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Ccorahua-Rios, M. S.

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CASE REPORT

Supraclavicular nerve entrapment by the external jugular vein: An unreported finding

Piégeage du nerf supraclavicular par la veine jugulaire externe : une observation non encore signalée.

M.S. Ccorahua-Rios[a,b], L.A. Ccahuantico-Choquevilca[a,b], J.B. Bernaola-Sánchez[a,b], F. Miranda-Solis[a,b], J. Choque-Velasquez[c,*]

[a] *Laboratorio de anatomía humana, escuela de medicina, universidad nacional de San Antonio Abad del Cusco, Cusco, Peru*
[b] *Centro nacional de plastinación y técnicas anatómicas, Cusco, Peru*
[c] *Department of Neurosurgery, Helsinki University Hospital, Topeliuksenkatu 5, 00260 Helsinki, Finland*

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KEYWORDS
Supraclavicular nerve ;
External jugular vein ;
Entrapment syndrome ;
Congenital abnormality ;
Vascular abnormality

Summary
Objective. — We aim to describe the supraclavicular nerve's vascular entrapment by the external jugular vein as an unreported anatomical finding.
Case description. — In a routine cadaveric dissection, the superficial emergence of the first division of the left supraclavicular nerve emerged along a duct formed through the external jugular vein. No other vascular or neural anatomical abnormalities were found in the surrounding structures.
Conclusion. — This unreported vascular entrapment of the supraclavicular nerve by the external jugular may harbour clinical implications for surgical and endovascular procedures on the external jugular vein and in refractory thoracic and scapular waist pain.

Résumé
Objectif. — Nous décrivons le piégeage vasculaire du nerf supraclaviculaire par la veine jugulaire externe en tant qu'observation anatomique non encore rapportée.

Abbreviations: EJV, external jugular vein ; SN, supraclavicular nerve.

* Corresponding author.
Adresses e-mail : maycol.s.c.r@hotmail.com (M.S. Ccorahua-Rios), lccahuantico@gmail.com (L.A. Ccahuantico-Choquevilca), johnbernaolasanchez369@gmail.com (J.B. Bernaola-Sánchez), mdfranklinm@gmail.com (F. Miranda-Solis), johchove@hotmail.com (J. Choque-Velasquez).

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Description du cas. — Dans une dissection cadavérique courante, la sortie superficielle de la première division du nerf supraclaviculaire gauche émergeait le long d'un conduit formé par la veine jugulaire externe. Aucune autre anomalie anatomique vasculaire ou neurale n'a été trouvée dans les structures environnantes.
Conclusion. — Ce piégeage vasculaire, non rapporté du nerf supraclaviculaire par la veine jugulaire externe, peut entraîner des implications cliniques pour des procédures chirurgicales et endovasculaires sur la veine jugulaire externe ainsi que dans la douleur thoracique et scapulaire réfractaire.

Introduction

The external jugular vein (EJV) is a superficial vein of the neck usually formed by the retromandibular vein and the posterior auricular vein [1,2]. Supraclavicular nerves (SNs) are superficial and sensitive branches of the cervical plexus formed by the cervical nerve roots C3 and C4. SNs emerge from a common trunk that divides into medial, intermediate, and lateral SNs to innervate the skin and teguments of the sternal, supra- and infraclavicular regions and shoulder stump [3,4].

Here, we aim to describe the vascular entrapment of the SN by the EJV, an unreported finding on the trajectory of the common trunk of the SN.

Case description

An unusual trajectory of the left SN was found during routine dissection of a cadaveric specimen preserved in 10% formalin. The specimen underwent the plastination technique with latex injection into blood vessels for colour recovery of the vascular structures [5].

The cadaveric specimen underwent dissection without modifying the anatomical structures. Initially, the specimen followed treatment with plastination. The dehydration phase was carried out for nine weeks with isopropyl alcohol, with concentrations ranging between 70% and 100%. According to the modified protocol of the laboratory, the specimen impregnated in a vacuum chamber with polydimethylsiloxane for 40 days, followed a nerve staining technique after impregnation with vegetable anilines (yellow for nerves). The latex colours previously injected into the veins and arteries became highlighted after the dehydration process. The specimen underwent a gas-curing chamber, and halogen light accelerated the final process.

We observed that the common left supraclavicular trunk had a deep anterior, lateral, and lower trajectory before splitting into anterior and posterior secondary trunks. The superficial emergence of this first SN division emerged along a duct formed through the EJV (Fig. 1). Finally, the secondary SN trunks offered medial, intermediate, and lateral terminal branches.

Discussion

Here, we present an unreported SN entrapment by the EJV. The precise origin of the EJV is still under debate. Some

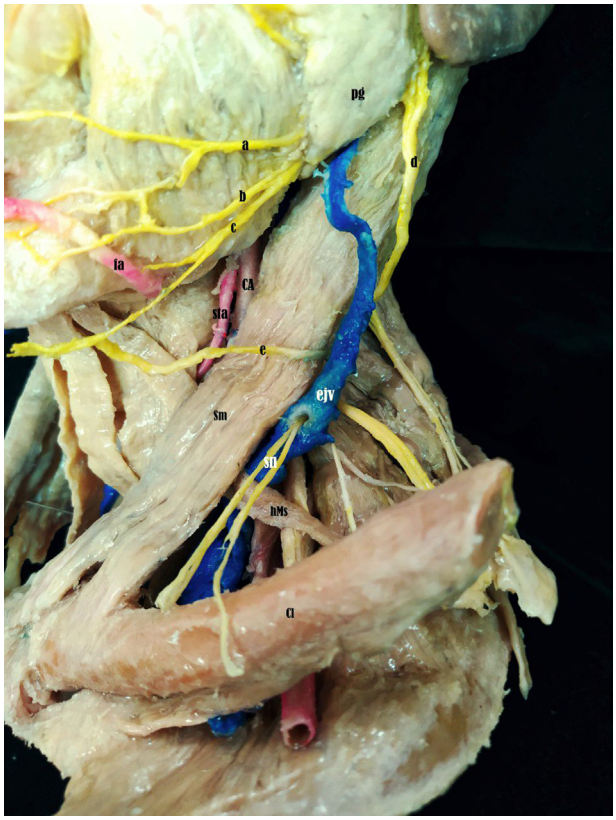

Figure 1 Left supraclavicular nerve entrapment by the left external jugular vein. Buccal (a), marginal branch of the mandible (b), and cervical (c) branches of the facial nerve; clavicle (Cl); external carotid artery (CA); external jugular vein (EJV); facial artery (fa); greater atrial nerve (d); omohyoid muscle (hMs); parotid gland (Pg); transverse cervical nerve (e); sternocleidomastoid muscle (Sm); superior thyroid artery (sTa); and supraclavicular nerve (SN).

authors describe the EJV formed by the confluence between the superficial temporal vein and the internal maxillary vein [6,7]. However, other authors described the EJV formed by the retromandibular vein and the posterior auricular vein [1,2,8]. The experience we have collected in our laboratory corresponds with this last description. Thus, we consider the retromandibular vein and the posterior auricular vein, the corresponding feeders of the EJV.

Previous studies have described multiple variations in the origin and course of the EJV. Reports on the bifid or double jugular veins with nerves crossing between them are widely

available in the literature [9—12]. However, reports of jugular vein ducts are scarce, with only one case in which the accessory nerve crossed the jugular vein through its bifurcation [13]. Proper knowledge of vascular abnormalities of the EJV is of importance for clinical and surgical practice in close relation with this vascular structure [14].

The EJV receives along its trajectory multiple tributaries from the anterior jugular veins, suprascapular vein, and superficial cervical vein before draining towards the subclavian vein [1]. Anatomical variations of EJV include the absence of the former trunks, the disappearance of the cephalic part of the EJV, abnormal communication with the facial vein and the linguofacial trunk of the deep venous systems, EJV duplications, anastomosis between the EJV and internal jugular veins, ipsilateral or bilateral absence of EJV, and EJV size variations in regards to the human body structure [1,14—19].

The SN covers a significant sensitive territory of the shoulder and thoracic region. Thus, SN injuries may be considered in the case of refractory thoracic and scapular waist pain [20]. The post-surgical SN trapping syndrome and syndromes associated with osteomuscular abnormalities are the most common related syndromes with SN dysfunction [21,22]. Non-surgical entrapment of the SN is a rare entity caused by clavicular channels, which usually affect the intermediate branch of the SN [23,24].

The abnormal development of the EJV may constitute a structural dysfunction during the embryological stage [15]. Fetal vasculogenesis starts in the third week of development. However, vascular development suffers a high transformation along the eighth week of the embryological period [25].

This present report corresponds with an unsuspected finding. The cadaveric specimen did not present other similar anatomic variations. We discard a possible modification of the morphology during the dissection process since an experienced operator usually performs these procedures. The preservation technique may reduce the dimensions due to dehydration process, but rarely influence the morphology of the anatomical structures.

This report's main limitation includes the absence of the patient's clinical information, as this finding belongs to a routine cadaveric dissection.

Conclusion

We present a case of SN entrapment by the EJV as an unreported anatomical finding with clinical implications in refractory thoracic and scapular waist pain. Surgical procedures, such as thyroidectomies and endovascular procedures on the EJV to manage vascular malformations and highly vascularised extracranial tumours, should also pay attention to this anatomic variation.

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Disclosure of interest

The authors declare that they have no competing interest.

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