

Original Research Article

A Cadaveric Study of the Formation of Median Nerve in the Infraclavicular Part of the Brachial Plexus

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ABSTRACT

Background and objectives: Variations in the formation of median nerve are common and knowledge of these variations is useful during surgical procedures in the axilla and for treatment of fractures and for nerve blocks in anesthesia.

Methods: The axilla and arm were dissected in 25 cadavers and the infraclavicular part of the brachial plexus was explored. The formation of median nerve and its relations to axillary artery were observed.

Results: The median nerve was formed by two lateral roots from lateral cord and one medial root from medial cord in 21 specimens and three lateral roots and one medial root in 2 specimens. In one specimen median nerve was formed posterior to axillary artery. The second lateral root was long and united with the median nerve at the level of insertion of coracobrachialis in one specimen. Two medial roots from medial cord were found uniting with one lateral root to form median nerve in one upper limb

Conclusion: The variations in the formation of median nerve are essential for medical professionals for surgical exploration of the axilla.

Keywords: Median Nerve, Lateral Root, Medial Root, Axillary Artery.

INTRODUCTION

The lateral root from the lateral cord and medial root from the medial cord unites to form median nerve. The medial root crosses anterior to axillary artery from medial to lateral to unite with the lateral root to form the median nerve lateral to axillary artery. ⁽¹⁾ Many authors have reported variations in the formation of median nerve. ^(2,3) During neck dissections and various surgical explorations of axilla variations of the nerves are more prone for injury. ⁽⁴⁾ This study is done to identify the variations in the formation of median nerve.

MATERIALS AND METHODS

Upper limbs of twenty five cadavers were dissected on both sides during routine dissection for undergraduate students. The axilla was dissected and the cords and branches of the infraclavicular part of the brachial plexus were explored. Variations in the formation of median nerve and its relation to axillary artery were observed.

RESULTS

Two lateral roots having its origin from lateral cord was observed in 21 upper limbs and they united with the medial root of median nerve which originated from the medial cord which crossed the axillary

artery anteriorly to form the median nerve lateral to axillary artery (Figure 1). Two limbs were observed to have three lateral roots from lateral cord and one medial root from medial cord and united to form median nerve lateral to axillary artery (Figure 2). In one specimen the median nerve was formed by union of two medial roots and one lateral root (Figure 3). The lateral root and medial

root of median nerve united to form median nerve posterior to axillary artery in one specimen (Figure 4). The first lateral root and medial root united to form median nerve in the axilla but the second lateral root from the lateral cord was long and united with the median nerve at the level of insertion of Coracobrachialis in one specimen (Figure 5).

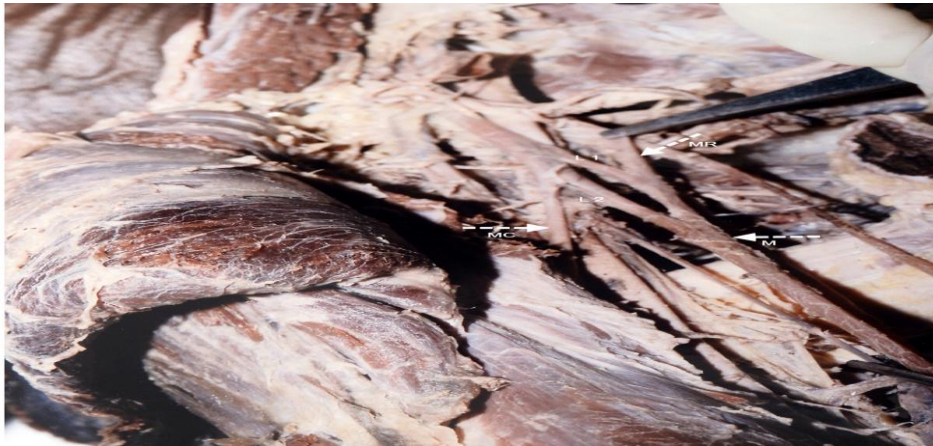


Figure 1: Two lateral roots of median nerve. MC-Musculocutaneous nerve; M-Median nerve; L1-First lateral root; L2-Second lateral root; MR-Medial root

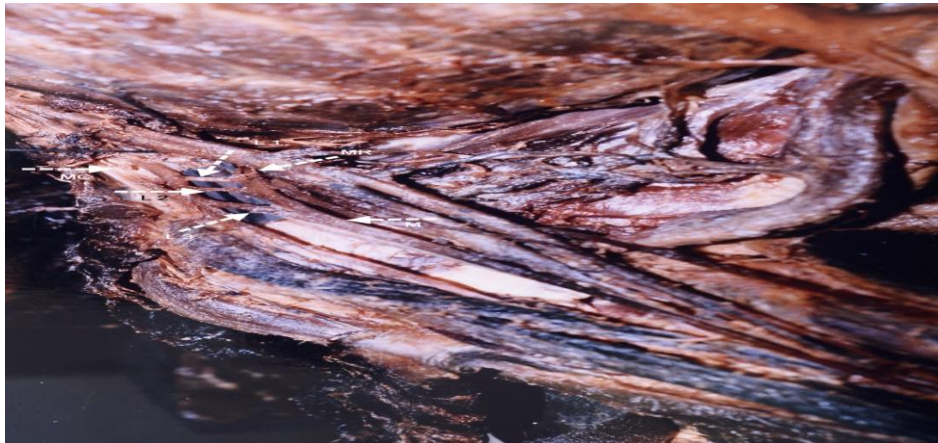


Figure 2: Three lateral roots of median nerve .MC-Musculocutaneous nerve; M-Median nerve; L1-First lateral root; L2-Second lateral root; L3-Third lateral root; MR-Medial root

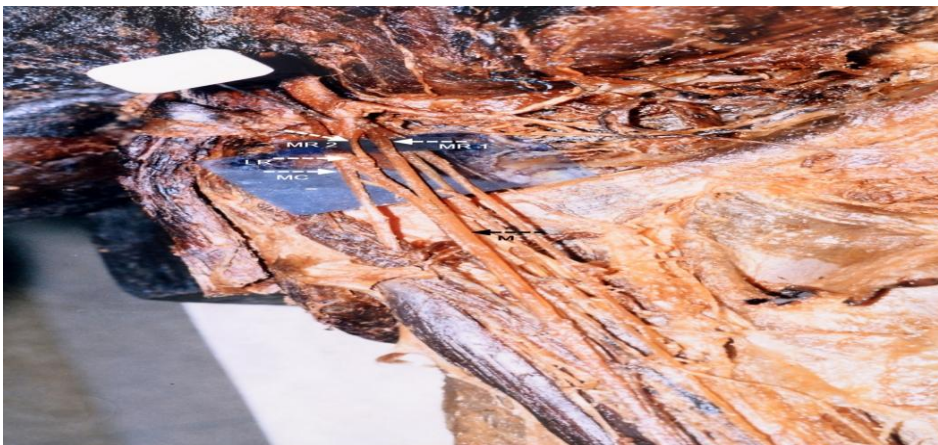


Figure 3: Two medial roots of median nerve .MC-Musculocutaneous nerve; M-Median nerve; MR1-First Medial root; MR2-Second medial root; LR-Lateral root

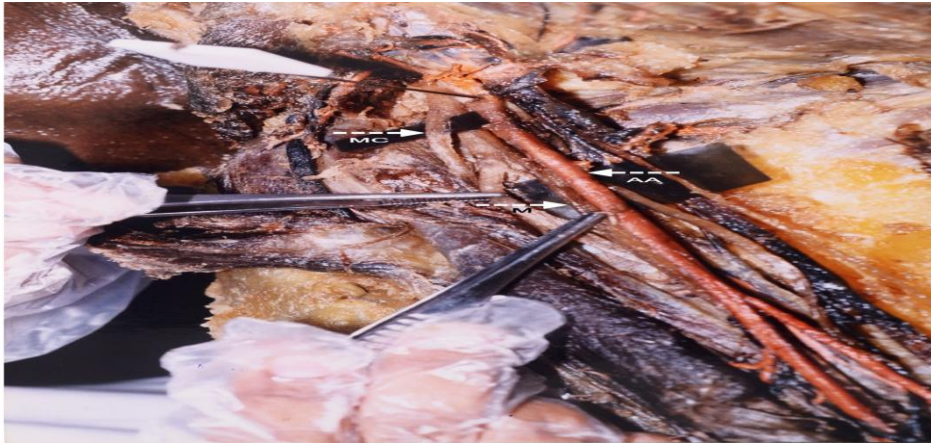


Figure 4: Median nerve formation posterior to axillary artery. AA-Axillary artery; MC-Musculocutaneous nerve; M-Median nerve.



Figure 5: Long second lateral root. MC-Musculocutaneous nerve; M-Median nerve; LR1-First lateral root; LR2-Long Second lateral root

DISCUSSION

Pias D et al ⁽⁵⁾ reported in his study that the median nerve was formed by union of two lateral roots and one medial root in the axilla. In the present study also twenty one upper limbs were found to have two lateral roots from lateral cord uniting with the medial root originating from medial cord to form the median nerve in the axilla. Budhiraja et al ⁽⁶⁾ reported in 44 upper limbs the median nerve was formed by three roots which coincides with the present study where in 22 specimens the median nerve was observed to be formed by three roots. The third root was arising from lateral cord in 28 limbs in their study which is similar to the present study where the third root was arising from the lateral cord in 21 specimens. He also reported in 16 limbs that the third root had its origin from Musculocutaneous nerve which was not noted in the present study. In the present study in one limb the

median nerve was observed to be formed posterior to axillary artery which coincides with the study reported by Ramachandran ⁽⁷⁾ and Haviarova et al ⁽⁸⁾. Budhiraja et al ⁽⁶⁾ reported in 3 limbs the formation of median nerve anterior to axillary artery. There were no such observations in the present study. Uzun and Seeling ⁽⁹⁾ described the formation of median nerve by four roots in a case where one root was originating from medial cord and three roots had its origin from lateral cord, which is similar to the present study where the median nerve was observed to be formed by four roots in 2 limbs where three lateral roots were originating from lateral cord and one medial root was originating from medial cord. Pandey and Shukla ⁽¹⁰⁾ reported the formation of median nerve medial to the axillary artery where the lateral root of median nerve crossed medial to the axillary artery to join the medial root. No such

observations were observed in the present study. Formation of median nerve below the midpoint of the arm was reported in one specimen by Nayak et al. ⁽¹¹⁾ In the present study no similar variations were observed. Amirtha Bharti et al. ⁽¹²⁾ reported in one case where the second lateral root originating from the lateral cord joined the median nerve in distal part of the arm which is similar to one case in the present study where in one limb the second lateral root was long and joined the median nerve at the level of insertion of Coracobrachialis. Formation of median nerve by two lateral roots from lateral cord and one medial root from medial cord was reported by Talhar et al. ⁽¹³⁾ and Nene et al. ⁽¹⁴⁾ which coincides with the present study where there were two lateral roots from lateral cord uniting with medial root to form median nerve in 21 specimens. Formation of median nerve by three roots where third root was having its origin from medial cord as second medial root has not been reported previously in the literature. But in the present study in one upper limb the median nerve was formed by two medial roots from medial cord and one lateral root from lateral cord, Embryological reasons for these variations may be due to the action of chemorepellants and chemoattractants on the developing axons are site specific and notable variations can develop because of disturbances in signaling between neuronal growth cones and mesenchymal cells. ⁽¹⁵⁾

CONCLUSION

Neurosurgeons and surgeons should be aware of these variations for treating nerve sheath tumours such as schwannomas and non neuronal tumors like lipomas. Awareness of these variations is important for interpretation of radiological images, treatment of fractures, for giving nerve blocks in anesthesia and shoulder reconstructive surgeries. Surgical exploration of the axilla necessitates the awareness of these variations.

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