

## Unusual variation of the lateral cord of brachial plexus and absent musculocutaneous nerve- a case report.

Satyanarayana N<sup>a</sup>, Sunitha P<sup>b</sup> Arul moli R<sup>c</sup>, Chandralekha G<sup>d</sup>, Ravindranath G<sup>e</sup>

*a Lecturer, Department of Anatomy, AIMST University, Semeling, 08100 Bedong, Kedah Darul Aman, Malaysia. b*

*Lecturer, Department of Physiology, AIMST University, Semeling, 08100 Bedong, Kedah Darul Aman, Malaysia.*

*c Professor and Head, Department of Anatomy, AIMST University, Semeling, 08100 Bedong, Kedah Darul Aman, Malaysia.*

*dSr Associate Professor, Department of Anatomy, AIMST University, Semeling, 08100 Bedong, Kedah Darul Aman, Malaysia.*

*eAssociate Professor, Department of Anatomy, AIMST University, Semeling, 08100 Bedong, Kedah Darul Aman, Malaysia.*

---

**Abstract**—Fusion of lateral cord of brachial plexus with median nerve and absence of musculocutaneous nerve was found in the right upper limb of an adult male cadaver during routine dissection in the Department of Anatomy, College of Medical Sciences, Bharatpur, Nepal. The fusion was noted to be proximal to the insertion of coracobrachialis muscle. The finding was noted after thorough and meticulous dissection of the upper limbs of both sides (axilla, arm, forearm and palm). The muscles of the front of the arm, namely coracobrachialis, biceps brachii and medial part of brachialis were found to be innervated by branches from the median nerve. No other abnormality was detected.

**Keywords**—median nerve, brachial plexus, lateral cord, spinal nerve

---

### I. INTERDUCTION

More anatomical Variations are found in the formation of the brachial plexus. Normally the brachial plexus is formed by the lower four cervical ventral rami and the greater part of the first thoracic ventral ramus. The fourth cervical ramus normally gives a branch to the fifth and the first thoracic frequently receives one from the second thoracic. Commonly the fifth and sixth rami unite at the lateral border of the scalenus medius to form the upper trunk, the seventh cervical forms the middle trunk and the eighth cervical and first thoracic join to form the lower trunk. All these trunks incline laterally either just above or behind the clavicle. There they divide in to ventral and dorsal divisions. These ventral and dorsal divisions unite to form various cords (lateral cord, medial cord, posterior cord) in the axilla around the first, second and third parts of axillary artery. The ventral divisions of the upper and middle trunk unite to form the lateral cord. it lies lateral to the axillary artery in the axilla. The ventral division of the lower trunk forms the medial cord, lying first behind to first and second parts of axillary artery, then medial to the third part of axillary artery. The dorsal divisions of all the trunks unite to form the posterior cord, which lies behind the axillary artery.<sup>1</sup>

Normally, the lateral cord gives its first branch to the pectoralis major muscle, named the lateral pectoral nerve and then it divides into the musculo-cutaneous nerve and the lateral root of the median nerve. The lateral root of the median nerve then joins the medial root of median nerve from the medial cord to form the median nerve trunk, which lies anterior to the third part of the axillary artery.

### II. CASE REPORT

Fusion of lateral cord of brachial plexus with the median nerve and absence of musculocutaneous nerve was found in the right upper limb of an adult male cadaver during routine dissection in the Department of Anatomy, College of Medical Sciences, Bharatpur, Nepal. The fusion was noted to be proximal to the insertion of coracobrachialis muscle. The finding was noted after thorough and meticulous dissection of the upper limbs of both sides (axilla, arm, forearm and palm). The lateral cord of brachial plexus gave off the lateral pectoral nerve and lateral root of median nerve and then continued without giving off musculocutaneous nerve. Finally, it joined the median nerve trunk proximal to the insertion of coracobrachialis muscle. (Figure no. 1)

The median nerve however, was found to be formed normally by two roots. The muscles of the front of the arm i.e. coracobrachialis, biceps brachii and medial part of brachialis were supplied by branches from

median nerve. The medial and posterior cords of the brachial plexus were found to be normal. The left upper limb revealed no abnormality.

### III. DISCUSSION

Lateral cord of brachial plexus is formed by union of anterior divisions of upper and middle trunks. Therefore the lateral cord contains the fibres from C5, C6 and C7. The lateral cord gives off three branches namely lateral pectoral nerve (C5, C6, C7), lateral root of median nerve (C5, C6, C7) and musculocutaneous nerve (C5, C6, C7).

Normally the lateral cord gives its first branch as lateral pectoral nerve which makes a loop of communication with the medial pectoral nerve (from the medial cord of brachial plexus, C8, T1) in front of first part of axillary artery and pierces the clavipectoral fascia to supply the pectoralis major and minor muscles. Then lateral cord divides into musculocutaneous nerve and lateral root of median nerve. Musculocutaneous nerve conveys the fibres from C5, C6 and C7. The nerve initially accompanies the lateral side of the third part of axillary artery and pierces the coracobrachialis muscle; it supplies the coracobrachialis. The nerve then passes downward and laterally across the front of the arm in between the biceps brachii and brachialis. It supplies both heads of the biceps and the medial major part of the brachialis; through the nerve to the brachialis it gives articular twigs to the elbow joint and a nutrient branch to the humerus. It extends further downward as the lateral cutaneous nerve of forearm.

The other terminal branch of lateral cord is the lateral root of median nerve which joins with the medial root of median nerve (C8, T1) arising from medial cord to form trunk of median nerve. Before joining the lateral root, the medial root passes obliquely in front of the third part of axillary artery. Fusion of lateral cord of brachial plexus with median nerve trunk which was observed in the present study is rare as revealed by survey of literatures.

Variations in the formation of median nerve as noted by some earlier workers were related to anomalous relationship between median and musculocutaneous nerves. In one study, it was found that the lateral root was small and the musculocutaneous nerve was connected with median nerve in the arm<sup>1</sup>.

Another study involving dissection of ten cadavers, mentioned failure of separation of musculocutaneous nerve from the median nerve and the latter therefore gave off the branches that should arise from musculocutaneous nerve, namely branches to coracobrachialis, biceps brachii and major part of brachialis.<sup>2</sup> The present anomaly can be explained on the basis of embryogenic development.

The upper limb buds lie opposite the lower five cervical and upper two thoracic segments. As soon as the buds form, the ventral primary rami of the spinal nerves penetrate into the mesenchyme of limb bud. Immediately the nerves enter the limb bud, they establish intimate contact with the differentiating mesodermal condensations and the early contact between nerve and muscle cells is a prerequisite for their complete functional differentiation.<sup>3</sup>

The growth as well as the pathfinding of nerve fibres towards the target is dependent upon concentration gradient of a group of cell surface receptors in the environment.<sup>4</sup> Several signalling molecules and transcription factors viz. N-CAM, L1 and Cadherins 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.

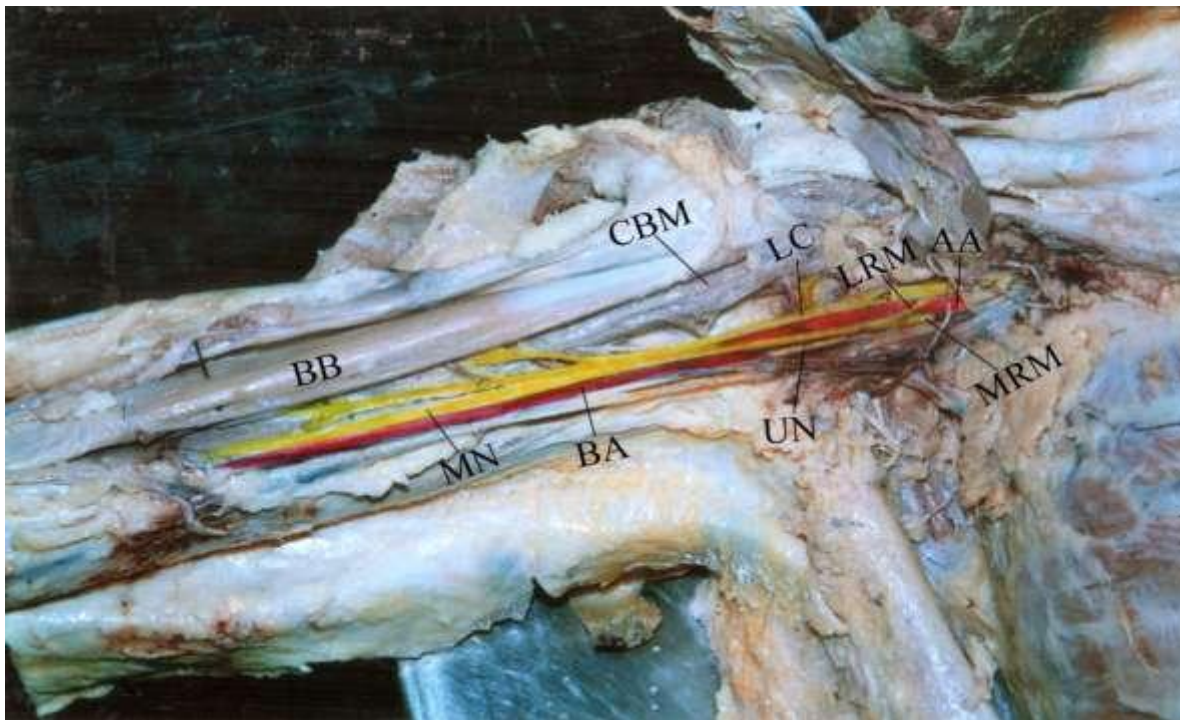
Finally knowledge of such variation is important for surgeons to perform surgical procedures in the arm.<sup>5</sup>

### REFERENCES

- [1]. Standring S, Ellis H, Healy JC, Johnson D, Williams A, Collins P et al - Gray's Anatomy. In: General organisation and surface anatomy of the upper limb. 39<sup>th</sup> ed. Philadelphia Elsevier Churchill Livingstone, 2005: 803-4.
- [2]. Guha R and Palit S - A rare variation of anomalous median nerve with absent musculocutaneous nerve and high up division of brachial artery. J Interacad 2005; 9(3): 398-403.
- [3]. Saddler TW - Langman's Medical Embryology. In: Muscular system. 10th ed. Philadelphia Lippincott Williams & Wilkins, 2006: 146-47.
- [4]. Williams PL, Bannister LH, Berry MM, Collins P, Dyson M, Dussek JE et al - Gray's Anatomy. In: Embryology and development. 38<sup>th</sup> ed. London Churchill Livingstone, 1999: 231-32.
- [5]. Uysal II, Seker M, Karabulut AK, Buyukmumcu M, Ziylan T - Brachial plexus variation in human foetuses. Neurosurgery 2003; 53(3): 676-84; discussion 684.

**LEGENDS OF PHOTOGRAPH**

**Figure No. 1:** Fusion of lateral cord of brachial plexus with median nerve and absent musculocutaneous nerve.  
LC= Lateral Cord, LRM= Lateral Root of Median nerve, MRM= Medial Root of Median nerve, MN= Median nerve, UN= Ulnar nerve, AA= Axillary artery, BA= Brachial artery, BB=Biceps Brachii, CBM=Coracobrachialis Muscle.



**Figure No. 1:** Right upper limb showing fusion of lateral cord of brachial plexus with median nerve and absent musculocutaneous nerve.

LC= Lateral Cord, LRM= Lateral Root of Median nerve, MRM= Medial Root of Median nerve, MN= Median nerve, UN= Ulnar nerve, AA= Axillary artery, BA= Brachial artery, BB=Biceps Brachii, CBM=Coracobrachialis Muscle.