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Musculocutaneous Nerve Not Piercing the Coracobrachialis Muscle and also having Communication with Median Nerve – A Case Report

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Abstract: ***During undergraduate routine cadaver dissection, a rare anatomic variation was encountered in the right sided upper limb of the human male cadaver. The variation was unilateral. A very thin lateral root of median nerve was observed. Musculocutaneous nerve from lateral cord was very thick compared to the opposite limb. Muculocutaneous nerve descended downwards without piercing the coracobrachialis and gave muscular branch to coracobrachialis from its lateral side. At the lower border of teres major muscle there was a communicating branch which was observed joining the median nerve. On further dissection it was observed that the median nerve acquired larger thickness. Further continuation of musculocutaneous nerve became very thin. Further course of median and musculocutaneous nerve are normal as that of opposite side limb. It is important to be aware of such variations while planning a surgery in the region of axilla and arm as these nerves is more liable to be injured during surgical procedures. Possible embryological explanations and clinical significance have been discussed.***

Keywords: Axilla, Coracobrachialis, Musculocutaneous nerve, Median nerve and Teres major

1. Introduction

The brachial plexus is formed by the ventral rami of the lower four cervical and first thoracic spinal nerves, with a variable contribution from C4 and T2. All the nerves of the brachial plexus are formed and remain in two planes, anterior and posterior. The anterior plane comprises the branches of the lateral and medial cords of brachial plexus while the posterior plane comprises the branches of posterior cord. The musculocutaneous nerve (C5, C6, C7) arises from the lateral cord of the brachial plexus in the axilla and runs downwards by piercing the coracobraxhialis muscle and also innervates coracobrachialis, biceps brachii and brachialis muscles. It terminates as the lateral cutaneous nerve of the forearm which supplies the skin of the anterolateral region of forearm as far distally as the base of the thenar eminence. The median nerve will be formed in the axilla by fusion of its medial and lateral roots, derived from the respective cords of the brachial plexus (Standring S. Gray's Anatomy).

Anatomical variations recognized during routine cadaveric dissection of the infra-clavicular part of the brachial plexus acquire clinical importance in posttraumatic evaluations and exploratory interventions of the arm for peripheral nerve repair. Moreover, it imparts the concept of patient uniqueness and subsequent individualization of medical and surgical therapies. Brachial plexus variations have frequently been observed in the formation and further ramification of the cords to form the musculocutaneous and median nerves.

2. Case Report

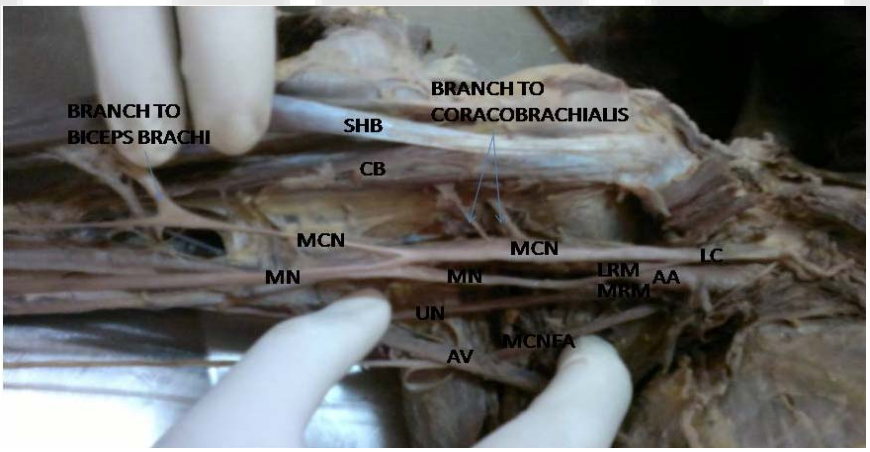

Figure 1: Musculocutaneous nerve not piercing the coracobrachialis and presence of two lateral roots of median nerve, proximal root and distal root

During routine dissection of an adult male cadaver in the Department of Anatomy, DM- Wayanad Institute of Medical Sciences, Meppadi, Kerala, the present variation was observed in the right upper limb. The body was preserved by the injection of formalin based preservative (10% formalin) and stored in 7% formalin tank solution (M.L. Ajmani 1998).

The dissections of upper limbs were carried out according to the instructions by Cunningham's manual of practical anatomy. Both upper extremities (right and left) of the body were dissected

3. Discussion

The existence of communication from the median to the musculocutaneous nerve anomaly may be attributed to random factors influencing the mechanism of formation of limb muscles and peripheral nerves during embryonic life.

Embryologically, the presence of communication may be attributed to random factors influencing the mechanism of formation of the limb muscles and the peripheral nerves. The limb muscles develop from the myotome and are innervated by the corresponding spinal nerves. The formation of plexus is a complicated process and depends on the interaction between organizers and the host muscle. The coracobrachialis muscle is a degenerated part of original muscle which has lost one of the head in the course of evolution. In some mammals it is tricipital in origin (A. K. Datta- 2010). In humans upper two heads are fused and take origin from the coracoids process and the Musculocutaneous nerve passes between them. So the present condition may be due to the degeneration of one of the head of the muscle.

Embryologically, the brachial plexus appears as a single radicular cone of axons of spinal nerves, growing distally to reach the muscles and skin of the upper limb; later these axons divide to form ventral and dorsal divisions (Iwata H 1960). The ventral divisions give rise to the median and ulnar nerves; the musculocutaneous nerve is derived later from the median nerve. It seems that nerve fibers from the fifth and sixth cervical ventral rami passed along the median nerve through its variant lateral root and rejoined the musculocutaneous nerve in the lower half of the arm (Arey LB 1960 & Moore KL 1993). The present study confirms the primitive embryologic origin of the musculocutaneous nerve from the median nerve, reflected in the presence of a communication from the median to the musculocutaneous nerve.

Several signalling molecules and transcription factors have been identified which induce the differentiation of the dorsal and ventral motor horn cells. Misexpression of any of these signalling molecules can lead to abnormalities in the formation and distribution of particular nerve fibres. Once formed, any developmental differences would persist postnatally (Eglseder WA Jr 1997).

4. Conclusion

Presence of two roots for median nerve and also musculocutaneous nerve not piercing the coracobrachialis muscle is a rare finding in Indian population. The anomalous distal lateral root (communication) of median nerve in the current study had a very close oblique course over the middle part of the brachial artery; this may lessen the blood supply of the distal part of upper extremity by compressing the vessel. Injury to the present variant median nerve in the proximal arm may lead to paresthesia along the preaxial border of the forearm, weakness of elbow flexion, in addition to its other manifestations. Studies of anatomical variations of peripheral nerves are important because most times, they bring clarity to otherwise incomprehensive clinical findings. The knowledge of variations such as has been discussed in this study is important in clinical neurophysiology, anterior surgical approaches in the upper limb. It may also suggest the pathway of evolution in which the humans are progressing. The study has a very good future prospect. The variations may be regional and environmental factors may act in the development of such anomalies so study from other regions on this topic may shed some light on such variations.

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