

A rare branching pattern of ulnar nerve in the lower arm

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Abstract

Introduction: The ulnar nerve is one of the two terminal branches of the medial cord. It passes down the medial aspect of the arm and runs posterior to medial epicondyle to enter the forearm without branching. Previously, ulnar nerve variations have been consistently located in origin or course of the distal branches.

Case Report: In this present case, an unreported rare bifurcation of ulnar nerve was seen in the left lower arm of a 65 year male cadaver with the resulting posteromedial and anterolateral branches arising above the medial epicondyle in. Its phylogeny and implications are discussed in detail. **Conclusion:** A lack of awareness of variations might complicate surgical repair and may cause ineffective nerve blockade.

Keywords: bifurcation, lower arm, ulnar nerve.

1 Introduction

Normally, the ulnar nerve is one of the two terminal branches of the medial cord, receiving fibers from C8 and T1 and sometimes C7. It passes down the medial aspect of the arm and runs posterior to medial epicondyle to enter the forearm without branching. The ulnar nerve supplies one and half muscles of the anterior compartment of the forearm (Flexor Carpi Ulnaris-FCU and ulnar part of Flexor Digitorum Profundus-FDP) and then continues into the hand, where it supplies most intrinsic muscles of the hand (MOORE and DALLEY, 1999).

A communicating branch of the dorsal and superficial rami of the ulnar nerve, known as Kaplan anastomosis which is a rare occurrence has been described by other authors (KAPLAN, 1963; HOOGBERGEN and KAUER, 1992; WULLE, 1998; PARASKEVAS, GEKAS, TZAVEAS et al., 2008). Also Lama, Potu and Bhat in 2009 reported a high origin of the dorsal branch of the ulnar nerve and the variations in its branching pattern and distribution in the forearm.

According to the work of Paraskevas, Gekas, Tzaveas et al. (2008), ulnar nerve variations have been consistently located in the origin or course of the distal branches, but in the present work, ulnar nerve was noted to have divided into 2 branches in the arm above the medial epicondyle.

Many authors have reported unusual ulnar nerve branching but this division of the ulnar nerve in the arm is a variation which has not been reported in other literatures.

There is a growing interest in the use of regional anesthesia worldwide. Regional anesthesia, particularly peripheral nerve blocks, has become an important anesthetic tool for pain and surgical management during the past century (RUKWE and FATIREGU, 2010) and knowledge of the anatomical variations described in this report may be important in the administration of regional anaesthetic agent during surgery in the upper limb and may also be important for the interpretation of pain and sensory loss in the area sustained during injuries or surgical procedures.

The knowledge of variation in the course of ulnar nerve may explain the failure of ulnar block and this will be needed in establishing new anatomical land marks for such blocks.

2 Case Report

During the dissection of a 65- year old male cadaver for demonstration in a regional anesthesia course, we observed a rare branching pattern of the ulnar nerve in the left lower arm. A longitudinal incision was made through the skin and fascia of the arm and forearm. The ulnar nerve was exposed after reflecting the flexor carpi ulnaris medially, by removing the flexor retinaculum and transecting the roof of canal of Guyon. The ulnar nerve was seen to have bifurcated into posteromedial and anterolateral branches at a point 83.50mm above the medial epicondyle (Figure 1a, b). The posteromedial branch passed posteriorly to the medial epicondyle. It then divided into a muscular branch supplying the anconeus and a cutaneous branch to the skin on medial side of the elbow (Figure 2). The cutaneous branch continued as dorsal cutaneous nerve which supplied the ulnar side of the dorsum of the hand. The anterolateral branch passed anterior to the medial epicondyle and bifurcated into deep and cutaneous branches at a distance of 89.59mm from the point of origin (Figure 3). The cutaneous branch continued as palmar cutaneous nerve which innervated the skin over the ulnar side of the palm of the hand. The deep branch passed between the flexor carpi ulnaris and flexor digitorum profunda, gave a twig to them and descended through the canal of Guyon. Further course, branching and distribution of ulnar nerve in the deserted hand was observed to be normal and the branching pattern and course of ulnar nerve on the other side (right) of the body was also found normal.

3 Discussion

The present case revealed a rare bifurcation of the ulnar nerve in the lower arm with dorsal and palmar cutaneous nerves having high origins from the posteromedial and

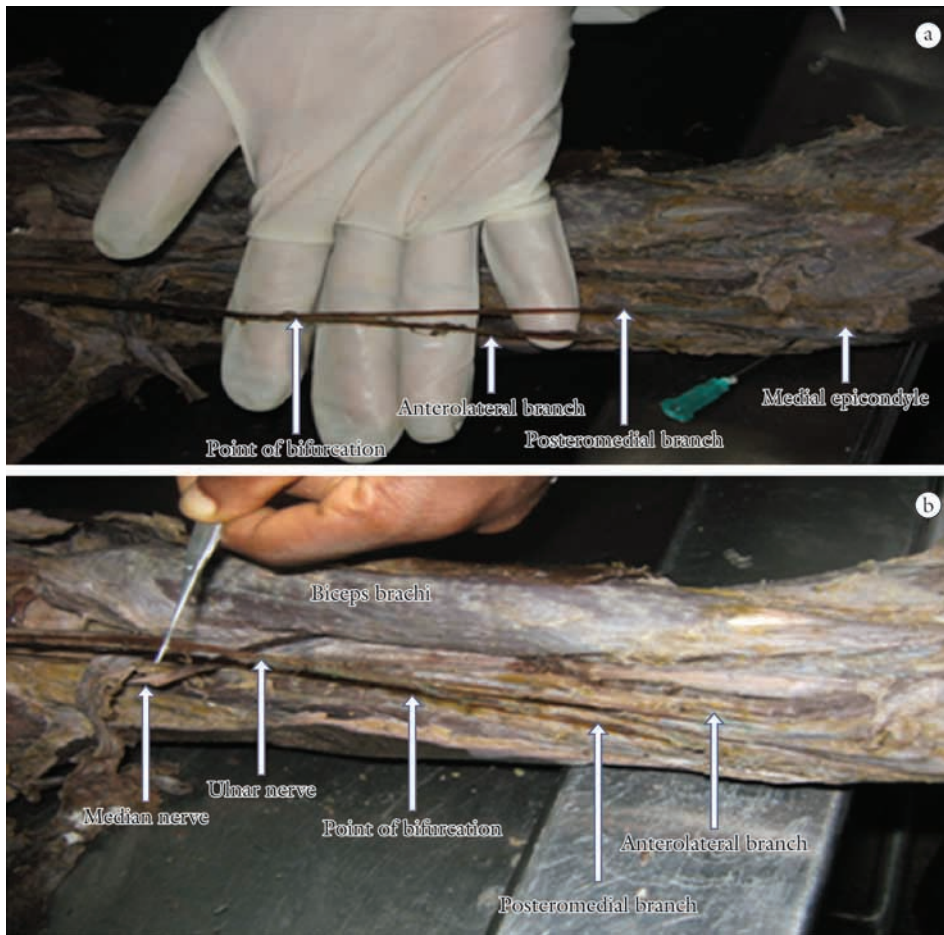


Figure 1. (a) Anteromedial aspect of the arm. (b) Anterior view of the arm showing the ulnar nerve bifurcation and the related structures.



Figure 2. Anterior aspect of the proximal forearm.

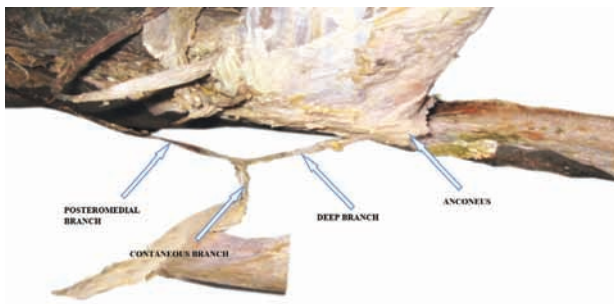


Figure 3. Elbow region showing posteromedial aspect of the proximal forearm.

anterolateral branches respectively. Polly Lama and his group have described a high origin of dorsal nerve but this is from an unbifurcated ulnar nerve (LAMA, POTU and BHAT, 2009). Ulnar nerve passing in front of medial epicondyle has been previously reported by Bergman, Afifi and Miyauchi (1996). Ulnar nerve has been shown to innervate medial head of triceps, anconeus and inconstant epitrochlea anconeus. Variations involving connecting branches with median nerve has been reported in the arm (BERGMAN, THOMPSON, AFIFI et al., 1988), forearm (KIMURA, AYYAR and LIPPMANN, 1983; HARNESS and SEKELES, 1971) and hand (KAPLAN, 1985; WULLE, 1998; PARASKEVAS, GEKAS, TZAVEAS et al., 2008).

The finding in the present case is important as it explains failure of ulnar nerve block. The classical anatomical landmark for ulnar nerve block is one centimeter above the medial epicondyle in the ulnar groove. The anterolateral branch which is responsible for the innervations of most of the hand muscles passed in front of the medial epicondyle thus escaping the block.

Knowledge of existence of the abnormal bifurcation of ulnar nerve is very essential, as it may be damaged during surgery or trauma in these areas. It also explains unexpected sensory loss following surgery trauma or regional blocks.

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