CASE REPORT

A Case Report on Bilateral Median Nerve Variations and Absence of Musculocutaneous Nerves in the Brachium

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ABSTRACT

The medial root and lateral root of the median nerve from the brachial plexus unite in the axilla to form the median nerve, also known as "Eye of the hand." This case report presents a rare combination of musculocutaneous nerve absence, variation in median nerve innervation, & presence of anomalous muscular slip in the arm. Anatomical dissection undergraduate classes at Christian Medical College, Vellore, on a 28-year-old male cadaver in the upper one-third of the arm revealed bilateral median nerve variation; an anomalous muscular slip concealing the neurovascular bundle of the arm and the musculocutaneous nerve was absent. The lateral cord of the brachial plexus supplied the coracobrachialis muscle in the axilla. The median nerve variations are of utmost importance for surgical procedures of the upper limb, like brachial plexus nerve block anaesthesia. The presence of anomalous muscular slip can compress the neurovascular bundle, resulting in neurovascular deficit in the distal upper limb.
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Keywords: Median nerve variation, Brachial plexus, Anomalous muscular slip, Musculocutaneous nerve absent, Brachium

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INTRODUCTION

The median nerve is formed by the union of the medial root and lateral root of the brachial plexus in the axilla lateral to the third part of the axillary artery. The medial root conveys C8 & T1 fibres, & the lateral root conveys C5, C6 & C7 fibres, forming the median nerve. In the arm, the median nerve crosses the brachial artery from the lateral to the medial side, but it does not supply any muscles of the arm. It enters the forearm between the two heads of the pronator teres muscle, mainly supplies the superficial flexor muscles of the forearm, & it gives rise to the anterior interosseous nerve, which in turn supplies the deep flexor muscles of the forearm. The median nerve passes deep to the flexor retinaculum and gives recurrent muscular, lateral & medial branches that supply muscles of the thenar eminence, the first two lumbricals & the lateral 3 1/2 digits. The median nerve variations are significant for anatomists as well as clinicians in deciding the plan of management in several anaesthetic and surgical therapeutic procedures. Variation of median nerve formation noted in 30 % of upper limb specimens [1]. Median nerve anatomical variations have been reported in the literature very well. This case report presents bilateral anatomical variation in the formation and distribution of the median nerve in the arm, bilateral absence of musculocutaneous nerves, & presence of anomalous muscular slip in the arm. The combination of the variations present in this case is quite a rare phenomenon, and it is the least reported in literature.

CASE REPORT

This case report was noticed during routine dissection classes for undergraduate medical students at Christian medical college,Vellore. The dissection of both upper limbs of a 28-year-old male cadaver revealed the following findings: Bilateral variation in the formation and distribution of median nerve and musculocutaneous nerves was absent bilaterally. In addition, an anomalous muscular slip bilaterally was noted in the middle one-third of the arm. The above-mentioned findings are discussed in the following order, respectively.

Median nerve variation

The lateral root of the median nerve from the brachial plexus supplied the following muscles of the arm: coracobrachialis, biceps brachii, and brachialis, and then joined the medial root of the median nerve at the

insertion of the coracobrachialis muscle. The nerve to brachialis continued as the lateral cutaneous nerve of the forearm. The musculocutaneous nerve was absent bilaterally (Fig. 1). Thus, the lateral root of the median nerve replaced the functional contribution of the musculocutaneous nerve in the arm due to its absence.

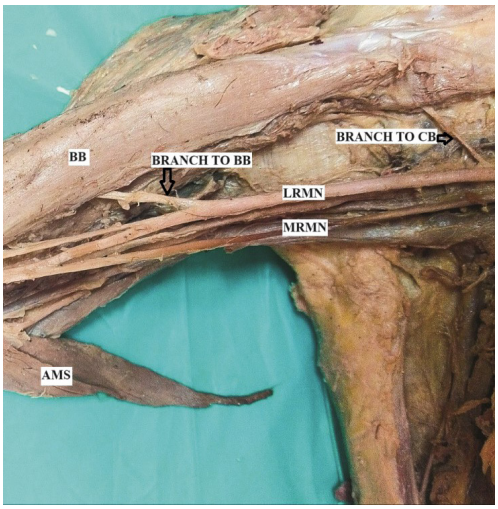

Figure 1: Bilateral absence of the musculocutaneous nerve. LRMN – Lateral root of Median nerve, MRMN – medial root of Median nerve, BB – Biceps brachii, CB – Coracobrachialis, AMS – Anomalous muscular slip

Anomalous muscular slip

The anomalous muscular slip extended between the short head of the biceps brachii and the triceps brachii, concealing the neurovascular bundle of the arm. The muscular slip was completely fleshy on the right side (Fig. 2), whereas it was tendinous near its proximal attachment on the left side (Fig. 3). The anomalous muscular slip measured 160x25x2.5 mm on the right side & 125x20x1.9 mm on the left side. The measurements of anomalous muscular slip and its distances from the proximal and distal attachments are discussed in Table I.

DISCUSSION

The knowledge of variation of peripheral nerves is important for evaluation of nerve injuries and during any procedures in the upper limb to prevent accidental injuries. Studies have reported median nerve formation with two or more roots in the brachial plexus is common. Three roots forming the median nerve were found in about 36.4% of left upper limbs and 18.2% of right upper limbs [2]. Complete absence of the musculocutaneous nerve has been reported in 4% to 6% of the population [3]. Injury to the lateral root of the median nerve could result in paresis of muscles of the arm in this case, which mainly innervates them. This can result in difficulties in performing the following movements: flexion & adduction of the arm, flexion & supination of the forearm. Regional expression of five Hox D genes is attributed to upper limb development. Variations in the signalling between mesenchymal

Figure 2: Right-sided completely fleshy muscular slip. LRMN – Lateral root of Median nerve, MRMN – Medial root of Median nerve, BB – Biceps brachii, TB – Triceps brachii, AMS – Anomalous muscular slip

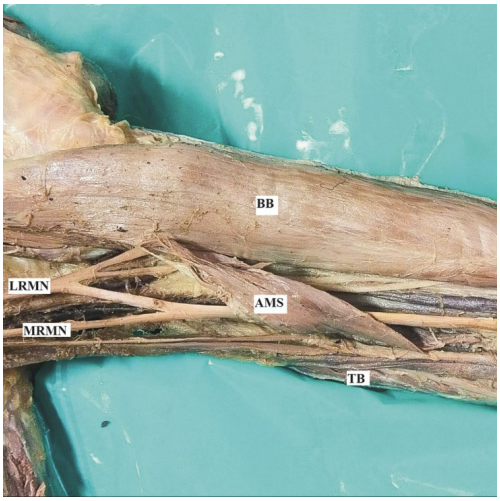

Figure 3: Left-sided muscular slip exhibiting a tendinous proximal attachment. LRMN – Lateral root of Median nerve, MRMN – Medial root of Median nerve, BB – Biceps brachii, TB – Triceps brachii, AMS – Anomalous muscular slip

Table I : Measurements of Anomalous muscular slip

SERIAL NUMBER	PARAMETER	RIGHT (mm)	LEFT (mm)
1.	Length	160	125
2.	Width	25	20
3.	Thickness	2.5	1.9
4.	Distance from CP to its proximal attachment	75	115
5.	Distance from ME to its distal attachment	90	77

CP – Coracoid process of scapula, ME – medial epicondyle of humerus

cells and neuronal growth cones during embryological development can lead to variations in the branching pattern of the brachial plexus, reinforcing the variations in the present case. Rare anomalous muscular slips between the biceps brachii and triceps brachii could be a potential entrapment site. These additional slips can create a tunnel concealing the neurovascular bundle of the arm [4]. A similar anomalous muscular slip has been reported in literature from the pectoralis major muscle to the biceps brachii communicating with brachial fascia named Thoracobrachialis [5]. Potential site of compression of the median nerve results in the functional impairment of the anterior compartment of the forearm and weakness and numbness in the radial three and a half fingers. Brachial artery compression may result in pain, numbness, tingling, coldness, and weakness of the affected upper extremity. The prevalence of bilateral variations in the median nerve and absent musculocutaneous nerve has been reported in literature; the presence of anomalous muscular slip in addition seen in the present case deviates significantly from other reported cases in a unique way, and the combined variations are least reported in literature.

CONCLUSION

In this case report, the musculocutaneous nerve was absent, and the lateral root of the median nerve replaced the musculocutaneous nerve by innervating the muscles of the arm. The knowledge of such variations is of paramount importance in various therapeutic modalities in the axilla and arm, such as axillary nerve blocks for upper limb surgeries. This study also suggests the need for preoperative imaging to create awareness among surgeons to operate on patients with such variations.

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REFERENCES

1. Ghosh B, Dilkash MNA, Prasad S, Sinha SK. Anatomical variation of median nerve: cadaveric study in brachial plexus. Anat Cell Biol. 2022 Jun 30;55(2):130-134. doi: 10.5115/acb.22.022. Epub 2022 Jun 20.
2. Mat Taib CN, Hassan SN, Esa N, Mohd Moklas MA, San AA. Anatomical variations of median nerve formation, distribution and possible communication with other nerves in preserved human cadavers. Folia Morphol (Warsz). 2017;76(1):38-43. doi: 10.5603/FM a2016.0045. Epub 2016 Sep 26. PMID: 27665953.
3. Sarkar A, Saha A. Bilateral absence of musculocutaneous nerve: a case report. J Clin Diagn Res. 2014 Sep;8(9):AD06-07.
4. Natsis K, Tsakotos G, Triantafyllou G, Olewnik Ł, Zielinska N, Koutserimpas C, Totlis T, Piagkou M. Muscle interconnections in the anterior and posterior arm compartment: a cadaveric case series with possible clinical implications. Surg Radiol Anat. 2023 Sep;45(9):1111-1116. doi: 10.1007/s00276-023-03209-5. Epub 2023 Jul 19.
5. Zielinska N, Karauda P, Węgiel A, Szewczyk B, Olewnik Ł. A very rare case of a thoracobrachialis muscle. Surg Radiol Anat. 2023 Nov;45(11):1493-1496. doi: 10.1007/s00276-023-03240-6. Epub 2023 Sep 21. PMID: 37733018; PMCID: PMC10587252.