

ORIGINAL RESEARCH ARTICLE

COMMUNICATION BETWEEN MUSCULOCUTANEOUS NERVE AND
MEDIAN NERVE-A CADAVERIC STUDY

K. Sivaranjani¹, C. Sasikala², P. Mythili³, A. Subbulakshmi^{4*}

¹Assistant Professor, Department of Anatomy, Government Medical College, Omandurar Government Estate, Chennai, Tamil Nadu, India.

²Assistant Professor, Department of Anatomy, Government Mohankumaramangalam Medical College, Salem, Tamil Nadu, India.

³Assistant Professor, Department of Anatomy, Government Medical College, Omandurar Government Estate, Chennai, Tamil Nadu, India.

^{*4}Assistant Professor, Department of Anatomy, Government Medical College, Tirupur, Tamil Nadu, India.

Corresponding Author: A. Subbulakshmi, Assistant Professor, Department of Anatomy, Government Medical College, Tirupur, Tamil Nadu, India.

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ABSTRACT

Background: The most common communication found in Brachial plexus is the communication between the Median nerve and the Musculocutaneous nerve. It is important anatomical variation which should be found early. If left unnoticed it cause serious implications during the surgery procedures. **Aim:** The aim of the study is to find out the incidence of communication between Median nerve and Musculocutaneous nerve.

Materials and Methods: This study was conducted in 48 upper limbs of 24 adult human cadavers in the Department of Anatomy, Government Medical College, Omandurar Government estate, Chennai. The study was done over a period of 2 years during educational dissections. The communications between the Musculocutaneous nerves and the median nerves and their variations were observed. The Ethical clearance was obtained from the Institutional ethical committee.

Result: The communication between Musculocutaneous nerve and Median Nerve was observed in present study. The incidence of communication between Musculocutaneous nerve and Median nerve is 17.7%.

Conclusion: Knowledge of the communication between the Median nerve and Musculocutaneous nerve in arm is important in order to avoid the surgical damage of nerves and to find out any unusual clinical presentation in peripheral nerves of arm and shoulder injuries.

Keywords: Communication, Musculocutaneous nerves, Median nerves, Variations.

INTRODUCTION

The network of plexus which is located in the lower neck and axilla and formed by the anterior primary rami of C5 to C8 is the brachial plexus. It supplies the shoulder, upper limb and chest. Several variations were noted during the formation, course and the distribution of root and cords and branches of the brachial plexus. Of which the communication of the musculocutaneous and median nerve is mentioned by many authors. The lateral cord of the

brachial plexus gives rises to the musculocutaneous nerves (C5,C6,C7).The Musculocutaneous nerve is the terminal branch of the lateral cord of brachial plexus and it pierces the coracobrachialis muscle but supplies it before piercing. It later descends between the brachialis muscles and biceps brachii supplying them and then descends as lateral cutaneous nerves of forearm.

The Median nerve is formed by the union of two roots, one from the medial cord (C8,T1) and the other from the lateral cord (C5,C6 and C7)(1,2).It descends crossing the brachial artery from lateral to medial side without giving any branches to arm. These nerve traverse the anterior compartment of the arm subsequently without any interconnections with the neighbour nerve (3).

Anastomosis between two different nerves is rarely seen. But anastomosis between Musculocutaneous nerve and Median nerve is reported since the 19th century (4).The anatomical variations of the peripheral nerves of upper limb is very important as they get injured during administration of nerve blocks in the axillary regions or during surgical procedures. The aim of the study is to find the variations in the communications between the musculocutaneous nerves and the median nerve which is have both clinical and anatomical importance.

MATERIALS AND METHODS

This study was conducted in 48 upper limbs of 24 adult human cadavers. Of them 17-Male and 7 Females in the Department of Anatomy, Government Medical College, Omandurar Government Estate, Chennai. The study was done over a period of 2 years during educational dissections. The cadavers were properly embalmed and fixed in formalin. The standard procedure was followed to dissect the brachial plexus on both sides and was done carefully. The communications between the Musculocutaneous nerves and the median nerves and their variations were observed. The Ethical clearance was obtained from the Institutional ethical committee. The obtained data was entered in the MS Excel Windows 10.Statistical analysis was done with the help of SPSS 23.Categorical data was expressed in terms of Numbers and percentages.

RESULTS

In the present study, among the 48 upper limbs, the communications was noticed in 8 upper limbs. Of the 8 upper limbs, Three cases were bilateral and two cases unilateral. The incidence of communication was found to be (17.7%). Of them 17-Male and 7 Females The results were discussed based on the following headings:

- Formation of the two nerves whether normal or abnormal
- Length of communicating branch
- Number of Communicating branch.

Table 1: Observations of the study participants

S.No	Sex	Upper limb (Unilateral / Bilateral)	Formation of nerves	Number of Communicating Nerve	Level of Communication	Twig length
1	Male	Bilateral	Normal	Single	Both After piercing Coracobrachialis	R-2 cm L-2cm
2	Male	Unilateral (Right)	Normal	Single	After giving twig to Biceps brachi	2cm
3	Male	Unilateral (Right)	Normal	Single	After giving twig to Biceps brachi	4 cm

4	Female	Bilateral	Normal in right side and Variant in left side	Single	R-Before piercing Coracobrachialis (Musculocutaneous nerve did not pierce Coracobrachialis) L-After piercing Coracobrachialis	R-1 cm L-7 cm
5	Male	Bilateral	Normal	Single	R-Before piercing Coracobrachialis L-After piercing Coracobrachialis	R-0.5 cm L-2 cm

Among the 8 upper limbs ,in two upper limbs alone Median nerve was communicating with the Musculocutaneous nerv. In 6 upper limbs, it is the Musculocutaneous nerve which communicates with the Median Nerve.

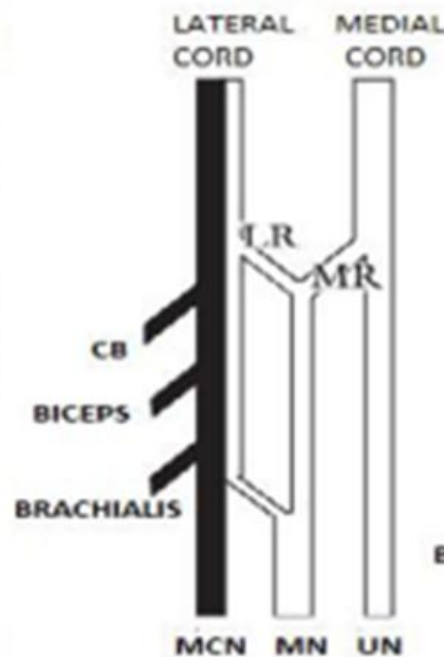
Image 1:

Musculocutaneous nerve communicating with Median nerve after piercing Coracobrachialis



Red – Median Nerve
 Yellow – Brachial artery
 Green – Coracobrachialis
 Blach arrow – Communicating twig

Image2: Variation in the Formation of Musculocutaneous nerve and Median nerve



Red – Median Nerve
 Yellow – Musculocutaneous nerve

DISCUSSION

Brachial plexus is the complex formation and prone for variations. The most common and frequent variation is communication between Musculocutaneous nerves and Median Nerve. This is due to the result that both the nerves are from common origin and from the primary ventral rami of C5,C6 and C7 nerves.

The incidence of the communications in our study was found to be 17.7%.This was similar to study of Rev Bras Ortop et al where the incidence was found to be 19.8%.This is slightly more than our study. The incidence ranges from 17-36% in some studies(5-10).The highest incidence was reported in certain studies(11-14).Bilateral communications are rarely seen in studies.But in our study bilateral communications noted in 3 cadavers. This was higher than Mariya et al study where bilateral communications were noted in 1 cadavers(15).

The below table gives us the various incidences of the Communication between Musculocutaneous nerve and Median nerve.

Table 2

Author	Incidence(%)
Sawant et al	30%
Mariya et al	6.6%
Venieratos and Anagnostopoulou et al	13.90%
Guerri-Guttenberg and Ingolotti et al	53.60%
Kerr et al	24%
Choi et al	26.40%
Pitta Venkata Chankdrika et al	25%
Present study	17.7%

Based on Phylogenetics and Embryology will help us in explaining the variant nerve patterns. The site specific direction of the growth the high coordination and innervation of the mesenchymal cells by the spinal nerves which is under the control of the circulatory and the chemotactic factors are the reason. When the cords of brachial plexus fuses if altered signaling occurs it will also leads to developmental defect. Some anatomical study states that reported in animals like Apes and Monkeys stated that variable patterns of communication exist and it was according to “Ontogeny recapitulates Phylogeny”.

Venieratos and Anagnostopoulou (1998) suggested classification in relation to coracobrachialis muscle(16).

Type I: Communication is proximal to Coracobrachialis muscle

Type II: Communication is distal to Coracobrachialis muscle

Type III: Neither the nerve nor the communicating branch pierce the Coracobrachialis muscle.

In our study, Type I pattern was observed in two upper limbs and both cases presented this variation in right side. One among these two presentations had Type III pattern in addition. Type II pattern was observed in remaining six upper limbs in which two upper limbs presented the communication after giving twig to Biceps brachii and four upper limbs before giving twig to Biceps brachii.

The formation of Musculocutaneous nerve and Median Nerve was altered in a left upper limb of female cadaver. The formation pattern was Type II Pattern according to LI MINORS classification (17). During shoulder reconstruction procedure it is important to identify and palpate Musculocutaneous nerve as it is vulnerable to injury from retractors placed under coracoid process(18). Variation in the Origin of Musculocutaneous nerve from split Median nerve, may produce confusion during shoulder reconstruction. Awareness of such variations prevents unwanted complication.

CONCLUSION

The study shows us the knowledge of the communication of the Musculocutaneous nerves and Median nerve as it is clinically important and helps in evaluating and managing in the upper limb motor disorders which is due to peripheral nerve injuries and for surgical planning and surgical approaches of arm and axilla.

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