

Morphometry of The Cleido-Occipito-Cervical Muscle and Its Variation in the Trapezium Morphology: a Rare Case of Muscular Anomaly

Eduardo Poletti Camara,¹ Thales do Vale Ottoni,² Antonio Jose Assis Xavier de Souza Pinto,² Samyra Nina Serra e Serra,³ Fabio Parreira de Araújo Alves,⁴ Marcelo Rodrigo Tavares,³ Valeria Paula Sassoli Fazan,⁵ Renato Savariego Porto,⁴ Arizon Catarino Cirineu⁴

¹Department of Cardiology, São Francisco Hospital, Ribeirão Preto, SP, Brazil

²Department of General Surgery, Santa Casa de Misericórdia Hospital, Passos, MG, Brazil

³José do Rosário Vellano University – UNIFENAS, Alfenas, MG, Brazil

⁴Department of Orthopedics and Trauma, São Francisco Hospital, Ribeirão Preto, SP, Brazil

⁵Department of Surgery and Anatomy, School of Medicine of Ribeirão Preto, University of São Paulo, Ribeirão Preto, SP, Brazil

Disclose and conflicts of interest: none to be declared by all authors

ABSTRACT

Introduction: during a routine dissection in the cervical region of a 70-year-old male cadaver, an anatomical variant was observed and is being described.

Case Report: based on its anatomical characteristics, the anomalous muscle was recognized as a cleido-occipitalis-cervicalis muscle, measuring 7cm long, in a conical shape, by 2cm wide for the muscle variant found. The measurements were performed with the aid of a caliper. The corpse was treated with glycerin and local conservation methods, the photos were taken using an 8 MP camera with a resolution of 3264 x 2448 pixels.

Conclusion: the use of morphometry becomes essential to characterize the muscular proportions and to further expand the studies of these samples and their effective cataloging. The variations characteristics must be considered in the clinical study and subsequent treatment of patients.

Keywords: Cleido-occipitalis-cervicalis; Morphometry; variation; anatomy; Implications, Clinics.

Introduction

The trapezius is a broad, superficial muscle in the posterior region of the chest and neck. It extends and protects the most important vessels and nerves in the back. Its fibers form the limits of the posterior cervical trigone and the auscultation trigone^{1,2}. The muscle originates from the medial third of the superior nuchal line, from the external occipital protuberance, from the spinous processes and supraspinous ligament of the C7-T12 vertebrae^{1,2}. The trapezius muscle has three types of fibers; upper, middle and lower. The fibers of the upper part extend from the neck to the shoulders. The fibers in the middle are smaller and extend transversely in the scapula. The lower part of the muscle forms the largest portion of it and extends upwards in the superolateral direction in the back^{1,2}.

This muscle is commonly variable, especially in its morphology^{3,4}. The variations consist of the lack of some fibers to the total absence of muscle^{5,6}. The occipital (upper) fibers are mainly variable in their fixation. The presence of distinct bundles of the trapezius muscle is very rarely documented in the literature called "cleido-occipitalis" or "cleido-occipitalis-cervicalis

muscle"^{7,8}. During rotation, retraction and elevation of the scapula, the trapezius together with the variant muscle contracts and can lead to compression of the supra clavicular nerve and external jugular vein against the clavicle^{7,8}.

Case report

We present a case of a left unilateral occurrence of an accessory head of the trapezius muscle in a 70-year-old male corpse. The cadaver was not previously subjected to cervical procedures performed in the scapular, jugular or clavicular regions and no other anatomic variations were observed and evidenced. The muscle was discovered during a routine dissection to prepare new biological material for the academic year that would take place at the José do Rosário Vellano University during the first semester of 2019. The corpse was treated with glycerin and local conservation methods, photographs were taken for the laboratory catalog, using an 8 MP camera with a resolution of 3264 x 2448 pixels. Using the classic method of dissection, and after removing the overlying skin and the fascial layers on the left side of the posterior

cervical region, we found an aberrant fascicle of the left trapezius muscle (Figure 1), identified as a cleido-occipitalis-cervicalis muscle. The cleido-occipitalis-cervicalis muscle presented as a thin conical muscle (20 mm wide and 7 cm long) inserted superficially in the scapular neuro-vascular bundle. This muscle slip originated from the anterior border of the upper cleido-occipital or part of the left trapezius muscle, detaching itself from the main muscular part. It was directed almost parallel to the anterior border of the muscle to insert as a tendinous portion in the superoposterior medial third of the clavicle, left to the origin of the sternocleidomastoid muscle. The muscle fibers of the variant muscle originated from the medial part of the superior nuchal line, this anomalous belly is supplied by the accessory nerve branch of the spine. The external jugular vein passes through the triangle formed by the cleido-occipitalis cervicalis, trapezius and clavicle. As the vein passes between the tendon of the cleido-occipitalis cervicalis and the clavicle, it can be compressed during certain actions of the trapezius muscle, such as in rotation and elevation of the scapula. The muscles of the right side did not present a similar variation (Figure 2).

Discussion

The trapezius is a complex muscle with three distinct divisions (upper dorsoscapular, lower dorsoscapular and cleido-occipital) among which, the clavicular portion is associated with the cleido-occipital element of the sternocleidomastoid muscle in

lower mammals and, therefore, this separate fascicle can be called cleido-occipitalis-cervicalis muscle^{7,8}. Both the trapezius and the sternocleidomastoid are of mixed origin, derived partly from the branchial mesoderm and partly from the adjacent myotomes. This common origin arises from the occipital region to the last branchial arch and develops as a thick columnar mass. Then it separates from the ventral part, forming the sternocleidomastoid, and from the dorsal part, forming the trapezius. For this reason, the clavicular fixation of the trapezius varies in length⁹⁻¹².

The anomalous cervical cleido-occipital muscle is an unusual variant muscle in the posterior triangle of the neck and can be unilateral or bilateral. Its reported incidence varies widely between 4% and 33%^{1,13}. In the anomalous cleido-occipitalis-cervicalis muscle, all or part of the cleido-occipital division is separated from the rest of the trapezius muscle and follows a medial course within the posterior triangle⁹⁻¹². We present a case of a cervical occipital fascicle separated from the trapezius muscle.

The reported variation of cleido-occipitalis occurs mainly in the trapezius muscle¹⁴⁻¹⁶. We observed in the literature that, during slight abduction of the ipsilateral arm, the fibrous arch imprisoned the supraclavicular nerves, leading to cervical spondylosis, loss of arm sensation on the ipsilateral side and supraspinatus tendinitis^{12,15}. In our study, the external jugular vein was spared from being the main content of the trigone formed by cleido-occipitalis-cervicalis.

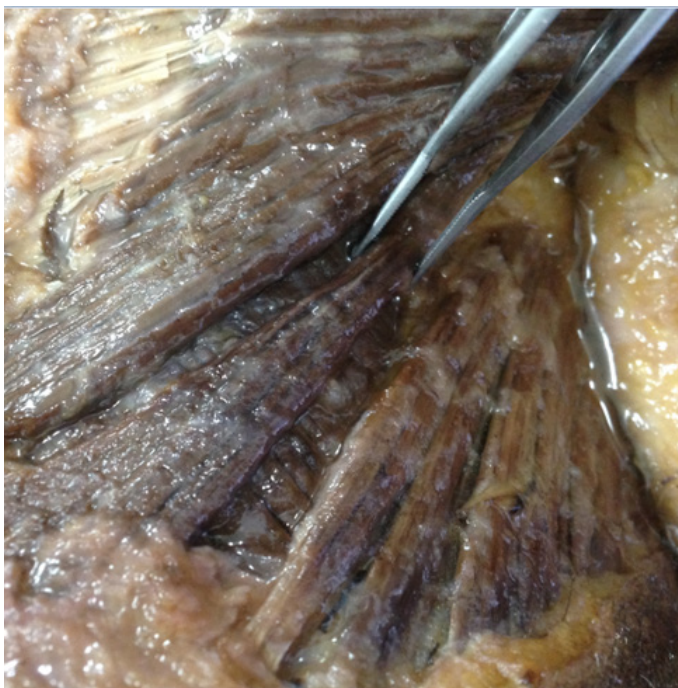


Figure 1. Presence of the anomalous muscular bundle, 7 cm long and 20 mm wide, characterized as a cleido-occipitalis cervicalis muscle, in forceps. Note the spacing between the other bundles of the trapezius muscle.

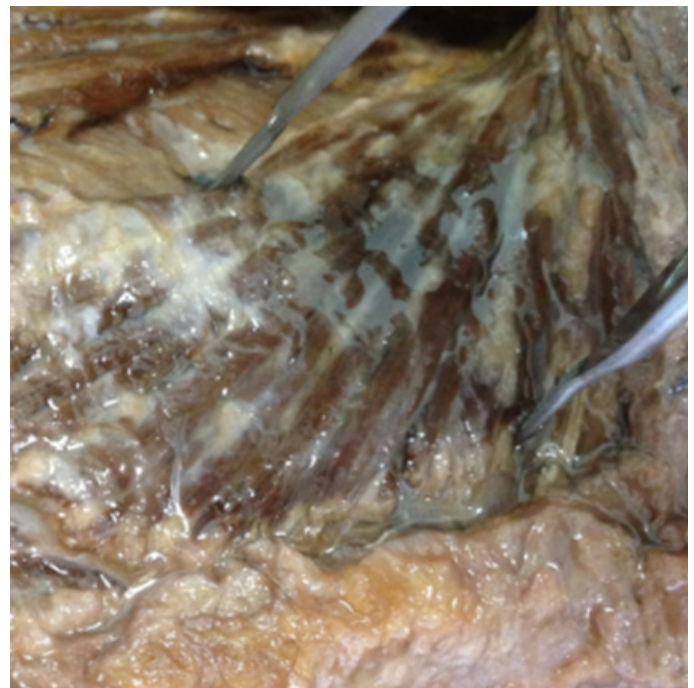


Figure 2. Right trapezius muscle, treated with glycerin, of the same specimen; without the presence of anomalous or supernumerary bundles.

Conclusions

The external jugular vein is used in several procedures, such as transjugular biopsy of the liver, catheterization for hemodialysis and central access. Therefore, general surgeons, head and neck surgeons, and plastic surgeons must be aware of the muscular and vascular variations in the neck, to avoid

iatrogenic mistakes. Also, an anomalous muscle in the posterior trigone of the neck can induce difficulties during venous catheterization. Thus, clinicians, interventional radiologists and anesthesiologists, who perform vein catheterization and transjugular systemic shunts can do the procedures in a safe and accurate way.

References

1. Drake RL, Vogl W, Mitchell AWM. *Gray's Anatomy for Students*. Elsevier Churchill Livingstone, Philadelphia, 2005.
2. Williams PL, Gray H, Bannister LH, Dyson M, Warwick RM, *Gray's anatomy*, 37th edition, Churchill Livingstone, Edinburgh, 1989, 608–609.
3. Bergman RA, Thompson SA, Afifi AK. *Catalog of Human Variation*. Urban & Schwarzenber, Munich, 1984.
4. Beaton LE, Anson BJ. Variations in the origin of the M. trapezius, *Anat Rec*, 1942, 83(1):41–46.
5. Emsley JG, Davis MD. Partial unilateral absence of the trapezius muscle in a human cadaver, *Clin Anat*, 2001, 14(5):383–386.
6. Gross-Kieselstein E, Shalev RS, Familial absence of the trapezius muscle with associated shoulder girdle abnormalities, *Clin Genet*, 1987, 32(3):145–147.
7. Rahman HA, Yamadori T, An anomalous cleido-occipitalis muscle, *Acta Anat (Basel)*, 1994, 150(2):156–158.
8. Kwak HH, Kim HJ, Youn KH, Park HD, Chung IH, An anatomic variation of the trapezius muscle in a Korean: the cleidooccipitalis cervicalis, *Yonsei Med J*, 2003, 44(6):1098–1100.
9. Rubinstein D, Escott EJ, Hendrick LL, The prevalence and CT appearance of the levator claviculae muscle: a normal variant not to be mistaken for an abnormality, *Am J Neuroradiol*, 1999, 20(4):583–586.
10. Natsis K, Apostolidis S, Nikolaidou E, Noussios G, Totlis T, Lazaridis N, Levator claviculae muscle: a case report, *Cases J*, 2009, 2:6712.
11. Raikos A, Paraskevas GK, Triaridis S, Kordali P, Psillas G, Brand-Saberi B, Bilateral supernumerary sternocleidomastoid heads with critical narrowing of the minor and major supraclavicular fossae: clinical and surgical implications, *Int J Morphol*, 2012, 30(3):927–933.
12. Natsis K, Asouchidou I, Vasileiou M, Papatheanasiou E, Noussios G, Paraskevas G, A rare case of bilateral supernumerary heads of sternocleidomastoid muscle and its clinical impact, *Folia Morphol (Warsz)*, 2009, 68(1):52–54.
13. McMinn RMH (ed), *Last's anatomy: regional and applied*, 8th edition, Churchill Livingstone, London, 1990, 57–425.
14. Bergman R, Thompson SA, Afifi AK, Saadek FA (1988) *Compendium of human anatomical variation*. Urban Schwarzenberg, Baltimore, pp. 40.41.
15. Sarikcioglu L, Donmez BO, Ozkan O. Cleidooccipital muscle: an anomalous muscle in the neck region. *Folia Morphol (Warsz)*, 2001, 60(4):347–349. [8] Wood J. *Proc R Soc Lond*, 1869, 160:1–3.
16. Paraskevas GK, Natsis K, Ioannidis O. Accessory cleido-occipitalis muscle: case report and review of the literature. *Rom J Morphol Embryol* 2013, 54(3 Suppl):893–895.
17. Natsis K, Apostolidis S, Nikolaidou E, Noussios G, Totlis T, Lazaridis N. Levator claviculae muscle: a case report. *Cases J*, 2009, 2:6712.

Received: September 20, 2020

Accepted: December 15, 2020

Corresponding author

Valéria Paula Sassoli Fazan

E-mail: vpsfazan@yahoo.com.br