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CASE REPORT

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An unusual muscle of the wrist with potential compression of the ulnar nerve

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During routine cadaveric dissection of the upper extremity an unusual muscle was discovered arising from the tendon of the flexor carpi ulnaris and inserting into the muscle belly of the flexor digiti minimi. The muscle's course was superficial to the ulnar nerve and artery in Guyon's canal. We review the literature regarding such muscle variations and discuss the potential for compression of the ulnar nerve by such muscles.

Key words: anatomy, wrist, anomaly, surgery, variant

INTRODUCTION

Guyon's canal, or the carpal ulnar neurovascular space, has been defined as the tunnel extending between the antebrachial fascia and the hypothenar muscles and associated bones that is bordered by the palmaris brevis muscle (the radial border) and the pisiform bone and the meeting of the fascia covering the roof and floor (the ulnar border) [1]. The ulnar nerve can be compromised in this tunnel by such entities as anomalous muscles, hypertrophied arteries [6], ganglionic cysts [12], thromboses, schwanomas, abnormally large carpal bones, oedema and fibrous tissue masses [8]. While the existence of muscle variations residing in Guyon's canal is seldom associated with ulnar nerve compression, instances of these anomalous muscles are relatively common. Various studies have reported the frequency of such muscles in approximately 22 to 35% of hands [2, 4, 18]. One author has stated that ulnar nerve compression is due to the existence of aberrant muscles in approximately 3% of cases [13].

Most muscle variations of the wrist have been classified by their distal insertion. For example, accessory origins of the abductor digiti minimi brevis have been reported that arise from the flexor retinaculum [5, 9, 15], the transverse carpal ligament [10] or the palmaris longus tendon [3]. In an ultrasonic study of 116 asymptomatic individuals each of the 40 anomalous muscles identified in Guyon's canal were variants of the abductor digiti minimi brevis [4]. In a study of 19 cadavers six unilateral muscle anomalies were found in Guyon's canal, of which, five were classified as abductor digiti minimi brevis variants [4]. We report an unusual muscle found with Guyon's canal.

CASE REPORT

We report a 78-year-old male formalin-fixed cadaver that during routine dissection was found to harbour an unusual muscle variation of the left upper extremity. This muscle originated from the anterolateral aspect of the distal tendon of the flexor carpi ulnaris muscle and inserted into the flexor digiti minimi muscle (Fig. 1) This muscle was innervated by the ulnar nerve just proximal to the pisiform (Fig. 2). At its termination into the hand the muscle described compressed the ulnar artery and nerve. However, no gross atrophy of the muscles of the hand innervated by the ulnar nerve was observed.

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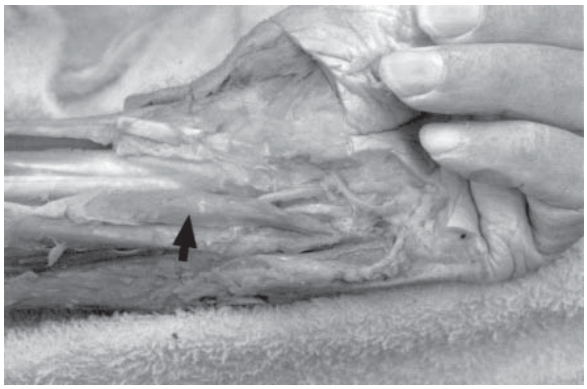

Figure 1. Photo of the cadaveric specimen noted in the above case report. The anomalous muscle is seen at the arrow tip.

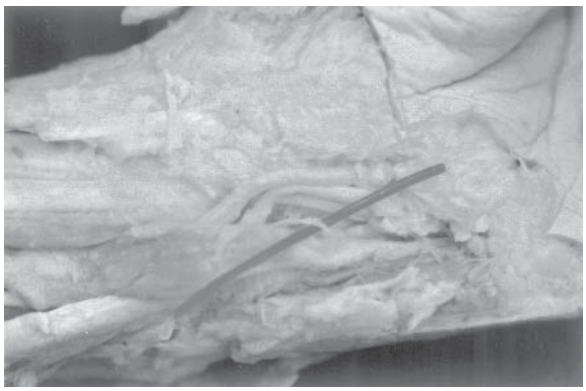

Figure 2. The same cadaveric specimen as in Figure 1. Note the nerve supply from the ulnar nerve travelling superficially to the rubber tube.

DISCUSSION

On the basis of its origin and insertion, the muscle variation we report could represent an accessory origin of the flexor digiti minimi or an additional distal belly of the flexor carpi ulnaris. Muscle aberrations associated with the flexor carpi ulnaris have been well documented; however, these have been limited to abnormal divisions of the flexor carpi ulnaris tendon proximal to Guyon's canal [11]. Fibres from the flexor carpi ulnaris have been documented as extending to the fifth metacarpophalangeal joint, the location of the normal flexor digiti minimi insertion.

The abductor digiti minimi brevis muscle is occasionally divided into multiple slips and an accessory head; the accessorius ad abductorem digiti minimi manus is frequently present. This muscular fascicle may originate from the tendon of the flexor carpi ulnaris, from the flexor retinaculum, the tendon of palmaris longus, the fascia of the forearm or the bones of the forearm [13]. Travelling distally, this muscle may cover and potentially compress the ulnar artery or nerve. A small separate slip may extend from the pisiform bone to a metacarpal bone, thus forming the pisimetacarpus muscle. A pisiuncinatus (pisohamatus) muscle has been described in 2–5% of hands. This extends from the pisiform bone to the hook of the hamate bone. A similar slip may extend from the pisiform bone to the flexor retinaculum.

The flexor digiti minimi muscle is extremely variable. This muscle may be replaced by a tendinous band that arises from the flexor carpi ulnaris and inserts onto the base of the fifth proximal phalanx and hook of the hamate. This muscle may arise from the flexor retinaculum or the antebrachial fascia and insert into the flexor digiti minimi [1, 4, 16]. Other anomalous flexor digiti minimi muscles have been found coursing through Guyon's canal, but these have been depicted as travelling superficially to the ulnar nerve and vessels in Guyon's canal and arising from the superficial transverse septum just deep to the flexor carpi ulnaris [7].

Other muscular variations in this region include the tensor capsularis articulationis metacarpophalangei digiti minimi, which arises from the ligaments joining the pisiform and hamate bones. This muscle inserts into the palmar surface of the metacarpophalangeal joint of the fifth digit. The tendon of the palmaris longus may give rise to the accessorius ad flexorum digiti minimi, which inserts on the fifth metacarpal between the abductor digiti minimi brevis and the flexor digiti minimi. The palmaris brevis may join the flexor digiti minimi. The rare ulnaris externus brevis arises approximately 6 cm proximal to the wrist and inserts onto the fifth metacarpal, not unlike the opponens digiti minimi. Schmidt and Lanz [14] have also reviewed the potential for the presence of the abductor digiti minimi longus, accessory doubled abductor/flexor digiti minimi, accessory palmaris longus inserting into the abductor flexor complex and accessory head of the abductor digiti minimi brevis with its origin on the tendon of the flexor carpi radialis.

Although aberrant muscles arising from the anterior forearm have been reported and have occasionally been cited as structures causing ulnar nerve compression at the level of the tunnel of Guyon, we were unable to find other reports of such muscles originating specifically from the flexor carpi ulnaris and inserting into the flexor digiti minimi. The muscle described in the present case report displayed characteristics of recorded variations from

both the flexor carpi ulnaris and the flexor digiti minimi muscles and, though obviously rare, this distinct morphology should serve as another example of aberrant muscles that may potentially lead to distal ulnar nerve compression [16, 17].

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