

PRESENCE OF TRIPLE GANTZER'S MUSCLE - A RARE ANATOMICAL VARIATION.

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Abstract :

Anomalous muscles usually do not result in adverse symptoms but are of academic interest. However, these muscles can create neurovascular compression at times. Muscle anomalies of the upper extremity are recognized causes of peripheral nerve disorder. Koloh-Nevin Syndrome (Anterior Interosseous Nerve Syndrome) caused by the compression neuropathy of the anterior interosseous nerve in the forearm is believed to occur because of its compression by the accessory heads of flexor pollicis longus (FPLah) and flexor digitorum profundus (FDPah). The above two accessory muscles are also called Gantzer's muscle. During routine cadaveric dissection, we encountered multiple Gantzer's muscles in a 60 year-old- formalin embalmed male cadaver. Along with the usual FPLah and FDPah described by Gantzer, we too observed an accessory muscle in relation to the flexor digitorum superficialis (FDS). All the three anomalous muscles had a common origin from the under cover of the FDS fibers and by fibrous band above the insertion of brachialis. The presence of multiple additional muscles in the forearm flexor compartment is rare and clinically significant.

Keywords : flexor digitorum superficialis, Gantzer's muscle, multiple insertion sites.

Introduction:

The accessory muscles associated with the flexor pollicis longus (FPL) and flexor digitorum profundus (FDP) are called Gantzer's muscle in general and literature regarding the same are available in abundance^{1, 2, 3, 4, 5, 6, 7}. Apart from anatomical and morphological consideration the Gantzer's muscle has clinical importance as it may compress both the median nerve^{1, 2, 8} and its branch anterior interosseous nerve^{2, 4, 9, 10, 11}.

There are multiple reports of single^{2, 6, 10, 12} and double^{2, 7, 9} Gantzer's muscle are available in literature but the co-existence of three additional muscle in relation to FPL, FDP

and FDS in the same limb as observed in the present case is not available to the best of our knowledge. The entire morphology and there relation to the AIN; as it may cause Koloh-Nevin Syndrome (Anterior Interosseous Nerve

Syndrome) has been discussed.

Case Report :

Three Gantzer's muscle was detected in the right forearm of a 60 year old male formalin fixed cadaver; during routine practical anatomy course for undergraduate medical students at College of Medicine & J.N.M Hospital, Kalyani, India. These muscles were having common origin from the undersurface of flexor digitorum superficialis (FDS) muscle, the medial epicondyle of humerus and from a fibrous cord which was getting itself inserted to the upper surface of the brachialis muscle insertion (Fig. 1). The lateral one (1) was inserted into the ulnar side of FPL at the junction between proximal and middle third of forearm [named as FPL accessory head (FPLah)]. The intermediate one (2) was terminated into the upper surface of the FDP [named as FDP accessory head (FDPah)]. The medial one (3) was inserted into the undersurface of the FDS [named as FDS accessory head (FDSah)]. The length of the FPLah, FDPah & FDSah were 10 cm, 8.4 cm & 11.8 cm respectively. On further dissection we observed the AIN was passing

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between FPL (posteriorly) and FPLah (anteriorly) and the median nerve was running anterior the FPLah.

Discussion :

The occurrence of Gantzer's muscle is lowest in European Caucasians and highest in the Blacks with the Asian Japanese being midways and in Indian population (46.03%) it lies between the European Caucasians and the Asian Japanese². The presence of additional muscles like FPLah , FDPah and FDSah (as observed in the present case) may be due to the incomplete cleavage of the forearm flexor muscles during development as the deep layer of the flexor muscle mass gives rise to the FDS, FDP and FPL⁷.

When present the Gantzer's muscle mostly originated from the medial epicondyle of the humerus and from the under surface of FDS muscle^{2, 13}, as in the present case. Mahakkanukrauhp et al., (2004) and Al Qattan M (1996) observed FPLah originating from the medical epicondyle of the humerus in 74.5% and 85% cases respectively^{4,14} but Oh CS et al (2000) found the same to be merely 10.4% in Asian population⁶. The insertion of Gantzer's muscle varies a great deal^{2,7} as it may get itself inserted to the FPL, FDP and FDS (as in the present case).

Pai et al (2008) described a Gantzer's muscle in their study; which took origin from the undersurface of FDS, divided into two and then inserted to the FPL and FDP much like a similar case published by Jones et al (1997)^{2,7}. In the present study we observed similarity in its origin but the muscle divided into three different belly and inserted to the FPL, FDP and also to the FDS separately, which is not reported in the literature earlier. The presence of multiple accessory muscle in relation to the forearm flexors may confuse the surgeons operation in this area and may cause

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Koloh-Nevin Syndrome.

The Koloh-Nevin Syndrome occurs due to the compression of the AIN, as in most of the cases the AIN passes between the FPL muscle posteriorly and FPLah anteriorly^{2,7,10,11,12,15}. In the present case the PIN passes deep to the FPLah and can be a factor for the compression of the same. Ryu JY and Watson HK (1987) mentioned that presence of FDPah can cause burning pain in the lower third of the forearm via a muscle tendon shearing action¹⁶. The presence of an additional FDSah in the present case may result in restricted movement of forearm flexors and subsequent pain during various movements of the same.

Conclusion :

The presence of three additional muscles with its tendons getting inserted to three different sites makes the present case interesting both anatomically and clinically. Surgeons should aware of such a variation, which may be a causative factor for AIN nerve compression and restriction of muscle movement and pain in the distal part of the forearm.

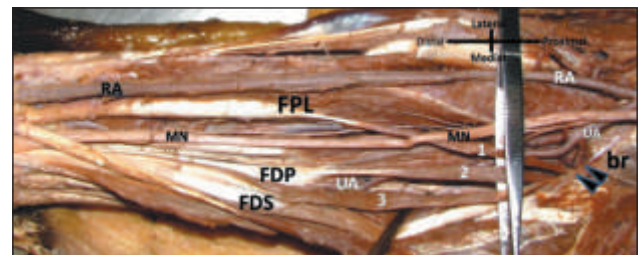


Figure 1: Right flexor compartment of the forearm. The arrow indicates the anterior interosseous nerve. The double triangular arrows indicate the fibrous cord which was getting itself inserted to the upper surface of the brachialis muscle insertion (br). 1- Indicates the accessory head of FPL (FPLah). 2- Indicates the accessory head of FDP (FDPah), 3- Indicates the accessory head of FDS (FDSah), FDP- Flexor digitorum profundus, FDS-Flexor digitorum superficialis, FPL- Flexor pollicis longus, RA- Radial aretey, UN- Ulnar artery, MN-Median nerve.

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