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Phlebactasia A Unique Anatomical Variation: A Case Series

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Abstract
Background *Internal jugular vein (IJV) ectasia is an uncommon condition, often presenting as a soft, compressible neck swelling that exacerbates with actions increasing intrathoracic pressure, such as straining or coughing. This condition typically affects one side of the neck and is more common in children and young adults. The IJV plays a crucial role in draining the head and neck and is an important surgical landmark for various structures. Deviations from normal IJV anatomy due to embryological dysgenesis can lead to significant clinical implications, particularly during surgical procedures.*
This article presents four cases of patients who were incidentally found to have abnormal IJV during neck dissection for head and neck cancers. These cases highlight the importance of recognizing IJV variations to avoid surgical complications. The discussion includes the anatomy and function of the IJV, the rare condition of phlebectasia, and the potential complications of such anomalies. Increased awareness and further research into these anatomical variations are necessary to improve surgical outcomes and reduce morbidity.
Keyword: *Phlebactasia, Internal Jugular Vein, Common Crotid Artery*

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I. Introduction

Internal jugular vein (IJV) ectasia normally manifests as a soft, compressible swelling in the neck that usually gets worse when one does actions that raise intrathoracic pressure, like straining, the Valsalva manoeuvre, sneezing, or coughing. This condition is usually unilateral. It is frequently seen in young adults or children.[1]

IJV is the main venous drainage of the head and neck and is the continuation of the sigmoid sinus. It travels down the neck through the carotid sheath, along with the common carotid artery (CCA), the internal carotid artery (ICA), the vagus nerve, and the deep cervical lymph nodes. The IJV joins with the subclavian vein posterior to the sternal end of the clavicle and forms the brachio-cephalic vein. Deviations from the normal anatomy due to embryological dysgenesis cause a variety of clinically significant anatomical variations. The IJV serves as a major surgical landmark for structures such as the spinal accessory nerve (SAN), the carotid artery, and cervical lymph nodes. Hence, the altered anatomy of the IJV is of significance as the landmark may be misinterpreted if not identified correctly. Besides anatomical variations, dimensions of IJV are of significant clinical interest; hence, various imaging modalities like color doppler ultrasonography(USG), magnetic resonance imaging (MRI), computed tomography (CT) are used to measure IJV dimensions.

II. Case Report

Case-1

A 60-year-old male presented to the surgical oncology OPD with a 2-month history of an unhealed ulcer in the right mandibular alveolus. He had a history of hypertension since 5 years and tuberculosis since 10 years. On palpation ulcer was hard and non-fluctuant, and lymph nodes in levels IB and II were tender, hard, and approximately 3x4 cm. Biopsy, CECT, and CEMRI confirmed CT4aN1M0. He underwent composite resection with hemimandibulectomy, modified neck dissection type II (levels I-V), and reconstruction with a PMMC flap. An enlarged IJV of approx. size of 2cm was discovered during neck dissection. (Figure- 01)

Case-2

A 40 year old female reported to OPD with the chief complaint of unhealed ulcer in the lower left region since 2 years. Patient gave history of diabetes since 15 years, hyperthyroidism since 10 years. Patient had habit of tobacco chewing since 15 years and biddi smoking since 20 years. Ulcer was erythematous, indurated margins, bleed readily on touch. It was extending from premolar to the retromolar region. Tooth mobility was noted in relation to 1st and 2nd premolar, 1st, 2nd molar. On lymph node examination level IA(2X1cm), IB(2X3cm), II(3X3cm) and III(1X1cm) was tender, flacuant and hard on palpation. According to biopsy, CECT head and neck conformed as squamous cell carcinoma with CT4aN1M0.patient underwent composite resection with hemimandibulectomy and modified neck dissection type II upto level I-V lymph nodes and reconstruction using PMMC (pectoralis major myocutaneous) flap. During neck dissection found enlarged IJV approx. 1.7cm in size. (Figure-02)

Case- 3

A 55year old female reported to OPD with the chief complaint of unhealed ulcer in the upper alveolar region since 2 years. Patient gave history of diabetes since 10 years. Ulcer was erythematous, indurated margins, bleed readily on touch approx size (4X 3cm). Tooth mobility was noted in relation to 1st, 2nd and 3rd molar. On lymph node examination level IA(2X1cm), IB(2X3cm), was tender, flacuant and hard on palpation. According to biopsy ,CECT head and neck conformed as squamous cell carcinoma with CT3N1M0.patient underwent composite resection with hemimaxillectomy with ITF(infratemporal fossa) clearance and modified neck dissection type II upto level I-V lymph nodes and reconstruction using temporals flap. During neck dissection found bifurcated EJV which is communicated with IJV, measuring approx size of 9 mm. (Figure-03)

Case- 4

A 30year old male reported to OPD with the chief complaint of unhealed ulcer in the tongue region since 6 months. Ulcer was erythematous, indurated margins, bleed readily on touch approx size (2X1cm). On lymph node examination level IA(2X1cm), IB(2X3cm),II(1X1cm) was tender, flacuant and hard on palpation. According to biopsy ,CECT head and neck conformed as squamous cell carcinoma with CT1N1M0.patient underwent composite resection with hemiglossectomy with and modified neck dissection upto level I-IV lymph nodes and reconstruction using temporals flap. During neck dissection found duplication IJV of approx size (12mm)which is a unusual finding related to IJV. (FigURE- 04)

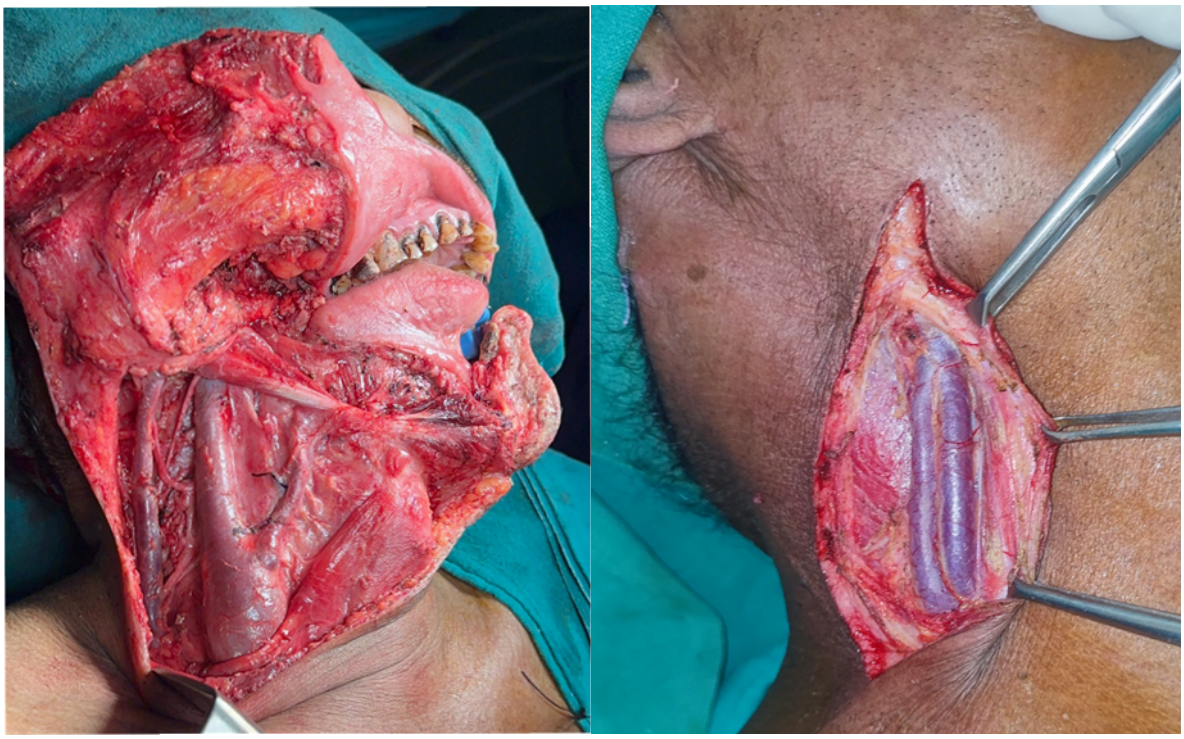

FIG 1,2

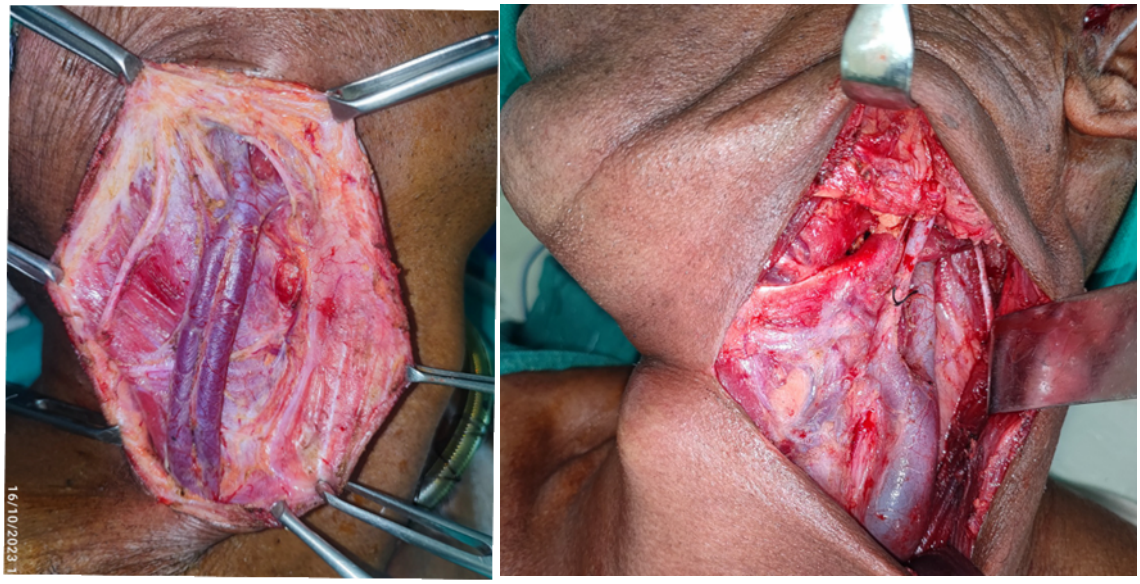

FIG 3,4

III. Discussion

The head and neck region's vascular system is complex. This area is crossed by several blood veins that supply crucial anatomical features. The main vein in the head and neck, the IJV, is one of the key structures. It drains the majority of the structures in the cranial cavity as well as the deeper part of the face and neck. It begins at the base of the skull, in the carotid sheath's posterior compartment of the jugular foramen, and extends distally in a vertical direction. It travels lateral to the common carotid artery (CCA) and the internal carotid branch. It drains the face and neck's superficial structure, orbits, and intracranial space.

Phlebectasia is an abnormal fusiform dilation of a vein. Zukschwerdt[2] described internal jugular phlebectasia for the first time. It is an uncommon condition that is typically diagnosed in childhood and can be unilateral or bilateral. Consequently, compared to infancy onset, adult onset is exceedingly uncommon.[3] Owing to the uncommon nature of this ailment, no plausible cause has been identified. Nonetheless, a primary lack of venous wall flexibility is thought to be the cause of most congenital instances. Furthermore, another theory that may contribute to phlebectasia is increased pressure in the internal jugular vein, which is most likely the case in our patient. In contrast to our patient, internal jugular vein phlebectasia is typically observed on the left side of the neck in adults, however in children, it is typically found on the right, as suggested by a theory put forth by La Monte et al.[4] This is fortunate since the right inferior vena cava provides a more direct and straighter route to the right atrium and superior vena cava.[5] In comparison to the left IJV, the right lung's apex is likewise lower than the left's, reducing the possibility of a pneumothorax. Typical clinical presentation as a soft, round or fusiform neck swelling located at the lower third of the anterior border of the sternocleidomastoid muscle in the neck that increases in size with straining, coughing, bending, sneezing, Valsalva manoeuvre, or after exertion.

According to a study by Denys and Uretsky, 4.4% of patients had either thrombosed or missing IJV, while 5% of patients had IJV widths less than 7 mm.[6] Mey et al. found that 12.1% of patients in European research with 493 patients receiving ultrasonography-guided IJV catheterization had IJV diameters ≤7mm.[7] Anatomic changes such as duplication, bifurcation, fenestration, posterior tributary, and trifurcation are also present in IJV.

Colour Doppler ultrasound is typically used for diagnosis because it verifies vascular flow. Additional diagnostic tools include venography and contrast-enhanced CT scans.[8] Five groups were created based on the Doppler ultrasonography classification of aberrant jugular venous flow patterns. Groups D and E were classified as high-flow groups and groups A, B, and C as slow-flow groups as described in Table 1.

GROUPS	CHARACTERSTICS
A	Decreased flow velocity with the peak velocity below 10cm/s
B	very low or no flow detected (stasis and/or thrombus formation).
C	Reversed flow
D	Increased turbulent flow with markedly increased flow velocity
E	Pulsatile turbulent flow related to arterial pulsation

Complications of phlebectasia include thrombosis and Horner's syndrome which are documented in literature, and their occurrence is extremely uncommon.[9] Surgery is typically saved for complications in such

benign cases because this ailment is extremely rare and diagnosis requires a high index of suspicion. One surgical option is to wrap the afflicted length in a polytetrafluoroethylene tube graft or remove the dilated portion of the vein.[10] For such a mild illness, jugular vein ligation is too drastic a surgery, and it is not applicable in cases of bilateral affliction.

IV. Conclusion

One of the fundamental principles of surgery is anatomical understanding. Anatomists and surgeons alike are fully aware of anatomical variations. Surgeons that specialize in oral and maxillofacial, vascular, plastic, and general surgery, as well as otolaryngology, regularly perform procedures in the head and neck region. Our goals have been to increase awareness, reduce morbidity, and encourage more research into these variances.

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