

Accessory Abductor Digiti Minimi Muscle: A Potential Cause of Ulnar Neuropathy at Wrist

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Abstract: Ulnar nerve compression at wrist is manifested either pathologically due to ganglia or neoplasms, or anatomically by the presence of accessory muscles in the hypothenar region. Accessory abductor digiti minimi muscle is an additional muscle encountered rarely in the wrist; presence of which causes high risk of ulnar neuropathy. We report here a case of unilateral accessory abductor digiti minimi muscle on the right hand of an elderly male cadaver of South Indian origin. The accessory muscle had flattened origin from the distal end of deep fascia of the forearm. It then formed a rounded belly and became narrowed to pass through the Guyon's canal to get attached into radial side of the abductor digiti minimi muscle. Knowledge of existence of additional muscles in the wrist is important for the surgeons as these often cause neuropathy and vascular thrombosis, which greatly affects the movement of the wrist.

Keywords: Accessory abductor digiti minimi, Neuropathy, Guyon's canal, Hypothenar muscles.

INTRODUCTION

Abductor digiti minimi (AbDM), also known as abductor digit minimi accessories is a hypothenar muscle of the hand originates from the pisiform bone, pisohamate ligament and from the tendon of flexor carpi ulnaris. At its distal attachment, it usually divides into two slips and then gets inserted into medial side of the base of the proximal phalanx of the little finger and to the medial border of dorsal digital expansion of extensor digiti minimi [1]. AbDM is innervated by the deep branch of ulnar nerve and it abducts the little finger away from the fourth digit.

Embryologically, AbDM develops from an ulnar muscle primordium of the superficial layer of the undifferentiated mesenchyme of the hand which is in contrast to the remaining hypothenar muscles as they are derived from the deep layer [2].

Occasionally, an additional slip to AbDM is encountered with the multiform origin from flexor retinaculum, deep fascia of the forearm or from the tendons of palmaris longus or flexor carpi ulnaris muscles [1]. Major problem which is identified in the clinical setup by the persistence of accessory AbDM is the ulnar neuropathy with the manifestation of paraesthesia in the ulnar nerve distribution. Accessory AbDM is also known to cause vascular thrombosis by compressing underlying ulnar vessels [3]. Anatomical knowledge of presence of accessory AbDM helps in the diagnostic approach of ulnar neuropathy which

enhances the timely treatment and better prognosis of the complications.

CASE REPORT

During routine dissection of the flexor compartment of the forearm and palmar aspect of the hand, we noticed the presence of accessory abductor digiti minimi muscle, originating from the ante-brachial fascia (deep fascia) covering the distal one third of the forearm (Fig. 1). From its flattened proximal attachment it coursed forward and became a rounded belly which eventually narrowed to form a tendon to pass through the Guyon's canal and entered the hypothenar region of the palm. In the palm, it was situated between abductor digiti minimi and flexor digiti minimi brevis and attached into lateral side of the abductor digiti minimi (Fig. 2). This variant muscle was measuring approximately 12cm long and was encountered unilaterally on the right upper limb of a formalin embalmed adult male cadaver of South Indian origin, aged approximately 60 years. It received the innervation by a twig from deep branch of the ulnar nerve.

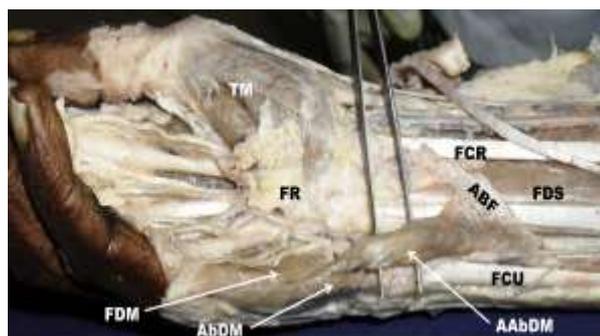


Fig. 1: Dissection of flexor compartment of the forearm and palm showing accessory abductor digiti minimi (AAbDM) originating from ante-brachial fascia (ABF) and attached into abductor digiti minimi (AbDM). FR- flexor retinaculum, FCU- flexor carpi ulnaris, FCR- flexor carpi radialis, TM- Thenar muscles, FDS- flexor digitorum superficialis, FDM- flexor digiti minimi brevis

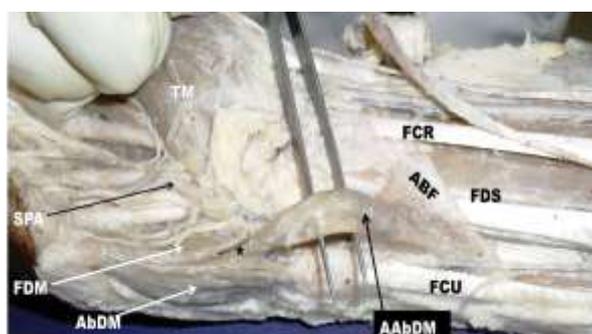


Fig. 2: Closer view of accessory abductor digiti minimi (AAbDM) arising from ante-brachial fascia (ABF) and its insertion (*) in to abductor digiti minimi (AbDM) muscle. FCU- flexor carpi ulnaris, FCR- flexor carpi radialis, TM- Thenar muscles, FDS- flexor digitorum superficialis, FDM- flexor digiti minimi brevis, SPA- superficial palmar arch

DISCUSSION

Variant form of AbDM may be categorized based on its absence, origin with two heads, aberrant origin and fusion with flexor digiti minimi brevis or co-existence with the reversed palmaris longus [4]. Atypical origin of AbDM from the lateral side of palmar carpal ligament with the few muscle fibre attachment to pisohamate ligament was reported by Jwalaram *et al.* [5].

The incidence of accessory AbDM is reported to be about 22.4 % [6, 7]. Among this, the prevalence of ulnar nerve entrapment is reported to be 2.9% [8]. Hence, not in all cases does its presence result in ulnar nerve entrapment. However, the site of its anatomical location and its pathological malformation into hypertrophy would cause higher risk of the entrapment syndrome [9].

Presence of accessory AbDM may give a false appearance of soft tissue tumour [8]. Sheppard *et al.* reported a case of anomalous muscle belly originating from deep fascia of forearm and inserted to AbDM in a patient with the clinical history of paraesthesia in the region of ulnar nerve distribution [10]. A clinical scenario with the dysesthesia on the volar aspects of medial 2 digits due to bilateral presence of accessory AbDM was reported by Netscher *et al.* [11]. Accessory AbDM arising from the tendon of palmaris longus, enclosing ulnar nerve and ulnar vessels has been reported by Soldado *et al.* [3]. In this report, authors have also observed the presence of a fibrous band from the accessory muscle covering the median nerve.

Ulnar nerve compression is more common at cervical spine or at the region of elbow when compared to at the level of wrist [12]. Peripheral neuropathies involving the ulnar nerve and its occurrence at different sites in the arm and upper part of the forearm may be the general phenomenon. But, the similar manifestations when observed in the wrist could be because of presence of accessory muscle in hypothenar region. Thus its presence cannot be overlooked.

CONCLUSION

Accessory AbDM is a potential cause for ulnar neuropathy and ulnar vascular thrombosis. Detailed anatomical knowledge of its persistence is important to the hand surgeons to avoid undue complications resulting by the delayed diagnosis and misinterpretation of these as lipoma or ganglion.

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