Anatomical variations of cervical vein drainage in candidates for neck surgery

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Raoul Borioni*, Federico Maspes**, Virgilio Baldassarre***, Mariano Garofalo*

**Division of Vascular Surgery, Aurelia Hospital, Rome, Italy*
***Department of Radiology, Aurelia Hospital, Rome, Italy*
****Vascular and Endovascular Surgery Unit (Dir.: Prof. F. Speziale), Department of Surgery "P. Stefanini", Policlinico "Umberto I", Sapienza University of Rome, Italy*

Anatomical variations of cervical vein drainage in candidates for neck surgery

The knowledge of both normal and abnormal anatomy of the veins of the neck may be important for surgeons performing neck surgery, to avoid inadvertent injury to vascular structures. In a 75-year-old man candidated to carotid endarterectomy preoperative CT-scan showed a rare anomaly of the venous drainage in the area of the anterior jugular vein (AJV), that usually begins in the suprahyoid region via the confluence of several superficial veins, to open into the ipsilateral external jugular vein. A large left sided venous trunk, originating from an anomalous proximal confluence with the internal jugular vein, descended in the AJV anatomical position, to cross over the sternum draining into the right subclavian vein. The knowledge of this abnormal anatomy allowed to perform a safe carotid bulb isolation avoiding inadvertent injury to vascular structures.

KEY WORDS: Anatomic variations, Anterior jugular vein, Jugular veins, Carotid endarterectomy, Neck surgery

The knowledge of both normal and abnormal anatomy of the veins of the neck may be important for surgeons performing neck surgery and anesthesiologists doing vascular access, to avoid inadvertent injury to vascular structures. According to standard anatomical descriptions, the normal pattern of venous drainage of the neck consists in the superficial vein system (anterior and external jugular veins), draining mostly the subcutaneous tissues, and the deep vein system (internal jugular veins), draining mainly the brain and other structures of face and neck. However a considerable variation in the venous anatomy of the neck can be revealed in humans between the right and left side, as well as between individuals [1,2]. Some of them are less common and can be incidentally observed in clinical practice during surgical maneuvers on the neck. The objective of this study is to report a rare variation of the cervical vein drainage observed in a candidate to carotid endarterectomy (CEA), providing a revision of the literature.

Case Report

A preoperative CT-scan was carried out as a part of preoperative work-up in a 75-year-old man candidate to left CEA. Besides a standard configuration of the Farabeuf venous trunk on the right side (Fig. 1A), the imaging showed a rare venous anomaly on the left side consisting in a hypertrophic trunk, originating from the internal jugular vein (Fig. 1B), descending in the anatomical position of the anterior jugular vein (AJV), to cross over the sternum and drain into the right subclavian vein (Fig. 2A-B). This rare anomaly was safely identified at the time of CEA: the proximal confluence with the internal jugular vein was legated and divided to gain a free access to carotid bifurcation. The operation was performed as usual and the postoperative period was uneventful.

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Correspondence to: Raoul Borioni, MD PhD, Via Telesilla 15, 00124 Rome, Italy (e-mail: raoulborioni@alice.it)

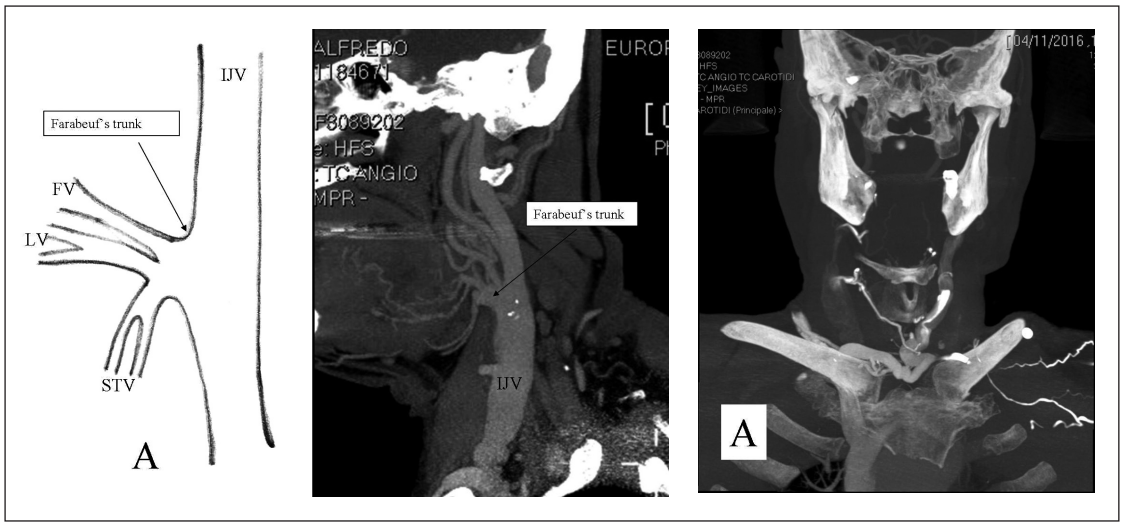

Fig. 1: A)Standard anatomical configuration of the Farabeuf venous trunk on the right side.
IJV = internal jugular vein
FV = facial vein
LV = lingual vein
STV = superior thyroid vein
B) Proximal confluence to the internal jugular vein of the anomalous venous trunk on the left side.

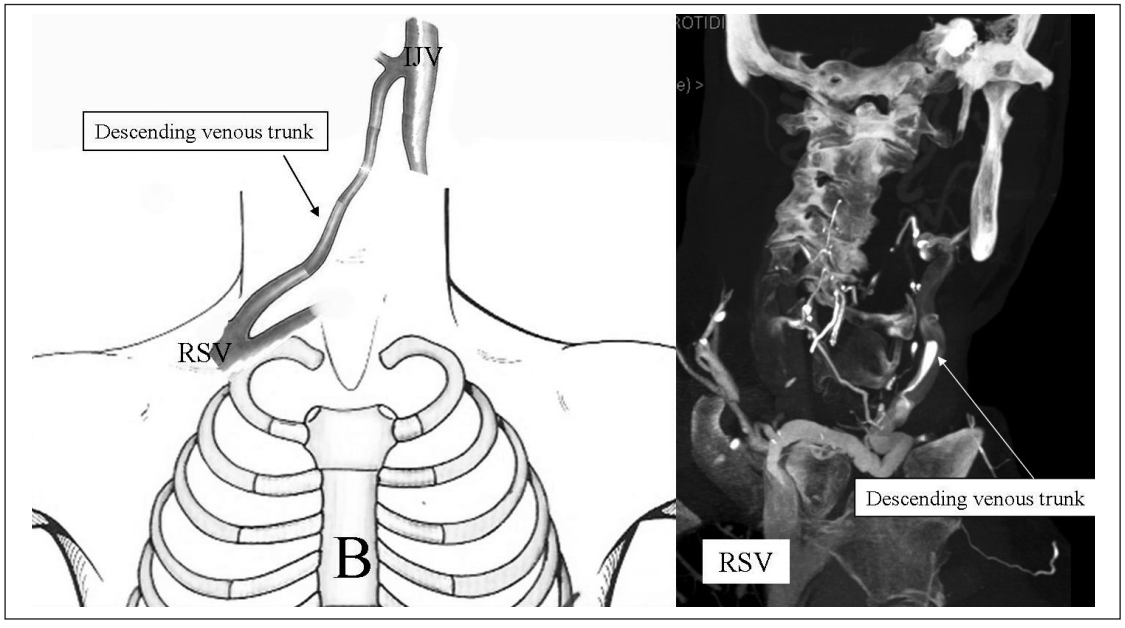

Fig. 2: A) Large venous trunk descending in the AJV anatomical position, to cross over the sternum and ending into the right subclavian vein, independently from the jugular arch. IJV = internal jugular vein B) RSV = right subclavian vein

Discussion

Different patterns of variations in the venous drainage of the neck have been reported in the literature [3-9]. The relevance and importance of such anomalies warrants the attention of physicians to avoid inadvertent injury during diagnostic and therapeutic procedures on the neck. In condition of normal anatomy, the AJV begins in the suprahyoid region via the confluence of several superficial veins, it descends between the median line of the neck and the anterior border of the sternocleidomastoideus muscle, to pass laterally, deep to the muscle, and open into the external jugular vein. Just above the sternum, the AJVs of both sides communicate via a transverse trunk, the jugular venous arch. Sometimes a single median AJV localized in the midline of the anteri-

or cervical region replaces two paramedian AJVs. Sometimes this median cervical vein is replaced by a grid of venules draining into the jugular arch [1,2,9].
Multiple variations of the left-sided veins in the neck region can be observed and unusual origin and termination of several anomalous veins in the jugulo-subclavian junction has been reported [5-7]. However, less common variations of AJV can be found in clinical practice. One study describes an abnormally large AJV duplicated and highly positioned, with a direct communication to internal jugular above the level of the hyoid bone [10]. Other studies report AJV duplications and triplications draining into the brachiocephalic system via a common trunk, or bilateral complex anomaly of the jugular veins, with multiple communications among superficial and deep systems [11,12]. We observed a rare anomaly of the venous drainage in the AJV area consisting in a left large venous trunk, with an anomalous proximal confluence with the internal jugular vein, descending in the AJV anatomical position, to cross over the sternum and ending into the right subclavian vein, independently from the jugular arch. The preoperative imaging of this anomaly ensured the successive surgical procedure.
Clinically significant variations of the veins of the neck can be attributed to the complex development of the vascular system. The presence of such variations should be considered and possibly identified by means of CT-scan or ultrasonic imaging, mainly in case of surgical or anesthesiological maneuvres on the neck to avoid failures and complications [13]. However, the knowledge of eventual venous anomalies is important in order to avoid inadvertent vascular injury in emergency situations and in case of lack of preoperative imaging study.

Riassunto

La conoscenza di una possibile variante anatomica del sistema venoso cervicale permette di evitare lesioni emorragiche improvvise in corso di chirurgia del collo. Le variazioni delle vene giugulari superficiali e profonde, specialmente sul lato sinistro, sono comuni, ma possono associarsi talora alla presenza di tronchi venosi ipertrofici con connessioni anomale. In questo report, relativo ad un paziente candidato ad endoarteriectomia carotidea sinistra, viene presentata una particolare variante anatomica della vena giugulare anteriore, associata ad una confluenza anomala a livello cefalico sinistro (giugulare interna) e dello stretto toracico destro (succlavia), rilevata occasionalmente in corso di TC preoperatoria. In particolare, si tratta di un tronco venoso ipertrofico nel territorio di drenaggio della vena giugulare anteriore, confluente prossimalmente con la giugulare interna e distalmente con la vena succlavia controlaterale, indipendentemente dall'arco venoso del giugulo. Viene inoltre presentata una revisione della letteratura, in merito alle possibili varianti ed anomalie anatomiche cervicali, la cui conoscenza è importante per evitare lesioni emorragiche cervicali, soprattutto in corso di procedure chirurgiche o anestesiologiche eseguite in urgenza.

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