

DISTRIBUTION OF MEDIAN NERVE INJURIES BY ANATOMICAL LOCALIZATION

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Abstract: Median nerve (n. medianus) injuries occupy an important place among peripheral nerve injuries of the upper extremity. The anatomical localization of the injury is one of the key factors determining the clinical neurological manifestations, severity of motor and sensory impairments, and the strategy of reconstructive treatment. The aim of this study was to evaluate the frequency of median nerve injuries in different anatomical regions, their clinical characteristics in the main and control groups, and the effect of injury localization on functional outcomes.

Keywords: median nerve, n. medianus, peripheral nerve injury, localization, forearm, wrist joint, microsurgery, 2PD, MRC, neuropathic pain.

Introduction

Median nerve injuries are among the clinically significant peripheral nerve injuries of the upper extremity and may lead to substantial motor and sensory deficits. The severity of functional impairment largely depends on the anatomical level of nerve injury. Proximal injuries can affect forearm flexor and pronator muscles, whereas distal injuries mainly impair thenar function and sensory perception in the hand. Therefore, identifying the anatomical localization of median nerve injury is essential for accurate diagnosis, treatment planning, and functional recovery. This study aimed to assess the distribution of median nerve injuries according to anatomical localization and to evaluate their relationship with clinical and functional outcomes.

Materials and Methods

The study included 83 patients treated for median nerve injuries. The patients were divided into main and control groups. The anatomical localization of the injury, motor and sensory functions, two-point discrimination (2PD), neuropathic pain, neuroma formation, and the need for reoperation were assessed as the main clinical parameters. The localization of the injury was analyzed according to the following anatomical regions: the shoulder, elbow, proximal and distal parts of the forearm, and the wrist region. The anatomical course of the median nerve and its motor and sensory branches

in the forearm and hand result in different clinical manifestations depending on the level of injury.

Results

The most common localizations of median nerve injuries in the study were the distal third of the forearm and the wrist region, accounting for 49.3% of all patients. The relatively superficial location of the nerve in this anatomical region and its susceptibility to various mechanical traumas are of considerable clinical importance.

Analysis of functional parameters between the main and control groups showed that $2PD \leq 10$ mm was observed in 62.0% of patients in the main group and 40.5% in the control group. Regarding motor function, an MRC score ≥ 3 was observed in 73.2% of patients in the main group compared with 52.4% in the control group. Neuropathic pain was reported in 17.1% of patients in the main group and 33.3% in the control group. Neuroma formation occurred in 7.3% and 19.0%, respectively, while the need for reoperation was 9.8% in the main group and 23.8% in the control group.

The findings demonstrate that, in addition to injury localization, the treatment method plays an important role in the recovery of motor and sensory functions. In particular, in distal median nerve injuries, preservation or restoration of thenar muscle function and sensory function of the hand is an important clinical criterion.

Table. Comparison of the main clinical parameters in patients with median nerve injuries between the study groups

Indicator	Main group	Control group
$2PD \leq 10$ mm	62,0%	40,5%
MRC ≥ 3 score	73,2%	52,4%
Neuropathic pain	17,1%	33,3%
Neuroma	7,3%	19,0%
Reoperation	9,8%	23,8%

Discussion

The anatomical localization of median nerve injuries plays a crucial role in determining their clinical presentation. In proximal injuries, the innervation of the forearm flexor and pronator muscles may also be affected, whereas distal injuries predominantly involve the thenar muscles and the sensory territory of the hand supplied by the median nerve. In our observations, the fact that nearly half of the injuries were localized to the distal part of the forearm and the wrist region indicates the particular clinical importance of this anatomical segment. The better recovery of sensory and motor functions in the main group, along with lower rates of neuropathic pain, neuroma

formation, and reoperation, demonstrates the effectiveness of the treatment approach used.

Conclusion

The anatomical localization of median nerve injuries has a significant impact on their clinical course and treatment outcomes. In our study, the most common injury localization was the distal third of the forearm and the wrist region, accounting for 49.3% of cases. The rates of sensory and motor functional recovery in the main group were higher than those observed in the control group.