

**IJCRR**

Vol 05 issue 21

Section: Healthcare

Category: Case Report

Received on: 22/10/13

Revised on: 27/10/13

Accepted on: 11/11/13

## UNILATERAL VARIATION IN THE TERMINATION OF MUSCULOCUTANEOUS NERVE

Sirisha V., Reshma Mohammad, Udaya Kumar P., Chandra Mohan M.

Department of Anatomy, Mamata Medical College, Khammam, Andhra Pradesh, India

E-mail of Corresponding Author: velpurisirisha@gmail.com

### ABSTRACT

Nerve variations are always a great challenge to the surgeons, anaesthetists and neurologists. The precise knowledge of variations may help to avoid injuries during surgical and anaesthetic procedures in the region of axilla, arm and forearm. Musculocutaneous nerve is a branch of lateral cord of brachial plexus. It pierces the coracobrachialis muscle and runs in between the biceps and brachialis muscles. After giving off muscular branches, the nerve pierces the deep fascia about 2-3cm above the elbow and continues as lateral cutaneous nerve of forearm. We observed that the lateral cutaneous nerve of forearm is found to be arising from the median nerve. The musculocutaneous nerve terminated after supplying the muscles of the arm without giving any communicating branch to the median nerve. The reminding of this type of variation is also important while performing the surgeries on the forearm.

**Keywords:** Musculocutaneous nerve, Median nerve, Lateral cutaneous nerve of forearm, Variation, Brachial plexus.

### INTRODUCTION

Musculocutaneous nerve (MCN) is derived from the lateral cord of brachial plexus and conveys the fibres from C5, C6, and C7. The MCN initially accompanies the third part of axillary artery and pierces the coracobrachialis muscle and supplies it. Then passes across the front of the arm in between the biceps brachii and brachialis muscles. It supplies both the heads of biceps muscle and medial major part of the brachialis muscle. Through the nerve to the brachialis it gives articular twigs to the elbow joint and a nutrient branch to the humerus.

The knowledge of the anatomical variation of the peripheral nerves in the upper extremities is important as the nerves could be injured during anaesthetic and surgical procedures and variation may explain unusual clinical symptoms.

### CASE REPORT

Present variation was noticed in the Department of Anatomy, Mamata Medical College, Khammam, during routine educational dissection for medical undergraduates. We observed a variation in the termination of MCN in right upper limb of 60 years old female cadaver. After piercing coracobrachialis muscle, MCN supplied biceps muscle and brachialis muscle and terminated by giving articular twig to the elbow joint. The LCNF has been observed arising from the lateral side of MN [fig-1] in the lower 1/3 of the arm, passed beneath biceps brachii and pierced the deep fascia above the elbow to supply the skin of the anterolateral region of forearm as far distally as the base of the thenar eminence [fig-2]. In this case we also noticed atrophy of long head of biceps brachii muscle. Other than this the left sided MCN and courses of all other major nerves like median, ulnar, axillary and radial were normal.

## DISCUSSION

In the present case, anatomical variation occurred in the termination of MCN in the right upper limb of 60 years old female cadaver. Variations in the course and termination of MCN have been reported by many authors. Choi D et al<sup>5</sup> (2002) and Budhiraja V et al<sup>3</sup> (2011) has worked extensively on the variations of the MCN. They reported variations like absence of MCN, communication between MCN & MN and fusion of MCN with MN. The present case does not correlates with their findings. Chitra<sup>4</sup> (2007) and Suseelamma<sup>8</sup> (2013) has reported communication between MCN and MN, but no such communication is observed in the present case report. Le Minor<sup>7</sup> (1992) classified these variations into five types.

Type 1: No communication between MN and MCN.

Type 2: The fibers of the medial root of the MN pass through the MCN and join the MN in the middle of the arm.

Type 3: The fibers of the lateral root of the MN pass through the MCN and after some distance leave it to form the lateral root of the MN.

Type 4: The MCN fibers join the lateral root of the MN and after some distance the MCN arise from the MN.

Type 5: The MCN is absent and all the MCN fibers pass through lateral root of MN; fibers to the muscles supplied by MCN branch out directly from MN. In this type, the MCN does not pierce the coracobrachialis muscle.

Veneratos and Anagnostopoulou<sup>9</sup> (1998) suggested another classification in relation to the coracobrachialis muscle.

Type I: Communication is proximal to the coracobrachialis muscle.

Type II: Communication is distal to the muscle.

Type III: Neither the nerve nor the communicating branch pierce the muscle.

The present finding does not fit into any of the above classifications. Bergman<sup>1</sup> (1988) described the short MCN and LCNF arising from MN. The

present case report correlates with his description. Bhattarai, et al<sup>2</sup> (2009) described a variation in the MCN in his study which is similar to the present variation excepting for the communication between the MCN and MN.

According to Larson WJ<sup>6</sup> as quoted by Yogesh AS<sup>10</sup> (2011) the motor axons, which enter the base of the limb bud, join with each other to form the brachial plexus in the upper limb. The guidance of the developing axons is regulated by the expression of chemoattractants and chemorepulsant in highly coordinated site-specific fission. Tropic substances such as brain-derived neurotropic growth factor, c-kit ligand, neutrin-1, neutrin-2, etc. attract the correct growth cones or support the viability of the growth cones that happen to take the right path. The significant variations in nerve pattern may be the result of altered signaling between the mesenchymal cells and the neuronal growth cones or circulatory factors at the time of fission of brachial plexus cords.

The MCN can be damaged by a number of mechanisms but isolated injury is rare when compared to other peripheral nerves. It may be injured in the axilla or more distally where just the sensory branch (LCNF) is affected resulting only in an altered sensation.

## CONCLUSION

The present case report gives us an idea that the lateral cutaneous nerve of forearm (LCNF) also arises from the MN without any communication between the MCN and MN.

Meticulous knowledge of possible variations of the MCN and the MN may endow us with valuable help in the management of upper limb injuries, specifically during anaesthetic and orthopaedic procedures.

## REFERENCES

1. Bergman RA, Thompson SA, Afifi AK Saadeh FA – Compendium of Human

- anatomical variations. Munich. Urban and Schwarzenberg. 1988 11,108-114, 139-141.
- Bhattarai C, Poudel PP – Unusual variations of musculocutaneous nerves. Kathmandu University Medical Journal, 2009, 7: 408-410.
  - Budhiraja V, Rastogi R, Asthana AK, Sinha P, Krishna A, Trivedi V – Concurrent variations in median and musculocutaneous nerves with clinical correlation-a cadaveric study, *Ital. J Anat Embryol.*, 2011; 116(2):67-72
  - Chitra R – Multiple bilateral neuratomical variations of the nerves of the arm, *Neuroanatomy*, 2007(6): 43-45.
  - Choi D, Rodriguez NM, Vazquez T, Parkin I, Sanudo JR – Patterns of connection between musculocutaneous and median nerves in the axilla and in arm. *Clinical Anatomy*. 2002, 15: 11-17.
  - Larson WJ – Development of Peripheral nervous system, 3<sup>rd</sup> ed., Pennsylvania, Churchill Livingstone, 2001, Human Embryology, pg 115-116.
  - Le Minor JM – A rare variant of Median and Musculocutaneous nerves in man, *Archives Anatomy Histology Embryology*. 1992, 73, 33-42.
  - Suseelamma D, Krishna chaitanya K, Sharada HR, Deepthi S – Radix formation between MN and MCN: embryological, morphological and clinical correlation, *Int J Res Med Sci*. 2013; 1 (3):222-225.
  - Venieratos D, Anagnostopoulou S – Classification of communications between musculocutaneous and median nerves, 1998, *Clinical Anatomy*, 11 (5): 327-331.
  - Yogesh AS, Marathe RR, Pandit SV – Musculocutaneous nerve substituting for distal part of radial nerve: A case report and its embryological basis, *J Neuroscience*, 2011,2[1]: 74-76.

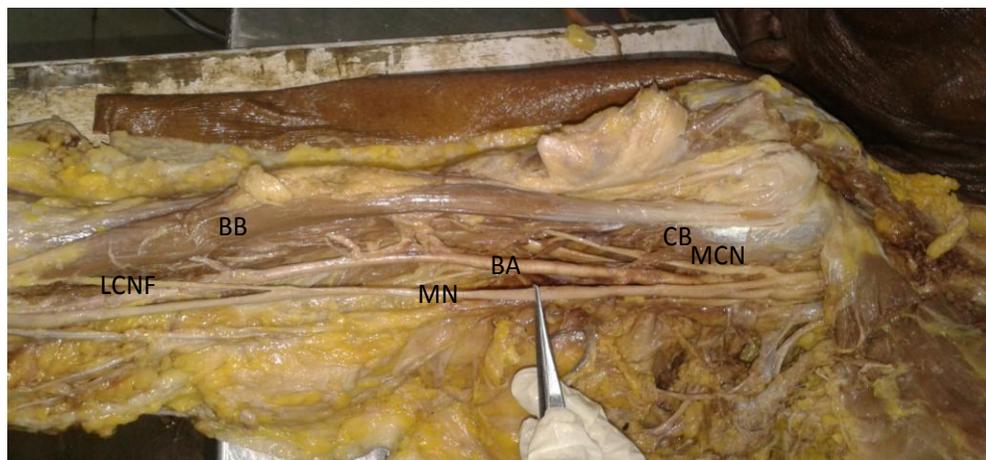
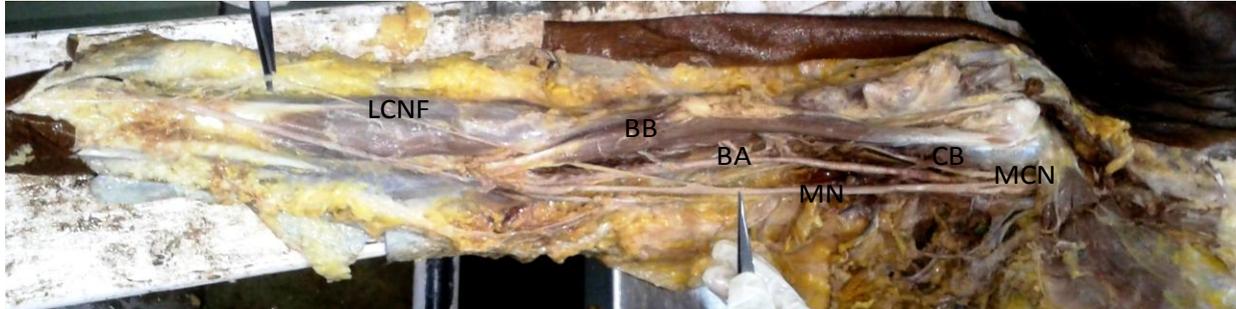


Fig : 1 right arm showing short Musculocutaneous nerve and Lateral cutaneous nerve of forearm arising from Median nerve.  
 BA- Brachial artery, BB- Biceps brachii, CB- Coracobrachialis, LCNF- lateral cutaneous nerve of forearm, MCN- Musculocutaneous nerve, MN- Median nerve.



**Fig : 2** Right arm showing the course of Lateral cutaneous nerve of forearm arising from the Median nerve.  
BA- Brachial artery, BB- Biceps brachii, CB- Coracobrachialis, LCNF- lateral cutaneous nerve of forearm, MCN- Musculocutaneous nerve, MN- Median nerve