

An abnormal radicle of Median Nerve from Musculocutaneous nerve in the Arm

¹B. Rajesh*, ²N.Anandaramajayan, ²V.Sanathi, ³K.C. Mallikarjuna, ³S.I. Tolanur, ⁴R. Praveen Kumar

ABSTRACT

Communication between Musculocutaneous and Median nerve is well documented and has clinical and surgical significance. One such communication is found in the right upper limb of a male cadaver during routine dissection in Anatomy. The additional root of median nerve arises from musculocutaneous nerve and joins the median nerve at the middle of the arm. The possible embryological reasons behind such variations are discussed. It is important to be aware of this variation while planning a surgery in the region of axilla or arm, as these nerves are more liable to be injured during operations.

KEY WORDS: Brachial plexus, Median nerve, Musculocutaneous nerve, Axillary artery, Brachial artery, Corachobrachialis.

Introduction

Brachial plexus is formed by the ventral rami of C5 to T1 spinal nerves and variations in the formation and branching pattern of the brachial plexus like prefixed and post fixed plexus are common [1-3]. The median nerve is formed by union of two roots from the lateral (C5,6,7) and medial (C8, T1) cords while the musculocutaneous nerve (C5,6,7) arises from the lateral cord of the brachial plexus[1-3]. Sometimes a major portion of the lateral root of median nerve may run in

musculocutaneous nerve and leave it either in arm or forearm to join their main trunk [1, 3]. In the present case one such communications between musculocutaneous and median nerves in a south Indian male cadaver is reported here and developmental reasons behind such variations are discussed.

Case Report

During the routine dissection for first year MBBS students in Anatomy, a variation of the median nerve was observed in a 50 years old South Indian male cadaver. The median nerve of the right upper limb was formed from three nerve roots, as usual one each from the lateral and medial cords and the third additional root originating from the musculocutaneous nerve., The third root which arises from the musculocutaneous nerve was thicker than the normal lateral root of median nerve. This variant root coming from the musculocutaneous nerve was running

¹Associate Professor,

²Tutor,

³Professor,

Department of Anatomy,

⁴Third year MBBS,

Sri Lakshmi Narayana Institute of Medical Sciences,

Osudu, Puducherry - 605502

***Corresponding Author**

Dr.B.Rajesh,

Associate Professor of Anatomy,

Sri Lakshmi Narayan Institute of Medical Sciences,

Puducherry - 605 502, India.

E-Mail: anat_rajesh@rediffmail.com

obliquely to reach the median nerve and it joins in the median nerve at middle of the arm at the level of insertion of the coracobrachialis muscle. Before it joins the median nerve it was crossed by brachial artery from medial to lateral side. No accurate description of a similar case has been found in the literature. The course of the musculocutaneous nerve was normal and it continued normally as lateral cutaneous nerve of the forearm.

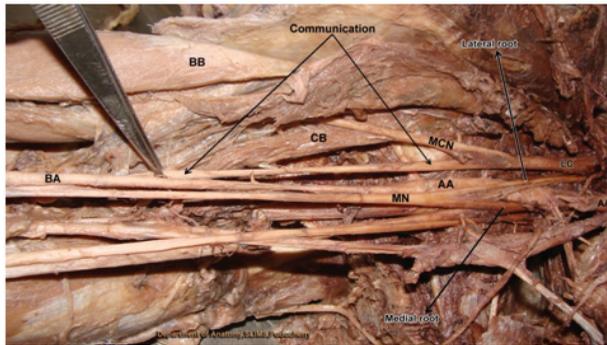


Figure 1: Median receives a third root from musculocutaneous nerves. It crosses the brachial artery posteriorly to join with the median nerve at the level of insertion of Coracobrachialis.

CB: Coracobrachialis; BB: Biceps Brachii; AA: Axillary Artery; BA: Brachial Artery; MCN: Musculocutaneous Nerve; MN: Median Nerve; LC: Lateral Cord.

Discussion

Communications between median nerve and musculocutaneous nerve is well documented and the incidence of these variations is 46 – 53% [4-5]. Le Minor has described five types of median and musculocutaneous nerves connections in man [6].

Type I: There are no connecting fibers between the musculocutaneous and median nerve as described in classic textbooks. The musculocutaneous nerve pierces the coracobrachialis muscle and innervates the coracobrachialis, the biceps brachii and brachialis muscle.

Type II: Although some fibers of the medial root of the median nerve unite with the lateral root of the median nerve and form the main trunk of the median nerve, remaining medial root fibers run in the musculocutaneous nerve leaving it after a distance to join the main trunk of the median nerve.

Type III: The lateral root of the median nerve from the lateral cord runs in the musculocutaneous nerve and leaves it after a distance to join the main trunk of the median nerve.

Type IV: The fibers of the musculocutaneous nerve unite with the lateral root of the median nerve. After some distance, the musculocutaneous nerve arises from the median nerve.

Type V: The musculocutaneous nerve is absent [7]. The fibers of the musculocutaneous nerve run within the median nerve along its course. In this type the musculocutaneous nerve does not pierce the coracobrachialis muscle.

The course of the abnormal radicle of Median nerve in the present case is not matching to any of the above category but partially similar to the Type III with a slender lateral root.

Canter et al. [8] reported a case of abnormal communication in which the lateral root of the median nerve from the lateral cord was normal and the abnormal communicating branch was significantly thick. But in our case the normal root was significantly small/thin (Fig.1)

Considering the coracobrachialis muscle as the reference point, musculocutaneous and median nerve communication can be three types [9]. In type one the communication was proximal to the entrance of the musculocutaneous nerve into the coracobrachialis muscle, in type two the communication was distal to the muscle and in

type three the nerve and the communicating branch did not pierce the muscle. Our case was similar to the Type one of this classification.

Studies with altered signalling between mesenchymal cells and neuronal growth cones leads to the formation of such variations in nerve patterns [10]. Vascular growth pattern can also influence the branching pattern of brachial plexus[11]. This shows growth and formation of communications between nerves is influenced by the mechanism of development of limb muscles and blood vessels during embryonic life.

Summary

The variations in the formation and branching pattern of brachial plexuses and its branches are very common. The variant root of median nerve is due to the altered signalling between the nerve fibers and the mesenchymal tissue. In conclusion, a clear knowledge of the anatomical variations of Brachial plexus are useful in trauma care, reconstructive surgery, brachial plexus block in the upper arm. Surgical practitioners should be aware of these variations to avoid problems in surgical practices.

References

1. Peter L. Williams, Bannister, Martin M Berry, Patricia Colliins, Mary Dyson, Julian E. Dussek, Ferguson. *Grey's Anatomy -38th Ed*, New York: Churchill Livingstone; 1995.
2. Keith L. Moore and Arthur F Dalley II. *Clinically Oriented Anatomy 4th Ed*, Philadelphia: Williams & Wilkins; 1999.
3. Snell S. Richard. *Clinical Anatomy for Medical Students. 5th Edition*, USA: Little. Brown and Company; 1995.
4. Choi D, Rodríguez-Niedenführ M, Vázquez T, Parkin I, Sañudo JR. Patterns of connections between the musculocutaneous and median nerves in the axilla and arm. *Clin Anat.* 2002 Jan;15(1):11-7.
5. Guerri-Guttenberg RA, Ingolotti M. Classifying musculocutaneous nerve variations. *Clin Anat.* 2009 Sep;22(6):671-83. doi: 10.1002/ca.20828.
6. Le Minor JM. A rare variation of the median and musculocutaneous nerves in man. *Arch Anat Histol Embryol.* 1990;73:33-42.
7. Arora L, Dhingra R. Absence of musculocutaneous nerve and accessory head of biceps brachii: a case report. *Indian Journal of Plastic Surgery.* 2005; Vol: 38, Issue: 2, pp 144-146.
8. Canter Halil Ibrahim, Erdem Adnan, Denk C. Cem. Variation between Median and Musculocutaneous Nerves. *The Internet Journal of Surgery.* 2005; 6:1.
9. Venieratos D, Anagnostopoulou S. Classification of communications between the musculocutaneous and median nerves. *Clin Anat* 1998; 11(5): 327-331.
10. Sannes HD, Reh TA and Harris WA. Development of the nervous system In: *Axon growth and guidance.* Academic Press New York: pp 189-197 (2000).
11. Kosugi, K, Mortia, T; Yamashita, H. (1986). Branching pattern of the musculocutaneous nerve; 1 case possessing normal biceps brachii. *Jikeikai Medical Journal* 33: 63-71.