

A supraclavicular cephalic vein drained into the subclavian vein

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Abstract Although the cephalic vein follows a fairly consistent course, numerous variants have been reported. We found a rare anatomical presentation of the cephalic vein in a 75-year-old Korean male cadaver. The left cephalic vein was identified in the deltopectoral groove, ascended over the clavicle, and terminated into the left subclavian vein just before its union with the left internal jugular vein. The detailed knowledge on the variations of the cephalic vein is important for clinicians as well as anatomists since the approach through the axillary base is favored in many invasive clinical procedures.

Keywords Cephalic vein · Subclavian vein · Supraclavicular course · Variation

Introduction

The cephalic vein (CV) in the deltopectoral triangle is typically the first choice in central venous access and transvenous lead placement [16, 22] because it has a constant anatomical presentation and sufficient size to facilitate easy cannulation [1, 13]. Thus, the detailed knowledge

of the possible variations on the CV is important for clinicians as well as anatomists.

The CV usually pierces the clavipectoral fascia within the deltopectoral triangle and ends in the axillary vein [1, 16], or occasionally communicates with the external jugular vein by a tributary that passes in front of the clavicle [4]. The CV displays high variability concerning its termination into the basilic vein [24], the internal jugular vein [14, 19], or the subclavian vein [5, 6, 9, 13] as well as absent or too thin CV [2, 12]. Variations on the course of the CV have also been reported: passing over the clavicle [17, 18], running between the clavicle and the subclavius muscle [23], divided two branches over and under the clavicle (Thomson's report) [3], or perforating the pectoralis major muscle [8, 10].

The supraclavicular path of the CV, however, has rarely attracted attention until now. In this report, we describe a rare variation of the supraclavicular CV that terminates into the left subclavian vein just before its union with the left internal jugular vein.

Case report

During a routine dissection at Jeju National University Medical School in 2017, we found a variant anatomical presentation of the CV along its left path in a 75-year-old Korean male cadaver, whose cause of death was 'unknown'.

The anatomy of the CV on the right side was as usual. Up to the neck–shoulder region, on the left side, the normal expected CV termination was not visible. Further dissection was necessary and involved removing the clavicle to trace the path of the vein (Fig. 1).

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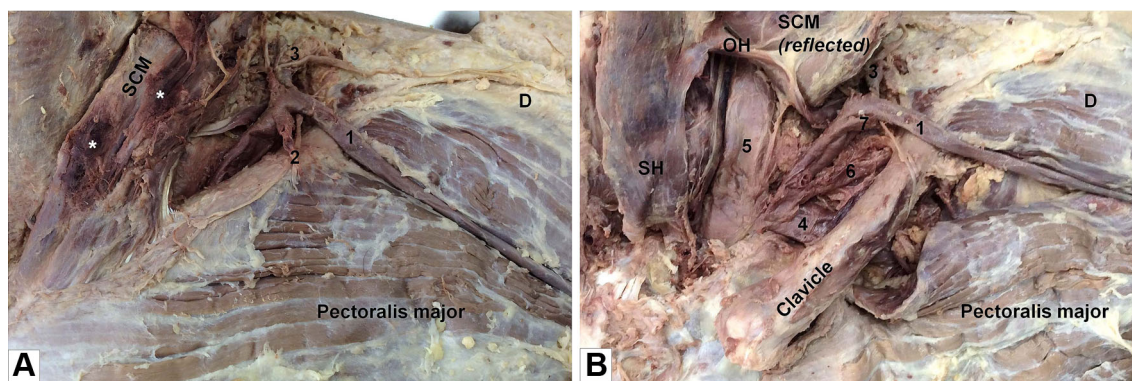


Fig. 1 Photographs of a supraclavicular cephalic vein (*J*) before (**a**) and after (**b**) reflecting the left sternocleidomastoid muscle (SCM) and the clavicle. Severe adhesion (*asterisks*) of the sternocleidomastoid and the superficial tissues, which made the examination on the path of the external jugular vein impossible. 2 Pectoral branch of the

thoracoacromial vein; 3 posterior tributaries of the external jugular vein; 4 subclavian vein; 5 internal jugular vein; 6 transverse cervical vein; 7 supraclavicular vein; *D* deltoid muscle, *SH* sternohyoid muscle, *OH* omohyoid muscle

The left CV was identified in the delto-pectoral groove, after crossing the delto-pectoral triangle, and was ascended over the clavicle. During its path, the CV received the venous return from the posterior tributaries of the external jugular veins, the supraclavicular vein, and the transverse cervical vein. The supraclavicular CV did not connect with the axillary vein. The termination was found to be into the left subclavian vein just before its union with the left internal jugular vein.

Unfortunately, the terminal part of the external jugular vein was attached to the surrounding subcutaneous tissue and the sternocleidomastoid muscle. We cannot see the relationship between the external jugular vein and the CV directly.

Discussion

The frequency of the supraclavicular CV has been reported in clinical (4 cases in 374 cases, 0.01%) [21, 22] and anatomic (4 cases in 200 cases, 2%) [13] studies. Although collateral branches of the CV usually communicated with the external jugular vein in these cases [11, 13, 25], there has been little variation on the termination of the CV into the subclavian vein [5, 6, 9, 13].

The superficial jugular vein system appears at the 8th week of gestation. The proximal end of primitive CV curves around the superficial aspect of the clavicle and that joins the external jugular vein (called jugulocephalic vein), but in which there is also present a connection between the CV and the subclavian veins [7]. At embryos of 22 mm long, the CV forms a venous ring around the clavicle [15]. Regarding the likely model of embryological development on this earlier drainage channel of the CV into the external jugular vein, we consider that the anterosuperior portion of the CV might be remained to form a supraclavicular

course, while the jugulocephalic vein might be shifted anterosuperior to the clavicle.

This observation is significant in view of the clinical use of the CV: The risk in the wrong direction and puncturing wrong structures on the axillary or supraclavicular areas could increase. This type of variation has another potential clinical implication because thoracic duct typically drains into the point at which the internal jugular vein joins with the subclavian vein. Saxena et al. [20] reported that the patient developed bilateral massive chylothorax after cannulation of left internal jugular vein, due to direct injury to the thoracic duct during the procedure.

Taken together, this case differs from the others that have been reported in the literature: the CV was identified in the deltopectoral groove, ascended over the clavicle, and terminated into the left subclavian vein just before its union with the left internal jugular vein. As the variations on the CV can be related to the occurrence of iatrogenic complications, the detailed knowledge on the anatomical variations of the CV might have significance to clinicians as well as anatomists.

Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interests.

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