

A Case Report: Variation of the Cephalic and External Jugular Veins

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ABSTRACT

The knowledge of variations in the superficial veins is of clinical importance for the anatomist, radiologists, clinical practitioners and surgeons in order to plan about the operative procedures. Usually cephalic vein drains into the axillary vein. In this case report study the left cephalic vein communicates with the left external jugular vein and made a common trunk at the superior surface of the clavicle, and then opened into the subclavian vein posterosuperior to the clavicle. The aim of this report was to discuss about the presence of an abnormal communication between external jugular and cephalic vein.

1. Introduction

Many authors have reported the variations of the cephalic vein so that it may be absent, very thin, it may have different course, accessory cephalic vein and variety of terminations [1, 2]. Study of variation in the superficial veins is important for the anatomist, interventional radiologists, surgeons, and clinical practitioners who carry out procedures like canulations, venegraft harvesting in endarterectomy, implantation and selective venous samplings [3, 4].

Connection of EJV with cephalic vein through a large communicating vein has also been reported [5]. In cases

of superficial vein variations, ultrasound-guided venepuncture is a viable possibility, and their awareness is also critical during reconstructive surgery. Preferably superficial cervical veins are the first choice to be grafted into the carotid artery during endarterectomy [5].

In order to administer intravenous therapies or canulation and conduct diagnostic procedures, utilization from superficial vein is permanently increased [6].

Cephalic vein is the longest vein of the upper limb, normally formed over the 'anatomical snuff box', curves proximally from the radial side of the dorsal venous network round the forearm's radial side to its ventral aspects. Distal to the elbow joint a branch from the deep

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veins is joined to the median cubital vein. Subsequently median cubital vein diverges proximomedially to reach the basilic vein. The cephalic vein ascends in front of the elbow, superficial to a groove between the brachioradialis and biceps brachii, crosses superficial to the lateral cutaneous nerve of the forearm, ascends lateral to the biceps brachii and between pectoralis major and the deltoid muscle, where it lies in the deltopectoral groove accompanied by deltoid branch of the thoraco-acromial artery. Entering into the infraclavicular fossa to pass behind the clavicular head of pectoralis major, it pierces the clavipectoral fascia, crosses the axillary artery and joins the axillary vein just below clavicle [7].

The external jugular vein begins near the angle of the mandible (just inferior to the auricle) by union of the posterior division of the retromandibular vein with the posterior auricular vein. The EJV crosses the SCM obliquely, deep to the platysma, and enters the antero-inferior part of the lateral cervical region. It then pierces the investing layer of deep cervical fascia, at the posterior border of the SCM and terminates in the subclavian vein. It drains most of the scalp and side of the face [8].

On the other hand, the venous cut-down approach has been widely described in the literature as a safe, fast, and low-cost approach [9]. When the cephalic vein (CV) is not suitable for use because of previous chemotherapy or is absent because of an anatomical anomaly, the external jugular vein (EJV) can be approached. Most commonly central venous access is achieved at bedside through the subclavian, femoral, brachiocephalic and cephalic veins [10]. The cephalic vein is used routinely for central venous access, defibrillator and pacemaker implantation. Studies show that cephalic puncture have a lower incidence of complications than subclavian [11]. So the cephalic vein is clinically important. The correct anatomical knowledge of the cephalic vein is of critical importance when considering emergency procedures [1].

2. Case Report

In this case report we described a variation of the cephalic vein, which was joined to the external jugular vein. During regular dissection of a male 40 years old cadaver for undergraduate students, after the sternocleidomastoid muscle dissected, we found the unilaterally connection between left cephalic and external jugular vein above the superior surface of the clavicle. The common trunk opened into the subclavian vein posterosuperior to the clavicle. There were no other notable variations in the cadaver. All the superficial veins of the right side of

neck were normally draining into the subclavian vein of same side.

3. Discussion

Venous variations are more common than arterial variations. Since the developmental pattern of superficial vein is complex, its variation in venous drainage of head & neck is common [12]. In order to perform central vein puncture (CVP) in patient bedside, the brachiocephalic, subclavian, femoral, and cephalic veins are used [10]. The best choice and suitable vein for CVP, defibrillator and pacemaker implantation is the cephalic vein so that lower incidence of complications is occurred compared with subclavian puncture [11]. The knowledge of cephalic vein anatomy is clinically important specially in cases of emergency procedures. So, the cephalic vein is critically important [1]. Similarly any anomaly of the EJV should be identified primarily; meanwhile the surgeons design the operative procedures. During surgery the vein and its major tributaries should be identified and ligated in order to diminish the probability of excessive bleeding [4].

Previous studies showed that a relatively acceptable procedure in children for totally implantable venous access device (TIVAD) was CV cut down. The more readily accessible veins, the EJV and IJV, can be preserved by using the CV initially. Our findings suggest that patients weighing more than 15 kg have better outcomes. So the CV cut down in children should be considered as an option for central venous access [13].

Selvi in his study on 40 cadavers of Indian origin showed the incidence of the facial vein draining into the EJV in 5% of cases. During this study, authors also noticed few anomalies such as the facial vein continued as EJV, common facial vein draining into the EJV and also the anomalous formation of the EJV [14].

The variations of cephalic veins are also well-known and their clinical application has been documented. It was shown that the cephalic vein may be small or absent. It may be accompanied by an accessory cephalic vein. A supraclavicular course of the cephalic vein has also been noted [15].

The superficial veins, especially the external jugular vein and cephalic vein are increasingly being utilized for cannulation to conduct diagnostic procedures or intravenous therapies. While the subclavian or axillary vein can be safely and successfully punctured in the majority of cases, some device implanters still prefer cut down to the cephalic vein as the initial approach to venous

access for transvenous placement of pacemaker or defibrillator leads out of concern for the risk of pneumothorax, subclavian crush, and other possible complications. The complications related to the use of external jugular or cephalic veins for cannulation are relatively less than that of internal jugular vein. It is important to know about the existence of communication between the cephalic vein and external jugular veins across the clavicle. The catheter can easily pass into this communicating vein and miss the intended direction. The cephalic vein running between subclavius muscle and clavicle, and the communicating vein running superficial to clavicle may bleed profusely in case of fracture of clavicle. Ultrasound-guided venipuncture is a viable possibility in cases of variations in the patterns of superficial veins, and their knowledge is also important for surgeons doing reconstructive surgery.

4. Conclusion

It is reported that there a few EJV and abnormal pattern of drainage of veins in the upper limb. Awareness of these venous variations is vital for the surgeons to avoid any intraoperative trial or error during surgical procedures and to prevent unnecessary bleeding.

Abbreviations List

EJV, External jugular vein

CVP, Central vein puncture

TIVAD, Totally implantable venous access device ()

Conflict of Interest Statement

This manuscript has been read and approved by all the authors. There is no conflict of interest between authors and none of the authors has any financial or personal relationships that could inappropriately influence or bias the content of the paper.

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