

Unilateral Neural Communication between Radial and Ulnar Nerves at High Humeral Level

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Abstract: Neuroanatomical variations of the brachium constitute an important anatomical and clinical entity. During the educational gross anatomy dissection of axilla and brachium for undergraduate medical students in a 50 yrs old male cadaver we observed a connection between ulnar and radial nerves at high humeral level in left arm. It is very important to know such variations to minimize the possible complications of regional anesthesia and surgery.

1. Introduction

Effective brachial plexus blockade requires a thorough understanding of the anatomy of the plexus, as well as an appreciation of anatomic variations that may occur [1]. Anomalies at the high humeral level of the brachial plexus may also present as a complicating factor during surgical attempt to nerve blockade. At high humeral levels the median nerve descends from the axilla in close proximity to the brachial artery, frequently lying just lateral to the artery. Likewise, the ulnar nerve remains close to the artery to this point and is especially found just medial to the artery. The radial nerve leaves the axilla posterior to the artery and passes deep to the long head of the triceps, proceeding distally around the humerus in the spiral groove [2]. In the previous studies the connections between terminal branches of the brachial plexus in the arm or forearm have been reported, and some of them presented the percentage of the connection [3-5]. There are few studies like our case, which were about connections between ulnar and radial nerves. In the previous studies, the connections were sensorial and they were on the dorsal or palmar aspect of the hand [6, 7].

2. Case Report

During routine educational dissection of brachial plexus at our department, a 50-year-old male cadaver was dissected. There was no trauma or surgical intervention on his upper extremity. Brachial plexus and its terminal branches, axillary and brachial vessels were exposed. In our case, there was a unilateral connection between ulnar and radial nerves at high humeral levels on the left arm (Figure 1). The connection was 6 cm long and 3 mm wide, it was lying anteromedial to distal of the axillary artery and proximal of the brachial artery. Rest of the terminal branches of the brachial plexus and axillary artery and vein were as usual. There were no abnormalities detected on right side.

3. Discussion

Brachial plexus variations are frequently reported. Uysal et al. dissected 200 brachial plexus in human fetuses, only 93 of the brachial plexuses showed no variations [8]. In other words, the variations of brachial plexus were observed in 53.5% of the cases. Choi et al. [3] have observed a communication between the median and musculocutaneous nerves in 46.4%; Loukas and Aqueelah [4] described same communication in 63%, Venieratos and Anagnostopoulou [5] observed in 20%. Communications between the median and

ulnar nerves have also been reported. Kazakos et al. [9] observed this type of communication branch between median and ulnar nerves in 10 forearms of 163 cadavers.

Bergman et al. [10] reported possible communication between radial and ulnar nerves in the arm. However, a percentage value for the communications between radial and ulnar nerves on the arm or forearm is missing in the literature. On the other hand, dorsal sensorial branch communications between the radial and ulnar nerves (60%) on the dorsal surface of the hand [6], and radial nerve cutaneous innervation to the ulnar dorsum of the hand (16%) have been reported [7]. In our case, superficial structures on the hand have already been dissected and removed. **1**

Therefore, we could not observe any sensorial innervation in the hand. There was no unusual motor or sensorial innervation observed during the forearm dissection. It means that the type of the communicating branch might be probably sensorial. Variant nerve communications may cause ineffective nerve blockade and also blockade of unexpected areas. During surgical procedure, such variations may lead to possible complications. Therefore, it is very important to know all variant communicating branches of brachial plexus for successful regional nerve blockade and operations.

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Figure 1 :MR- Medial root of median nerve,LR- Lateral root of median nerve M- Median nerve R- Radial nerve MC-
Musculocutaneous nerve A- Axillary artery V- Cephalic vein U- Ulnar nerve CUT- Medial cutaneous nerve of arm COM-



communicating branch between ulnar nerve & radial nerve