

Case Report

BILATERAL ABSENCE OF MUSCULOCUTANEOUS NERVE: REPORT OF TWO CASES

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ABSTRACT

Anatomical variations involving the brachial plexus are not uncommon. Abnormal communications among the branches of musculocutaneous nerve especially those involving the posterior division are widely reported due to their significance in various surgical procedures performed in this region. During the routine gross anatomical dissection, we observed the bilateral absence of musculocutaneous nerve in two male cadavers aged 60 and 65 years and the muscles of anterior compartment of arm were innervated by the branches from the Median nerve. In case 1, it was observed that in the right and left arm, branches from the median nerve supplied the muscles of the anterior compartment namely the coracobrachialis, biceps brachii and brachialis. The branch which innervated the brachialis muscle later continued as lateral cutaneous nerve of forearm. In case 2, Absence of MCN observed bilaterally wherein right arm, wherein, a single branch from median nerve supplied the coracobrachialis muscle. Another branch from the median nerve, after passing through the lower end of coracobrachialis, divided into an oblique and a vertical branch which supplied the biceps brachii and brachialis respectively. These anatomical variations in the course of musculocutaneous and median nerve should be considered during surgical procedures and while performing nerve conduction studies.

KEY WORDS: Biceps brachii, Brachialis. Brachial plexus, Coracobrachialis, Median nerve, Musculocutaneous nerve.

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INTRODUCTION

The brachial plexus is a network of nerve fibres arising from C5-T1 cervico-thoracic segments. It gives rise to lateral, medial and posterior cords. The musculocutaneous nerve is a continu-

ation of lateral cord and the median nerve is formed from the lateral root of lateral cord and medial root of medial cord. The musculocutaneous (C5-7) nerve serves as the chief nerve supply of anterior compartmental muscles of the

arm namely coracobrachialis, biceps brachii and brachialis. It pierces the coracobrachialis and descends laterally between biceps and brachialis to the lateral side of the arm. Just below the elbow it pierces the deep fascia lateral to the tendon of biceps and continues into the forearm as the lateral cutaneous nerve of the forearm. Studies in the past have reported variations in the course of musculocutaneous nerve. In this study, we report two cases with bilateral absence of musculocutaneous nerve wherein, the median nerve served as the major nerve supply to the muscles of the anterior compartment of arm [1].

CASE REPORT

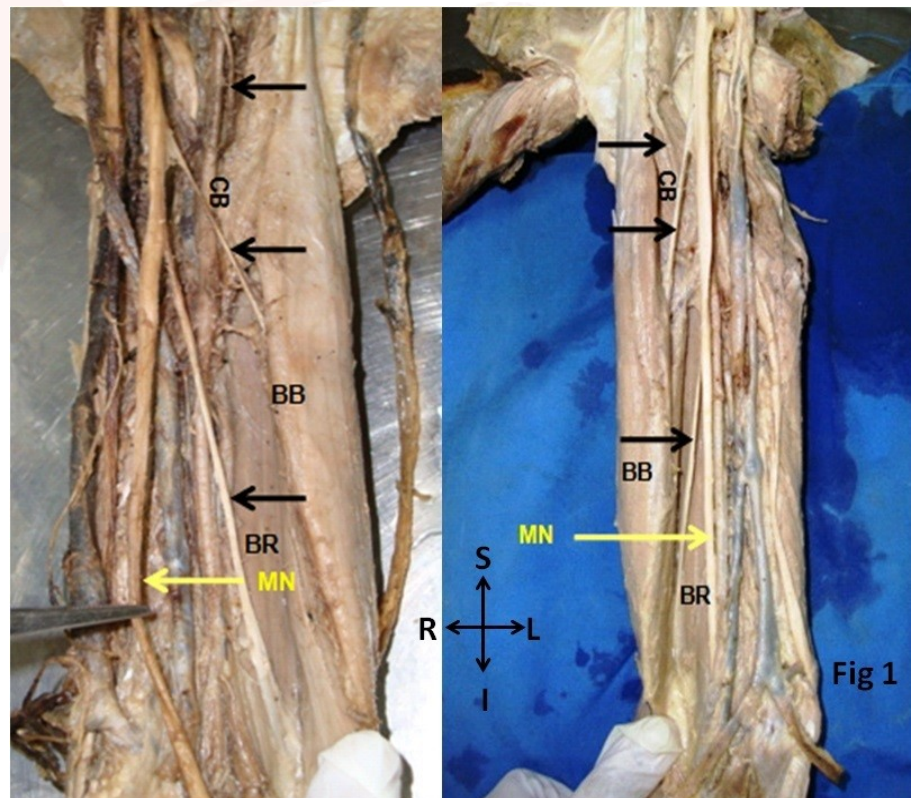
The anatomical variations in the musculocutaneous nerve which is reported in our case

report were observed during the routine cadaveric dissection of upper limb for the IMBBS students in the Department of Anatomy, Pondicherry Institute of Medical Sciences, Puducherry. Bilateral absence of Musculocutaneous nerve was observed in two male cadavers aged 60 and 65 years respectively.

Case 1

Right and Left upper limbs: Dissection of the upper limb of a 60 years old male cadaver revealed the bilateral absence of Musculocutaneous nerve. The Median nerve was seen to be arising from the lateral and medial cord of the brachial plexus which further continued as a single trunk and innervated the muscles of the anterior compartment of the arm

Fig. 1: Dissection of right and left anterior compartment of arm.



MN-median nerve, CB-coracobrachialis, BB- biceps brachialis, BR- brachialis. The black arrows indicate the separate branches from the median nerve to the respective muscles. The yellow arrows indicate the Median nerve.

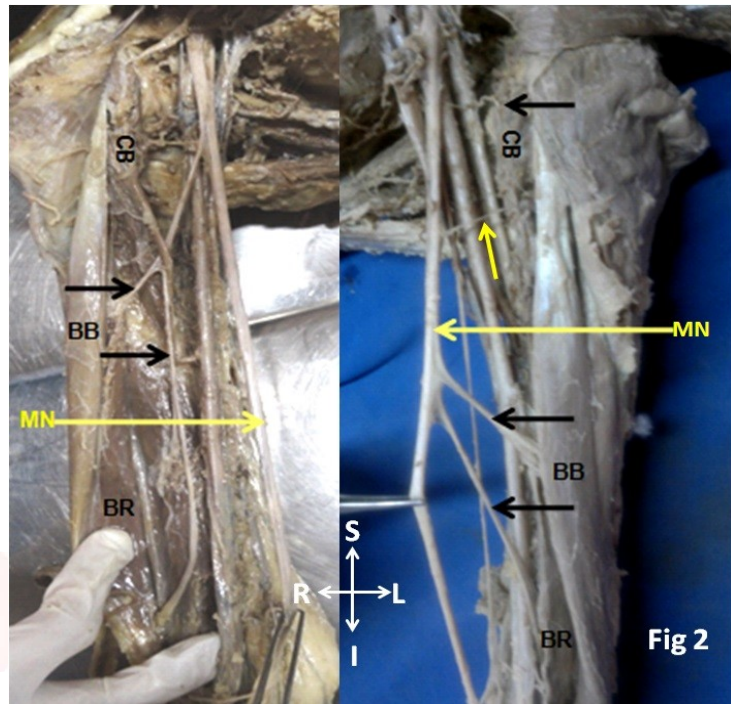
Case 2

Right upper limb: During dissection of the right upper limb of a 65 years old male cadaver, the musculocutaneous nerve was found to be absent and the anterior compartmental muscles of the arm were supplied by the branches from the Median nerve. The coracobrachialis and biceps brachii were supplied by separate branches from the median nerve. However, it was

observed that the branch to the biceps brachii muscle had an oblique course initially, which then gave rise to a vertical branch before its termination on the muscle. This vertical branch Supplies the brachialis.

These anatomical variations are however different from those described in the Le Minor classification for absence of Musculocutaneous nerve [2].

Fig. 2: Dissection of right and left anterior compartment of arm.



MN median nerve, CB coracobrachialis, BB biceps brachialis, BR brachialis. The black arrows indicate the separate branches from the median nerve to the respective muscles. Long yellow arrow indicate the Median nerve and small arrow for the branch to coracobrachialis muscle and continued as the lateral cutaneous branch of forearm.

Left upper limb: Dissection of the left upper limb of the same cadaver also revealed the absence of the musculocutaneous nerve. The coracobrachialis muscle was seen to be supplied by two branches from the Median nerve. The first branch was seen to be arising at the level of the shoulder joint and the second branch at the level of axilla. At the mid arm level, the median nerve gave separate branches to the biceps brachii and brachialis and continued as lateral cutaneous nerve of forearm (**Fig. 2**).

DISCUSSION

Studies by Bergman et.al [3]. have reported variations in the course and branches of the Musculocutaneous nerve, Nakatani et. al [4]. have published a report on 3 cases in which the lateral cord, Median nerve and Musculocutaneous nerve were found to be wrapped in a single sheath of connective tissue.

Likewise, bilateral [2] and unilateral absence [5,6]. of Musculocutaneous nerve have also been reported in the past. Beheiry in 2004 [7] noted the absence of musculocutaneous nerve in only one of the (1.7%) 60 arms which were dissected. A study by Prasad Rao and Choudhary [8] reported the absence of the musculocutaneous nerve in 24 of 85 arms.

The two cases described in this case report have also shown the absence of Musculocutaneous nerve accompanied by variations in the nerve supply to the muscles of the anterior compartment. The first case of our study is in line with the type (V) Le Minor classification while the second case on the right side does not correlate with any of his classifications. However, on the left arm, the coracobrachialis innervated by two branches as an upper and lower branch directly from median nerve and other branches to the anterior compartment as described in Le Minor classification of type (V).

William Larsen (1997) quoted, at the thirtieth day of embryonic period the axons of ventral motor column develop from spinal cord in cranio-caudal direction. An apical structure present in the tip of the axon is called as "Growth Cone" will decide the path to reach the target organ. Filopodia present on growth cone leads to grow towards the target area by sensing the molecular markers secreted by surrounding tissue. The location and innervations of the target organ (muscle, joint, skin) is dependent on secretion of certain tropic substances by target organs and its identification by growing axon. The Absence of Musculocutaneous nerve in the present case by the growth cone filopodia in the axons of ventral motor columns while develop-

ing from C5, C6 and C7 of spinal segments take an unusual path and traveled from Lateral Cord to form Median nerve through Lateral Root of Median nerve. However the growth cone recognized their target organs correctly and innervated them [9].

Since the muscles of anterior compartment were supplied by branches from median nerve, a rare anatomical variation, the power of the flexor muscles in the arm would still be normal, although they are not innervated by the musculocutaneous nerve. However, such structural abnormalities and variations of the nerves of brachial plexus have recently become significant because of new imaging techniques such as computed tomography and magnetic resonance imaging. These variation need to be kept in mind during various surgical procedures and while performing nerve conduction studies.

CONCLUSION

Knowledge regarding the anatomical variations in the nerve innervations of the muscles is very essential at a clinical point of view, especially for flap dissections, post traumatic evaluation of arm and during repair of peripheral nerve injuries.

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Conflicts of Interests: None

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