Anatomical variation in the branching pattern of musculocutaneous nerve & its clinical importance - A case report:

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Abstract: The anatomical knowledge of the musculocutaneous nerve and its variations play an important role for the surgeons due to the fact that one of the complications in many upper-limb surgical procedures involves injury to this nerve. During routine dissection of the left upper limb of a male cadaver, we observed an anatomical variation of the musculocutaneous nerve originating in the lateral cord after passing through the coracobrachialis muscle and then gave the communicating branch to the median nerve. The union between the musculocutaneous nerve and the median nerve occurred approximately at the midpoint of the arm. We consider this variation to be rare.

Key Words: Musculocutaneous nerve, Median nerve, Variations.

Introduction:

Disparities in the origin, course, branching pattern and termination of the brachial plexus in the upper extremity are quite frequent and have been documented in manyliteratures[1].The clinical and surgical importance of anatomical knowledge of the musculocutaneous nerve and its variations is due to the fact that one of the complications in many upper limb surgical procedures involves injury of this nerve.About 65.3% of the populations were reported of these types of variations[2]. A classical description of the musculocutaneous nerve given in Gray's Anatomy indicates that the musculocutaneous nerve is the nerve of the anterior compartment of the arm and arises from the lateral cord of brachial plexus having root value C5,6,and 7 opposite the lower border of pectoralis minor muscle. It gives a branch to the shoulder joint, and then it passes through 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 as the lateral cutaneous nerve of the forearm. It supplies coracobrachialis, both the heads of biceps and most of brachialis (lateral most slip of brachialis is supplied by the radial nerve). The branch to coracobrachialis is given off before the nerve enters the muscle: its fibres are from the seventh cervical ramus and may branch directly from the lateral cord. After piercing the coracobrachialis it then supplies biceps and the brachialis, the branch to brachialis also supplies the elbow joint. It gives a small branch to the humerus, which enters the shaft with the nutrient artery.The musculocutaneous nerve has frequent variations. It may run behind coracobrachialis or adhere for some distance to the median nerve and pass behind biceps. Some fibres of the median nerve may run in the musculocutaneous nerve, leaving it to join their proper trunk; less frequently the reverse occurs, and the median nerve sends a branch to the

musculocutaneous. Occasionally it supplies pronator teres and may replace radial branches to the dorsal surface of the thumb[3].

Case Report

Using conventional dissecting techniques, with a purpose of preparation of the teaching and museum anatomical specimens the left upper limb wasdissected in a 55-year-old embalmed male cadaver, in the Anatomy Department of Subbaiah Medical College and Research Centre, India. There was no sign of trauma, surgery or wound scars in the upper extremity. The skin, superficial fascia and the deep fascia of the upper limb, were removed systematically. The muscles, nerves and vessels were cleaned and exposed. Special attention was given to the nerves and vessels of the axilla, arm and forearm region.

During the dissections of the axilla, arm and forearm region we observed a rare case of the musculocutaneous nerve after piercing the coracobrachialis gave a communicating branch in the middle of the arm to the median nerve and later continued as the lateral cutaneous nerve of the forearm (Figure1). In addition to the communicating branch given to the median nerve, we also observed muscular branches coming from the musculocutaneous nerve to supply coracobrachialis, short and long head of biceps and brachialis muscle, However, we did not observe any variations in further course and distribution of the musculocutaneous nerve.

Discussion:

Musculocutaneous nerve is the nerve of the anterior compartment of the arm. The lateral cord of the brachial plexus continues as muculocutaneous nerve. After piercing the coracobrachialis muscle the nerve descends laterally between the biceps and brachialis muscles and supplies all the muscles in the anterior compartment of the arm. A variation in the origin, course and the branches of the musculocutaneous nerve has been documented (4&5). Reports of absence of musculocutaneous nerve, musculocutaneous nerve not piercing the coracobrachialis and assumption of its innervation by the median nerve have also been found in review of literature (6, 7& 8). Variations often involve communication between the musculocutaneous and the median nerves through one or more of the communicating branches (9 &10)

Taking into considerationof the large number of discrepancy found in the review of literature, attempts have been made to classify such variations of the musculocutaneous nerve. Le Minor (11) describes five types of variations pattern of musculocutaneous nerve and Venieratos and Anangnostopolou (12) indicates three types of variations. Some authors classified the variations in the musculocutaneous nerve based on the number of communicating branches and their height (13 &14).In our finding, the communicating branch of themusculocutaneous nerve with the median nerve occurs after piercing the coracobrachialis muscle.

The embryological basis of the upper limb might assist in relating this anatomical disparity. At 4-7thweek of intra uterine life the mesenchyme, from the dorso-lateral part of the somites, immigrates and forms the muscles into the limb bud, which is penetrated by the ventral primary rami of the suitable spinal nerves which are located opposite the developing limb bud at the same time. Communication between nerves and muscle cells are necessary for mesenchymal condensation to form muscles. Connecting loops of the nerve fiber to form plexuses joins nerves supplying the limbs. The median nerve is formed by the combination of ventral segmental branches and

musculocutaneous nerve arises from it. Any deviation from these processes, lead to anatomical variation in the innervationsof the muscles by appropriate nerves (15 & 16).

Consent Disclaimer:
As per international standard or university standard, patient's written consent has been collected and preserved by the author(s).

Conclusion:

The present study highlighted rare anatomical variations of musculocutaneous nerve and the awareness of such variations is important for surgeons, anesthetists and orthopedics who are involved in the management of the upper limb peripheral nerve lesions in shoulder, axilla and arm regions that could be a cause of serious medical conditions.

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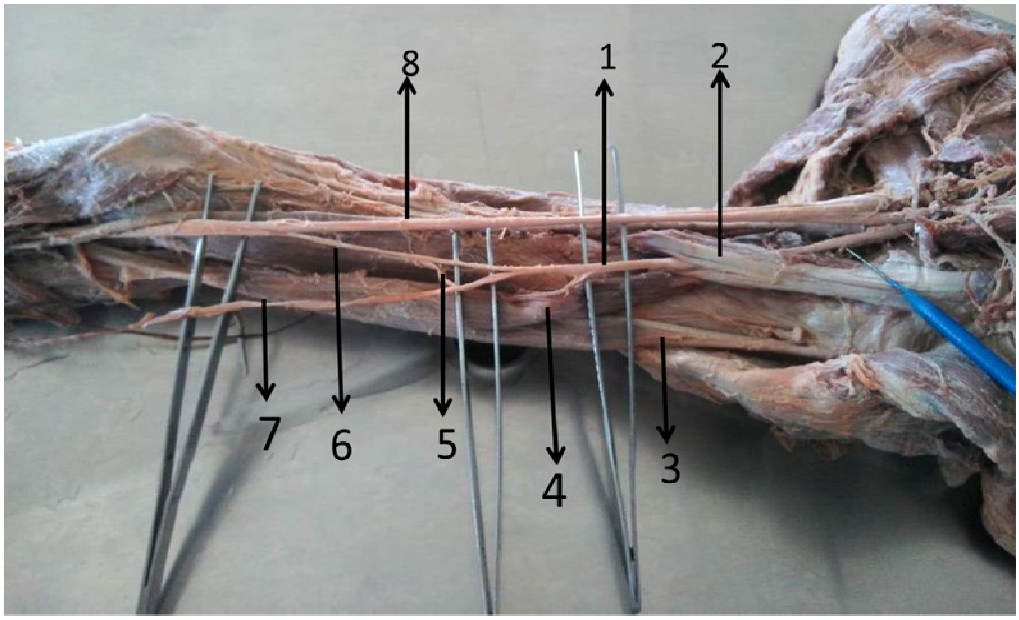

Fig.1: **1**-Musculocutaneous nerve **2**-Coracobrachialis **3**-Long Head of Biceps brachii **4**- Short Head of Biceps brachii **5**-Branch to brachialis muscle **6**-Communicatin branch from Musculocutaneous nerve to Median nerve **7**- Lateral cutaneous nerve of forearm **8**- Median nerve