Original Article

Indian Journal of Anatomy
Volume 6 Number 2, April - June 2017
DOI: http://dx.doi.org/10.21088/ija.2320.0022.6217.13

Study of Course of Median Nerve in Forearm and Its Termination

Channabasanagouda*, Manjunath Halagatti**

Abstract

Background: Median nerve is called labourers' nerve, as it is responsible for powerful coarse hand movements. Impairment of function of forearm muscles and thenar muscles affects employment and everyday tasks. *Materials and Results:* In our study of 50 upper limbs the median nerve passed between the two heads of pronator teres in 44 (88%), deep to the two heads in 2 (4%), through ulnar head in 2 (4%) and the nerve passed deep to humeral head the ulnar head being absent in 2 (4%) specimens. *Conclusion:* Our study has thrown up a number of avenues for further research studies and would help in framing better guidelines for understanding the clinical conditions and for successful surgical procedures as well.

Keywords: Median Nerve; Variations; Termination.

Introduction

Compresssive or entrapment neuropathy results from compression of a nerve at some point along its course in the upper extremity which can result in altered function and if left untreated leads to considerable morbidity [1].

Impairment of function of forearm muscles and thenar muscles affects not only prospects of employment but also a whole range of everyday tasks. It is therefore extremely important clinically to preserve the functions of forearm and hand.

The clinical relevance of variations might be correlated to entrapment syndromes. Entrapment of median nerve may give rise to symptoms of median nerve neuropathy. This knowledge may prove useful for clinicians in order to avoid an unnecessary carpal tunnel release [2].

Author's Affiliation: *Associate Professor **Assistant Professor, Department of Anatomy, Koppal Institute of Medical Sciences, Koppal, Karnataka, India.

Corresponding Author: Channabasanagouda, Associate Professor, Department of Anatomy, Koppal Institute of Medical Sciences, Gangavathi Road, Koppal, Karnataka-583231.
E-mail: drcbg2007@gmail.com

Received | 27.01.2017, **Accepted** | 10.04.2017

Objectives

To study the course of median nerve in forearm and mode of its termination

Materials and Methods

The study was carried out over a period of two years by dissecting 50 upper limbs available in the Department of Anatomy. Course of the median nerve was traced in forearm and hand till its termination. Pronator teres was cut at its insertion and the superficial flexor tendons were also cut proximal to flexor retinaculum. Variations of the median nerve pertaining to its course in forearm and its termination in hand were noted. Photographs were taken. The data collected in the present study was recorded, tabulated, analyzed and compared with that of the previous studies.

The following parameters were looked for in the present study of median nerve

1. Course of median nerve in relation to pronator teres.
2. Course of median nerve in relation to flexor digitorum superficialis.
3. Level of median nerve becoming superficial in forearm.

4. Level and mode of termination of median nerve

Statistical Analysis

The data were tabulated and analyzed. Rates and ratios were calculated.

Results

The data obtained on different parameters were tabulated and recorded as follows.

Table 1: Course of median nerve in relation to pronator teres muscle

MN Relation to Pronator Teres Muscle	Number of Specimens
Between two heads	44
Deep to muscle	2
Through the ulnar head	2
Deep to humeral head, ulnar head being absent	2

Table 2: Course of median nerve in relation to the FDS muscle

Relation of Median Nerve to F D S	Number of Specimens
Deep to F D S	48
Piercing the F D S muscle	2

Table 3: Level of median nerve becoming superficial in the forearm

MN Becoming Superficial in	Number of Specimens
Lower third of forearm	40
Middle third of forearm	10

Course of Median Nerve in Relation to Pronator Teres

Beaton and Anson (1939) in their study of 240 arms found the median nerve to pass between the two heads of pronator teres in 82.5%, deep to the two heads in 6.3 %, through humeral head in 2.5% and in 10.8% the nerve passed deep to humeral head, the ulnar head being absent [3].

Bergman RA et al. (2002) have noted the median nerve wherein it passed superficial or deep to two heads or pierced the humeral head of pronator teres [4].

In the present study the median nerve passed between the two heads of pronator teres in 44 (88 %) specimens, deep to the two heads in 2 (4%) specimens, through ulnar head in 2 (4 %) specimens (Figure 1) and in 2 (4%) specimens the nerve passed deep to humeral head the ulnar head being absent (Figure 2).

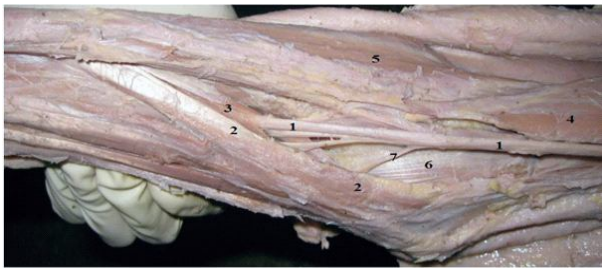

Fig. 1: M N passing through ulnar head of pronator teres.

1. Median nerve
2. Humeral head of P T
3. Ulnar head of P T
4. Biceps brachii
5. Brachioradialis
6. Brachialis
7. Nerve to P T

Fig. 2: M N passing below humeral head of pronator teres, ulnar head being absent.

1. Median nerve
2. Humeral head of P T
3. Flexor carpi radialis
4. Nerve to P T
5. Brachialis
6. Brachioradialis

Course of Median Nerve in Relation to Flexor Digitorumsuperficialis

Many authors like Hollinshead WH (1958), Last RJ (1999) and Johnson D and Ellis H (2005) have mentioned that the median nerve passed deep to flexor digitorumsuperficialis almost to the wrist [5,6,7].

Bergman RA et al. (2002) have noted the median nerve passing superficial to flexor digitorum superficialis and also passing through the muscle belly [4].

In the present study the median nerve passed deep to flexor digitorum superficialis in 48 (96%)

specimens and was found to pierce the muscle in 2 (4%) specimens.

Level of Median Nerve Becoming Superficial in Forearm

Hollinshead WH (1958) has mentioned that the median nerve becomes superficial in the forearm proximal to flexor retinaculum and lies between the tendons of flexor digitorum superficialis and flexor carpi ulnaris [5].

Bergman RA et al. (2002) have observed the median nerve becoming superficial 2.5 cm proximal to the wrist [4].

According to Johnson D and Ellis H (2005), the median nerve becomes superficial 5 cm proximal to flexor retinaculum [7].

In the present study it was observed that the median nerve appeared superficial in lower third of forearm in 40 (80%) specimens and in middle third of forearm in 10 (20%) specimens (Figure 3).

Fig. 3: M N appearing superficial in the middle third of forearm.

1. Median nerve
2. Flexor digitorumsuperficialis
3. Palmaris longus
4. Flexor carpi radialis

Level and Mode of Termination of Median Nerve

Urban T and Krosman M (1992) have found terminal division of median nerve in proximal 1/3rd of forearm [8].

Rader et al. (1992) have noted terminal division of median nerve in distal 1/3rd of forearm [9].

Last RJ (1999) and Dutta AK (2004) have mentioned that the median nerve terminates in the palm by dividing into medial and lateral branches, which in turn give digital branches just distal to the flexor retinaculum [6,10].

Johnson D and Ellis H (2005) have mentioned that the median nerve terminates in the palm by dividing into variable number of branches [5].

In the present study the median nerve was found to terminate in the forearm in 2 (4%) specimens by dividing into medial and lateral branches and in 48 (96%)specimens it terminated in hand. Of the latter 48 specimens, in 43 it terminated in two branches and in 5 specimens in 3-5 branches.

Conclusion

In the present study an attempt is made to know the possible variations of median nerve in its course in the forearm and its termination in hand so as to provide additional information which may help to decrease the risk of diagnostic and operative complications. The present study concludes that, the different types of variations in cadavers which have been studied would be of immense help for successful clinical approaches. Our study has thrown up a number of avenues for further research studies and may help in framing better guidelines for understanding the clinical conditionsand for successful surgical procedures as well.

Conflicts of Interests: None

References

1. Mukund R. Thatte, Khushnuma A. Mansukhani. Compressive neuropathy in the upper limb. Indian J Plast Surg. 2011 May-Aug; 44(2):283–297.
2. Arora J, Kapoor V, Suri RK, Khan RQ. Inter-Communications Between Median and Musculocutaneous Nerves With Dual Innervation of Brachialis Muscle-A Case Report. J. Anat. Soc. India. 2003; 52(1):66-8.
3. Beaton L E, Anson B J. The Relation of the Median Nerve to the Pronator TeresMuscle.Anat. Rec.1939; 75:23-6.
4. Bergman RA, AfifiAK ,Miyauchi R. Illustrated Encyclopedia of Human Anatomic Variation: Opus III: Nervous System: Plexuses Median Nerve. [updated 2001 Dec 4; cited 2009 Jan 9] Available from: http://medpro.smiletrain. org/library/images/vh094.htm.
5. Johnson D, Ellis H, Editors. Gray's Anatomy.The Anatomical Basis for Clinical Practice. 39th Ed: Elsevier Churchill Livingstone; 2005.p.817-933.
6. Last RJ, Sinnatamby CS. Last's Anatomy Regional and Applied 10th ed. Inburgh. Churchill Livingstone. 1999.p.35-105.
7. Hollinshead WH. Anatomy for Surgeons: Back and Limbs, Volume 3. 1sted. New York, PaulHoeber Inc. 1958.p.207-580.
8. Urban T, KrosmanM.Variation of the Median Nerve in the Forearm and the Wrist. Folia.Morphol. 1992;

51(1):77-9.

9. Rader CP, Rehm KE, KoebkeJ.Anomalous Course and Anomalous Division of the Median Nerve in the Distal Forearm.HandchirMikrochirPlastChir. 1992; 24(5):276-8.
10. Dutta A.K. Essentials of Human Anatomy: Superior and Inferior Extremities. 3rd Ed. Calcutta.Current Books Int. 2004.p.101-6.