures in the neck, a preoperative examination of a contrast-enhanced CT scan of the face and neck is required **(Figure 4)**.

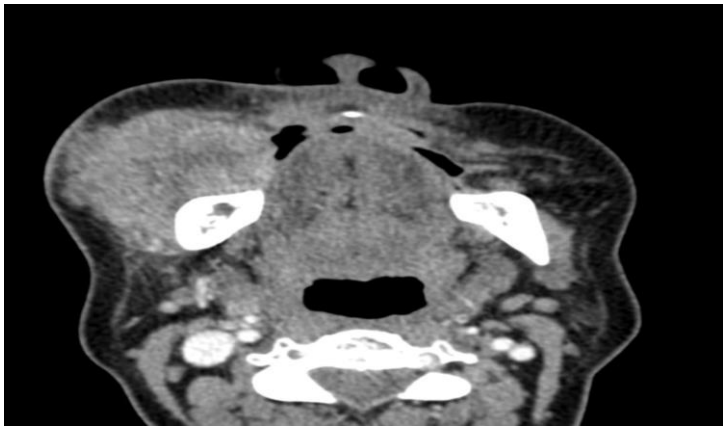

Figure 4: Preoperative CT scan of face showing lesion of size 7.3 x 5.2 x 3.1 cm involving right lower gingivobuccal sulcus.

DISCUSSION

Head and neck procedures often include the vascular structures such as the carotid artery and internal jugular vein (IJV). When performing preventative or therapeutic lymph node dissections in the neck, the anatomical path of the IJV is used as a point of reference. For medication delivery, volume resuscitation, and central venous pressure monitoring following the implantation of the central venous catheter, anaesthetists also consider the location of the IJV to be clinically relevant. It is even more difficult to prevent harm and catastrophic bleeding in these cases when there is anatomic variance such as IJV duplication. Case reports and case series are used to calculate the prevalence of IJV duplication. According to a recent research by Wang et al. (2020) [3,1], it is around 0.9% and 0.4% in Prades et al. (2002). Understanding the various IJV abnormalities can help to prevent iatrogenic damage to the IJV during neck dissections. Additionally, it guards against damage to the spinal accessory nerve during its passage through the IJV duplication [2]. These IJV abnormalities lack a well-defined aetiology [1]. To explain these abnormalities, however, a number of vascular, neurological, skeletal, and muscular theories have been put forth [4,5]. IJV duplication abnormalities were categorised by Nayak et al. (2017) according to their morphological patterns, each of which has a unique set of possible clinical consequences [2].

Type A

Beginning above the level of the inferior border of the posterior belly of the digastric muscle, the IJV is visible. Duplicate veins unite above or near the level of the omohyoid muscle's central tendon. For the duration of their journey, duplicated IJVs were contained in the carotid sheath.

Type B

The inferior omohyoid tendon is the continuation of the caudal portion of duplicated IJV. The sole distinction between type B and type A is this.

Type C

At the level of the hyoid bone is where the duplication begins. The posterior component travels via the posterior triangle of the neck, passes lateral to the omohyoid muscle, and then enters the carotid sheath near the root of the neck.

Based on Nayak et al.'s categorisation, our case falls within Type C. Before neck dissections, preoperative planning requires the utilisation of a three-dimensional, surface-rendered CT scan [6]. IJV abnormalities, however, are only reported in a small number of instances following a contrast-enhanced CT scan, which illustrates how little consideration is given to the venous system when a pathologic adenopathy is present [1]. Intraoperative direct visualisation is the most widely used diagnostic technique documented in the literature for the identification of duplicated IJV [7]. The path of a duplicated IJV is comparable to a bullet's unusual trajectory in gunshot wounds [8]. As a result, working close to vascular structures shouldn't be done in the dark.

CONCLUSION

Hence, knowledge of the various courses of duplicated IJV and meticulous, impartial anatomical delineation are required for lymph node dissection in MRND. In every case where a neck dissection is planned, we also advise a preoperative examination of a contrast-enhanced CT scan of the face and neck.

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