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AN INTERCONNECTION BETWEEN MEDIAN NERVE AND MUSCULOCUTANEOUS NERVE: A CASE REPORT

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ABSTRACT

Brachial plexus is the point of formation of many nerves, innervates the upper limb and its variations are common. Knowledge of these is important to anatomists, radiologist anesthesiologists and surgeons. The presence of anatomical variations of the peripheral nervous system is often used to explain unexpected clinical signs and symptoms. During the routine dissection, an interconnection was seen between the musculocutaneous nerve and the median nerve at the middle of the arm. Knowledge of such communications between musculocutaneous and median nerve will be helpful in surgical repair of the nerves.

KEYWORDS: Brachial plexus, median nerve, musculocutaneous nerve.

INTRODUCTION

The brachial plexus is formed by the union of the ventral rami of the lower four cervical nerves and the greater part of the first thoracic ventral ramus.[1] Median nerve and musculocutaneous nerve are the branches of brachial plexus having the root value C_{5}-$_{8}$, T1 and C_5-C_7 respectively.[2]

The median nerve (MN) arises by the union of two roots. Its lateral root is derived from the lateral cord (C5, C6 and C7) and medial root from the medial cord (C8, T1) of the brachial plexus.[2] The roots embrace the third part of axillary artery uniting either in front or on the lateral side of the artery. The median nerve descents into the arm lying at first lateral to the brachial artery; about the level of insertion of the coracobrachialis, it crosses in front of the

brachial artery and descents on its medial side of the cubital fossa where it lies behind the bicipital aponeurosis and in front of the brachialis.[3] It supplies flexors of forearm except flexor carpi ulnaris, 3 thenar muscles, skin of lateral two third of palm of hand and fingers.[3] Branches of the median nerve are muscular, cutaneous, articular, vascular.[4]

Musculocutaneous nerve arises from the lateral cord of the brachial plexus opposite to the lower border of the Pectoralis minor; its fibers being derived from the fifth, sixth, and seventh cervical nerves. It pierces the Coracobrachialis and runs downwards and laterally between the Biceps brachii and Brachialis muscles to reach the lateral side of the arm; a little beyond the elbow it pierces the deep fascia on the lateral side of the tendon of the Biceps brachii and is continued into the forearm as the lateral cutaneous nerve of the forearm.[1] As implied by its name the musculocutaneous nerve is distributed partly to muscles and partly skin.[5]

CASE REPORT

During our routine dissection of 54yr old male cadaver, the axillary and arm regions were exposed neatly and carefully in order to study the origin and course of the brachial plexus and related structures in the axilla and the arm regions. The origin of musculocutaneous nerve and median nerve was observed to be normal in this case. The communication was observed soon after the musculocutaneous nerve pierces the Corachobrachialis muscle and it was measured about 0.6cm in lenth(horizontal) and around 5cm above the elbow. Photographs of the communicating branch were taken.

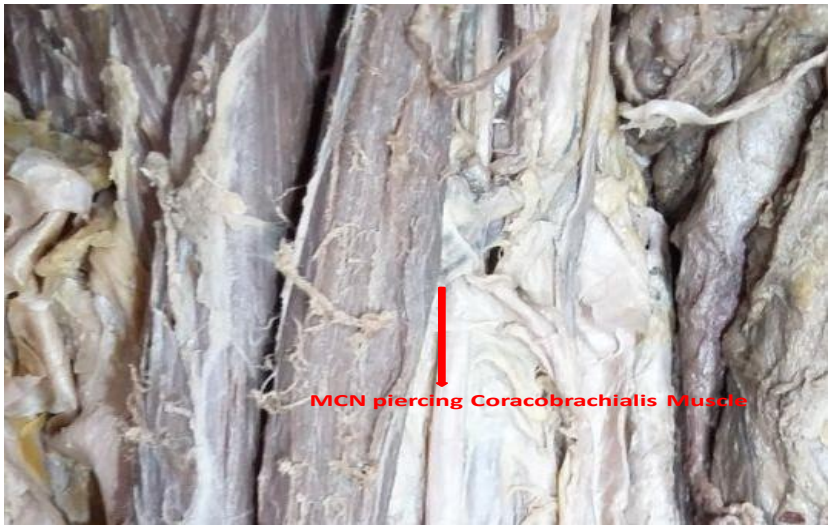

Figure 1: Anterior view of right arm showing Musculocutaneous nerve (MCN) beginning course where it piercing corachobrachialis muscle.

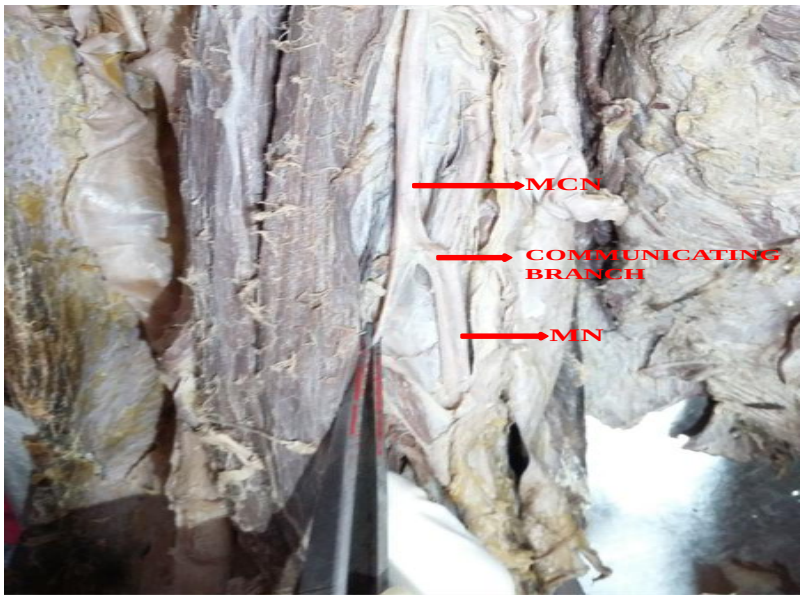

Figure 2: Anterior view of right arm showing communicating branch between Musculocutaneous nerve and Median nerve (MN).

DISCUSSION

Knowledge on the existence of communication between MCN & MN is relevant for clinical practice. It allows assessment and appropriate management of motor disorders of the upper limbs caused by peripheral nerve lesions, and allows proper planning for the surgical approach. Some authors[6-8] reported MCN-MN communication incidence higher than 40% of cases, others[9-12] less than 15%. Communications between the median nerve and the musculocutaneous nerve are the most frequent variations observed in brachial plexus. There are 4 types of communications observed between MCN and MN. Out of these the type III is the kind where communications are presented distal to the entry of Musculocutaneous nerve in the Corachobrachialis muscle.[13] Present case is similar to the type III, where the communication is seen 5cm above the elbow.

Normally in arm Median nerve gives vascular branches to brachial artery and branch to Pronator teres proximal to elbow joint & MCN gives articular twig to shoulder and elbow joint, muscular branches to coraco brachialis, biceps brachii, brachialis.[14]

Often some of the fibers derived from the c_7 leaves the lateral root in the lower part of the axilla and passes distally and medially behind the medial root and usually in front of the Axillary artery to join the Ulnar nerve. These fibers from C_7 may arise from the lateral cord and believed to be mainly motor fibers to Flexor carpi ulnaris. If the lateral root is small, the Musculocutaneous nerve sends a communicating branch to median nerve in the arm.

The presence of such communications may be attributed to random factors influencing the mechanism of formation of limb muscles and the peripheral nerves during embryonic life (Saeed et al). Past research studies were also describes that any communication between two nerves is due to the result of neurobiotaxis occurring during fetal development (Saeed et al). Significant variations in nerve patterns may also be a result of altered signaling between mesenchymal cells and neuronal growth cones or circulatory factors at the time of fusion of brachial plexus cords.

According to some studies conducted by Abhaya, Bhardwaj and Prakash in 2003 on variation in brachial plexus, the human brachial plexus appears as a single radicular cone in the upper limb bud, which divides longitudinally into ventral and the dorsal segments. The ventral segments give roots to the Median and the Ulnar nerves with Musculocutaneous nerve arising from the median nerve. The possibility of failure of the differentiation is a cause for some of the fibers taking an aberrant course as a communicating branch.[15]

Some opines that the limb muscles develop from the mesenchyme of local origin, while axons of spinal nerves grow distally to reach the muscles and/or skin. They blamed the lack of coordination between the formation of the limb muscles and their innervations for appearance of a communicating branch (sargon et at).[16]

CONCLUSION

Though the variations that we have mentioned here may not alter the normal functioning of the limb of the individual, it is vital during treatment of traumatology of the shoulder joint, in plastic and reconstructive operations, as well as to the anesthetist performing pain management therapies on the upper limb. The nerve communication between the Musculocutaneous and median nerves can effect changes in clinical symptoms, particularly in patients with carpal tunnel syndrome, since these variations may aggravate or alleviate the symptoms causing motor and sensory changes different from the usual pattern.

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