

Bilateral variation in the Origin of Sternocleidomastoid muscle

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ABSTRACT

Morphological variations of sternocleidomastoid are not uncommon. During our routine dissection, in the department of anatomy PIMS Jalandhar, we encountered a rare case of presence of third head of sternocleidomastoid, bilaterally. This anomalous head is arising from clavicle lateral to the clavicular head of sternocleidomastoid muscle. This report not only adds to the knowledge of anatomists but will hold good to surgeons, anaesthetists and radiologists as well.

Key Words: Sternocleidomastoid, spinal accessory, Sternal, clavicular

Introduction

The SCM muscle is of interest to anatomists because the unique position it occupies in the neck makes it key to understanding the layout of cervical muscles. The SCM diagonally divides the neck musculature into anterior and posterior triangles on either side, making the cervical region easy to study. It has attracted the general surgeons and plastic surgeons because of the applications in tissue repair: as it is richly vascularised, can be used as a myocutaneous flap, each of its 2 heads can be shifted separately, and the cosmetic results are satisfactory.

The muscle is thick and narrow centrally, and broader and thinner at each end. The muscle is attached inferiorly by two heads. The medial or sternal head is rounded and tendinous, arises from the upper part of the anterior surface of the

manubrium and sterni and ascends posterolaterally. The lateral or clavicular head, which is variable in width and contains muscular and fibrous elements, ascends almost vertically from the superior surface of the medial third of the clavicle. The two heads are separated near their attachments by a triangular interval which corresponds to a surface depression, the lesser supraclavicular fossa. As they ascend, the clavicular head spirals behind the sternal head and blends with its deep surface below the middle of the neck, forming a thick, rounded belly.^[1]

Sternocleidomastoid inserts superiorly by a strong tendon into the lateral surface of the mastoid process from its apex to its superior border, and by a thin aponeurosis into the lateral half of the superior nuchal line. The clavicular fibres are directed mainly to the mastoid process; the sternal fibres are more

oblique and superficial, and extend to the occiput. The direction of pull of the two heads is therefore different, and the muscle may be classed as 'cruciate' and slightly 'spiralized'.^[1]

Sternocleidomastoid is supplied by the spinal part of the accessory nerve. 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.

Case Report

During the routine gross dissection of neck region of a male cadaver, in the department of Anatomy, PIMS Jalandhar it was observed that unusual third head was originating from clavicle lateral to the usual clavicular head of SCM. This variation was bilateral. Both the clavicular heads i.e, medial and lateral, showed unique features on both the sides while the sternal head had the usual origin. (Fig. 1)



Fig. 1 Showing bilateral variation the origin of sternocleidomastoid muscle
1. Sternal head 2. Medial Clavicular head
3. Lateral Clavicular head

On left side the medial clavicular head was small and had a tendinous origin from the superior surface of clavicle. The lateral clavicular head originated from the superior surface as well as anterior surface overlapping the medial belly as a fanned out aponeurosis, extending upto middle third of clavicle. While the fibres of medial clavicular head were fusing with the fibres of sternal head at the junction of middle and lower one-third, the fibres of lateral clavicular head were fusing higher up, at upper and middle one-third. (Fig. 2)

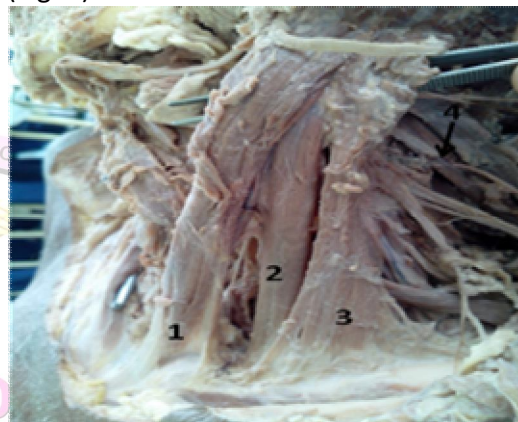


Fig.2 Showing dissection of left lateral side of neck
1. Sternal head
2. Medial clavicular head fusing with sternal head at junction of middle and lower one third
3. Lateral clavicular head fusing at upper and middle one third
4. Spinal accessory nerve

On right side the observations were remarkably different. Origin of both the clavicular heads was tendinous and from the superior surface of clavicle. While the medial belly was wider and expanded, the lateral belly was small and fleshy. There was no overlapping; rather these 2 heads were separated by a triangular gap. The medial fibres met the sternal belly just above the origin, the lateral fibres fused at upper and middle third of the muscle. (Fig. 3)

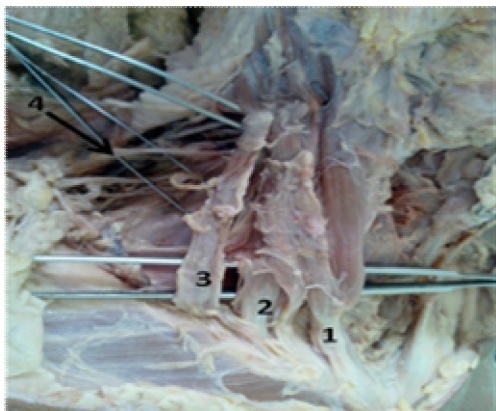


Fig.3 Showing dissection of right lateral side of neck

1. Sternal head
2. Medial clavicular head fusing with sternal head just above the origin
3. Lateral clavicular head fusing at middle and lower one third
4. Spinal accessory nerve

The insertion of the muscle on both sides was at mastoid process and adjoining part of superior nuchal lines. The innervation of the muscle was from spinal accessory nerve.

Discussion

The abnormal origins, presence of additional bellies, layered arrangement of fibers are the reported variations of the sternocleidomastoid muscle in the past. In contrast, however, variations pertaining to insertion are uncommon. In our present study, the unusual third head occurring bilaterally is unique. Previously a case of third head of SCM which was unilateral has been reported.^[2, 3] Some other authors have also reported cases with multiple slips.^[4, 5] The bilateral variation of additional head in the sternal origin and additional head in the clavicular origin of sternocleidomastoid have been also reported.^[6, 7]

The sternocleidomastoid muscle shows a great variation in the extension of the origin of clavicle: in some cases the

clavicular head can be as narrow as the sternal; in other cases it can have about 7.5 cm of width. When the clavicular origin is wide, it is occasionally subdivided in various slips separated by narrow intervals.^[8] The adjacent edges of sternocleidomastoid and trapezius muscles are rarely found in contact.^[9] The observations in present study are similar to the previous studies. In our study on right side the third head is narrow, whereas, on left side it is wide (7.2cm) and extending upto middle third of clavicle.

During the development, sternocleidomastoid and trapezius muscles share a common premuscle mass from the last two occipital and upper cervical myotomes. This muscle mass splits and separates at 9 mm stage of development separates. The two divisions grow independently along the upper limb bud. At 14 mm stage the mass destined to form sternocleidomastoid becomes fixed first to the clavicle and later to the sternum, occipital bone and mastoid process. The additional slip in the clavicular origin of sternocleidomastoid muscle may be due to unusual splitting in the mesoderm of post-sixth branchial arch.^[7]

Another interesting observation in present case is that the lateral clavicular head on left side is overlapping the medial clavicular head. Comparative studies in mammals have demonstrated that the sternocleidomastoid muscle frequently separated into five parts which are arranged in two layers: a superficial sternomastoid, sterno-occipital and cleido-occipital 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 sternomastoid, a supernumerary cleido-occipital muscle, more or less separate from the sternocleidomastoid muscle have been reported. [10, 11] An earlier finding reported by Bergman et al stated that the SCM is disposed in two layers, superficial and profound, that subdivide into five parts. The superficial portion of the SCM may have sternomastoid, sterno-occipital, and cleido-occipital subregions. Additionally, the profound part may display sternomastoid and cleido-mastoid subregions. In the present case the lateral head on left side depicts superficial layer as it overlaps the medial clavicular head. [8]

Sternocleidomastoid muscle can be used as myocutaneous flap for facial defects, parotid surgery, carotid artery protection and repair of oral cavity defects. Thorough knowledge of variations of sternocleidomastoid is necessary for harvesting the muscle flap. Awareness of additional clavicular head should be kept in mind while adjudging the various levels in CT and MR images.. The additional triangular interval between two clavicular heads should be kept in mind while approaching internal jugular vein for venous catheterization.

Morphological variations arise due to the complexity of sequential development of any region. SCM is an important surgical landmark for clinicians. A well versed knowledge of its variations can avoid diagnostic and surgical complications.

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