



COURSE OF ULNAR NERVE IN THE HAND - A RARE ANATOMICAL VARIATION

Anatomy

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ABSTRACT

Introduction: The ulnar nerve is the continuation of medial cord of brachial plexus with a root value C8 and T1 (C7 fibers supply flexor carpi ulnaris). The nerve divides into superficial and deep branches. The deep branch runs in the Guyon's canal within the concavity of deep palmar arch supplying most of the intrinsic muscles of hand. However, Variations in the nerve anatomy can occur, leading to atypical innervation pattern. **Methods:** The study was carried out in the department of anatomy, Government medical college, Siddipet during dissection on ten cadavers. The variation in the deep branch of ulnar nerve in the palm was noted and photographed. **Result:** In one of the cadavers of right palm a rare variation was observed, in which deep branch of ulnar nerve was innervated by abductor pollicis brevis which is usually supplied by the median nerve. Hence, I conclude that the ulnar nerve exhibited an aberrant course supplying the abductor pollicis brevis muscle. **Conclusion:** Recognition of such variation is crucial in surgical procedures such as ganglion excision, decompression of Guyon's canal and for drainage of palmar spaces and for evaluation of nerve related conditions like traumatic neuritis, handlebar neuropathy in which grasping the objects might be affected. These findings contribute to our understanding of peripheral distribution of ulnar nerve and emphasize the importance of anatomical variation in clinical practice.

KEYWORDS

Abductor Pollicis Brevis, Flexor Pollicis Brevis, Ulnar Nerve.

BACKGROUND:

The ulnar nerve is an important peripheral nerve of the upper limb that has motor and sensory innervation to the forearm and hand. The ulnar nerve is formed in the axilla as a continuation of medial cord of brachial plexus and conveys fibers from C8 and T1 (has fibers from C7 supplies flexor carpi ulnaris only)¹. The nerve courses along related to the medial side of axillary artery, brachial artery in proximal half of the arm and appears in the interval between medial epicondyle and olecranon process. The nerve enters the forearm between 2 heads of flexor carpi ulnaris. In upper 3rd of forearm the nerve is more deeply placed, rests on flexor digitorum profundus and is overlapped by flexor carpi ulnaris. In the lower 3rd of forearm it becomes more superficial, here it is accompanied by ulnar artery enters the palm on the radial side of pisiform bone and superficial to flexor retinaculum. The ulnar nerve is covered by volar carpal ligament and the area under it is termed as ulnar tunnel which is also known as Guyon's canal (1st described by French surgeon Jean Casimir Felix Guyon in 1861), is a fibro osseous tunnel located on the anteromedial side of the wrist. It is approximately 4 cm long. The deep branch runs in the Guyon's canal within the concavity of deep palmar arch supplying most of the intrinsic muscles of hand. It has motor and sensory innervations, the nerve bifurcates into superficial and deep terminal branches beneath palmaris brevis. Deep branch carries motor fibers across the palm, it supplies all 3 hypothenar muscles, 3rd and 4th lumbricals, all palmar and dorsal interossei and terminates in adductor pollicis. Flexor pollicis brevis has dual supply by median and ulnar nerve. The thenar muscles may receive median, ulnar or dual innervation². The knowledge of variation in the deep branch of ulnar nerve is important for the diagnosis of complicated clinical conditions.

METHODS:

A total of 20 upper limb specimens (10 cadavers) were dissected in the department of Anatomy, GMC, Siddipet to know the innervation pattern of muscles of palm in which we accidentally found that the Abductor pollicis brevis muscle was supplied by a deep branch of ulnar nerve. A transverse incision was made at the distal flexor crease of the wrist. The second incision was from the midpoint of 1st incision to the center of middle finger. The skin was reflected, the ulnar nerve was identified and its distal course was traced³. The branching pattern of superficial and deep branch of ulnar nerve was observed. A variation in the innervation of abductor pollicis brevis muscle by deep branch of ulnar nerve was noted and documented by photographs.

RESULTS:

Out of 20 upper limb specimens, in 19 specimens of right and left upper

limbs the deep branch of ulnar nerve gives muscular branches to 3 hypothenar muscles, 2 lumbricals (3rd and 4th), all palmar and dorsal interossei, deep head of flexor pollicis brevis and adductor pollicis. In one specimen of left palm, the deep branch of ulnar nerve after supplying flexor pollicis brevis giving a twig to abductor pollicis brevis, it is a rare finding which is usually supplied by recurrent branch of median nerve.

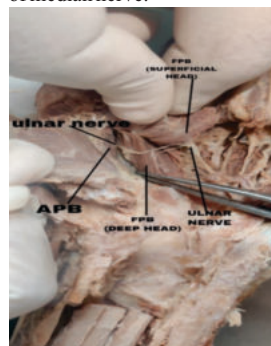


Fig-1

FPB: Flexor pollicis brevis



Fig-2

DISCUSSION:

After coursing through the arm and forearm, the ulnar nerve enters the palm, just radial to the pisiform bone⁴, where it divides into terminal superficial and deep branches beneath palmaris brevis. Mc Farlane et al along with Enna et al proposed the name piso hamate tunnel⁵. The superficial branch supplies palmaris brevis and provides sensory innervation to skin on the palmar surface of medial one and half fingers. The deep branch is purely motor and supplies all intrinsic muscles of hand except thenar and 1st, 2nd lumbricals which are supplied by median nerve. The present study showed variation in the muscle innervation by deep branch of ulnar nerve. Deep branch may be affected by ganglion, fracture of carpal bones, oedematous tissue in Guyon's canal leading to Guyon's tunnel syndrome. Ulnar nerve is known as musician's nerve. Muscles for prehensile movements are primarily supplied by ulnar nerve and a complex clinical evaluation is required to determine exact site of lesion or damage owing to considerable anatomical variations.

CONCLUSION:

Recognition of such variations is crucial in radiological or surgical

procedures in operating fractured bones, ganglion excision, decompression of Guyon's canal and for drainage of palmar spaces. Also useful for neurologists in the evaluation of nerve related condition such as handle bar neuropathy, traumatic neuritis in which grasping the objects might be affected and weakness in the movement of abduction due to paralysis of Abductor pollicis brevis muscle. Iatrogenic injuries and trapping neuropathies (as ulnar nerve is the second most common neuropathy to be involved in entrapment) are vulnerable to variations in the origin, course and distribution of nerve. These findings contribute to our understanding of peripheral distribution of ulnar nerve and emphasize the importance of recognizing anatomical variation in clinical practice.

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