Agenesis of Internal Jugular Vein a Cause for Concern

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Abstract Internal jugular vein is one of the major contributors to the venous drainage from the intracranial structures. Neck dissections which necessitates ligation of internal jugular vein leads to significant alteration of cerebrospinal fluid pressures in the range of three times for unilateral ligation to five times in cases of bilateral ligation. Agenesis of internal jugular vein merits concern prior to central venous cannulation and ligation during radical neck dissection for metastatic nodes in head and neck cancers.

Keywords Agenesis of internal jugular vein · Neck dissection · Intracranial tension · Cannulation of internal jugular vein

Introduction

Internal jugular vein (IJV) drains blood from the head and neck region and is a major contributor to venous drainage from intracranial structures. It is the continuation of sigmoid sinus after it exits from the cranial cavity via the jugular foramen. It forms the jugular bulb and then descends in the neck in the carotid sheath in close approximation to internal carotid artery and then common carotid artery in the lower part of neck below the lower

border of thyroid cartilage and at the root of the neck in the thoracic inlet it is joined by the subclavian vein and continues as superior vena cava and in the left brachiocephalic vein [1]. IJV develops from the anterior cardinal vein cephalic to the origin of intersegmental vein which forms the subclavian vein [2].

We report a case of an agenesis of left internal jugular vein:

Case History

A 76 year old male patient presented with a non healing lesion on the lower lip 3 months duration. Clinical examination revealed 4×2 cm ulcerated lesion in the (R) side of lower lip crossing the midline and bilateral submandibular lymph node enlargement. Biopsy of the lesion revealed well differentiated squamous cell carcinoma. Since the disease was localized to the soft tissues of lip without involvement of the bone prior imaging was omitted.

He was planned for wide excision of lower lip with bilateral neck dissection and reconstruction. As a routine practice on our services less involved neck is addressed first i.e. Left neck was approached by a visors incision.

Exploration revealed:

- Left internal jugular vein was not developed from the base of skull till the junction of left middle thyroid vein.
- The internal jugular vein above was represented by a fibrous cord in left carotid sheath along with vagus nerve.
- Non developed left facial vein and linguo—facial trunk.
- Over distended and dominant left external jugular vein.

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He successfully underwent bilateral supra—omohyoid neck dissection and wide excision of lower lip with right nasolabial flap reconstruction.

Discussion

Internal jugular vein is the most commonly used vein for central venous access as a part of major surgical procedures in intensive care monitoring of medically ill patients due to easy accessibility and fewer complications as compared to the subclavian cannulation.

It is also of prime importance to preserve the internal jugular vein in therapeutic neck dissection as it forms the main channel for the venous drainage from the cranial cavity. Although unilateral alterations in the venous drainage does significantly alter the intracranial pressure to three times the normal, bilateral alterations in internal jugular veins leads to severe intracranial venous hypertension raising the intracranial pressure to five times the normal which may result in severe morbid and potentially fatal cerebral edema [3–6].

Normally the left anterior cardinal vein caudal to the intercardinal anastomoses regresses and the intercardinal anastomoses persists as the subclavian vein excessive regression leads to continuation of the process cephalic to the internal cardinal anastomoses thus causing agenesis of left internal jugular vein [2]. Denys & Uretsky have reported agenesis of internal jugular vein in 2.5% of cases [7]. The possibility of agenesis of the internal jugular vein should caution us during therapeutic neck dissection one has to be very meticulous and every attempt has to be made to avoid inadvertent damage to the internal jugular vein on the non diseased side and also to be aware of this anomaly prior to ligation of involved vein on the diseased side in performing a bilateral neck dissection, so also to avoid disrupting the alternate pathways of venous drainage i.e. external jugular which develop in agenesis of venous systems.

Knowledge about the venous anomaly of agenesis of internal jugular vein also assumes importance in avoiding the complications of procedures like central venous cannulation and could be one of the probable cause of failed central venous cannulation. Venous Doppler (Sonoline)

is an important adjunct easily available for localization of internal jugular vein prior to central venous cannulation.

As a precautionary measure to prevent potentially life threatening complication of cerebral edema in patients who require bilateral neck dissections or in cases requiring removal of unilateral internal jugular vein on the side of disease due to infiltration of vein it has become a protocol to proceed with a neck dissection on the non diseased side thus safeguarding at least one internal jugular vein prior to sacrificing the diseased involved vein.

Intraoperative photograph showing left internal jugular vein represented by fibrous cord up to the junction of middle thyroid vein with IJV

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