Duplication of Median Nerve Proximal To Carpal Tunnel

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Citation

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Abstract

Anatomical variation of median nerve at wrist level is important especially in traumatic injuries of the wrist and in surgical treatment of carpal tunnel syndrome. Here in this case, we present a case with Lanz group 3 variation in median nerve, observed in the emergent exploration of an accidentally injured wrist. Two bundles of the median nerve discovered in exploration of the wrist were repaired separately. Furthermore, literature review is presented concerning the anatomical variations of the median nerve.

INTRODUCTION

Awareness of anatomical variations of peripheral nerves is important in repair of traumatic injuries and treatment of compression syndromes of these nerves, since in each situation precise dissection of the nerve is mandatory. Because of the fact that the carpal tunnel syndrome is the most common compression syndrome and wrist is one of the most common injured areas of the body parts, it is particularly useful to keep in mind the anatomical variations of the median nerve at the level of wrist and carpal tunnel. Here in this case, we present a case with Lanz group 3 variation in median nerve, observed in the emergent exploration of an accidentally injured wrist. Furthermore, literature review is presented concerning the anatomical variations of the median nerve.

CASE REPORT

Nineteen-year old men with a wrist cut after hitting fist to window was evaluated at the emergency department of our hospital. Along with all flexor tendons in zone V, extensor tendons of first & third compartments found to be cut with the broken glass. There was no arterial circulation at all indicating the complete cut of both radial and ulnar arteries. There was complete sensorial loss in the dermatomes of median & ulnar nerves. (Figure 1)

Figure 1

Figure 1: Traumatic cut of the right wrist, demonstrating the injury of the all anatomical structures of the flexor compartment, in addition to the extensor tendons of first & third compartments

Proximal to the carpal tunnel the median nerve was found to be extending as two bundles, each of which has the diameter of a normal median nerve. (Figure 2a) Each bundle was repaired separately along with all injured structures at the wrist level. (Figure 2b)

Figure 2

Figure 2: Traumatic cut of each bundle of the median nerve proximal to the carpal tunnel a) before coaptation of the bundles, b) after coaptation of each bundle separately. Microscopic images were captured by the method described by Gurunluoglu et al. Proximal and distal ends of each bundle are marked with arrows.

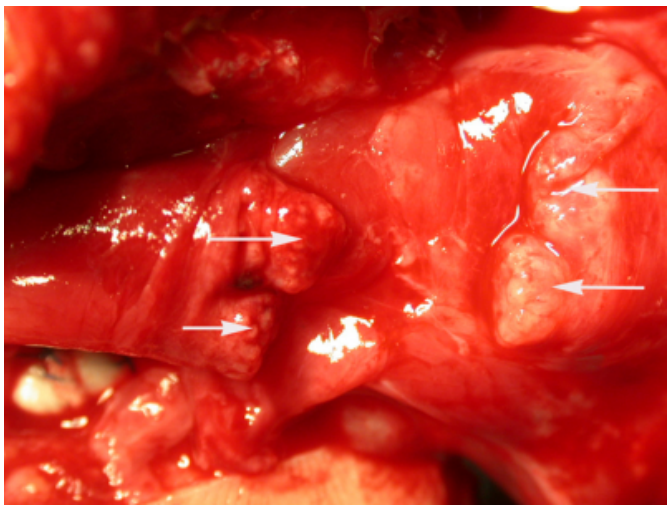
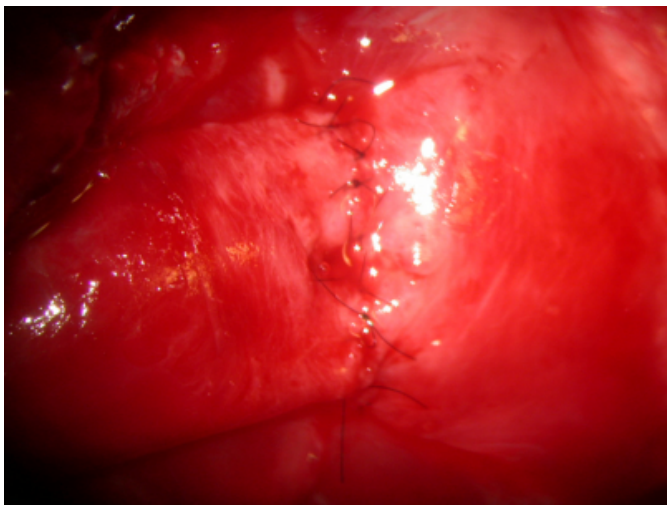


Figure 3



DISCUSSION

Variation of the median nerve in the course of the forearm is classified in its relation to the pronator muscle, depending on the presence or absence of the ulnar head of the muscle[2]. Variations at wrist level, which is more important clinically, has classified by Lanz on the basis of the following groups[3]:

Group 1: Variation of the course of the thenar eminence branch (46%)
Group 2: The presence of accessory branches in the distal part of the carpal tunnel (7.5%)
Group 3: High division or duplication of the madian nerve (2.9%)
Group 4: Accessory branches proximal to the carpal tunnel (2.9%)

Distribution of patient among Lanz groups was found to be different in different studies. Tountas reported the incidences as 1.42%, 0.37%, 0.97% and 0.97% from Lanz group I to IV[4]. In a survey of 3300 operated cases carpal tunnel syndrome, Castorina reported just eighteen cases of high duplication of median nerve (Lanz group 3)[5].

Variations of the median nerve at the level of carpal tunnel, on the other hand, are not infrequent. In particular, variations of the course of thenar branch and presence of accessory branches in the territory distal to the carpal tunnel have been well described[3]. Tountas described the thenar motor branch as “extraligamentous” when it emerges from the nerve after it has already passed the distal border of the ligament. This pattern is considered as normal. It is considered as “subligamentous” when it emerges from the median nerve below the transverse ligament and as “transligamentous” when it emerges from the nerve through the transverse carpal ligament.

Understanding of the anatomical variations of the median nerve in the territory of the carpal tunnel is of great clinical importance, since such variations are not infrequent insofar as they relate to Lanz Group 3 variations. In conclusion such variations of peripheric nerves noticed in routine surgical procedures or in traumatic injuries should be included into the surgical training programs to help avoiding iatrogenic injuries, even if is not necessary to be included in the routine anatomy education programs in medical schools.

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