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Duplicated anterior belly of the digastric muscle

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ABSTRACT During routine dissection of the submental region of a 65-year-old female cadaver, a bilateral supernumerary muscle, medial to the anterior bellies of the digastric muscle, was observed. The accessory muscle bundle was attached proximally to the digastric fossa of the mandible, with an intermediate attachment to the body of hyoid bone and a distal attachment to the medial margin of the lower end of the anterior belly of the digastric muscle and its intermediate tendon on the respective side. These bilaterally symmetrical accessory muscles of the submental region may be erroneously identified as an infarcted submental lymph node or a pseudomass on radiological examinations.

Keywords: accessory muscle, anterior belly, digastric muscle, submental region, variation

INTRODUCTION

Anatomical variations of the anterior belly of the digastric muscle are significant during diagnostic and surgical procedures involving the suprahyoid region. Knowledge of muscular irregularities in the submandibular region is important because mobilisation of the myocutaneous flap is an essential element in certain plastic surgery techniques.[1] The anterior belly of the digastric muscle and its tendon are also important landmarks during submandibulectomy.

The digastric muscle is located in the suprahyoid region and consists of two fleshy bellies (the anterior and posterior belly) that are united by an intermediate tendon that lies below the body of the mandible and extends, in an angled form, from the mastoid process to the digastric fossa. The posterior belly is longer than the anterior belly, and is attached to the mastoid notch of the temporal bone. It passes downward and forward just behind and parallel to the stylohyoid muscle. The intermediate tendon of the digastric muscle perforates the lower part of the stylohyoid muscle and turns upward, forward and medially to become continuous with the anterior belly. After perforating the stylohyoid, the tendon is tethered to the root of the greater cornu of hyoid, just medial to the insertion of stylohyoid, by a fascial loop. The anterior belly is attached to the digastric fossa at the medial part of the lower margin of the body of mandible, adjoining the symphysis.[2]

The bellies of the digastric muscle arise from two different embryological precursors, and are therefore supplied by two different nerves. The anterior belly, a derivative of the first pharyngeal arch, is supplied by a branch of the trigeminal nerve – the mylohyoid nerve; the posterior belly, a derivative of the second pharyngeal arch, derives its nerve supply from the facial nerve. Abnormalities of the pharyngeal arches during development can lead to multiple variations of the digastric muscle.

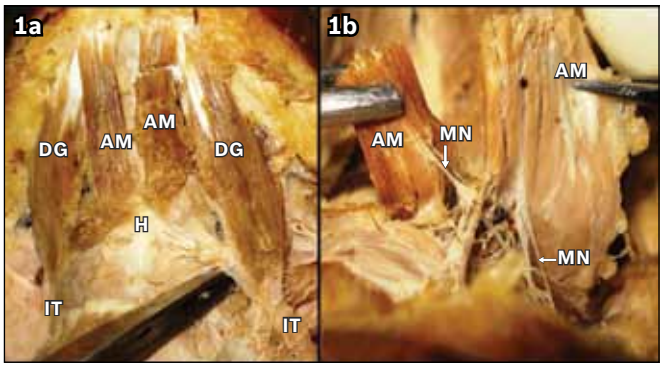

Fig. 1 Photographs show (a) the anterior bellies of the digastric muscle with bilateral accessory muscle and (b) innervation of the accessory muscle. AM: accessory muscle; DG: anterior belly of digastric muscle; H: hyoid bone; IT: intermediate tendon of digastric muscle; MN: mylohyoid nerve (arrows)

CASE REPORT

During routine dissection of the submental region of a 65-year-old female cadaver, we observed an accessory muscle that was bilateral and medial to the anterior bellies of the digastric muscle. Both sides of the accessory muscle were proximally attached to the digastric fossa of the mandible, medial to the anterior bellies of the digastric muscle. The muscle fibres were directed backward, downward and medially, with an intermediate attachment to the body of hyoid bone on either side of the midline at its upper border. The fibres then ran downward and laterally to attach to the medial margin of the lower end of the anterior belly of the digastric muscle and its intermediate tendon (Fig. 1a). This distal part of the muscle was fleshy superficially, while a tendon was observed on its deeper aspect. The accessory bundles were organised superficial to the mylohyoid muscle and deep to the platysma. This supernumerary muscle was innervated by the mylohyoid nerve of the respective sides, from its deeper surface (Fig. 1b). Arterial supply to the muscle was derived from the finer branches of the

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submental and mylohyoid arteries. Further dissection revealed that the posterior belly of the digastric muscle, as well as the mylohyoid, geniohyoid and infrahyoid muscles, exhibited normal anatomy on both sides.

DISCUSSION

Variation is the first and most fundamental evolutionary factor. Formation of supernumerary muscles could be attributed to abnormal splitting of the muscle anlagen. Duplication of the bilateral anterior belly of the digastric muscle in the neck may be due to a deficiency in the differentiation of the mesoderm of the first pharyngeal arch of both sides or the abnormal migration of neural crest cells.[3]

The complexity of sequential development naturally gives rise to countless potential variations. Variations or anomalies of the anterior belly of the digastric muscle are quite common and many forms of such variations have been reported. Although the exact incidence of digastric muscle anomalies is not known, several studies have described variations of the anterior belly and fibrous sling of the digastric muscle. Celik et al observed an abnormal digastric muscle with unilateral quadrification of the anterior belly,[4] while Sarikcioglu et al reported an anomalous digastric muscle with three accessory bellies and one fibrous band.[5] Both unilateral[6] and bilateral[7,8] variations have been reported.

The supernumerary muscle may arise from the anterior belly itself,[6] the intermediate tendon,[8] the hyoid bone,[9] the mandible or the digastric fossa.[10] Possible insertion points include the mylohyoid raphe,[2,8] the hyoid bone,[7] the mandible,[8,9] the anterior belly of the opposite side,[10] or even the mylohyoid muscle.[2,9] Some accessory muscles were reported to cross the midline of the neck.[8,10] Loukas et al reported a case of bilateral accessory digastric muscles, which originated from the digastric fossa of their respective sides – the left one was inserted into the midline raphe of the mylohyoid muscle, while the right one immediately bifurcated into two heads.[3] The lateral head rejoined the main belly of the digastric muscle, while the medial head inserted into the midline raphe of the mylohyoid muscle.[3] In the present study, however, the accessory muscle was bilaterally symmetrical. The anomaly was somewhat similar to that described by Jaijesh, who reported a bilateral symmetrical variation of the anterior belly originating from the digastric fossa of the mandible.[11] Most (about 90%) of the muscle fibres were inserted into the hyoid bone, at its junction between the body and greater cornu, while about 10% of fibres were inserted into the intermediate tendon of the digastric muscle.[11] Our case was different in that all the fibres were first attached to the body of hyoid bone, followed by attachment to the digastric muscle and its intermediate tendon.

Asymmetrical unilateral or bilateral variations of the anterior belly of the digastric muscle have radiological importance, especially when computed tomography or magnetic resonance imaging is used in the detection and staging of tumours in the submental region or the floor of the mouth. It is essential to be able to differentiate between tumours, metastatic lymph nodes and muscular variations. Since not all asymmetrical images indicate tumours, clinicians must be vigilant to avoid misinterpretation. A bilateral and symmetrical muscular variation could easily be misinterpreted as a pseudomass or a normal or metastatic submandibular or submental lymph node. Also, since the anterior belly of the digastric muscle is used as a landmark to identify the lingual nerve and duct of the submandibular gland,[1] surgeons performing surgical procedures in the neck and oral region (e.g. mobilisation of the myocutaneous flaps of platysma in reconstructive procedures and dissection for metastatic node removal) should be aware of possible variations of the anterior belly of the digastric muscle, and that bilateral and symmetrical variations in this region are possible.

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