Nervous Communication in the Distal and Previous Region of the Arm between the Median and Musculocutaneous Nerves

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Abstract: PURPOSE: To describe the nervous communication between median and musculocutaneous nerves. METHODS: 70 upper members of 35 bodies were dissected in the Human Anatomy Laboratory at Santo Amaro University. RESULTS: Only one of the dissected arms has the nervous communication between median and musculocutaneous nerves. CONCLUSION: The communication between median and musculocutaneous nerves, despite already cited in literature, was unusual in our sample, as long as in the dissection of 70 arms only one of them has this communication.

Key words: Anatomic variation, nervous communication, median nerve, musculocutaneous nerve.

1. Introduction

The nervous communication, anastomosis, between median nerve (MN) and musculocutaneous nerve (MCN), is an event resulting from factors set that occurs in embryogenesis, and not so recurrent. The knowledge of anatomic variations, which engage the nervous anastomosis, is relevant from physical evaluation and surgery practice. The nerve injury causes engines and sensitive deficits in muscles groups and skin areas in a certain way and when nervous anastomosis occur these patterns are not evident as in the normal patterns. In the preoperative, it is necessary to take into account the possibility of nervous routes different from the usual avoiding possible mistakes. The intention of this Project is to describe the nervous communication between MN and MCN in the distal arm region in order to help to increase the knowledge about anatomic variations.

2. Materials and Methods

70 upper limbs of 35 bodies were dissected in the

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Human Anatomy Laboratory at Santo Amaro University (UNISA), Campus 1. The bodies were kept in a formaldehyde solution and had their forearms dissected in a similar way as in surgery conditions.

3. Results and Discussion

From 70 upper limbs dissection were found only one arm (right side) with anastomosis between MCN and MN, located in the distal and anterior region of the upper limb. This finding represents 1.4% of our entire sample (Fig. 1). We observed that MCN passes through coracobrachialis muscle and in the distal and anterior region of upper limb fuses with MN (Fig. 2).

Nerves are anatomic components from the peripheral nervous system, formed by nervous fibres fibers bundles encircled and sustained by connective tissue cover called endoneurium that covers the nervous fiber, perineurium that covers the nervous fascicle and epineurium that covers the nerve. In epineurium are present the adipose tissue, lymphatic vessels and blood vessels which will fill the nervous fibers and your coating [1].

Fig. 1 Frequency of anastomosis between MCN and MN.

* Source: The Human Anatomy Laboratory at Santo Amaro University.

Fig. 2 Previous view from upper limb.

*It's important to look at the MN-formation (1) and its medial path in the upper limb. MCN (2) pierces coracobrachialis muscle and in the distal region communicates with MN (3).

MN, the main nerve from the anterior compartment of the forearm, derived from the connection of lateral root and lateral fascicle of brachial plexus with the medial root from the medial fascicle. During its route in the forearm, it goes to cubital fossa, medially of the brachial artery, passing through the pronator teres muscle heads. After that, descend in the fascial plane between flexor digitorum superficialis and flexor digitorum profundus, keeping its path in the deep palmaris longus tendon, approaching the flexors muscles retinaculum to cross the carpal tunnel [1, 2].

The MN does not innervate arms muscles, however, it sends fibers to supply the forearm musculature (except the flexor carpi ulnaris muscle and flexor digitorum profundus to the 4th and 5th fingers). After crossing the carpal tunnel, it sends fibers to contribute to the pollicis muscle innervation (except the adductor pollicis muscle) and lumbricals hand muscles (1st and 2nd). The cutaneous region of the 1st, 2nd, 3rd, and lateral half of the 4th finger are supplied by the MN [3].

The MCN, which in turn derives from the brachial plexus lateral fascicle, opposite to the bottom margin of the pectoralis minor muscle, situating laterally to MN. It pierces coracobrachialis muscle, innervating this muscle. The MCN continues distally between biceps brachii muscle and brachialis muscle [1, 2]. After supplying the three muscles already cited (owned to anterior compartment of the arm), emerges laterally of biceps brachii muscle called lateral cutaneous nerve of the forearm. MCN—pierces the muscular fascia proximal to cubital fossa, it continues its path with cephalic vein in subcutaneous tissue, becoming subcutaneous to supply the skin of the forearm laterally face [1].

The nerves anastomosis have been considered a congenital variation. The differences in the innervation pattern are results of factors set such as changes in the signal between the mesenchymal cells and growth cones or circulatory factors in the time of branches of the brachial plexus merger or factors that occur during the embryogenesis and can contribute to

communication between MN-and MCN [4].

The communication between MN and MCN has already been described sometimes in the literature. A study with a body dissection has showed that MCN joins MN after it issues the lateral cutaneous nerve of forearm [5]. However, as already described, this communication happens from MN, which distributes itself in its end in direction to MCN [6]. Communications between MN and MCN frequently occurs in the lower third of the arm with a frequency, in this region, of 8% [7].

Some authors registered the incidence of MN-MCN communication over 40% of the cases, others, lower than 15% [8, 9]. The dissection of 40 arms from 20 fetuses showed that 10 of them had this nervous communication and 90% of them left from MCN to MN [8].

There are descriptions of this nervous communication adopting as reference the coracobrachialis muscle (when the communication are proximal, distal or doesn't cross the muscle) [4] and pronator teres muscle (when the communication crosses between the two roots, when crosses the ulnar root or when cross under the muscle) [3].

The knowledge about the nervous anastomosis is of major importance to avoid injuries during surgery proceedings and this variation frequently involves the MN-MCN communication through one or more communicating roots [3-7, 8].

Differently from resulting of works mentioned above, we found in our study only one case (1.4%) with MCN-MN communication. This anastomosis occurred in the distal and anterior region of the forearm, with MCN going to MN, after crossing the coracobrachialis muscle. Clinically, this anastomosis can cause difficulty in the evaluation. An MN injury in the axilla or in the proximal region of the arm would result in a significant decrease of the wrist flexion and hand of benediction. Although, in the presence of this nervous communication, fibers from MCN go to distal region of the arm, being able to supply the musculature. In this

case, the classic clinics characteristics from MN injury would not be observed.

4. Conclusion

The MN-MCN communication was a rare finding in our survey, representing 1.4% of our sample. Our purpose is to report the frequency of this nervous anastomosis, contributing to surgery proceedings and clinical evaluations.

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