

Case report**A CASE OF DISTAL ULNAR NERVE VARIATION – PRESENCE OF SENSORY LOOP AROUND THE HOOK OF THE HAMATE BONE****Alexander K. Angelov*, Lazar Jelev***Department of Anatomy, Histology and Embryology, Medical University of Sofia, Sofia, Bulgaria***RESUMÁN**

Las variaciones del nervio cubital ulnar en la muñeca son extrañas, pero todavía tienen importancia clínica. Durante una disección de rutina de la mano derecha de un hombre europeo de 67 años, se encontró en la muñeca un nervio ulnar aberrante. Su rama superficial se bifurcó y formó un lazo completo alrededor del gancho del hueso ganchoso. Los nervios sensoriales de los dedos surgieron de las diferentes partes de este lazo. La presencia de dicha variación predispone al nervio a una neuropatía por compresión incluyendo una lesión accidental ocasionada durante las intervenciones quirúrgicas.

Palabras clave: *variación del nervio ulnar, lazo neural, hueso ganchoso, retináculo flexor, implicaciones clínicas.*

ABSTRACT

Ulnar nerve variations in the wrist are rare but still have clinical importance. In the course of a routine dissection of the right hand of a 67-year-old Caucasian male cadaver an aberrant ulnar nerve at the wrist was found. Its superficial branch bifurcated and formed a complete loop around the hook of the hamate bone. The sensory digital nerves arose from the different parts of this loop. The presence of such a variant neural loop predisposes the nerve to compression neuropathy and accidental injury during surgical interventions.

Key words: *ulnar nerve variation; neural loop; hamate bone; flexor retinaculum; clinical implications*

INTRODUCTION

Ulnar nerve variations in the wrist are rare. A study undertaken by Dodds et al (1990) to determine the frequency of variations involving the anatomy of Guyon's canal in a series of 58 wrist dissections revealed a 22.4% incidence of anomalous muscles and only a 1.7% incidence of anomalous nerve paths, pointing to the conclusion that aberrant branching of the ulnar nerve in this area is uncommon. These anatomical variations may be related to nerve compression syndromes (Aguilar et al, 2001; Haase, 2010; Yassen, 2012), that can cause pain in the hand and hypothenar region. Other possible causes for such pain could be neuritis (Osborne, 1959; Moffat, 1964), trauma on the ulnar artery (Ablett and Hackett, 2008) or chronic overuse injury (Helal, 1978; Chuckpaiwong and Harnroongroj, 2009). Knowledge of these anatomical variants of the nerves in the hand is crucial for successful surgical procedures. Herewith, we present a case with variation in the ulnar nerve at the wrist and discuss its possible clinical significance.

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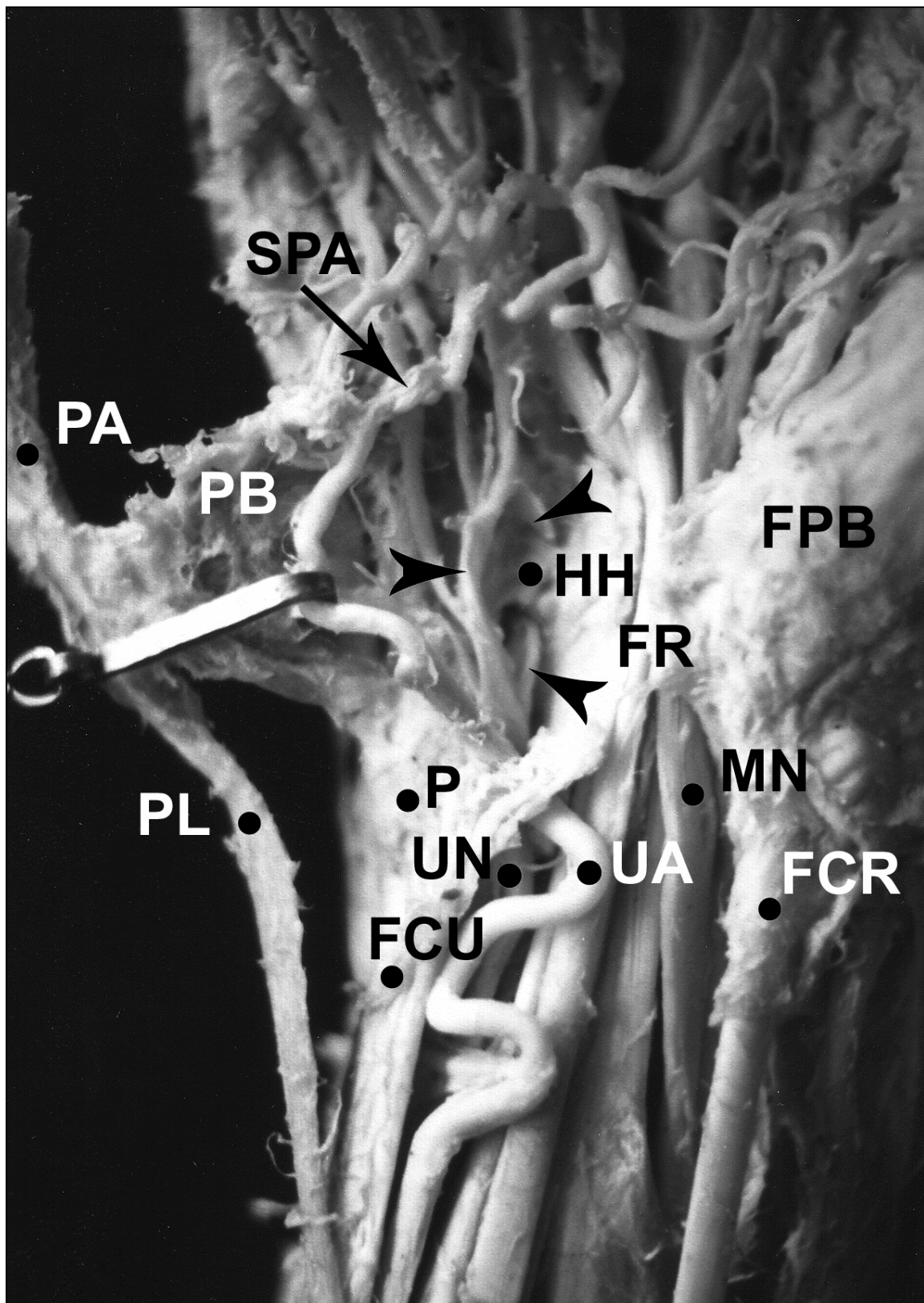


Figure 1 - Photograph of the right wrist and hand showing the aberrant neural loop (arrowheads). UN, ulnar nerve; MN, median nerve; UA, ulnar artery; SPA, superficial palmar arch; PA, palmar aponeurosis; PB, palmaris brevis; PL, palmaris longus; FCU, flexor carpi ulnaris; FCR, flexor carpi radialis; FPB, flexor pollicis brevis; FR, flexor retinaculum; HH – hook of the hamate bone; P, pisiform bone.

CASE REPORT

During the routine anatomical dissection of the right hand of a 67-year-old caucasian male cadaver an interesting variation of the ulnar nerve was found. After entering the palm of the hand through Guyon's canal the palmar branch of the ulnar nerve bifurcated into the deep motor branch and the superficial sensory branch. The deep motor branch continued on its usual route, while the superficial branch showed significant variation in its path. The superficial branch bifurcated into a medial and a lateral part. The medial part continued as usual over the hamate bone, while the lateral part passed through the fibers of the flexor retinaculum and reunited with the medial part forming a loop around the hook of the hamate bone (Figure 1). The medial part of this loop gave off the proper palmar digital nerve to the medial side of the pinkie finger. The reunited medial and lateral parts of the loop extended into the common palmar digital nerve to the adjoining sides of the pinkie and ring fingers and a small communicating branch to the median nerve.

DISCUSSION

The distal ulnar tunnel, also called Guyon's canal, is a space at the wrist between flexor retinaculum and the palmar carpal ligament, which runs between the pisiform bone and the hamate bone, containing the ulnar neurovascular bundle. This is an occasional site for ulnar nerve entrapment (Standing, 2005). The ulnar nerve may be constricted anywhere along the course of Guyon's canal. Compression on the ulnar nerve can cause sensory-motor, only motor, or only sensory loss (Shea and McClain, 1969). Causes for harm of the ulnar nerve could be anomalous muscles (Hill et al, 2006; Ogun et al, 2007; Georgiev and Jelev, 2011; Lokanathan et al, 2014), lipoma (Rohilla et al, 2009), ganglion cyst (Elias et al, 2001; Chan et al, 2008; Pearce et al, 2009), osteoblastoma (Ayan and Serinsöz, 2014) and variant ulnar artery (Banasik et al, 2011). The aberrant path of this nerve may cause Guyon's canal syndrome as described in some clinical and anatomical reports. Fenning (1965) described a passing of the deep branch of the ulnar nerve beneath an abnormally displaced hook of the hamate causing a neuroma resulting in paralysis and muscle atrophy. A study by Lassa and Shrewsbury (1975) revealed a variant neural loop formed by the deep (motor) branch of the ulnar nerve. Olave et al (1999) have reported a case similar to our anatomical findings and they

also suggested the importance during carpal tunnel decompression surgery. Musthyala and Jones (2005) presented a surgical case of a patient with an anomalous neural loop of the ulnar nerve at the wrist. Symptoms were directly related to the presence of the loop. Our case suggests a possible pure sensory loss in the respective ulnar nerve area. Knowledge of this rare nerve variation is important because of the possible predisposition to compression. Additionally, the nerve can also be harmed during surgical incisions of the flexor retinaculum for carpal tunnel release and hamate bone fractures, so insight is essential for gratifying surgical results

REFERENCES

- Ablett CT, Hackett LA.* 2008. Hypothenar hammer syndrome: case reports and brief review. *Clin Med Res* 6: 3-8.
- Aguiar PH, Bor-Seng-Shu E, Gomes-Pinto F, Almeida- Leme RJ, Freitas AB, Martins RS, Nakagawa ES, Tedesco-Marchese AJ.* 2001. Surgical management of Guyon's canal syndrome, an ulnar nerve entrapment at the wrist: report of two cases. *Arq Neuropsiquiatr* 59: 106-11.
- Ayan I, Serinsöz E.* 2014. Osteoblastoma in the os hamatum: a rare case report. *Eklemler Hastalıkları Cerrahisi* 25: 56-59.
- Banasik M, Madziarska K, Weyde W, Kusztal M, Goźbiowski T, Zmonarski S, Krajewska M, Janczak D, Klinger M.* 2011. A rare variant route of the ulnar artery does not contraindicate the creation of a fistula in the wrist of a diabetic patient with end-stage renal disease. *Postępy Hig Med Dosw* 65: 654-57.
- Chan JC, Tiong WH, Hennessy MJ, Kelly JL.* 2008. A Guyon's canal ganglion presenting as occupational overuse syndrome: A case report. *J Brachial Plex Peripher Nerve Inj* 3: 4.
- Chuckpaiwong B, Harnroongroj T.* 2009. Palmar pressure distribution during push-up exercise. *Singapore Med J* 50: 702-04.
- Dodds GA 3rd, Hale D, Jackson WT.* 1990. Incidence of anatomic variants in Guyon's canal. *J Hand Surg Am* 15: 352-55.
- Elias DA, Lax MJ, Anastakis DJ.* 2001. Musculoskeletal images. Ganglion cyst of Guyon's canal causing ulnar nerve compression. *Can J Surg* 44: 331-32.
- Fenning JB.* 1965. Deep ulnar-nerve paralysis resulting from an anatomical abnormality. A case report. *J Bone Joint Surg Am* 47: 1381-82.

- Georgiev GP, Jeleu L.* 2011. An aberrant flexor digiti minimi brevis manus muscle. *J Hand Surg Am* 36: 1965-67.
- Haase J.* 2010. Distal median- and ulnar nerve compression syndromes. *Pan Arab Journal of Neurosurgery* 14: 38-45.
- Helal B.* 1978. Chronic overuse injuries of the piso-triquetral joint in racquet game players. *Br J Sports Med* 12: 195-98.
- Hill ML, Shoja MM, Salter EG, Tubbs RS.* 2006. An unusual muscle of the wrist with potential compression of the ulnar nerve. *Folia Morphol (Warsz)* 65: 178-80.
- Lassa R, Shrewsbury MM.* 1975. A variation in the path of the deep motor branch of the ulnar nerve at the wrist. *J Bone Joint Surg Am* 57: 990-91.
- Lokanathan TH, Surendra M, Ajay N, Rajendra RR.* 2014. Unusual Co-existence of Biaponeurotic Palmaris Longus and Accessory Abductor Digiti Minimi in Man. *J Clin Diagn Res* 8: 146-47.
- Moffat JH.* 1964. Traumatic neuritis of the deep palmar branch of the ulnar nerve. *Can Med Assoc J* 91: 230-31.
- Musthyala S, Jones WA.* 2005. Symptomatic ulnar neural loop at the wrist. *J Hand Surg Br* 30: 326-27.
- Ogun TC, Karalezli N, Ogun CO.* 2007. The concomitant presence of two anomalous muscles in the forearm. *Hand (N Y)* 2: 120-22.
- Olave E, Del Sol M, Gabrielli C, Rodrigues CF.* 1999. Abnormal disposition of a branch of the ulnar nerve in the flexor retinaculum. *J Anat* 194: 473-74.
- Osborne G.* 1959. Ulnar neuritis. *Postgrad Med J* 35: 392-96.
- Pearce C, Feinberg J, Wolfe SW.* 2009. Ulnar neuropathy at the wrist. *HSS J* 5: 180-83.
- Rohilla S, Yadav RK, Dhaulakhandi DB.* 2009. Lipoma of Guyon's canal causing ulnar neuropathy. *J Orthop Traumatol* 10: 101-03.
- Shea JD, McClain EJ.* 1969. Ulnar nerve compression syndromes at and below the wrist. *J Bone Joint Surg Am* 51: 1095-103.
- Standring S.* 2005. *Gray's Anatomy. The Anatomical Basis of Clinical Practice.* 39th Ed. Churchill Livingstone: Elsevier. p. 913.
- Yasen S.* 2012. Acute calcific tendinitis of the flexor carpi ulnaris causing acute compressive neuropathy of the ulnar nerve: a case report. *J Orthop Surg (Hong Kong)* 20: 414-16.

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