Variation of Bilateral Multiheaded Sternocleidomastoid Muscle

Bilateral Çok Başlı Musculus Sternocleidomastoideus Varyasyonu

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ABSTRACT

The sternocleidomastoid muscle is important anatomically and clinically because of its relationship with many neurovascular structures in the neck. The muscle descends obliquely across the side of the neck and divides it into anterior and posterior triangles. In this case report, the additional clavicular head of bilateral sternocleidomastoid muscle was shown. During routine dissections of the neck for anatomy education in the Department of Anatomy Laboratory in the Faculty of Medicine at the Gazi University, additional clavicular heads of sternocleidomastoid muscle were observed bilaterally. The additional clavicular heads originated from the superior surface of the middle third of the clavicle. Furthermore, on the left side of the neck, muscle fibers originating from sternal head of sternocleidomastoid muscle and blending with clavicular head of sternocleidomastoid muscle were seen. Both of the minor supraclavicular triangles were narrower than normal. Unusual clinical cases in medical area makes diagnosis and treatment more difficult. Knowledge of anatomical variations is very important for avoiding of this difficulty.

Key Words: Additional head, anatomical variation, sternocleidomastoid, muscle variation, additional clavicular head

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ÖZET

Boyunda birçok nörovasküler yapılarla ilişkisi nedeniyle, musculus sternocleidomastoideus (SCM) anatomik ve klinik açıdan önemlidir. Kas, boynun yan tarafı boyunca oblik olarak iner ve boynu ön ve arka üçgenlere böler. Bu vakada, bilateral musculus sternocleidomastoideus'un ek klavikular başı gösterildi. Gazi Üniversitesi Tıp Fakültesi Anatomi Anabilim Dalı Laboratuvarı'nda, anatomi eğitimi için yapılan rutin boyun diseksiyonu sırasında, bilateral olarak musculus sternocleidomastoideus'un ek klavikular başı gözlendi. Ek klavikular başlar clavicula'nın üçte bir orta kısmının üst yüzünden orijin almakta idi. Ayrıca, boynun sol tarafında, SCM'nin sternal başından kaynaklanan ve SCM'nin klavikular başıyla karışan kas lifleri görüldü. Her iki trigonum supraclaviculare minor normalden daha dar gözlendi. Medikal alanda, nadir klinik olaylarda tanı ve tedavi zor hale gelir. Bu zorluğu önlemek için anatomik varyasyonların bilinmesi çok önemlidir.

Anahtar Sözcükler: Ek baş, anatomik varyasyon, sternocleidomastoid, kas varyasyonu, ek klavikular baş

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INTRODUCTION

Because of its relationship with many neurovascular structures in the neck, the sternocleidomastoid muscle (SCM) is important surgical landmark. The muscle descends obliquely across the side of the neck and divides it into anterior and posterior triangles(1-3).

The SCM is attached inferiorly by two heads. The medial head, which is rounded and tendinous, originates from the upper part of the anterior surface of the manubrium sterni. It is called the sternal head and ascends posterolaterally. The lateral head, which is variable in width and contains muscular and fibrous elements, originates from the superior surface of the medial third of the clavicle. It is called the clavicular head and ascends almost vertically. Near their origins, the two heads are separated by a triangular interval which corresponds to a surface depression and is known as the lesser supraclavicular fossa.

The SCM is inserted into the lateral surface of the mastoid process from its apex to its superior border by a strong tendon and into the lateral half of the superior nuchal line by a thin aponeurosis. While the sternal fibers are more oblique and superficial and extend to the occiput, the clavicular fibers reach mainly to the mastoid process(4).

The upper part of the SCM is supplied by branches of the occipital and posterior auricular arteries, middle part of the SCM is supplied by the superior thyroid artery and the lower part of the SCM is supplied by the suprascapular artery. SCM is innervated by the spinal part of the accessory nerve. Besides, branches of the ventral rami of the second, third, and sometimes fourth cervical spinal nerves innervate the muscle. Although it was believed that these cervical rami were only proprioceptive, clinical evidence suggests that some of their fibers are motor(4).Acting alone, the SCM flexes the neck laterally and rotates the face to the other side. When the muscles of the two sides contract together, they flex the head and neck forcibly (1, 5).

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CASE REPORT

During routine dissections of the neck for anatomy education in the Department of Anatomy Laboratory in the Faculty of Medicine at the Gazi University, variations of SCM were found bilaterally in a 66-year-old male cadaver. The incision was performed on each side of the neck in accordance with traces of SCM. Skin, superficial fascia, platysma and deep fascia were removed and the muscles of the neck were exposed. During the dissections, two clavicular heads in addition to a sternal head were observed on the right, and similarly a sternal head and two additional clavicular heads were observed on the left. However, on the left some groups of fibers on the left of the sternal piece were splitting and were first connecting to the clavicular in the medial(Figure 1A and 1B).This cluster of muscle fibers was initially perceived as a head. All the heads on the left and right ended normally as a single joint body extending.

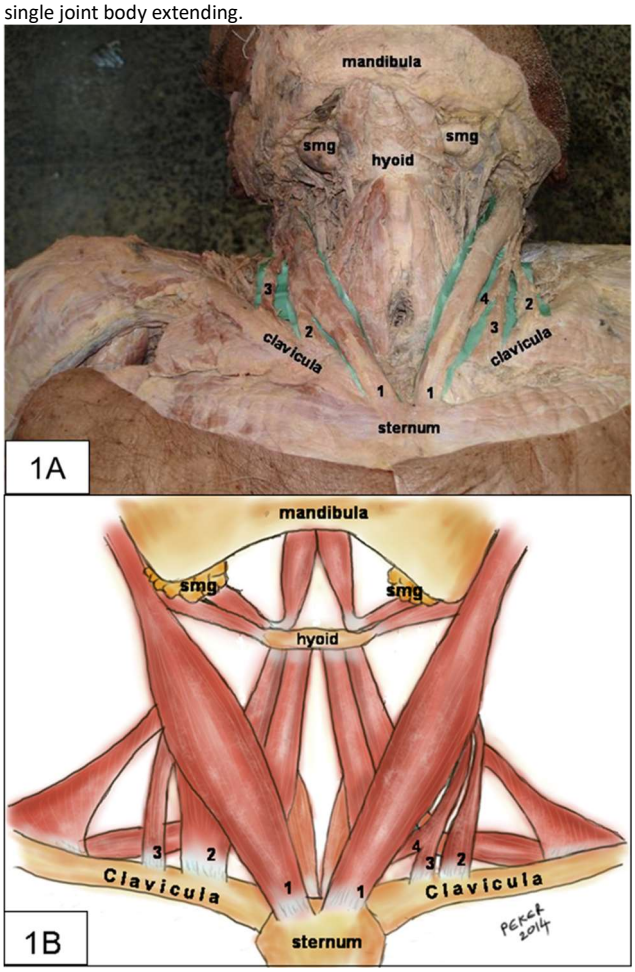


Figure 1A and 1B: General view of variation of sternocleidomastoid muscle. *smg* submandibular gland, *1* sternal head of sternocleidomastoid muscle, *2* clavicular head of sternocleidomastoid muscle, *3* accessory clavicular head of sternocleidomastoid muscle, *4* accessory clavicular head of sternocleidomastoid muscle between sternal head and accessory clavicular head

After these processes, additional clavicular heads of SCM were observed bilaterally. The additional clavicular heads originated from the superior surface of the middle one third of the clavicle. It was discovered that the right additional clavicular head was 8 cm laterally of the outer edge of the sternal head and the left one 7 cm laterally of the outer edge of the sternal head. The lengths of both SCM were measured as 25 cm. Besides, it was determined that right additional clavicular head blended with the other fibers of SCM 17 cm superiorly of the sternum and the left additional clavicular head blended with the other fibers of SCM 15 cm superiorly of the sternum.

Respectively, the lengths of right and left additional clavicular heads were measured as 11 cm and 12 cm. The measurements were performed with a mechanical caliper (BTS-12003, China). Measurement precision is 0.02 mm. Both of the lesser supraclavicular triangles were seen to be narrower than normal and it was shown that the insertion of the SCM was normal bilaterally.

DISCUSSION

Unusual clinical cases in medical area makes diagnosis and treatment more difficult. Knowledge of anatomical variations is very important for avoiding of this difficulty (6). In order to understand anatomical variations, knowledge of human embryology is very valuable. The SCM and trapezius develop from a common premuscle mass from the last two occipital and upper cervical myotomes. This common mass splits and separates at 9 mm stage and these two divisions grow independently along the upper limb bud. The mass forming SCM becomes fixed first to the clavicle and later to the sternum, occipital bone and mastoid process at 14 mm stage (7). Abnormality of the separation of common mass may be cause of variations of SCM.

Although several variations of origin of the SCM are common, variations of its insertion are very rare(1, 3). Different variations related to additional heads of the SCM have been reported by various authors. Cherian and Nayak (1) reported unilateral additional clavicular head of the SCM on the left side of the neck of 65-year-old male cadaver. Similarly, during the gross dissection of the neck region of a 65-year-old male cadaver, Rani et al. (7) found an additional clavicular head on the left side.

During the routine anatomy dissection, Mehta et al. (3) detected a bipartite clavicular head of the SCM on the left side of the neck of a male cadaver, whereas the sternal head of SCM was normal. Aparna (8) reported an additional clavicular head of SCM on the left side, during the routine student dissection of the head and neck region of a 50-year-old male cadaver.

Ramesh et al. (5) and Amorim et al. (6) observed an additional clavicular head of the SCM bilaterally on a male cadaver as in our case. Boaro and Fragoso Neto (9) reported the presence of three clavicular heads, while the sternal head was normal on a nine-month-old infant. Natsis et al.(10) noticed bilateral supernumerary heads of the SCM that had an additional sternal head and three additional clavicular heads, making six heads in total with normal heads of SCM. In addition to these variations, similar to our case, they revealed that the lesser supraclavicular triangle was very narrow. During routine dissection of the neck of a male cadaver for undergraduate students, Kaur et al.(2) also observed that the right SCM was formed by six heads, two sternal and four clavicular, whereas the left SCM was without any variation.

The SCM is a landmark for physicians such as orthopedic surgeons, neurosurgeons and especially anesthesiologists who intervene in the lesser supraclavicular fossa during instillation of a central venous line. The presence of additional clavicular heads can misdirect them, and consequently the catheter may puncture the pleura and possibly lead to pneumothorax. While trying to access the vital elements that are located in the lesser supraclavicular fossa, variations of SCM may cause some complications. For example, the spinal accessory nerve can be damaged and cannulation of the internal jugular vein can be unsuccessful. So, in order to prevent complications in this area, surgeons and anesthetists should be aware of anatomical variations of SCM (8, 10).

The knowledge of anatomical variations of SCM is also useful for plastic surgeons. The SCM can be used in several ways during surgery. The additional head of the SCM may not have any functional advantage on the movement of the neck, but it may be used in various reconstructions of the head and neck region. Plastic surgeons can use this additional head for muscle graft surgeries. It may be utilized as a myocutaneous flap in reconstructing the oral floor, as a suture line to protect the carotid arteries, or, along with a portion of the clavicle, to reconstruct the mandible (1, 3).

Conflict of interest
No conflict of interest was declared by the authors.

REFERENCES

1. Cherian SJ, Nayak S. A rare case of unilateral third head of sternocleidomastoid muscle. Int J Morphol2008; 26:99-101.
2. Kaur D, Jain M, Shukla L. Six heads of origin of sternocleidomastoid muscle: a rare case. Internet Journal of Medical Update 2013;8: 62-4.
3. Mehta V, Arora J, Kumar A, Nayar AK, Ioh HK, Gupta V et al. Bipartite clavicular attachment of the sternocleidomastoid muscle: a case report. Anat Cell Biol2012;45: 66-9.
4. Standring S. Gray's Anatomy. 39th ed. London: Elsevier Churchill Livingstone; 2005.
5. Ramesh RT, Vishnumaya G, Prakashchandra SK, Suresh R.Variation in the origin of sternocleidomastoid muscle. A case report. Int J Morphol2007;25: 621-3.
6. AmorimAA, Lins CCSA, Cardoso APS, Damascena CG.Variation in clavicular origin of sternocleidomastoid muscle. Int J Morphol 2010;28:97-8.
7. Rani A, Srivastava AK, Rani A, Chopra J. Third head of sternocleidomastoid muscle. International Journal of Anatomical Variations 2011;4: 204-6.
8. Aparna G. Additional head of sternocleidomastoid muscle with 3rd supraclavicular fossa. Int J PharmBioSci2013;4: 586-9.
9. Boaro SN, FragosoNeto RA. Topographic variation of the sternocleidomastoid muscle in a just been born children. Int J Morphol 2003;21:261-4.
10. Natsis K, Asouchidou I, Vasileiou M, Papathanasiou E, Noussios G, Paraskevas G. A rare case of bilateral supernumerary heads of sternocleidomastoid muscle and its clinical impact. Folia Morphol2009; 68: 52-4.