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Case Report

COMMUNICATION BETWEEN RADIAL AND ULNAR NERVE AT A HIGH HUMERAL LEVEL

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ABSTRACT

Various communications between the different branches of brachial plexus have been reported by many authors but the communication between the radial and ulnar nerve; the branches of posterior and medial cords of brachial plexus in the arm is very rare. It features the communicating ramus travelling from proximal radial nerve and distal ulnar nerve at a high humeral level in the right arm of a 56 year old male cadaver. Knowledge of such variations may be of importance in the evaluation of certain entrapment phenomenon of ulnar nerve or unexplained sensory loss after trauma or surgical interventions in that particular area is also of clinical significance in anaesthetic blocks.

KEYWORDS: Brachial Plexus, Radial Nerve, Ulnar Nerve, Communication.

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INTRODUCTION

Variations at the high humeral level of the brachial plexus and its terminal branches are not uncommon and have been documented as prefixed or postfixed communications [1]. The three trunks i.e. upper, middle and lower trunks of brachial plexus are formed by the ventral rami of spinal nerves C5-C8 and T1 that bifurcated into anterior and posterior divisions. All the posterior divisions of these trunks of brachial plexus united to form the posterior cord and the anterior divisions of the upper and middle trunk unite to form the lateral cord. The medial cord was formed as a continuation of anterior division of the lower trunk.

The radial nerve arises as a continuation of the posterior cord (C8-T1) of the brachial plexus, leaves the axilla posterior to the axillary artery and passes deep to the long head of the triceps. The ulnar nerve originates from the medial cord (C8-T1) of the brachial plexus runs distally through axilla and lies most medial to the axillary artery [2].

Previous studies have reported variations in the anatomy and connections between the terminal branches of the brachial plexus in the arm or the forearm but there is paucity of literature on the communication between the ulnar and radial nerve, as seen in the present report of the case.

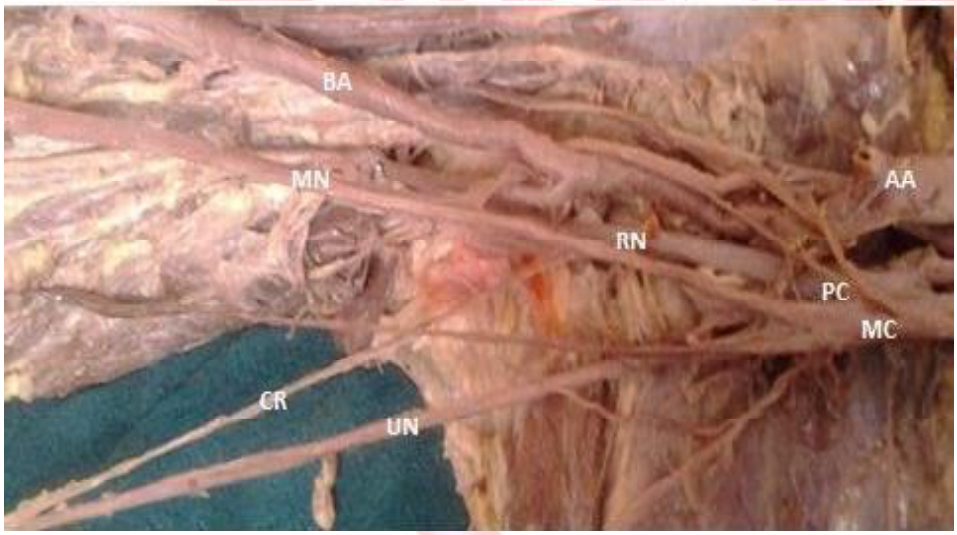
These communications can cause inappropriate nerve blockade and blockade of unexpected

regions during anaesthesia. Failure to recognize these variations can also confound the assessment of the severity of nerve injury as well as recovery [3]. The understanding of possible variations will also aid proper diagnosis of sensorimotor symptoms [4]. Therefore, it is very important to know all variant communicating branches of brachial plexus for successful regional nerve blockade and operations.

CASE REPORT

During a routine educational dissection of 56 year-old male cadaver an anatomical variation in the form of communication between the radial and ulnar nerve in the right arm was observed. The connection was in the form of a unilateral communicating ramus between proximal radial and distal ulnar nerve at a high humeral levels in the right arm as shown in the (Fig.1).

Fig. 1: Showing the communication between radial and ulnar nerve.



UN- Ulanr Nerve,
RN- Radial Nerve,
CR- Communicating Ramus,
PC- Posterior Cord,
MC- Medical Cord,
MN- Median Nerve,
AA- Axillary Artery,
BA- Brachial Artery.

The ulnar nerve arose from medial cord of brachial plexus and ran on medial side of the brachial artery upto elbow. The posterior cord was seen posterior to third part of axillary artery and continued as radial nerve which was seen entering into the radial groove. The radial nerve 3.8 cm distal to its origin from the posterior cord gave a communicating branch which ran downwards and medially for to join the ulnar nerve 9.8cm distal to its origin from the medial cord of brachial plexus. The communicating ramus was 8.2 cm in length and 1.3 mm in diameter. Rest of the terminal branches of the brachial plexus and axillary artery were as usual. No such variation was observed on the left side.

DISCUSSION

Different types of communications between the branches of brachial plexus like Martin-Gruber anastomosis, Marinacci communication and Berretini anastomosis have been reported in the literature [5]. These communications are known to exist between the median and ulnar nerves in approximately 20% of the population and also between the musculocutaneous nerves and median nerves in 46% of the subjects [6]. Uysal et al (2003) dissected 200 brachial plexus in human fetuses and the variations of brachial plexus were observed in 53.5% of the cases [7].

Communications between the radial and ulnar nerves have been reported on the dorsal surface of the hand. In 200 dissected cadavers 60 % of the subjects had a communication between the radial and ulnar nerves on the dorsum of the hand [8] whereas Leis & Wells in (2008) have also reported radial nerve cutaneous innervation to the ulnar dorsum of the hand in 16% of cases [3]. In the previous studies, the connections were sensorial and they were on the dorsal or palmar aspect of the hand.

To the best of our knowledge, there are only two cases in the literature denoting the communication between the radial to ulnar nerves. Ozguner et al (2010) have reported the communication similar to the variation in the present case in Turkiye population but the connection was from ulnar to radial nerve [9]. Arachchi et al (2013) have also reported a case of communicating branch between the radial and ulnar nerve in the arm in Australian popula-

tion [10]. But there are no reports of communication between the ulnar and radial nerves at the high humeral level among Indian population from the literature reviewed.

The ontogenic explanation for the presence of such communication may be attributed to the random factors like altered signalling between the mesenchymal cells and the neuronal growth cones [11] or the failure of differentiation as a cause for some of the fibres taking an aberrant course as a communicating branch [12] or these may be due to circulatory factors at the time of fusion of the brachial plexus cords [13]. Chiarapattanakom et al (1998) are of opinion that the limb muscles develop from the mesenchyme of local origin while axons of spinal nerves grow distally to reach the muscles or the skin. They blamed the lack of coordination between the formation of the limb muscles and their innervation for appearance of a communicating branch [14].

CONCLUSION

Variation in nerves with abnormal origin, course, and distribution are usually more prone to iatrogenic injuries and entrapment neuropathies [15]. Communication between branches of the brachial plexus could complicate the management of conditions such as complex regional pain syndrome. Therefore Knowledge of these variations is of clinical significance in anaesthetic blocks, surgical approach and nerve entrapment syndromes involving different branches of brachial plexus.

Conflicts of Interests: **None**

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