

AGENESIS OF MUSCULOCUTANEOUS NERVE AND THE MEDIAN NERVE INNERVATED THE BRACHIAL FLEXORS IN A FEMALE CADAVER – A CASE REPORT

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ABSTRACT

The musculocutaneous nerve (MCN) arises from the lateral cord of brachial plexus that supplies the brachial flexor muscles. The variations in the formation of MCN are common but arising as branches from the median nerve is a rare case. During routine dissection for undergraduate medical students in Panimalar Medical College Hospital and Research Institute at Chennai, observed agenesi s of MCN and the muscles of the anterior compartment of the arm was supplied by the branches originated from the median nerve in a female cadaver aged about 65 years old. This variation was found on the left arm and the right arm showed normal course of the nerve. On the left arm, a thin nerve was observed along the lateral side that have originated from the lateral root of the median nerve supplied coracobrachialis and is named as the nerve to coracobrachialis. At about 5 cm below the formation of median nerve, arise a trunk which descended laterally for about 2 cm and then trifurcated. The first branch supplied the biceps brachii muscle, the 2nd branch entered brachialis muscle to supply it, and 3rd branch descended between biceps brachii and brachialis and emerged from the lateral border of the tendon of biceps brachii by piercing the deep fascia at about 2–3 cm proximal to the bend of the elbow as lateral cutaneous nerve of the forearm. According to this study, injury to the median nerve in the arm may cause clinical findings similar to those of MCN injury signs such as weakness in elbow flexion, atrophy of the biceps brachii, and paresthesia at the lateral forearm. Therefore, the knowledge of the present variation may help in clinical practice while doing invasive or surgical procedures and in post-traumatic evaluation of the nerve pathway.

Keywords: Agenesi s of musculocutaneous nerve, Nerve to coracobrachialis, Muscular trunk from median nerve, Trifurcate branching pattern, Median nerve.

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INTRODUCTION

The musculocutaneous nerve (MCN) emerges as a branch from the lateral cord of the brachial plexus. It passes inferolaterally to supply and then pierce coracobrachialis. It then descends between the biceps and brachialis, sending branches to both, and emerges from beneath the lateral border of the tendon of biceps as the lateral cutaneous nerve of the forearm.

The lateral cutaneous nerve of the forearm pierces the deep fascia just lateral to the tendon of biceps brachii at approximately 2–3 cm proximal to the bend of the elbow. It divides into anterior and posterior branches that supply the anterolateral and posterolateral surfaces of the forearm, the anterior extends on to the ball of the thumb [1].

The median nerve is formed in the axilla by the union of the medial and lateral roots of the median nerve which are the branches from the medial and lateral cords of the brachial plexus respectively. It descends anterior to the axillary and upper part of the brachial arteries to reach the medial aspect of the brachial artery in the distal half of the arm. It supplies most of the flexor muscles in the anterior aspects of the forearm and the thenar and two lumbrical muscles in the hand. It also supplies the lateral part of the skin in the hand and 3½ fingers but only sympathetic postganglionic fibers to the axillary and brachial arteries in the axilla and arm [2].

Various cadaveric studies have documented anomalous variations in the musculocutaneous and median nerve by the anatomist [3-5]. In such a way, the present study documents the agenesi s of MCN and the flexor muscles of the arm are supplied by a branch from the median nerve in a female cadaver.

OBSERVATIONS

During routine dissection for the undergraduate medical students in Panimalar Medical College Hospital and Research Institute at Chennai, observed an agenesi s of MCN and the muscles of anterior compartment of the arm was supplied by the branches originated from the median nerve in a 65-year-old female cadaver.

Further dissection was done according to Cunningham's manual to find out the motor branch for brachial flexors and sensory branch [1]. A thin nerve is observed along the lateral side and is named as the nerve to coracobrachialis muscle that originated from the lateral root of median nerve. At about 5 cm below the formation of the median nerve (the joining point of medial root and lateral root of median nerve), arise a trunk which descended inferolaterally for about 2 cm then trifurcates (divided into 3 branches). The first branch supplied the biceps brachii muscle, the 2nd branch entered brachialis muscle to supply it, and 3rd branch descended between biceps brachii and brachialis and emerged from the lateral border of the tendon of biceps brachii by piercing the deep fascia at about 2–3 cm proximal to the bend of the elbow as lateral cutaneous nerve of the forearm (Figs. 1 and 2).

DISCUSSION

The MCN is a branch from the lateral cord of brachial plexus. It pierces the coracobrachialis muscle and innervates the muscles of anterior compartment of arm and then continues in the forearm as lateral cutaneous nerve of the forearm [6,7]. The agenesi s of MCN has been extensively studied by many authors [8-18]. According to their report, if the MCN is absent, the lateral root of median (MN) will supply the flexor muscles of the arm.

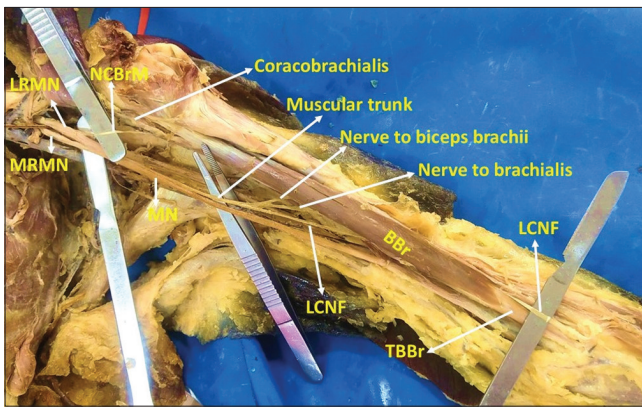


Fig. 1: Left arm shows agenesis of musculocutaneous nerve and anomalous branch from the median nerve. LRMN: Lateral root of median nerve, MRMN: Medial root of median nerve, NCBM: Nerve to coracobrachialis muscle, MN: Median nerve, BBr: Biceps brachii muscle, LCNF: Lateral cutaneous nerve of forearm, TBB: Tendon of biceps brachii muscle

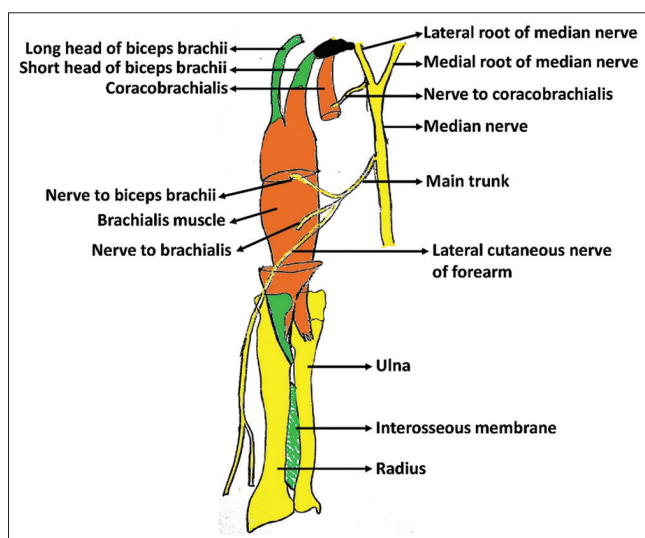


Fig. 2: Diagrammatic representation of anomalous branching pattern of median nerve in the absence of musculocutaneous nerve

Jerome *et al.* have reported the absence of MCN from the lateral cord of brachial plexus and they found a biceps branch which have originated from the median nerve in the arm supplied the biceps muscle with a C5,6 brachial plexus avulsion injury [19]. Similarly in the present study, agenesis of MCN was observed on the left arm. A thin nerve originated from the lateral root of the median nerve supplied coracobrachialis and is named as the nerve to coracobrachialis. At about 5 cm below the formation of median nerve, arise a trunk which descended laterally for about 2 cm and then trifurcated. The first branch supplied biceps brachii muscle, the 2nd branch entered brachialis muscle to supply it, and 3rd branch descended between biceps brachii and brachialis and emerged from the lateral border of the tendon of biceps brachii by piercing the deep fascia at about 2–3 cm proximal to the bend of the elbow as the lateral cutaneous nerve of the forearm.

Embryologically, the muscles of the upper limbs are derived from mesodermal somites that migrate into the developing limb bud during the 5th week of intrauterine life. During further development, the muscles are arranged along the pre-axial and post-axial borders of the limbs. The pre-axial muscles are innervated by the upper segments and the post-axial muscles by the lower segments of the spinal nerves.

The muscles are re-grouped into extensor muscles dorsally and flexor muscles ventrally. Consequently, the nerves of the lower limbs undergo dorsal and ventral divisions. Subsequently, union of the dorsal and ventral branches is responsible for the formation of the root plexus of the limbs. The radial nerve supplies the extensor muscles of the upper limb; thus, it is formed by the union of the dorsal divisions of the brachial plexus. The median and the ulnar nerves, being the nerves of the flexor muscles of the upper limb, are necessarily contributed by the ventral divisions of the brachial plexus [20].

In clinical manifestation, median nerve injury leads to motor and sensory deficits in the forearm and hand [21]. According to the present findings in the absence of a MCN, if the median nerve gets injured in the axilla, would lead to an atypical clinical presentation like loss of shoulder and elbow flexion with cutaneous sensory loss to the lateral forearm and weakness in supination (from biceps brachii palsy) may occur.

CONCLUSION

Agenesis of MCN and its role is taken up by the median nerve is a common variation. However, it is the responsibility of an anatomist to report the anomalous variations in the branching pattern of the median nerve in the absence of MCN is necessary to avoid confusion during surgical procedure. Therefore, this study is one of the references for surgeons while dealing with surgeries in the upper limb.

AUTHORS CONTRIBUTIONS

Dr. Priya G has conceptualized, designed, and drafted the manuscript. Mrs. Nandhini S and Dr. Yuvaraj M were gathered the data with relevant photographs. Mrs. Nithya S involved in the manuscript writing. Dr. Mahima Sophia M involved in the final editing and proofreading of the manuscript. All the authors together revised and approved the final version of the manuscript.

CONFLICT OF INTEREST

Nil.

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