Case Report

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A New Variation of Omohyoid Muscle: A Case Report

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ABSTRACT

BACKGROUND AND OBJECTIVE: The omohyoid muscle is one of the muscles among the infrahyoid muscles. Due to the connections and proximity of this muscle to the brachial plexus, carotid sheath, phrenic nerve and sternocleidomastoid muscle, it is very important to be aware of all possible variations of this muscle in terms of anatomic, clinical and surgical factors.

CASE REPORT: During the dissection of posterior carotid triangle on the left side of the neck of a 55-year-old male cadaver (who had been purchased about two years ago from Tehran University of Medical Sciences) for master's students of anatomy in the dissection room of Babol University of Medical Sciences, it was observed that instead of passing under the sternocleidomastoid muscle, the intermediate tendon of the omohyoid muscle passes through its two origins connected to the sternum and the clavicle.

CONCLUSION: This type of variation of the omohyoid muscle can be very important due to the proximity of this muscle to the surrounding elements and its effect on the large vessels of the carotid sheath and surrounding tissues.

KEY WORDS: *Anatomical Variation, Omohyoid Muscle, Infrahyoid Muscles, Sternocleidomastoid Muscle*.

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Introduction

The omohyoid muscle is one of the muscles in the infrahyoid muscles. This muscle consists of two bellies, an inferior and a superior belly, which are connected by an intermediate tendon. The inferior belly originates from the superior border of the scapula and goes obliquely upwards and inwards, ending in the intermediate belly. The superior belly begins from the intermediate tendon and ascends on the exterior of the sternohyoid and connects to the hyoid bone. This muscle passes under the sternocleidomastoid muscle and over the brachial plexus, carotid sheath, and phrenic nerve. It connects to the carotid sheath and the deep cervical fascia, and fibers from the cervical fascia connect this muscle to the clavicle. The omohyoid muscle, along with the suprahyoid and infrahyoid muscles, are involved in the stability of the hyoid bone and pulls down the ascended hyoid bone. The omohyoid muscle is innervated by the cervical curves, which are formed from the anterior roots of the first three cervical spinal nerves (1, 2).

So far, various variations have been proposed for the omohyoid muscle regarding the origin and destination of the connection, the passageway, the number of bellies, and how they are adjacent to the surrounding muscles. Bifurcation of the superior belly of the muscle, one end of which connects to the hyoid bone and the other end to the sternohyoid muscle, bifurcation of both bellies of the muscle (3-5), the absence of superior belly of muscle (6) which can also be unilateral (7), the absence of the inferior belly of the muscle, in which case the superior belly usually originates from the clavicle, and the inferior belly of the muscle originates from the clavicle (8), attachment of the muscle to the cervical vertebrae (9, 10) and missing intermediate tendon (11, 12) are cases of variation of this muscle. Superior belly variations are divided into five to six groups (6, 13).

Due to the proximity of this muscle to the surrounding elements and the use of this muscle in clinical cases such as repair of damaged laryngeal muscles and vocal folds (14, 15), having knowledge about variations of the omohyoid muscle in neck surgery is of particular importance. Accordingly, a new case of variation of this muscle that has not been previously reported and has been accidentally identified in cadaver dissection is reported here.

Case Report

This study was approved by the ethics committee of Babol University of Medical Sciences with the code IR.MUBABOL.REC.1400.102. During the dissection of posterior carotid triangle on the left side of the neck of a 55-year-old male cadaver (who had been purchased about two years ago from Tehran University of Medical Sciences) for master's students of anatomy in the dissection room of Babol University of Medical Sciences, it was observed that instead of passing under the sternocleidomastoid muscle, the intermediate tendon of the omohyoid muscle passes through its two origins connected to the sternum and the clavicle (Figures 1 and 2).

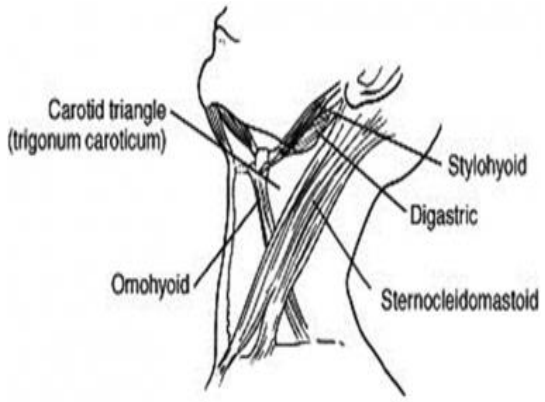

Figure 1. Schematic view of the omohyoid muscle

Figure 2. The arrows show the omohyoid muscle (scm= sternocleidomastoid muscle)

The muscle normally originated from the upper side of the scapula and was attached to the hyoid bone. The bellies of the muscle had a normal anatomical position. To determine if this variation was unilateral or bilateral, posterior carotid triangle on the right side of the neck was dissected, demonstrating an anatomically normal omohyoid muscle. Therefore, this variation has been unilateral. The sternocleidomastoid muscle had two normal origins, one end of which was attached to the sternum and the other end to the clavicle.

Discussion

In this variation, which has not been reported so far, instead of passing under the sternocleidomastoid muscle and over the carotid sheath, the intermediate tendon of the omohyoid muscle passes through its two origins connected to the sternum and the clavicle. The omohyoid muscle is an important surgical and clinical feature in the neck area. This muscle divides the anterior and posterior carotid triangle of the neck into smaller triangles and is the best indicator to identify the internal jugular vein. It is especially important in the local description of the neck area. Lack of familiarity with variations of this muscle increases the risk in neck surgeries (16, 17).

Due to the connection of the intermediate tendon of this muscle to the anterior layer of the internal jugular vein and its connection with the thin fascia to the pretracheal layer of the deep cervical fascia, its contraction can increase the diameter of the duct of this vein (18). Therefore, not being attached to the anterior layer of the internal jugular vein, as seen in this variation, can interfere with keeping this vein open. Conversely, shortness of this muscle can put pressure on the internal jugular vein and cause hemodynamic changes in the intracranial veins during yawning (19).

The omohyoid muscle is an appropriate guide for jugular vein catheterization, and variation of this muscle can cause problems in jugular vein catheterization (20). The anatomical position of the muscle is a criterion for differentiating the level of lymph nodes 3 and 4 in cases of metastasis, and its variation can interfere with differentiation of the degree of metastasis and the level of these nodules (21). This muscle can be used as a useful feature in endoscopy of the brachial plexus (22). The flaps of this muscle are used to fix larynx and tongue problems, and it is important for the surgeon to know about possible muscle variations (23, 24).

Due to the importance of variations of omohyoid muscle, these variations have been divided into 5 categories by Mori (25), but the variation presented here is not among any of the mentioned groups. Loth believes that the omohyoid muscle is a remnant of the sternocleidomastoid muscle that could itself be a remnant of a degenerated sternocleido-omohyoid muscle (13). Most cervical muscles originate from the mesenchyme of the cervical curves, but omohyoid muscles appear to originate from the myoblasts of the cervical myotomes (26, 27).

Among the infrahyoid muscles, the omohyoid muscle has the highest number of variations. The bilateral origin of this muscle may be a justification for this. The infrahyoid muscles originate from superficial and deep muscle layers during development. The deep layer becomes the sternothyroid and thyrohyoid muscles. The superficial layer is degenerated in the midline and is divided into inner and outer layers. The inner layer becomes the sternohyoid and the outer layer apparently forms the superior belly of the omohyoid muscle and the inferior belly of the muscle originates from the subscapular muscle.

Passing through the middle of the sternocleidomastoid muscle can make the omohyoid muscle function dependent on the situation of the mentioned muscle; the function of the omohyoid muscle may be impaired during contraction or spasm of the sternocleidomastoid muscle. Due to the importance of the scapular muscle in the dissection and surgery of the neck area, knowing the variations of this muscle should receive more attention.

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