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A Rare Variation in the Position of the Median Nerve: A Case Report

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ABSTRACT

Background and Objective: Several variations have been reported regarding the formation of the brachial plexus, and all of these variations should be considered when planning surgical approaches to treat injuries that affect the brachial nerves. In the present study, a rare variation in the position of the median nerve and the branches of the medial cord is reported.

Case Report: During the autopsy of a 65-year-old man for teaching purposes in the medical school, a rare variation in the brachial plexus was observed in the right axillary fossa. During dissection of the pectoral region and axillary fossa, and upon further examination, it was determined that the median nerve was formed by the union of the medial and lateral roots of the medial and lateral cords of the brachial plexus, in the arm and posterior to the brachial artery. The medial cutaneous nerve of the arm and the medial cutaneous nerve of the forearm also originate from a common trunk that branches off from the medial cord.

Conclusion: According to the results of this reported case, awareness of these variations is important for anatomists, radiologists, anesthesiologists, and surgeons to interpret unexplained clinical signs and symptoms and can prevent potential complications of surgery.

Keywords: *Brachial Plexus, Median Nerve, Axillary Artery, Medial Cord, Variation*.

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Introduction

The brachial plexus is responsible for the sensory and motor innervation of the back and upper limbs and is formed by the combination of the anterior branches of the lower cervical spinal nerves to the first thoracic spinal nerve (1). The median nerve is one of the branches of the brachial plexus and is formed by the union of two medial and lateral roots that arise from the medial and lateral cords, respectively. The formation of the median nerve occurs in front of or outside the axillary artery in the axillary fossa (2). In the arm, the median nerve passes in front of the brachial artery from the outside to the inside and enters the cubital fossa with the brachial artery. Many reports have been presented on the variation in the formation of the brachial plexus and the connections between their branches, and most of these studies have reported variations in the number of median nerve roots, which can be formed from two, three, or four roots of the brachial plexus (3, 4), and in all of these cases, the nerve arises anterior to or outside the axillary artery. Knowledge of the location of the brachial plexus branches is important for specialists in anatomy, surgery, radiology, and anesthesia. The purpose of the present report is to investigate a rare type of variation related to the position of the median nerve relative to the brachial artery, as well as the variation in the branches of the medial cord.

Case Report

This study was approved by Arak University of Medical Sciences with the ethics code IR.ARAKMU.REC.1403.046. During the dissection of the upper limb of a 65-year-old man for educational purposes in the dissection hall of the Faculty of Medicine of Arak University of Medical Sciences, a rare variation was observed in the brachial plexus of the right axillary fossa in relation to the location of the formation of the median nerve relative to the brachial artery and also the branches of the medial cord. After dissection of the pectoral region (pectoralis major and minor muscles) and removal of the axillary fat and dissection of the arm region of this cadaver, it was observed that the medial and lateral roots of the median nerve, which were separated from the medial and lateral cords of the brachial plexus, were connected posterior to the brachial artery and formed the median nerve, and to see the median nerve in the arm region, the brachial artery had to be moved aside (Figure 1).

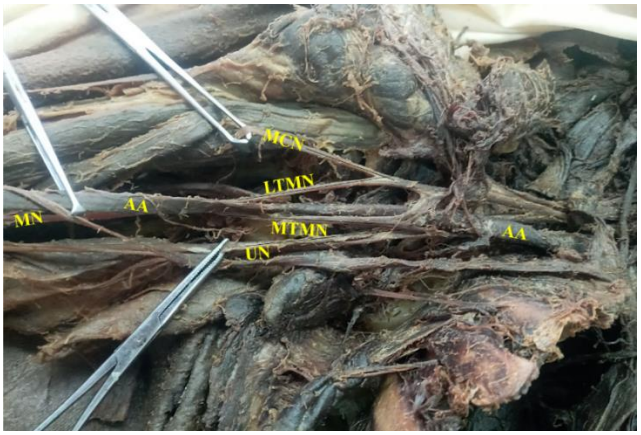

Figure 1. Location of the median nerve posterior to the brachial artery. **Axillary Artery, Median Nerve, Ulnar Nerve, Lateral Root of Median Nerve, Medial Root of Median Nerve**

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The median nerve was located in the cubital fossa in a medial position relative to the brachial artery. There was no variation in the position and branches of the posterior cord in the axillary region, and all branches of this cord were in a normal position and followed their normal course. However, variation was observed in the medial cord, such that the medial cutaneous nerves of the arm and forearm were separated from the medial cord as a common trunk, and the division of this common trunk was in the lower part of the arm (Figure 2). The terminal part of the medial cord formed the ulnar nerve, which was in a normal position relative to the artery.

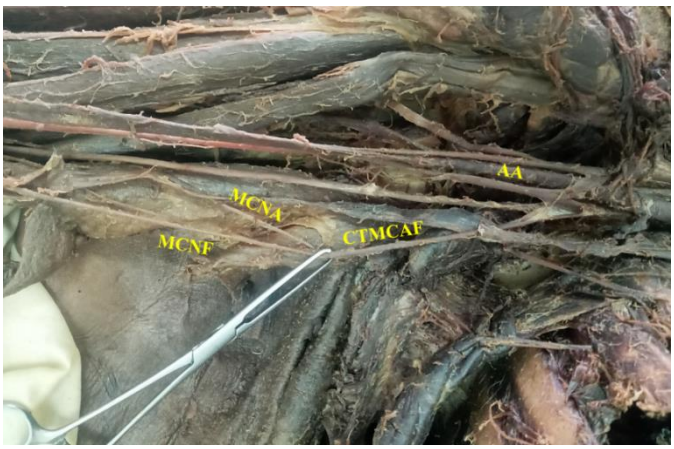

Figure 2. Common Trunk of Medial Cutaneous of Arm and Forearm and its bifurcation point

Discussion

In this report, the median nerve was composed of lateral and medial roots, but the location of the junction of these two roots was varied and the nerve was formed posterior to the brachial artery. In addition, the medial cord of the brachial plexus also varied, so that the medial cutaneous nerves of the arm and forearm had a common trunk. So far, many variations have been reported regarding the pattern of formation and branches of the brachial plexus. Pour Ghasem et al. also reported a case of variation in the posterior cord of the brachial plexus and the origin of the radial nerve (5). These variations, which were seen in the formation of trunks, branches, and cords, did not affect the arrangement of the terminal branches. Accurate knowledge of these variations is very important from a medical and surgical perspective. Bala et al. studied variations of the brachial plexus in humans and reported that in the cadaver of a 45-year-old man, the junction of the medial and lateral roots of the median nerve was in the lower arm and medial to the brachial artery, such that the lateral root of the median nerve passed from the lateral side to the medial side and in front of the third part of the axillary artery (6). Variation in the formation of the median nerve with respect to its relationship to the nerve is of great clinical and practical importance for both the nerve and the adjacent structures. Any injury to this nerve in the axillary fossa or arm can cause unexpected paralysis of the flexor muscles of the forearm. Our knowledge of variations in the brachial plexus is also important when performing nerve blocks in the subclavian part of the brachial plexus (7). In a 65-year-old man's autopsy, Pais et al. reported that the median nerve has an additional root that connects the lateral cord of the brachial plexus to the medial root of the median nerve (8). Also, Uzun et al. observed in the axillary fossa that the median nerve has a branch communicating with the musculocutaneous nerve (9). A number of studies have

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reported median nerve variation in association with the absence of the musculocutaneous nerve. After dissecting the axillary cavity and arm of a 58-year-old male cadaver, Aydin et al. reported that median nerve variation was observed in association with the absence of the musculocutaneous nerve and that the anterior muscles of the arm were innervated by the median nerve (10). Overall, the above findings are not similar to the present study and actually indicate diverse variations in the brachial plexus, while in this study, the location of median nerve formation was varied and, unlike other studies, the nerve was formed posterior to the brachial artery. Embryologically, developing axons are controlled by chemical pathways, and deviations from normal signaling between mesenchymal cells and neuronal growth cones may lead to significant variations in neural plexus (11). Given the results of this reported case, awareness of these variations is important for anatomists, radiologists, anesthesiologists, and surgeons to interpret unexplained clinical signs and symptoms and can prevent possible complications of surgery.

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