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Morphological Variant of Sternocleidomastoid Muscle- A Case Report

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Absract

The sternocleidomastoid is an important muscle of head and neck region dividing the neck into anterior and posterior triangles. It arises from two heads one sternal and other clavicular and gets inserted into the lateral surface of mastoid process and lateral part of superior nuchal line.

Unilateral variation found in origin of sternocleidomastoid muscle during routine dissection of head and neck region on a 60 year old male cadaver. Three heads of sternocleidomastoid were found on the left side.

The accessory head of sternocleidomastoid muscle was found on the left side taking origin from clavicle 4.2cm lateral to the normal clavicular head. Its fibres then merged with the normal clavicular fibers and got inserted into the lateral surface of mastoid process and lateral part of superior nuchal line.

The study will help the surgeons and interventionists for muscle graft and also approach of this area carefully during neck surgery or while taking MRI scans.

Keywords- sternocleidomastoid, unilateral , accessory belly.

INTRODUCTION

The sternocleidomastoideus muscle is one of the most complex muscles of the body. The muscle while acting alone flexes the neck laterally and turns the face to the opposite side. When the muscles of the two sides contract simultaneously, they flex head and neck, therefore is responsible for the mechanical action for the majority of the movements of the head, and it is considered to be an accessory muscle of inspiration. This muscle is an important landmark in the neck which divides it into an anterior and a posterior triangle.[1] It originates as two heads, the medial or the sternal head which is tendinous and rounded; and the lateral or the clavicular head. The sternal head originates from the upper part of the anterior surface of the manubrium sterni. The two heads blend into round, thick muscle belly which is then inserted as a strong tendon onto the lateral surface of the mastoid process from its apex to superior border, and as a thin aponeurosis into the lateral half of the superior nuchal line of the occipital bone. The muscle is innervated by the spinal part of accessory nerve along with branches from ventral rami of C 2-3 and sometimes ventral rami of C4 spinal nerves. It is vascularized by the branches of suprascapular, superior thyroid, occipital and posterior auricular arteries.[2]

CASE REPORT

During the routine dissection of head and neck region on a 60 year old male cadaver. It was observed that the sternocleidomastoideus muscle of the left side had three heads. The sternal , clavicular and the accessory head - its origin was 1.5 cm lateral to the clavicular head. The three heads were originating separately, after crossing more than lower 2/3rd of neck the clavicular head joined the sternal head to get inserted onto the lateral surface of mastoid process however the accessory head after crossing the lower 2/3rd splitted into two bellies, medial and lateral. The medial belly merged with the main

sternocleidomastoid muscle and got inserted onto the lateral surface of mastoid process while the lateral belly got inserted separately onto the lateral 2/3rd of superior nuchal line (cleido-occipital belly). All the three heads were receiving nerve supply from spinal accessory and the branches of cervical plexus.

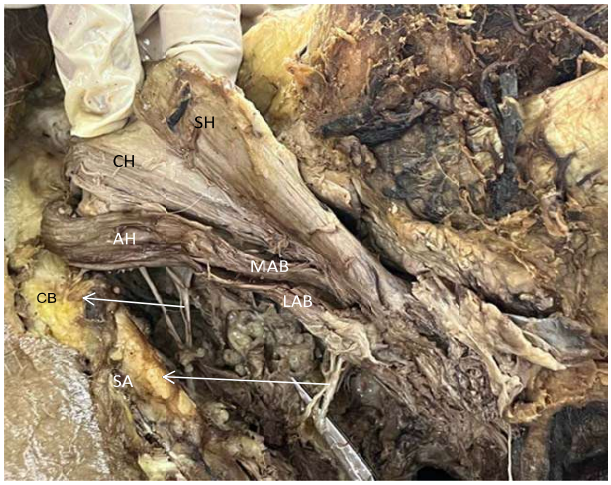


Fig. 1. Dissection on left side of the neck showing the variation in the origin of sternocleidomastoid muscle.
SH-sternal head, CH- clavicular head, AH-additional head, MAB- medial accessory belly, LAB- lateral Accessory belly, SA- spinal accessory nerve, CB- Cervical branches

DISCUSSION

The abnormal origins, presence of additional bellies, layered arrangement of fibers are the reported variations of the sternocleidomastoid muscle in the past. Variations are more common in the clavicular head of origin and in the layered arrangement of its fibers. However, the variation in its insertion is very rare. The origin of the clavicular head may be as broad as 7.5 cm and occasionally divided into many slips with narrow intervals when it is broad.[2]The number of these extra clavicular slips may vary and such occurrence may be unilateral or bilateral. They cause formation of supernumerary lesser supraclavicular fossa. Developmentally, these additional muscle slips indicate abnormal mesodermal splitting in posterior sixth branchial arch. They may not cause any functional advantage or disadvantage in neck movement but might be physically interfering during invasive procedures. However, they can be effectively utilized for muscle flap harvests.[1]

The presence of an unilateral additional head of sternocleidomastoid on right side (clavicular origin) in male cadaver and unilateral additional head on right side of a female cadaver has been reported.[3] The presence of unilateral two additional bellies on left side of male cadaver have also been reported.[4]

Comparative studies in mammals have demonstrated that the sternocleidomastoid muscle frequently separated into five parts which are arranged in two layers: a superficial sternomastoid, sternooccipital and cleidooccipital part; and a deep layer consisting of a deep sternomastoid and cleidomastoid part. In humans, the presence of multiple layers such as sternocleidooccipital, cleidomastoid and sterno-mastoid,[5] a supernumerary cleido-occipital muscle, more or less separate from the sternocleidomastoid muscle[6] have been reported.

In many animals, the cleidomastoid belly is distinctly separate from the sternomastoid belly. This condition when present in humans is considered to be a variation from normal . The two separate sterno-mastoid and cleidomastoid bellies further subdivide the anterior triangle into a supernumerary triangle. This extra triangle can also be considered as an extended lesser supraclavicular fossa which normally separates the sternal and clavicular heads of origin of sternocleidomastoid. The occurrence of such a variation can be explained by fusion failure or abnormal mesodermal splitting during development. In this regard we may refer to Sinohara's law of fusion which states that a muscle supplied by two different nerves is formed by fusion of two separate muscle masses.[1]

Embryology- During the development, sterno-cleidomastoid and trapezius muscles share a common pre muscle mass from the last two occipital and upper cervical myotomes. This muscle mass splits and separates at 9 mm stage of development. In some cases the splitting may be incomplete; hence sternocleidomastoid can be fused with trapezius.[2] This myotome segregates into the ventral Sterno-cleidomastoideus and dorsal trapezius. The trapezius and Sternocleidomastoideus arises from a common pre-muscle mass in the occipital region just

caudal to the sixth branchial arch. Therefore, occasionally the margins of these two muscles make contact with each other.[1] However, Bergman et al[7] considered the fusion of these two muscles as a normal feature. Occasionally, the muscle shows tendinous intersections in its lower part which may represent its development from several myotomes.[7]

Clinical Significance – A sound knowledge of the additional head of sternocleidomastoid muscle will help the clinicians while performing various procedures. Anaesthetists and intensivists for central venous catheterization prefer internal jugular vein cannulation, as this approach has a lower incidence of pneumothorax. Any variation in origin of Sternocleidomastoideus muscle can lead to narrowing of lesser supra clavicular fossa, which can complicate internal jugular vein, subclavian, external jugular vein cannulation. The segments of the SCM may be utilized as a muscle or myocutaneous flap for the reconstruction of regional soft tissue defects after traumatic and oncologic head & neck procedures, thus rehabilitation of oral cavity defects, reanimation of the face, aiding in shoulder elevation, added protection to the carotid and innominate arteries, its use along with a part of clavicle to reconstruct mandible, reconstruct mandibular defects.[1]

Table 1 - Incidence of occurrence of variation in origin/ insertion of sternocleidomastoid have been tabulated below-

Authors	Number of additional bellies origin/insertion	Side	Sex
Sirasanagandla et al[2]	One(origin)	Right	Male
Saxena et al[4]	Two(origin)	Left	Male
Goswami et al[8]	One (origin), One(insertion)	Right	Male
Hurtado et al[1]	One, two(origin)	Right-one, left-two	Male
Hurtado et al[1]	One(origin)	Right-one, left-one	Male
Sabnis et al[3]	One(origin)	Right	Male
Sabnis et al[3]	One(origin)	Right-one, left-one	Female
Present study	One(origin), One(insertion)	Left	Male

CONCLUSION

This additional head of sternocleidomastoid is of great importance to plastic surgeons, radiologists and intensivists and physiotherapists. Anaesthetists should be careful while giving brachial plexus block. It should be kept in mind during MR scan of neck also. The lateral belly of accessory head can be easily mobilized for any flap reconstruction.

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