



Case Report

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Bilateral absence of musculocutaneous nerve and its clinical and surgical implications

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ABSTRACT

The musculocutaneous nerve is one of the terminal branches of the lateral cord of the brachial plexus, and is responsible for innervation of the flexor musculature of the brachium, and cutaneous innervation of the lateral surface of the forearm. During dissection of 58 year old male cadaver, we observed a case of bilateral absence of the musculocutaneous nerve, the lateral root of median nerve on left side pierces and supply the coraco brachialis muscle and then gave three branches, first branch joined the medial root and formed the median nerve, second branch supplied the brachialis muscle and then continued as lateral cutaneous nerve of forearm. The third branch supplied the biceps brachii muscle. On right side lateral root of median nerve supplied the brachium close to its formation. These variations have clinical significance during surgical procedures, in brachial plexus block and in diagnostic clinical neurophysiology.

Key words: Brachial plexus, Musculocutaneous nerve, Coracobrachialis

INTRODUCTION

Variations in the formation and branching pattern of brachial plexus are common and have been reported by several authors. The brachial plexus is formed by ventral divisions of cervical 5, 6, 7, 8 and thoracic 1 segment of spinal cord roots. These roots then divide into trunks as upper, middle and lower. Ventral divisions of upper and middle trunks form lateral cord and ventral division of lower trunk form medial cord. Posterior divisions of all trunks form posterior cord. These cords give rise to different branches. Lateral cord gives three branches, lateral pectoral nerve, musculocutaneous nerve and lateral root of median nerve. The classical pathway of the musculocutaneous nerve is that it pierces the coracobrachialis muscle and then passes obliquely down to the lateral side of the arm, between biceps brachii and brachialis muscles. Then it pierces the deep fascia lateral to the tendon of biceps brachii near elbow and is continues as the lateral cutaneous nerve of the forearm. It supplies coracobrachialis, biceps brachii and brachialis in its course. The median nerve (Labourer's nerve) is formed by (C5 to T1 roots) anterolateral to the third part of axillary artery by the union of its medial root from medial cord and lateral root from the lateral cord of brachial plexus. The median nerve crosses from lateral to medial side at the level of insertion of coracobrachialis. It descends in the cubital fossa posterior to the bicipital aponeurosis and anterior to the brachialis muscle [1]. Clinicians must know about knowledge of anatomical variations in the brachial plexus such as the absence of the musculocutaneous nerve and of the muscles that are innervated by unusual nerves.

Case report:

During routine dissection of the axilla and arm regions of 58 year-old male embalmed cadaver in the department of Anatomy, B L D E University's Shri B M Patil Medical College, Vijayapur, Karnataka State, India, it was observed that musculocutaneous nerve was absent in the both the axilla and arm region, and the muscles of arm are innervated by lateral root of median nerve. After careful dissection of the brachial plexus we observed lateral root of median nerve on left side penetrated the coraco brachialis muscle and supplied it, and then gave three branches, first branch joined the medial root and formed the median nerve, second branch supplied the brachialis muscle and then continued as lateral cutaneous nerve of forearm. The third branch again divided into ascending and descending branch then supplied the biceps brachii muscle. And on right side the lateral root of median nerve close to its formation provided branch to arm to supply the coracobrachialis biceps brachii and brachialis muscle without fenestration of the coracobrachialis muscle. In forearm and hand the course and distribution of median nerve was normal.

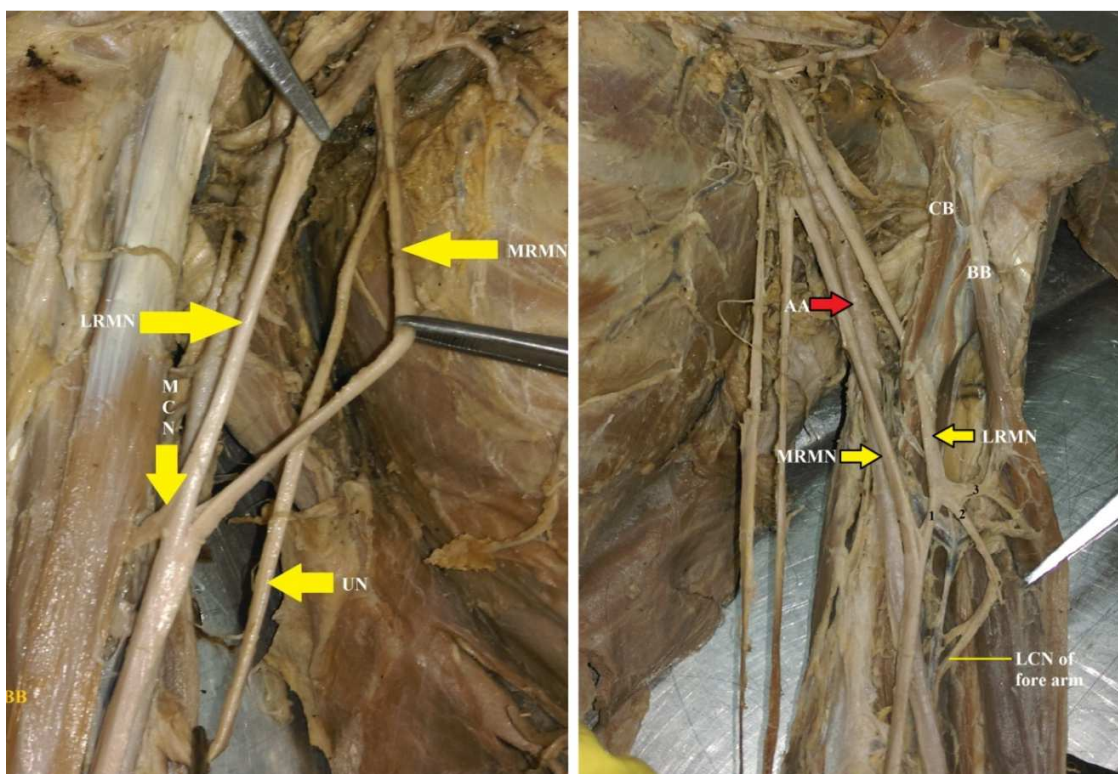


Figure 1 showing right and left axilla and arm region of upper limb MRMN- Medial branch Median nerve LRMN-Lateral root of Median nerve MCN –Musculocutaneous nerve AA-Axillary Artery LCN- Lateral cutaneous nerve of forearm UN – Ulnar nerve. BB- Biceps Brachii CB- Coracobrachialis

DISCUSSION

The anatomical abnormalities and the brachial plexus nerves variations have recently become significant because of new imaging techniques such as computed tomography (CT) and magnetic resonance imaging (MRI). Moreover, investigation of these variants is important in order to define the anatomical features of each in relation to clinical diagnosis and for surgical procedures. The musculocutaneous nerve supply muscles of the anterior compartment of the arm and the skin on the lateral side of the forearm. The median nerve does not have any muscular branches in the arm. If the musculocutaneous nerve is absent, its fibers run in the median nerve [2, 3] and muscles of the anterior compartment of the arm are innervated by the median nerve [4]. In rare cases, innervations are provided by the lateral root of the median nerve [5]. Studies on musculocutaneous nerve by Nakatani et al.[6] revealed three variations in which the musculocutaneous nerve did not pierce the coracobrachialis. Le minor [7] described a case of small branch from the lateral cord that first pierced the coracobrachialis muscle and then one of its terminal

branches, joining the medial root forming the medial nerve. Prasada Rao and Chaudhary [3] did not find musculocutaneous nerve in 8% of the 24 arms they dissected. In the published literature, only one case was presented where absence of the musculocutaneous nerve coexisted with a three-headed biceps brachii muscle and when the supernumerary head is present, innervation from axillary nerve of the brachial plexus is also possible [8]. Injury to the musculocutaneous nerve leads to weakness of elbow flexion because biceps and coracobrachialis are paralyzed and also leads sensory loss on the extensor aspect of the forearm in the distribution of the lateral cutaneous nerve of forearm. Pain and parasthesia may be aggravated by elbow extension [9]. During shoulder surgery it is important to palpate the musculocutaneous nerve, as it is vulnerable to injury from retractors placed under the coracoid process. During coracoid process of scapula bone grafting, shoulder dislocation and frequent arthroscopies may damage the biceps brachii and coraco brachialis muscle as well as the musculocutaneous nerve [10]. Absence of the musculocutaneous nerve is usually not revealed because its fibers run with the median nerve. After any lesion of the median nerve (with an abnormal distribution) in the region of the axilla or shoulder, unexplainable complications are often presented. Apart from common symptoms such as the loss of pronation and reduction in flexion of the hand and wrist, paralysis of the thenar muscles and loss of sensation in certain regions of the hand which are revealed when the median nerve has its normal anatomical course, clinicians may also encounter additional symptoms such as: weakness in forearm flexion and supination and hypoesthesia of the lateral part of the forearm [11].

CONCLUSION

knowledge of existence of such type of atypical presentation and course of MCN would be of immense value to the anaesthetist during the performance of axillary blocks, for plastic surgeons during flap dissections, for radiologist, computer imaging in diagnostic medicine, for neurosurgeons in diagnosing and treating post traumatic peripheral neuropathies and reconstructive nerve grafting following brachial plexus injuries and coracoids process grafting and shoulder arthroplasty procedures for orthopaedic surgeons.

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