Piternational

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Anatomy

An Accessory Branch from Musculocutaneous Nerve Joining with the Median Nerve at Two Separate Points

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ABSTRACT It is very common in the field of anatomy to detect variations in the brachial plexus and the branches emerging from it. The present report pertains to a case exhibiting two sites of communications between an accessory branch from musculocutaneous nerve and the median nerve in the left arm of a 50 years old male cadaver, while carrying out the routine dissection. Also the musculocutaneous nerve was found not piercing the coracobrachialis muscle but found normally supplying the biceps brachi and brachialis muscles. It is very essential to have a full knowledge of such variations while planning a surgery in the region of axilla and arm as these nerves are more liable to be injured during operations. Possible embryological explanations and clinical importance have been discussed.

KEYWORDS : Median nerve; Anatomical variations; Musculocutaneous nerve; Coracobrachialis; Brachial plexus

Introduction

Many authors have reported from time to time, the various connections at the arm level between the musculocutaneous and median nerves (Turner, 1864) (Minor, 1990) (Choi, Rodriguez-Niedenfuhr, Vazquez, Parkin & Sannudo, 2002). The most frequent of these are the presence of a communicating branch that bifurcates from the MCN and goes distally to join the MN (Venieratos & Anagnostopoulou, 1998).

In our case, in the left arm, we found one accessory brach from musculocutaneous nerve joining with the median nerve at two places whereas no variation was seen in the right arm. The presence of a communicating branch arising from the musculocutaneous nerve and joining to the median nerve is more common than the presence of a communicating branch arising from the median nerve joining to the musculocutaneous nerve. But it is a very rare finding to have one accessory branch from musculocutaneous nerve joining with the median nerve at two places. The median nerve, formed by the union of the terminal branch of the lateral (C5, C6, C7) and medial (C8, T1) cords of the brachial plexus, enters the arm lateral to the brachial artery and to the forearm between the two heads of the pronator teres muscle. On the other hand, 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 brachii and brachialis muscles and supplies all the muscles in the anterior (flexor) compartment of the arm. In the present case, the musculocutaneous nerve was found not piercing the coracobrachialis muscle its further course was found out normal.

The course and branching anomalies of the musculocutaneous nerve and its relation to the coracobrachialis muscle have been documented in the literature by Koizumi , Buch , Flatow et al. and Le Minor (Koizumi, 1989) (Buch, 1964) (Flatow, Bigliani, & April, 1989) (Minor, 1990) . While from the clinical point of view, the branching and distribution pattern of musculocutaneous nerve is very important, particularly in compression neuropathies due to severe and strong physical activities and stretch injuries seen in various surgical procedures.

Case Report

During routine dissection of the left side of the upper limb of a 50 year old male cadaver in the Department of Anatomy, Institute of Medical Sciences, Banaras Hindu University, Varanasi (Uttar Pradesh), India, the present obsevation was encountered. The dissections of upper limbs were done according to the instructions by Cunningham's manual of practical anatomy. Both right and left upper extremities of the body were dissected. The musculocutaneous nerve passed without piercing the coracobrachialis muscle, and gave branches to biceps brachii and brachialis muscles. The musculocutaneous nerve after emerging from lateral cord, immediately gave an accessory branch at a distance of 5.7 cm from the tip of the coracoid process which was found joining the median nerve at two separate points at a distance of 10.4 cm and 13.2 cm from the tip of the coracoid process respectively. After giving an accessory branch and branches supplying the

biceps brachii and brachialis muscle, the course of musculocutaneous nerve as a lateral antebrachial cutaneous nerve was found to be normal. The course of the musculocutaneous nerve was normal in the forearm region. Other branches of the brachial plexus were also found to be normal. However, on the right side of the upper limb of the same cadaver, no variations were observed.

Discussion

After piercing the coracobrachialis, the musculocutaneous nerve passes obliquely downward and laterally between the biceps brachii and brachialis. Just below the elbow, it pierces the deep fascia and continues downward as the lateral cutaneous nerve of the forearm. In the arm, it supplies coracobrachialis (before piercing the muscle), biceps and the medial major part of the brachialis.

The most common and frequent of all the variations that are observed among the branches of the brachial plexus is the anastomosis between the musculocutaneous and the median nerve (Venieratos, & Anagnostopoulou, 1998). Various authors examined connections between the median and musculocutaneous nerves, the incidence of such a connection ranges from 5 to 63.5. Several anomalous branches had been reported between the musculocutaneous nerve and median nerve by authors like Venieratos et al , Eglseder et al , Loukas et al , Prasada Rao et al , Chauhan et al (Venieratos, & Anagnostopoulou, 1998) (Eglseder, & Goldman, 1997) (Loukas, & Aqueelah, 2005) (Prasada Rao, & Chaudhary, 2000) (Chauhan, & Roy, 2002)

As per Choi et al (Choi, Rodriguez-Niedenfuhr, Vazquez, Parkin, & Sannudo, 2002), 2002 such communications have been broadly classified into 3 patterns. In pattern I, the musculocutaneous and median nerves were fused. In pattern II, there was only one connecting branch between the musculocutaneous and median nerve. In pattern III, two connecting branches were present between the musculocutaneous and median nerve. The incidence of this variant was 6.8%. However in the present case, we observed a different pattern where an accessory branch from the musculocutaneous nerve was seen joining the median nerve at two separate places. Therefore we can place this variation somewhere in between pattern II and pattern III as advocated by Choi et al (Choi, Rodriguez-Niedenfuhr, Vazquez, Parkin, & Sannudo, 2002), 2002. The presence of such communications may be caused due to random factors influencing the mechanism of formation of limb muscles and the peripheral nerves during embryonic life. Significant variations in nerve patterns may be a result of altered signalling between mesenchymal cells and neuronal growth cones (Sannes, Reh, & Harris, 2000) or circulatory factors at the time of fusion of brachial plexus cords (Kosugi, Mortia, & Yamashita, 1986). Also in the present case, the musculocutaneous nerve was found not piercing the coracobrachialis muscle. The coracobrachialis muscle is a degenerated part of original muscle which has lost one of the head in the course of evolution. In some mammals it is tricipital in origin (Datta, 2010). In humans upper two heads are fused and take origin from the coracoids process and the musculocutaneous nerve passes between them. So the present condition may be due to the degeneration of one of the head of the muscle.

Conclusion

In the present study, the variations that were observed involving the median and the musculocutaneous nerve might be of some importance to the surgeons and orthopaedicians. Knowledge of various communications between the musculocutaneous and the median nerve may prove valuable in traumatology of the shoulder joint, as well as in plastic and reconstructive repair operations. It is very important to rule out the presence of median and musculocutaneous communications to prevent unwanted outcomes of operations conducted on musculocutaneous nerve.



Fig I. 1. Medial root of Median nerve, 2. Lateral root of Median nerve, 3. Median nerve, 4. Ulnar nerve, 5. Musculocutaneous nerve, 6. Accessory branch from Musculocutaneous nerve which joins with Median nerve at two separate points (shown by green arrows). MC- Medial Cord, LC- Lateral Cord.

Schematic Representation



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