

A Rare Case of Bilateral Occipitoscapular Muscle

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In the present study, we described a variation of the neck muscles of a 73-year-old male cadaver during a routine anatomical dissection. The finding was represented by bilateral occipitoscapular muscle – a muscle that is normally not present in human. On the right side, the muscle was composed of inferior oblique, middle straight and superior oblique parts. The left muscle was represented by inferior and superior oblique parts. The muscles originated from the superior angle of the scapula and the tendons inserted on the lateral half of superior nuchal line of occipital bone. We observed and described the relations of these supernumerary muscles with the adjacent structures and their blood supply. In addition, we discussed the presence of this variation in the context of the embryonic development of neck muscles and phylogenetic development of mammals, as well as its clinical significance.

Key words: neck muscle, bilateral variation, occipitoscapular muscle

Introduction

The posterior cervical region is characterized by the presence of various muscles which can be classified into two main groups – muscles of neck and back. According to the origin, length and direction of muscle bundles, as well as the place of attachment, some of them may have action in more than one joint. Functionally, this musculature is associated with maintenance of posture of head and movements in the cervical and thoracic segments of the vertebral column. In addition, the levator scapulae and rhomboid muscles that are attached to the scapula may permit movements in the shoulder girdle. There is evidence for numerous variations of the muscles in the neck region: different tendinous insertions, especially for scalene and longissimus capitis muscle [27]; accessory caudal attachments of levator scapulae muscle to the serratus anterior, serratus posterior or first and second rib [1]; the cleido-occipitalis cervicalis bundle of the trapezius muscle [16]. Furthermore, the rhomboid muscles are characterized by varieties in their size and shape [14] and the presence of the third of the rhomboids has been described [11]. Occipitoscapularis muscle, known as rhomboid capitis or rhomboid occipitalis was first described by Wood in 1867 as arising from the occipital bone at the level on

the superior nuchal line and attached to the medial border of the scapula at the level of the scapular spine [26]. Rhomboideus occipitalis or capitis muscle was observed by Patten in 1935. It inserted between the attachments of levator scapulae and rhomboideus minor muscles [18]. Rogavski claimed to have described the third case of rhomboideus capitis in his study [21].

The aim of the current study was to present a multiple variation of bilateral occipitoscapular muscles in the cervical region and to describe their relations with adjacent structures. We also discussed the possible clinical significance of the observed finding.

Materials and Methods

The finding was made during a routine anatomical dissection of a 73-year-old male cadaver of Caucasian origin from the autopsy material available at the Department of Anatomy, Histology and Embryology, Medical University of Sofia, Bulgaria. The dissection was approved by the Medical Legal Office and the Local Ethics Committee. The body was preserved by an injection of a 10% formalin-based preservative and stored at -40°C .

Results

The present study describes two bilateral additional muscles, which were discovered in the posterior neck region during a routine anatomical dissection of a 73-year-old male cadaver. The right muscle was band-shaped. It originated from the superior angle of the scapula between the levator scapulae and rhomboideus minor muscles with a short tendon – 10 mm. Muscular fascicles ran parallel to each other in superomedial direction. The muscle was composed of three parts – initial inferior oblique – 52 mm, middle straight – 35 mm, and superior oblique – 59 mm. The distal tendon was 8 mm long and inserted on the lateral half of the superior nuchal line of the occipital bone. The muscle was situated over the splenius capitis and cervicis muscles just below the trapezoid muscle.

On the left side the muscle presented with two parts: inferior oblique – 72 mm, and superior oblique – 68 mm. It originated from the superior angle of the scapula with a short tendon – 11 mm and inserted on the lateral part of the superior nuchal line of the occipital bone. The distal tendon was 7 mm long. The muscle had the same relations to adjacent structures as described on the right side. The dissection revealed that these muscles were innervated by the dorsal scapular nerve (**Fig. 1**).

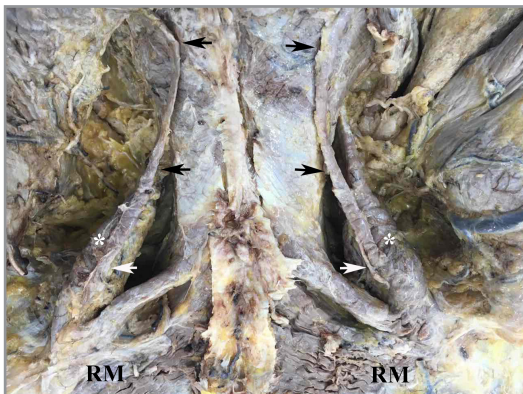


Fig. 1. Photograph of the posterior neck region: Arrows – occipitoscapular muscle; Asterisks – levator scapulae muscle; RM – rhomboideus major muscle

Discussion

Numerous studies have discussed various accessory muscle bundles in the cervical region [3, 22]. The reason for the observed accessory muscles may be associated with the embryonic development of neck musculature. It is known that in vertebrates, the body musculature originates from the somites, while the head muscles originate from the cranial mesoderm. The transitional location of neck muscles and the evidence of occipital lateral plate mesoderm as a novel source for vertebrate neck musculature [25] show the structural complexity of the neck region. Similar variation has been discussed in earlier descriptions in which the aberrant muscle was named as the occipito-scapularis, the rhomboideus-occipitalis or the rhomboideus capitis. Rogawski described the muscle as rhomboideus capitis, which originated from the occipital bone and was related to the splenius capitis muscle distally attached to the scapula [21]. Zagyapan et al. reported the muscle as occipito-scapular, but it was not related to the splenius capitis muscle caudally [27]. In contrast to these descriptions, in our study, we observed a bilateral variation represented by two occipito-scapular muscles. The rhomboideus occipitalis muscle is not normally present in human but it can be observed in genetic disorders such as Edward's syndrome [2]. Furthermore, the presence of these aberrant muscles can be explained by the phylogenetic development of mammals, because rhomboideus capitis exists in other species. In dogs, the rhomboideus capitis muscle originates from the dorso-cranial border of the scapula and inserts on the nuchal crest [23]. In the present case, the accessory occipitoscapular muscles were attached between the rhomboideus minor and levator scapulae muscles. In cats, this muscle stretches between the cranial nuchal line and superior angle of scapula and is associated with adaptation of standing postures [19]. In Rhesus monkey, the rhomboid muscle consists of rhomboideus capitis head and two conjoined parts – rhomboideus cervicis and rhomboideus dorsi [20].

Knowledge of anatomical variations in the neck region is clinically important. The presence of these supernumerary muscles may be misdiagnosed as tumor-mimicking lesions [15]. Some cases of palpable neck mass, which were treated by unilateral radical neck dissection, revealed hypertrophy of the ipsilateral levator muscle. In addition, Shpizner and Holliday investigated that the normal morphology of the muscle may be referred to as a tumor mass, because of muscular atrophy on the contralateral side [24]. On the other hand, the levator scapulae syndrome is characterized by pain radiated to the shoulder girdle and neck. Variability in the insertion of the levator and the origin of the serratus anterior muscles has been discussed in the etiology of this pathological condition [17]. Different muscular and fibro-muscular variations may occur and provoke compression of the brachial plexus and subclavian vessels in the thoracic outlet region, between the neck and the axilla [4-9, 12, 13]. In surgery, the levator scapulae flap is used in head and neck reconstruction [10]. In some cases, the occipitoscapular muscle may also be used as a flap during surgical interventions.

Conclusion

The presence of bilateral occipitoscapular muscle described in the present study represents a rare multiple variation in human and knowledge of it is important for both morphological and clinical disciplines such as surgery, radiology and musculoskeletal-medicine.

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