

Anatomical variation of the accessory muscle of the forearm (Gantzer's muscles) and his relationship with the median nerve: a case report in human

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Abstract

During routine anatomical dissections, the presence of the accessory muscle in the anterior area of the third distal of the forearm was determined in a 59-year-old male cadaver. This accessory muscle presents an intimate relationship with the median nerve. The described variation is also useful to the hand surgeon, as the anomalous muscle is an anatomical landmark for operations at this area. This variation may be clinically important because symptoms of median nerve compression arising from similar variations are often confused with more common causes, such as radiculopathy and carpal tunnel syndrome. To our knowledge, this variation has not been cited in recent medical literature.

Keywords: accessory flexor muscle, median nerve, forearm.

1 Introduction

Among the countless reports about the anatomical variations of the muscles of the forearm (CIGALI, KUTOGLU and CIKMAZ, 2002; HONG, 2005) and of the hand (AYDINLIOGLU, SAKUL and DIYARBAKIRLI, 1998; D'COSTA, JIJI, NAYAK et al., 2006; NAKANO, WATANABE and MASUTANI, 2003; NATSIS, LEVVA, TOTLIS et al., 2007; SOLDADO-CARRERA, VILAR-COROMINA and RODRIGUEZ-BAEZA, 2000; WINDISCH, 2000), a paper exists (JONES, ABRAHAMS and SANUDO, 1997) that mentions some important considerations on the muscle of Gantzer.

We described in this paper the presence of an accessory muscle in the right forearm of a 59 year-old male corpse. This muscle is relatively similar to the muscle described by Jones, Abrahams and Sanudo (1997); for these authors the accessory heads of the deep flexors of the forearm (Gantzer's muscles) have been described as 2 different small bellies which insert either into flexor pollicis longus muscle or flexor digitorum profundus. However, there are no previous reports that evidence an intimate relationship of this accessory muscle with the median nerve. The whole morphology of this muscle and his relationship with this important nervous road of the forearm is discussed in this paper.

2 Case report

An adult, white, male cadaver, aged 59 years, was used in this study. During the routine dissection, the presence of a located muscle was verified in the forearm on the right side of a corpse settled in formol 10%. The left side was normal. The whole anterior area of the third distal of the forearm was exposed; feeling matter attention for all morphologic organization of the accessory muscle (Figure 1).

Muscle tendon, thickness and belly measurements were taken with the aid of a digital pachymeter (Digimess). The accessory muscle presents a muscular belly of 9.5 cm of length by 0.8 cm of width and 0.2 cm of thickness, presenting a tendon of 2.5 cm of length and a diameter of 0.1 cm (Figure 2). An important observation in our case report is the interesting relationship of the accessory muscle with the median nerve. Immediately after emerging in the forearm the median nerve travels a distance of 12 cm and then it becomes separated in two strings (8 cm of length), medial and lateral. The accessory muscle with origin in the portion proximal of the flexor digitorum superficialis muscle (see A₁, Figure 2), crosses these strings (medial and lateral) and is inserted into tendon of the flexor pollicis longus muscle (see fixation point*, Figure 3); the insert point locates to 1 cm of the medial string of the median nerve. There was no evidence of any pathological involvement of the muscle of Gantzer and median nerve.

3 Discussion

In agreement with Moore and Dalley (2001) in a random group of people, individuals differ from each other in the physical appearance. The bones of the skeleton not just vary in his basic form, but also in smaller details of the surface structure. A wide variation is found in the form, in the size and in the pattern of insert of the muscles.

The importance of continuing to record and discuss anatomical anomalies was addressed recently by Hicks and Newell (1997) in the light of technical advances and interventional methods of diagnosis and treatment.

As mentioned for Khaledpour and Schindelmeiser (1994) the knowledge of such variations supplements the body of information on the muscles of the antebrachial and carpal

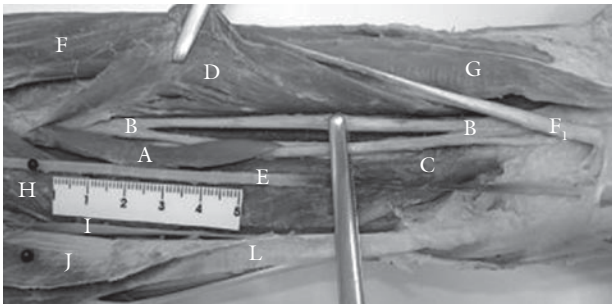


Figure 1. Dissection of ventral aspect of right forearm demonstrating the accessory muscle. A, accessory muscle; B, median nerve; C, flexor pollicis longus muscle; D, flexor digitorum superficialis muscle; E, radial artery; F, flexor carpi radialis muscle and his tendon (F₁); G, palmaris longus muscle; H, pronator teres muscle; I, radial nerve; J, brachioradialis muscle; L, extensor carpi radialis longus muscle. Scale in centimeter.

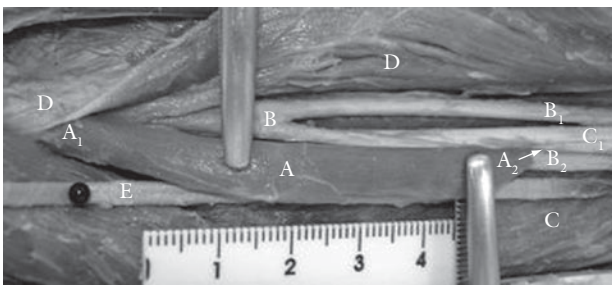


Figure 2. Photograph demonstrating the accessory muscle and his relationship with the median nerve. A, accessory muscle; A₁, proximal; A₂, distal; B, median nerve; B₁, medial string; B₂, lateral string; C, flexor pollicis longus muscle and his tendon (C₁); D, flexor digitorum superficialis muscle; E, radial artery. Final portion of the muscular belly (arrow). Scale in centimeter.

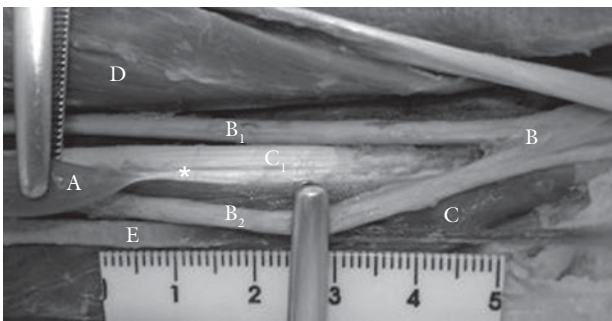


Figure 3. Detailed vision of the place of fixation of the accessory muscle. A, accessory muscle and his fixation point (*); B, median nerve; B₁, medial string; B₂, lateral string; C, flexor pollicis longus muscle and his tendon (C₁); D, flexor digitorum superficialis muscle; E, radial artery. Scale in centimeter.

regions and may be important for hand surgeons. According to Soldado-Carrera, Vilar-Coromina and Rodriguez-Baeza (2000), accessory fasciculi of the hypothenar muscles have been involved in vascular and nerve compressions.

Tabib, Aboufarah and Asselineau (2001) report a case of incomplete anterior interosseous nerve syndrome due to mechanical compression by Gantzer's muscle.

Degreeef and Smet (2004) mention a case where an older female patient with paralysis of the anterior interosseous nerve is reported. During exploration of an accessory muscle slip running from the coronoid process of the ulna towards the flexor pollicis longus (Gantzer's muscle) was found compressing the nerve.

The muscles vary plenty as for his insert; they can be absentees, and many accessory muscles were described already (GARDNER, GRAY and O'RAHILLY, 1988), however, they provoke neurological disorders that could limit the mobilization of the joints carpus (D'COSTA, JIJI, NAYAK et al., 2006), leading to pain and impeding the execution of professional activity.

Bataineh, Al-Hussain and Moqattash (2007) in a study on the neurovascular variation in one upper limb mentions that the median nerve forms a loop surrounding the median artery 4 cm below the intercondylar line and bifurcates 2 cm above the flexor retinaculum.

The case described by Jones, Abrahams and Sanudo (1997), is a supranumerary muscle of the forearm (Gantzer muscle) which arose from the undersurface of flexor digitorum superficialis and was inserted into flexor pollicis longus and flexor digitorum profundus.

Since their initial description, in 1813 (JONES, ABRAHAMS and SANUDO, 1997), they have been examined in further detail by a big number of authors. All show different results of prevalence, origin, insertion, relations and nerve supply.

We undertook this study with the aim of providing a more accurate account of the detailed morphology of another accessory muscles variation, because of the interesting relationship with the median nerve. The knowledge of the course of the median nerve and its relations with the adjacent anatomic structures facilitates determination of the exact cause of entrapment and allows a safe surgery. Finally, this variation should be borne in mind by clinicians, surgeons and academicians who manipulate this particular anatomical site.

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