

Review Article

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ANATOMICAL VARIABILITY OF THE SUPERIOR BELLY OF OMOHYOID MUSCLE AND ITS CLINICAL RELEVANCE

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ABSTRACT

The omohyoid muscle is a long, thin muscle consisting of superior and inferior bellies and an intermediate tendon, which runs obliquely in the lateral cervical region. The omohyoid is important in neck dissections because it is the surgical landmark for level III and IV lymph node metastases. In the present study, the anterior and posterior triangle of the neck was dissected in and observed for variations in the omohyoid unilaterally. Here an unusual attachment of the right omohyoid muscle was found during cadaveric dissection. No other muscular anomalies of the neck were found. Prevalence occurs in an approximately of the population. Variations of this muscle is important because of its close relation to the large vessels and brachial plexus.

Key words: Omohyoid muscle, Anatomy, Clinical significance.

INTRODUCTION

The omohyoid muscle consists of superior and inferior bellies and an intermediate tendon¹, which runs obliquely in the lateral cervical region. Two bellies united at an angle by an intermediate tendon. The inferior belly is a flat, narrow band, which inclines forwards and slightly upwards across the lower part of the neck. It arises from the upper border of the scapula, near the scapular notch, and occasionally from the superior transverse scapular ligament. It then passes behind sternocleidomastoid and ends there in an intermediate tendon.

The superior belly begins at the intermediate tendon, passes almost vertically upwards near the lateral border of sternohyoid, and is attached to the lower border of the body of the hyoid bone lateral to the insertion of sternohyoid. The length and form of the intermediate tendon vary, although it usually lies adjacent to the internal jugular vein at the level of the arch of the cricoid cartilage. The angulated course of the muscle is maintained by a band of deep cervical fascia, attached below to the clavicle and the first rib, which unsheathes the tendon. A variable amount of skeletal muscle may be present in the fascia band, either belly may be absent or double, and the inferior belly may be attached directly to the clavicle and the superior is sometimes fused with sternohyoid.

The intermediate tendon is connected to the clavicle by a fascial sling. The omohyoid is important in neck dissections because it is the surgical landmark for level III and IV lymph node metastases². Lang stated that contraction of the omohyoid muscles causes dilatation of the penetrating neck veins and may be responsible for the creation of an air embolus after trauma or surgery in this region by tenting open these vessels³.

It is necessary for clinicians to be aware of variations of the omohyoid because the inferior belly of the omohyoid is proximal to the brachial plexus trunks. According to Shih and Chuang, an anomalous omohyoid may cause Torticollis⁴. Moreover, a hypertrophied omohyoid may irritate the brachial plexus. Thus, the aim of the present study is to describe the variations in morphology of the omohyoid and to discuss the clinical implications in neck dissection.

Relations:

The inferior belly of omohyoid passes deep to the sternocleidomastoid muscle to join the intermediate tendon located behind it. Further along its course towards the hyoid bone, the superior belly of omohyoid muscle converges with the sternohyoid muscle and inserts in close proximity to it. Occasionally, the superior belly can be fused with the sternohyoid muscle and share a common attachment⁵.

The intermediate tendon of omohyoid muscle is ensheathed by deep cervical fascia. And it acts as a sling, binding the muscle to the inferiorly located clavicle and first rib, also helping the muscle to maintain its angulated pathway. The intermediate tendon, which is connected to the carotid sheath, also surrounds the neurovascular bundle containing the common carotid artery, internal jugular vein and vagus nerve (CN X). Because of this intermediate tendon is used as a surgical landmark for the carotid artery or internal jugular vein.

The omohyoid muscle which forms the borders of two triangles in the neck; they are

1. Occipital triangle: the superior margin of the inferior belly of omohyoid muscle is the base of this triangle. Contents are some important nerves, such as the accessory nerve (CN XI) and branches of both the cervical plexus and brachial plexus.

2. Supraclavicular triangle: the superior border of this triangle is formed by the inferior margin of the inferior belly of omohyoid muscle. Contents are branches of the brachial plexus, subclavian artery, nerve to subclavius and various lymph nodes.

Vascular supply

Omohyoid is supplied by branches from the superior thyroid and lingual arteries.

Enervation

The superior belly of omohyoid is innervated by branches from the superior ramus of the Ansa cervicalis (C1).

The inferior belly is innervated from the Ansa cervicalis itself (C1, 2 and 3)

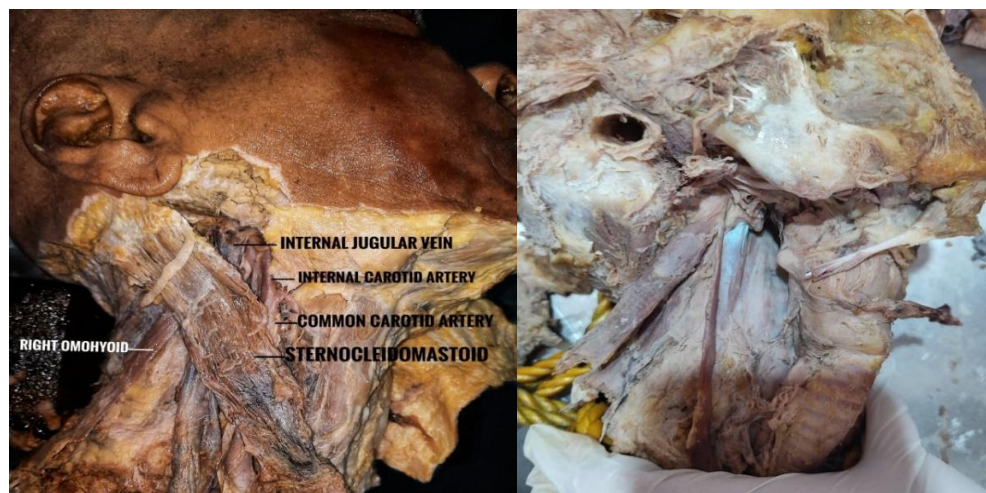
FUNCTION AND ACTION

Omohyoid depresses the hyoid bone after it has been elevated. It has been speculated that the muscle tenses the lower part of the deep cervical fascia in prolonged aspiratory efforts, reducing the tendency for soft parts to be sucked inwards. Omohyoid, depress the hyoid bone following its elevation during the act of swallowing. This action reopens the laryngeal inlet, which is normally closed off during swallowing to prevent inhalation of the food bolus. Thus, the act of opening the laryngeal inlet re-establishes breathing after swallowing.

An additional function of the omohyoid is related to its attachment at the carotid sheath. By contracting, it pulls on the sheath and maintains a low pressure in the internal jugular vein, thereby increasing the venous return from the head to the superior vena cava. similarly, this fascial connection allows the omohyoid muscle to control the bodily response to extended inspiratory activity, in which it tenses the cervical fascia and thereby lessens the likelihood of inward suction of soft tissues that would compress the great vessels and lung apices.

CASE REPORT: A female cadaver fixed with a 10% of formalin solution was dissected for UG teaching purpose at SDMIAH Bangalore and found the right omohyoid variation.

Figure shows the variation



Anomalies of right omohyoid muscle; the superior belly was attached to the transverse process of the C2 vertebra.

DISCUSSION:

During routine dissection of UG studies, a female cadaver with unknown medical history, we observed unilateral omohyoid variation in insertion. On careful examination revealed that there was variation in the right omohyoid muscle in its attachment. i.e., the superior belly was attached to the transverse process of the C2 vertebra.

Previously reported the anomalies of the superior belly of Omohyoid muscle. A case of the unusual attachment of superior belly of Omohyoid to the transverse process of C6, close to the scalenus medius has been reported⁶. But the attachment of transverse process of C2 is not reported. Also have observed a duplicated superior belly of the Omohyoid. Anderson has observed unilateral duplicated superior and inferior bellies⁷.

Sukekawa and Itoh are classified the intermediate morphologies into four types; type 1 - unclear anterior margin of the superior belly, type 2 - the superior belly was composed of a posterior large belly and an anterior small belly, type 3 - superior belly composed of three to five bellies, type 4 - the superior belly was found to consist of two bellies arranged parallel to each other in anterior-posterior direction⁸.

Omohyoid muscle is used to repair the laryngeal muscles⁹. The muscle is also used for the treatment of the bowed vocal folds¹⁰ and the vocal cord abduction restoration¹¹. Krishnan et al. have described that omohyoid is the reliable landmark for the endoscopic exploration of the brachial plexus¹².

Embryologically, the infrahyoid muscles are formed from a muscle primordium occurring in the anterior cervical area. The muscle primordium is first divided into a shallow and a deeper layer. The deep layer forms the sternothyroid and thyrohyoid muscles. The shallow layer becomes the splenius separated into internal and external muscles. The internal muscle becomes the sternohyoid muscle and runs straight into the anterior cervical region. The lower part of the external muscle grows in the external and inferior direction and becomes the omohyoid, which runs obliquely in the lateral cervical area¹³.

CONCLUSION:

Variations of omohyoid muscle is important because of its close relation to the large vessels and brachial plexus. Also, Omohyoid muscle has been successfully used for reconstructions of small and medium size defects in the neck caused due to tumor resection and also for laryngeal muscles. It is an important landmark for identification of internal jugular vein for IJV puncture which is usually done on the right side also landmark for endoscopic exploration of brachial plexus. Hence, omohyoid variant anatomy is of surgical importance for various procedures in the head and neck. Knowledge of the same helps the surgeons to find alternate methods and landmarks in the variant omohyoid cases.

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