

A case of unilateral fenestration of the external jugular vein, through which the cervical branch of the facial nerve passes

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The external jugular vein (EJV) is being utilized increasingly as the recipient vein in head and neck free tissue transfers, and for cannulation in order to conduct diagnostic procedures or intravenous therapies. Knowledge of variations in its structure or pathway are therefore important. Various authors have described phlebectasia (Hermans 1991; Turan-Ozdemir et al. 2004), saccular aneurysm (Verbeeck et al. 1997), duplication of the EJV (Comert and Comert 2009), and anastomosis between the EJV and internal jugular vein (IJV) (Chalian et al. 2001). We report on unilateral EJV fenestration, through which the cervical branch of the facial nerve passes—an entity that has not been reported previously.

During a course in applied clinical anatomy for dental students and dissection of the neck of a 75-year-old female cadaver, a large fenestration of the EJV was observed on the left side after removing the skin from the platysma muscle (Fig. 1). The anterior division of the retromandibular vein was absent. The entire retromandibular vein joined the posterior auricular vein to form the EJV, which continued downwards and bifurcated into a medial and lateral branch, half-way between the hyoid bone and the upper margin of thyroid cartilage, and reunited again just before penetrating the deep fascia 2.5 cm above the clavicle. There was no venous dilatation before or after the fenestration. The fenestrated segment of the EJV was large: 6 cm in length. The cervical branch of the facial nerve passed through the fenestrated EJV, running superficially to its medial and deep to its lateral branch before entering the platysma muscle. A communicating vein (CV)

connected the medial branch of the EJV and the anterior jugular vein (AJV), which was formed by a union of the facial vein and the submental vein. The EJV entered the subclavian vein on the deep surface of the sternocleidomastoid muscle. The AJV emptied into the EJV near the junction of the EJV with the subclavian vein. No variation of the IJV was observed. The veins on the right side of the neck showed no significant variations.

In many of the craniocervical arteries, divisions of the vasculature have been described, but venous fenestrations only rarely so (Towbin and Kanal 2004). Divisions (fenestrations or duplications) of the IJV are estimated to occur in as much as 0.4 % of the population (Prades et al. 2002). We could find only one publication on EJV division in the available literature (Comert and Comert 2009). In order to avoid confusion between the terms duplication and fenestration, which are used interchangeably in the literature, Downie et al. (2007) suggested that the term duplication be limited to those cases in which the branches of the anomalous vessel remain separate over the entire course, whereas the term fenestration should be used for those cases in which the branched vessel reunites into a single normal vessel.

Comert and Comert (2009) reported an EJV duplication observed during neck surgery. No nerve passed through the duplicated part of the vessel. Since the duplicated segment was described in the middle part of the EJV, which reunited again into a single stem, the anomaly concerned was in fact fenestration and not duplication according to the reclassification proposed by Downie et al. (2007).

It has been postulated that vessel duplication may be due to derangement from early development between the 3rd and 6th gestational weeks (Rossi and Tortori-Donati 2001). IJV duplication is usually reported in association with phlebectasia, suggesting abnormal development of the

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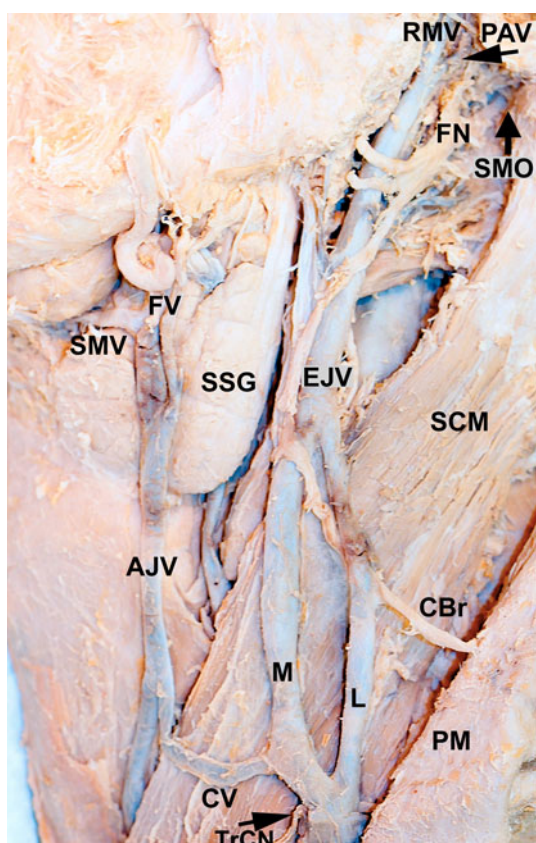


Fig. 1 Dissection showing the left side of the neck with fenestration of external jugular vein (EJV). *M* Medial branch, *L* lateral branch, *RMV* retromandibular vein, *PAV* posterior auricular vein, *FN* facial nerve, *SMO* stylomastoid opening, *SMV* submental vein, *FV* facial vein, *SSG* submandibular salivary gland, *SCM* sternocleidomastoid muscle, *AJV* anterior jugular vein, *CBr* cervical branch of the facial nerve, *PM* platysma muscle-reflect, *CV* communicating vein, *TrCN* transverse cervical nerve

venous wall, possibly involving incomplete formation of the muscular layer (Som et al. 1985; Rossi and Tortori-Donati 2001).

In the case presented, the cervical branch of the facial nerve passed through the fenestrated part of the EJV, suggesting nerve entrapment in the fenestrated vein during development. The typical pathway of the cervical branch of the facial nerve is superficial to the EJV. The nerve passing between the medial and lateral divisions of a fenestrated vein was described previously for IJV (Oztürk and Talas 2010).

The EJV develops from a tributary of the cephalic vein in the tissues of the neck, and forms an anterior connection

with the facial vein and a posterior connection with the retromandibular vein—the anterior connection being the one that disappears later in development (Collins 1995). The CV we found between the medial branch of the EJV and the AJV could represent the persistence of a communication between the primitive anterior facial vein and the developing EJV.

Fenestration of the EJV is a rare anomaly. Clinicians and surgeons performing neck vascular or reconstructive surgery should be aware of this unexpected variation of the EJV with a view to preventing inadvertent injury.

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