

## COMPARATIVE ANATOMY

# An anomalous left external jugular vein draining into right subclavian vein

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**Abstract:** Knowledge of the varying drainage patterns of superficial veins of head & neck, in particular, jugular veins are not only important for anatomists but also for the surgeons operating at this level and to clinicians in general. The variations are important also for interventional radiologists, who perform trans-jugular procedures, such as port implantations and trans-jugular intra-hepatic porto-systemic shunts or selective venous samplings. Results of recent studies report that the superficial veins, especially the external jugular vein, have been increasingly utilized for cannulation to conduct diagnostic and therapeutic procedures. We report a very unusual left-sided presentation of external jugular vein in an embalmed male cadaver. Embryological evaluations of the anomaly was done & compared with available literature, which showed that the observed variation is rare (Fig. 1, Ref. 12). Full Text (Free, PDF) [www.bmj.sk](http://www.bmj.sk).

Key words: external jugular vein, superficial veins, trans-jugular procedures, variations.

External jugular vein (EJV) has been recommended and routinely used in patients undergoing transjugular liver biopsy as it obviates a deep neck puncture, thereby reducing the risk in patients with impaired coagulation (1). EJV is easier to visualize than the internal jugular vein (IJV) and may give a reliable estimate of central venous pressure (2). In addition, it is reported that the insertion of permanent catheter for hemodialysis via EJV is a simple and short procedure with no severe complications (3). These are also important medico-legally (4). Any malformations of the external jugular vein should be suggested preoperatively, as this helps the surgeons to plan the operative procedure. The vein and its major tributaries have to be identified and ligated during surgery to prevent excessive bleeding.

## Case report

During routine dissection at the department of Anatomy, Kasturba Medical College, Mangalore for undergraduate students, in a middle-aged male cadaver, an unusual left-sided venous drainage pattern was noticed. Retromandibular vein (RMV) was formed in the substance of parotid gland by the union of maxillary and superficial temporal veins as usual and the RMV continued downwards and joined the facial vein (FV) to form

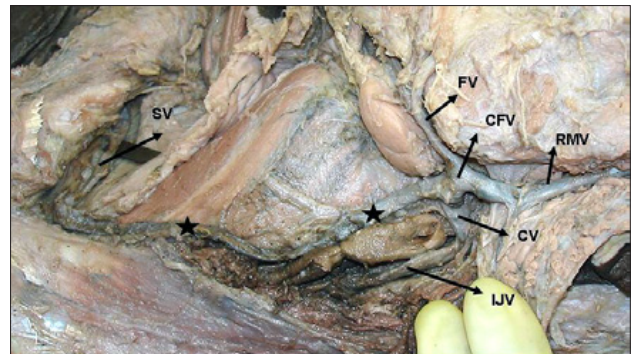


Fig. 1. Dissection of the left side of neck showing the anomalous external jugular vein. RMV – retromandibular vein, FV – facial vein, CFV – common facial vein, IJV – internal jugular vein, CV – communicating vein with the IJV, SV – subclavian vein, \* – anomalous external jugular vein.

the common facial vein (CFV) at the angle of mandible. CFV measured 1.5 cm in length and after a short course, it then bifurcated. One of the two divisions was found to follow a peculiar route of termination. The posterior division of CFV opened into the internal jugular vein (IJV) through a connecting vein (CV) that ran superficial to common carotid artery. The anterior division of CFV continued downwards and medially along the anterior border of sternocleidomastoid, reached the jugular notch, crossed the midline and drained into the opposite (right) subclavian vein (SV) (Fig. 1). This anomalous vein appeared like an external jugular vein (\*) because the usual one was absent. All the superficial veins of the left side of neck were seen to be draining into the subclavian vein of the same side. The anterior

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division of CFV from the point of bifurcation to that of termination in the right subclavian vein was found to be highly tortuous and measured 9.2 cm in length.

## Discussion

The veins of the neck vary considerably in their connections with each other, and in their relative sizes (5). These anomalous patterns differ in their presentation being unilateral or bilateral, as well as between individuals. The venous drainage of head and neck is provided with a paired triple jugular system comprising of superficial and deep vessels. The IJV is deep and dominant as it drains the brain. The superficial system includes subcutaneous veins; the external and anterior jugulars are especially variable in size and course. As per standard text books of Anatomy, EJV begins in the substance of the parotid gland by the union of posterior division of RMV and the posterior auricular veins, or, by a single one or some combination of these and the facial, maxillary or other veins near the mandibular angle (5, 6). EJV is increasingly being used by clinicians for therapeutic procedures and monitoring. It is often considered as a safer and suitable alternative when the cephalic vein approach is not feasible for totally implantable venous access device (TIVAD) placement (7). Yadav et al (2000) reported a case where EJV crossed sternocleidomastoid superficially and ended in IJV, above the level of superior belly of omohyoid (8). In contrast to the above mentioned case, in the present report, the left-sided EJV is considered to be the continuation of the anterior division of CFV which courses obliquely downwards to cross the midline and drain into the opposite subclavian vein (right). EJV usually receives the transverse cervical vein and suprascapular veins (6). In the present case, these veins were draining into subclavian vein of the same side. The complex embryological development of the vascular system might often result in clinically relevant variations, as in the present case where the normal course of external jugular vein is not present. Chaudhary (1997) has reported a case of anterior facial vein ending as external jugular vein and explained its embryonic development (9). The veins draining regions of the face and neck establish their identity only after the development of the skull. The external jugular vein is developed from a tributary of the cephalic vein from the tissues of the neck and anastomoses secondarily with the anterior facial vein. The cephalic vein at this stage forms a venous ring around the clavicle from which it is connected with the caudal part of the precardinal vein. The deep segment of the venous ring forms the subclavian vein and receives the definitive external jugular vein. The superficial segment of the ring usually dwindles, but may persist in adult life (10, 11).

Hollinshead mentioned that external jugular vein ended in internal jugular vein in one third of cases (12). In the present case, it can be hypothesized that external jugular vein failed to develop its posterior connection with RMV with the persistence of the connection between the common facial and precardinal veins as seen in the 18-mm stage of the embryo. The knowledge of variations in venous patterns in neck region is of paramount importance for surgeons in order to avoid unnecessary bleeding during surgical procedures.

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