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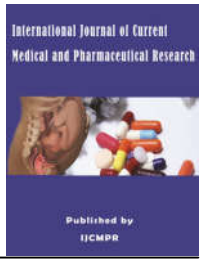

ANATOMICAL VARIATIONS OF THE MUSCULOCUTANEOUS NERVE: A CADAVERIC STUDY

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ABSTRACT

Background: The musculocutaneous nerve begins opposite the inferior border of the pectoralis minor muscle, pierces the coracobrachialis and continues distally between the biceps and brachialis. After supplying all three muscles of the anterior compartment of arm, the nerve emerges lateral to the biceps as the lateral cutaneous nerve of the fore arm. Researchers have been reported on the relationship in between the musculocutaneous nerve and the coracobrachialis muscle as well as the connections between the musculocutaneous nerve and median nerve.

Methods: During routine dissections in the Department of anatomy, Shyam Shah Medical College, Rewa, we observed and analyzed a total of 60 upper limbs from 30 adult cadavers to record anatomical variations in the musculocutaneous nerve.

Results: We found 3 male cadavers with variations in the course and branches of the musculocutaneous nerve. The musculocutaneous nerve was not piercing the coracobrachialis muscle left side in two cases and right side in one case. In all cases, it was arising from Lateral cord of brachial plexus and directly supplying biceps and brachialis muscles. Then it continued as lateral cutaneous nerve of the fore arm.

In one case of male cadaver, on the left side, musculocutaneous nerve was piercing the coracobrachialis but coracobrachialis muscle got its nerve supply by extra branch arising from the proximal end of musculocutaneous nerve.

Conclusions: The results show that the musculocutaneous nerve has significant variations. Knowledge of such anatomical variations is helpful for surgeons treating neoplasm or peripheral nerve repair.

INTRODUCTION

The musculocutaneous nerve is the continuation of the lateral cord of the brachial plexus. It pierces the coracobrachialis muscle and descends laterally between the biceps and brachialis muscles and supplies all the muscles in the anterior (flexor) compartment of the arm. It is the main nerve of arm, supplying the muscles of the arm.1,2 Anatomical variations in the formation of the brachial plexus and its terminal branches in the upper limb have been reported by many researchers.3,4The most frequent musculocutaneous nerve anomaly is its communication with median nerve.5 Knowledge of the existence of accessory muscles and their innervating nerve anomalies are useful for neurologists, orthopaedicians and trauma specialists. The aim of this study is to describe variations depending on the origin of musculocutaneous nerve in adult cadavers and provide morphological basis for clinical diagnosis and treatment of diseases.

MATERIAL AND METHODS

During routine dissections in the Department of anatomy, Shyam Shah Medical College, Rewa, we observed and analyzed a total of 60 upper limbs from 30 adult cadavers to record anatomical variations in the musculocutaneous nerve. The pectoral region, the axilla and the arm were dissected. The cords and the branches of the cords of the infraclavicular part of the brachial plexus were dissected. The variations of the musculocutaneous nerve were noted.

RESULTS

We found 3 male cadavers with variations in the course and branches of the musculocutaneous nerve. In one case (Fig.1), the musculocutaneous nerve was not piercing the coracobrachialis muscle on left side; however, on the right side it was normal. On the left side, musculocutaneous nerve arised from lateral cord of brachial plexus, continued as lateral cutaneous nerve of fore arm passing between brachialis and biceps muscle. There was a communication noted between median nerve and musculocutaneous nerve. In the second case (Fig.2) variation of musculocutaneous nerve was noted in right upper limb. The lateral cord after giving a small trunk as lateral root of median nerve, continued as musculocutaneous nerve as a large trunk and it did not pierce the coracobrachialis muscle, branch to coracobrachialis was given as a twig from it,

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then it continued as lateral cutaneous nerve of fore arm passing between brachialis and biceps muscle. There is no communication noted between median nerve and musculocutaneous nerve In the third case (Fig.3) variation of musculocutaneous nerve was noted in left upper limb. The lateral cord after giving a small trunk as lateral root of median nerve ,continued as musculocutaneous nerve as a large trunk and it pierced the coracobrachialis muscle , then it continued as lateral cutaneous nerve of fore arm passing between brachialis and biceps muscle. Branch to coracobrachialis arised from proximal end of musculocutaneous nerve as an extra branch. There is no communication noted between median nerve and musculocutaneous nerve.

In the fourth case (Fig.4) variation of musculocutaneous nerve was noted in left upper limb. The lateral cord after giving a small trunk as lateral root of median nerve, continued as musculocutaneous nerve and it did not pierce the coracobrachialis muscle, then it continued as lateral cutaneous nerve of fore arm passing between brachialis and biceps muscle. There is no communication noted between median nerve and musculocutaneous nerve.

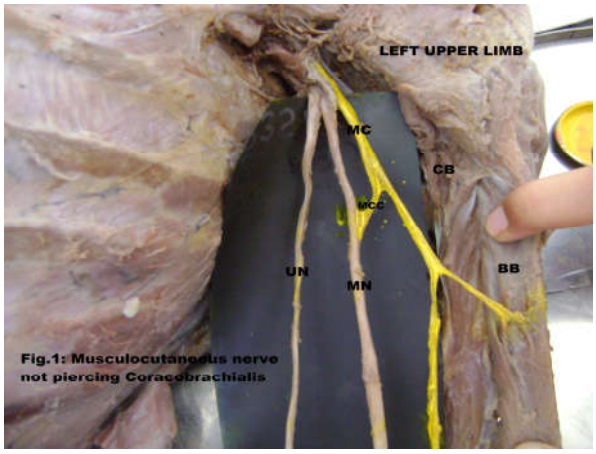

Fig.1 Musculo cutaneous nerve not piercing the coracobrachialis muscle
MC: Musculo cutaneous nerve
MCC: Communicating branch of Musculo cutaneous nerve with Median nerve
CB: Coracobrachialis muscle
MN : Median nerve
UN: Ulnar nerve
BB: Biceps Brachi muscle

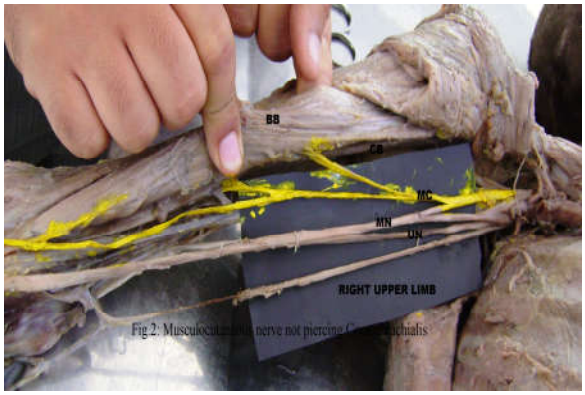

Fig.2 Musculo cutaneous nerve not piercing the coracobrachialis muscle
MC: Musculo cutaneous nerve
CB: Coracobrachialis muscle
MN : Median nerve
UN: Ulnar nerve
BB: Biceps Brachi muscle

Fig.3 Musculo cutaneous nerve giving extra branch to coracobrachialis muscle
MC: Musculo cutaneous nerve
CB: Coracobrachialis muscle
MN : Median nerve
UN: Ulnar nerve
BB: Biceps Brachi muscle
MCE: Musculo cutaneous nerve extra branch to coracobrachialis muscle

Fig.4 Musculo cutaneous nerve not piercing the coracobrachialis muscle
MC: Musculo cutaneous nerve
CB: Coracobrachialis muscle
MN : Median nerve
UN: Ulnar nerve
BB: Biceps Brachi muscle
BC: Brachialis muscle

DISCUSSION

The musculocutaneous nerve (C4–C6), arising from the lateral cord of the brachial plexus in the axilla, usually innervates the muscles of the anterior compartment of the arm and then continues as the lateral cutaneous nerve of the forearm.[6] The musculocutaneous nerve has frequent variations. It may run behind coracobrachialis or adhere for some distance to the median nerve and pass behind biceps.[1] Another variation in which the musculocutaneous nerve did not pierce the coracobrachialis , but rather pass between it and the biceps, and in some cases the nerve split ,one part going superficial to the muscle and the other through the muscle.[2] In present study 10% of the cases, the musculocutaneous nerve did not pierce the coracobrachialis muscle. The present variation coincides with (Jamuna, Chitra, Nayak , Patel *et.al.*[7,8,9,10]

Table 1 comparative study

S.No	Study done by	Percentage of cases observed
1.	Jamuna et.al[7]	6%
2.	Chitra et.al[8]	4%
3.	Nayak et.al[9]	1.66%
4.	Patel.et.al.[10]	2.5%
5.	Present study	10%

Variation of musculocutaneous nerve not piercing coracobrachialis

Nakatani *et al* and Le Minor observed the absence of the musculocutaneous nerve from the lateral cord of the brachial plexus and the branches from the lateral cord directly supplied the anterior compartment muscles of the upper arm. They also observed the formation of the median nerve by the union of the lateral root with the medial root in the upper arm and the lateral root was in fact, a continuation of the lateral cord after giving off the muscular branches.[11,12] In present study, absence of musculocutaneous nerve was not observed.

CONCLUSIONS

The musculocutaneous nerve was not piercing the coracobrachialis muscle left side in two cases and right side in one case. In all cases, it was arising from Lateral cord of brachial plexus and directly supplying biceps and brachialis muscles. Then it continued as lateral cutaneous nerve of the fore arm. In one case of male cadaver, on the left side, musculocutaneous nerve was piercing the coracobrachialis but coracobrachialis muscle got its nerve supply by a direct branch arising from the proximal part of musculocutaneous nerve. A thorough knowledge of the possible anatomical variations of musculocutaneous nerve is essential during shoulder surgery, to avoid injury from retractors which are placed under the coracoid process. During the coracoids process grafting, shoulder dislocations and frequent arthroscopies may damage the muscle as well as the nerve.[13]

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Declarations

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Conflict of interest: None
Ethical approval: Study involved only cadavers, so ethical approval is not required

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