



“VARIATION IN THE FORMATION OF MEDIAN NERVE BY TWO LATERAL ROOTS IN POPULATION OF GWALIOR REGION OF MADHYA PRADESH –A CADAVERIC STUDY”

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ABSTRACT

Objectives: The objective of the present study is to see the variation in the formation of median nerve in the population of Gwalior region.

Material and Method: The routine dissection of 86 upper limbs (Rt. And Lt.) of 43 cadavers were performed in the last four years during undergraduate practical teaching of students in the department of Anatomy of G.R. Medical college, Gwalior to find out the variation in the formation of median nerve.

Results: In the present study, the results are found important anatomically, clinically and statistically too. Cadaver 7(C7), cadaver 13 (C13), cadaver 19 (C19), cadaver 31(C31), and cadaver 39(C39) had have variation in the formation of median nerve in both the upper limbs and that is by one medial root and two lateral roots of median nerve. Cadaver 3(C3), cadaver 15(C15), cadaver 20(C20), cadaver 28(C28), cadaver 35(C35) and cadaver 37(C37) had have one medial root and two lateral roots of median nerve in only the right upper limbs. The formation of median nerve in left upper limbs in all these cadavers were found normal by one medial and one lateral root of median nerve. Cadaver 5(C5), cadaver 18(C18), cadaver 29(C29) and cadaver 42 (C42) had have one medial root and two lateral roots of median nerve in only the left upper limbs. The formation of median nerve in right upper limbs in all these cadavers was found normal by one medial and one lateral root of median nerve.

KEYWORDS : Median Nerve, Lateral Cord, Medial Cord, Brachial Plexus, Nerve root.

INTRODUCTION:

The median nerve is formed by lateral root and medial root of lateral cord and medial cord of brachial plexus respectively in the axilla. The root value of median nerve is (C5, 6, 7, 8, T1).¹ The medial root is derived from the medial cord of brachial plexus and conveys the fibers from C8 and T1 and the lateral root is continuation of lateral cord of brachial plexus and conveys fibers from C5, C6 and C7.² The median nerve runs on the lateral side of brachial artery in the arm. Thereafter it crosses the brachial artery from front to reach the medial aspect and descend further in the arm. It enters the cubital fossa as the medial most structure and descends down in the forearm to supply anterior compartment of forearm. It also supplies the thenar muscles, two lumbricals and skin of the hand. The Median Nerve controls coarse movement of the hand, as it supplies most of the long muscles of the front of the forearm. It is, therefore, called the 'Labourer's Nerve'.¹¹ Median Nerve supply skin of the hand and fingers but only sympathetic postganglionic fibers to the axillary and brachial arteries in the axilla and arm.¹² Lateral cord gives its first branch that is lateral pectoral nerve then it divides into musculocutaneous and lateral root of median nerve.¹ Because of the close relationship of brachial plexus with important anatomical structures such as axillary artery, variation in its structure has importance in clinical and surgical aspects.¹⁵ Commonly observed variations among the peripheral nerve are in the branching and fusion of the different branches of brachial plexus and there may be some unusual clinical symptoms due to these variations of brachial plexus and median is very important branch of brachial plexus.¹³ The aim of this study is to find out variations in the formation of median nerve.

MATERIAL AND METHOD:

The routine dissection of 86 upper limbs (Rt. And Lt.) of 43 cadavers tagged as C1-C43 were performed in last four years during undergraduate practical teaching of students in the department of Anatomy of G.R. Medical college, Gwalior to find out the variation in the formation of median nerve.

Dissection is done on both the upper limbs of the cadavers. Variations are observed in 15 cadavers. Sites of dissection with variation in median nerve formation were properly cleaned and photographed for proper documentation.

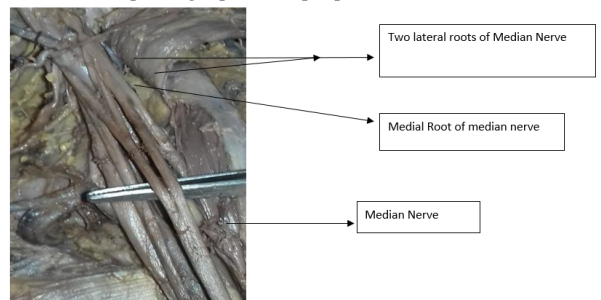


Fig 1: - Formation of Median Nerve by two lateral Roots

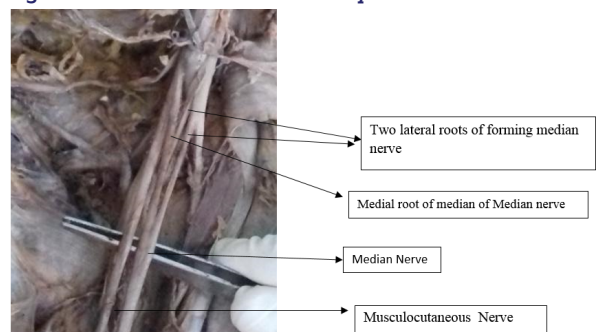


Fig2: - Formation of Median Nerve by two lateral Roots

RESULTS:

In the present study, the results are found important anatomically, clinically and statistically too. Cadaver 7(C7), cadaver 13 (C13), cadaver 19 (C19), cadaver 31(C31), and cadaver 39(C39) had have variation in the formation of

median nerve in both the upper limbs and that is by one medial root and two lateral roots of median nerve. Cadaver 3(C3), cadaver 15(C15), cadaver 20(C20), cadaver 28(C28), cadaver 35(C35) and cadaver 37(C37) had one medial root and two lateral roots of median nerve in only the right upper limbs. The formation of median nerve in left upper limbs in all these cadavers were found normal by one medial and one lateral root of median nerve. Cadaver 5(C5), cadaver 18(C18), cadaver 29(C29) and cadaver 42 (C42) had one medial root and two lateral roots of median nerve in only the left upper limbs. The formation of median nerve in right upper limbs in all these cadavers was found normal by one medial and one lateral root of median nerve.

Table 1- Showing variations in the formation of Median nerve

Sample size	Formation of median nerve by two lateral roots on both sides.	Formation of median nerve by two lateral roots in right side.	Formation of median nerve by two lateral roots in left side.	Total
43 Cadavers	5 cadavers	6 cadaver	4 cadavers	15 cadavers
86 Upper limbs	12 upper limbs	10 upper limb	8 upper limbs	30 upper limbs

DISCUSSION:

The study is conducted to know the percentage of two lateral roots of median nerve in the formation of the Median Nerve. This is done by dissection of bilateral upper limbs of 15 cadavers. The study shows the statistically significant variations in the formation of the Median nerve by two lateral roots from lateral cords of brachial plexus. Variations in the formation of the Median nerve in the different populations are due to genetic factors, environmental factors, sex, heredity, race and secular changes. In 1955, Buch Hansen declared that in 65.3% of people there are variations in structure of the brachial plexus.¹⁴ According to Kosugi K (1986)¹⁷ the variation could arise from circulatory factors at the time of fusion of the cords of the brachial plexus. In man, the forelimb muscles develop from the mesenchyme of the para-axial mesoderm during fifth week of embryonic life.¹⁸ So, any alterations in signalling between mesenchymal cells and neuronal growth cones can lead to major abnormalities.¹⁹ Variations of the median nerve have been studied and presented by many authors elsewhere. Bharti et al⁸ (10 cadavers) have done studies on brachial plexuses with regards to anatomical variations and relation in the formation of median nerve. Satyanarayana et al⁴ described 3 cases of different pattern of median nerve formation. One of the three variations of median nerves had four roots in the formation of median nerve. Median nerves form by three roots this anomaly is reported to be varied from 1- 52 %.⁶ the incidence of three roots median nerve in the current study is 23.33%. When the median nerve is formed by three roots the additional root comes frequently from lateral cord of brachial plexus.

Table 2- Comparative table to show different studies and their results

Author	No of upper limbs	No. of upper limbs with three roots of median nerve	Percentage of variation
Samarawickrama M. B ⁵	98 upper limbs	6 upper limbs	6.12%
Patil et al ⁶	40 upper limbs	4 upper limbs	10 %
Valeria et al ⁷	54 upper limbs	28 upper limbs	52%
Bharti et al ⁸	20 upper limbs	2 upper limbs	10 %
Anand C et al ⁹	50 upper limbs	-	36%
Present study	86 upper limbs	15 upper limbs	17.44 %

CONCLUSION:

Knowledge of variations in peripheral nervous system is important to anatomists, radiologists, anesthesiologists and surgeons, and has gained more importance due to the wide use and reliance on computer imaging in diagnostic medicine.¹⁹ The presence of these variations are used to explain unexpected clinical signs and symptoms and cause of a nerve palsy syndrome. Median nerve present in axilla, arm, forearm and hand region, explored during various surgical, anesthetic, orthopedic and radiological procedure so upper limb, therefore knowledge of variation in median nerve , its branches and its relations with arteries and other structures is very important for treatment, surgeries and anesthetic blocks in upper limb. The medical professionals explore the upper limb for treatment, intervention or for dissection as a part of medical undergraduate and post graduate curriculum. The knowledge of formation of median nerve by two lateral roots is thus important for anatomists, anesthetists, radiologists and surgeons.

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