International Journal of Research in Medical Sciences
Goswami P et al. Int J Res Med Sci. 2014 Aug;2(3):1161-1164
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: 10.5455/2320-6012.ijrms20140811

Case Report

Anatomical description and clinical significance of unilateral triheaded sternocleidomastoid muscle

Preeti Goswami, Yogesh Yadav*, Chakradhar V

Department of Anatomy, Rama Medical College, Hapur, U. P., India

Received: 16 April 2014
Accepted: 1 May 2014

***Correspondence:**
Dr. Yogesh Yadav,
E-mail: dryogeshyadav@gmail.com

ABSTRACT

Objective of this report is to observe and report unusual pattern of origin of sternal and clavicular heads of Sternocleidomastoid (SCM). An embryological insight into the possible causes for present anomaly is elucidated. The neck region of an adult male cadaver during gross anatomy teaching program. An abnormal Sternocleidomastoid (SCM) was observed while dissecting the neck region of an adult. Additional clavicular head of SCM muscle were found on the right side. The accessory clavicular head coursed deep to the sternal head whereas the some fibres of main clavicular head joined the accessory belly and together they fused with the main sternal head of SCM. There was another slip arising from sternal head and merge with deep cervical fascia near base of mandible. The topographical anatomy of SCM is extremely important, particularly because it serves as a useful surgical landmark and its relation to crucial neuro-vascular structures of the neck. The usage of SCM in reconstruction operations for covering defects is discussed. A detailed knowledge of the anatomy of SCM proves vital for radiological studies of the neck.

Keywords: Sternocleidomastoid, Additional, Sternal head, Clavicular head, Anomaly

INTRODUCTION

The SCM constitutes an important surgical landmark as it is related to many crucial neurovascular structures in the neck. It originates from two heads. The sternal head is rounded, tendinous and originates from the upper part of the anterior surface of the manubrium sterni. The clavicular head is flattened and takes origin from the medial one third of the superior surface of the clavicle. The muscle is inserted to the lateral surface of the mastoid process and lateral part of the superior nuchal line. The fibres of the muscle cross in such a manner that the clavicular fibres are inserted on to the mastoid process and the sternal fibres are inserted to the superior nuchal line. Branches from the ventral rami of the second, third, and sometimes fourth, cervical spinal nerves also enter the muscle. Although these cervical rami were believed to be solely proprioceptive, clinical evidence suggests that some of their fibres are motor. It receives its blood supply from branches of the occipital and posterior auricular arteries, which supply the upper part of the muscle. (Grays 39th).[1] Functionally the SCM is known to participate in various movements of head & neck, and is also regarded as an accessory muscle of respiration (Nayak et al 2006).[2]

Wry neck / torticollis is defined as a congenital disorder, idiopathic in origin; characterized by flexion deformity of the neck (Standring et al. 2005).[1] It has been pointed out that additional belly of clavicle part of SCM may be associated with wry neck. Numerous descriptions of clavicular head of SCM are elucidated in literature i.e. Miyauchi 1983:[3] Demir et al 1994,[4] Koura 1959;[5] Mori 1964;[6] Boraro and Fragoso Neto 2003.[7] Reports of

variability of SCM state its width, no. of slips etc. (Nayak et al. 2006).[2] Another important aspect of knowing the defects of SCM anatomy is its utility as myocutaneous flap in local tissue transfer. The most advantageous aspect of using SCM in reconstruction operations is that each of its two heads can be shifted separately, thus enhancing the usefulness of this vital muscle (Kierner, 1999).[8]

CASE REPORT

We encountered a unilateral anomalous sternocleidomastoid (SCM) muscle in an about 65 years old male cadaver during the course of educational dissection in the pre-clinical medical curriculum. The right SCM presented an additional muscle belly originating from the superior surface of the medial third of the clavicle just medial to usual clavicular head (Figure 1) as tendinous head which is 2.5 cm in length and 0.5cm thick. The belly of accessory muscle measured 7.0 cm in length and 1.0 cm in width. The fibres of additional belly ascended medially towards the sternal head and blended with it. There was another slip (mandibular slip) 3.5 cm in length and 0.5 cm in width arising from medial border of sternal head 11.5 cm from its origin and blend with deep cervical fascia near inferior border/base of mandible (Figure 2). Some fibres of clavicular head (communicating slip) 9.5 cm from origin traverse medially and joined accessory head deep to sternal head measured 2.4 cm in length and 0.6 cm in width (Figure 3). The supernumerary bellies were seen to be supplied by the spinal accessory nerve and ventral rami of second and third cervical spinal nerves. The trapezius showed normal attachments and were as usual with the innervation from spinal accessory nerve.

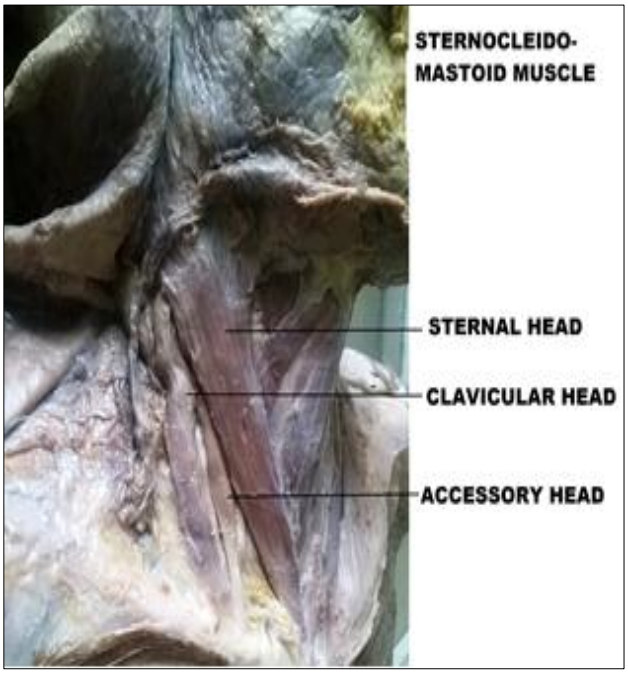

Figure 1: Accessory clavicular head.

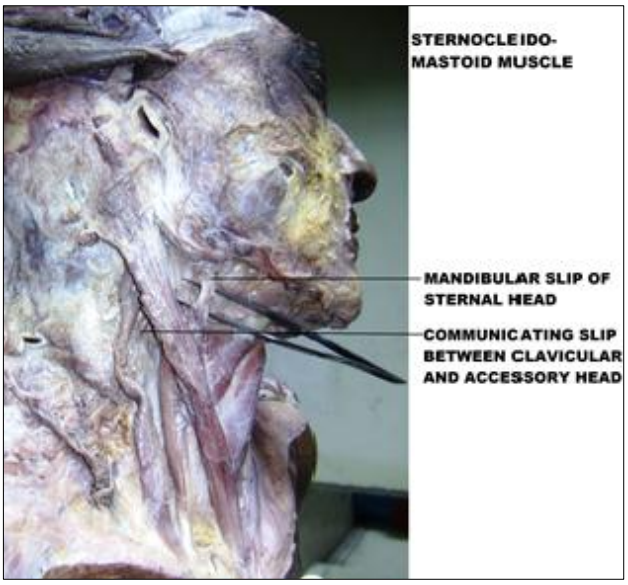

Figure 2: Mandibular slip of sternal head.

Figure 3: Communicating slip between accessory & clavicular head.

DISCUSSION

The presence of SCM in the neck serves as a useful surgical landmark (Moore and Dalley, 1999).[9] Developmentally, the SCM and Trapezius share the same origin and therefore may be fused with each other (Bergman et al. 1988).[10] Additionally, owing to the origin of the muscle from several myotomes, intersections may be observed in the muscle (Bergman et al. 1988).[10] The additional heads of SCM seen unilaterally in this study probably reflects abnormal splitting of mesoderm of 6th branchial arch, mediated by erroneous signalling Hox genes.(Nayak et al. 2006).[2] Hox genes may play an important role in regulating the mesoderm links muscles to the posterior neck and shoulder skeleton. (Matsuoka T et al. 2005).[11]

In agreement with the above any aberration in this signalling pathway related to Hox gene may result in super numerous heads of SCM.

Mustafa (2006)[12] has reported a supernumerary cleido-occipital muscle, more or less separate from the sternocleidomastoid muscle. This cleido-occipital muscle exists in 33% of cases. The presence of additional bellies bilaterally has been reported by Nayak et al. (2006)[2] and Ramesh et al. (2007).[13] Coskun et al. (2002)[14] have reported multiple unilateral variations of sternocleidomastoid muscles such as sternocleido-occipital, cleidomastoid and sternomastoid muscles. Divisions of SCM into two parts superficial and deep were described by Ramesh et al. (2007),[13] the superficial part consisted of sterno-occipital portion and cleido-occipital portion whereas the deep part had sternomastoid and cleidomastoid portion. Yadav et al. (2010)[15] reported unilateral tetra-headed SCM. In the present study, the additional bellies were found in relation to both clavicular and sternal heads and were fused with each other. This tetraheaded composition of SCM is rather unique and rare entity and has not been reported in the anatomical archives to the best of our knowledge. Mori et al. described the superficial and deep layers of SCM as independent of each other. The triangular facial space between the two is termed as trigonum supraclavicularis minor and is important because of its relation to Internal Jugular Vein (IJV). IJV may be approached in this space for therapeutic and diagnostic purposes. In the current study, the additional sternal head obliterates this passage making approach to IJV difficult.

The utility of SCM in Head & neck surgery is multifold. Jianu et al. 1909[16] first described the use of SCM for locoregional tissue transfer. Conley & Gullane (1980)[17] have explained various uses of the muscle such as mandibular reconstruction, transport as a myocutaneous flap for reconstruction of the oral floor and use as a suture line to protect carotid and innominate arteries. The rich vascularity and satisfactory cosmetic results are some of the reasons to use this muscle for local tissue transfer.

We suggest the usage of these extra heads observed in the present study as good material for such transfers and rectification of tissue defects. Awareness of variations in the topographical anatomy and the architecture of SCM may be important for muscle flap reconstruction during parotid surgery which is an effective method of covering the surgical defect and possibly preventing Frey's syndrome. (Kierner 1999)[8] A radiological study by Hamoir et al. 2002[18] outlined the boundaries between various neck levels, along SCM muscle.

Therefore, in our study, a preoperative radiological evaluation of the neck region may detect the variations in SCM muscle, enabling the reconstructive surgeon to plan the operation accordingly. It is essential for the surgeons to be aware of possible variations during routine head and neck surgeries.

Moreover in view of extra clavicular head, we also speculate that the muscle may possibly have a biomechanical advantage, by augmenting the clavicular elevation at sterno-clavicular joint. Precise knowledge and awareness of possible variations of this muscle is extremely important since vital neuro-vascular structures are located in its vicinity. The presence of this accessory head of SCM may pose challenge to the surgeons and can also erroneously diagnosed as a soft tissue tumor in radio studies.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Henry Gray, Susan Standring. Sternocleidomastoid (SCM). In: Standring S, Berkovitz BKB, Hackney CM, Ruskell IGL, eds. Gray's Anatomy. The Anatomical Basis of Clinical Practise. 39th ed. Edinburg: Churchill & Livingstone; 2005: 536.
2. Nayak SR, Krishnamurthy A, Kumar MSJ, Pai MM, Prabhu LV, Jetti R. A rare case of bilateral sternocleidomastoid muscle variation. Morphol. 2006;90:203-4.
3. MiyauchiR. A rare anomalous muscle of the neck. Okajimas Fol Anat Jap. 1983;60:187-94.
4. Demir S, Oguz N, Sindel M, Ucar Y. Musculus sternocleidomastoideus varyasyonu. Saglik Blimleri Arastirma Dergisi. 1994;5:67-71.
5. Koura K. Anatomical studies on cervical muscles. Shika Gakuho. 1959;59:1231.
6. Mori M. Statistics on musculature of Japanese. Okajimas Fol Anat Jap. 1964;40:195-300.
7. Boaro SN, Fragoso Neto. Topographic variation of the sternocleidomastoid muscle in a just been born children. Int J Morphol. 2003;21:261-4.
8. Kierner AC, Aiegner M, Zelenka I, Riedl G, Burian M. The blood supply of the sternocleidomastoid muscle and its clinical implications. Arch Surg. 1999;134:144-7.
9. Moore KL, Dalley AF. Bones of the neck, triangles of the neck, deep structures of the neck, and lymphatics in the neck. In: Moore KL, Dalley AF, eds. Clinically Oriented Anatomy. 4th ed. Philadelphia: Lippincott Williams & Wilkins Company; 1999: 1000-1062.
10. Bergman RA, Thomson SA. Muscles. In: Bergman RA, Thomson SA, eds. Compendium of Anatomic Variations. 1st ed. Baltimore Urban and Schwarzenberg; 1988: 32-33.
11. Matsuoka T, Ahlberg PE, Kessaris N, Lannarelli P, Dennehy U, Richardson WD, Mc Mohan AP, Koentges G. Neural crest origins of neck and shoulder. Nature. 2005;436:347-55.

12. Mustafa MA. Neuro anatomy. In: Mustafa MA, eds. 10th National Congress of Anatomy. Bordum, Turkey: Turkey Press; 2006: 6-10.
13. Ramesh RT, Vishnumaya G, Prakashchandra SK, Suresh R. Variation in origin of sternocleidomastoid muscle. A case report. Int J Morphol. 2007;25(3):621-3.
14. Coskin N, Yildirim FB, Ozkan O. Multiple muscular variations in neck region: a case study. Folia Morphol (Warsz). 2002;61(4):317-9.
15. Yogesh Yadav, Vandana Mehta, Vanita Gupta et al. Unilateral tetra headed sternocleidomastoid muscle-anatomical description and clinical significance. IMJ Jap. 2010;17(1):57-60.
16. Jianu J. Die chirurgische Behandlung der Facialislahmung. Deutsche Z Chir. 1909;102:377-86.
17. Conley J, Gullane PJ. The Sternocleidomastoid muscle flap. Head Neck Surg. 1980;2:308-11.
18. Hamoir M, Desuter G, Gregoitre V, Reychler H, Rombaux P, Lengele B. A proposal for redefining the boundaries of level V in the neck: is dissection of the apex of level V necessary in mucosal squamous cell carcinoma of head and neck? Arch Otolaryngol Head Neck Surg. 2002;128:1381-3.

DOI: 10.5455/2320-6012.ijrms20140811
Cite this article as: Goswami P, Yadav Y, Chakradhar V. Anatomical description and clinical significance of unilateral triheaded sternocleidomastoid muscle. Int J Res Med Sci 2014;2:1161-4.