



VARIATIONS OF BRACHIORADIALIS MUSCLE AND SUPERFICIAL BRANCH OF THE RADIAL NERVE: A CASE REPORT AND POSSIBLE CLINICAL IMPLICATIONS

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ABSTRACT

A case of two headed brachioradialis muscle tendon (BRMT) has been revealed during a routine dissection of a male cadaver both upper extremities. In this case, the superficial branch of the radial nerve (SBRN) descends in the forearm under the brachioradialis muscle (BRM) and then pierces the deep forearm fascia between the BRMT and extensor carpi radialis longus tendon. The brachioradialis muscle tendon divides in two head in both extremity and SBRN travels in between. Meanwhile, on the right side, brachioradialis muscle itself possesses two head.

Key words: Brachioradialis, Tendon variation, Superficial branch of the radial nerve, Wartenberg's syndrome.

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INTRODUCTION

The brachioradialis muscle (BRM) which forms the lateral border of the cubital fossa is the most superficial muscle along the radial side of the forearm. It originates from the proximal two-thirds of the lateral supracondylar ridge of the humerus and the anterior surface of the lateral intermuscular septum. The muscle fibers come to an end above mid-forearm level in a flat tendon and this tendon attachments on the lateral side of the distal end of the radius, usually just proximal to styloid process of it [1]. The radial nerve (RN) originates from the posterior cord of the brachial plexus. Typically, it gives off its branches some distance proximal to the part to be innervated. The

superficial branch of the radial nerve (SBRN) is a pure sensory nerve which innervates the dorsoradial side of the hand, the dorsal part of the thumb, forefinger and a variable prolong of the dorsal side of the middle finger and radial part of the ring finger. It usually arises from the cubital fossa as a branch of the radial nerve and continues distally below to the belly of the BRM [2].

The Wartenberg's syndrome is a pressing syndrome of the SBRN which causes unusual sensation and pain in the dispersion of the SBRN. Mostly insult of the SBRN distal to its perforation by way of the superficial fascia of the forearm is the case of the nerve disability [3]. In this case report, we demonstrated the variation of BRMT which is rare and clinically significant.

CASE REPORT

At the Faculty of Medicine, Department of Anatomy, during routine dissection of a male cadaver for

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educational purpose, variations of BRMT and SBRN were revealed in both upper limbs. During dissection of the forearm from elbow to metacarpophalangeal joint, skin and superficial fascia were removed and extensor muscles were exposed. Bilaterally, it was observed that BRMT ended in two parts. Besides, passed SBRN was determined

between these two parts. (Figs 1 and 2). Terminal branching pattern of SBRN on the dorsum of hand was normal (Fig. 2). In addition to these variations, on the right upper extremity, it was found that BRM with two heads (Fig. 1).

Fig 1. Brachioradialis muscle (BRM) with two heads (white stars). SBRN superficial branch of radial nerve, BRMT brachioradialis muscle tendon.



Fig 2. Superficial branch of radial nerve (SBRN) passing between the two parts of brachioradialis muscle tendon (BRMT). Black arrows terminal branches of SBRN.



DISCUSSION

The radial nerve which crosses the arm by winding around the shaft of humerus in the radial groove on the posterior surface is the largest branch of the brachial plexus. It gives off its terminal branches; the superficial branch and the deep branch after reaching the front of the lateral epicondyle of humerus and piercing the lateral intermuscular septum. The superficial branch of the radial nerve is a purely sensory nerve which originates from the radial nerve at the elbow region and lies deep to the BRM in the forearm [1, 4].

Herma et al. demonstrated an interesting coincidental variation of the SBRN and the BRM in a male cadaver. The SBRN was duplicated with one branch taking an aberrant course between the bellies of the BRM. The variant BRM featured two muscle bellies, a superficial one and a deep one, with one common origin and one common insertional tendon. The accessory nerve branch was impinged by two blood vessels and pierced the muscle bundles connecting the bellies of the BRM. The knowledge of this neuromuscular variant is of clinical relevance for the different diagnosis of pain and paresthesia on the dorsoradial aspect of the hand and for the surgical management of the Wartenberg's syndrome [2].

A lot of different cases have been described for SBRN: trauma, diabetes, repeated exposure to severe cold, over exertion of the hand, a too tightly worn wristwatch, de Quervain's disease, handcuffs, lipoma, operations, tightly pinching the thumb and index digit, compression by the BRMT and extensor carpi radialis longus alone or in combinations [5, 6]. De Quervain's disease was associated with Wartenberg's syndrome in 50%. For this reason, before operating on the tenosynovitis, in order to avoid unexpected postoperative complications and medicolegal problems, it is important to diagnose Wartenberg's

syndrome [6]. Furthermore, Wartenberg's syndrome may be caused by anatomic variations of BRMT [7].

There are very few studies made about the relationship between BRMT and SBRN. Turkof et al dissected 150 upper extremities of 75 nonrandomized cadavers to study the topographical relationship between the BRMT and SBRN [8]. They found a split BRMT in 9 arms. In 5 of those 9 arms, the SBRN emerged from under the BRM between the two divided BRMT to become superficial. In another study, Turkof et al carried out a retrospective study. To evaluate the incidence of this variation, in which the SBRN emerged from under the BRM between the two divided BRMT, they reviewed 143 operative reports from patients who had Wartenberg's syndrome and found the variation in 7 patients [9]. Tryfonidis et al dissected 20 preserved Caucasian cadaveric upper limbs on their study to look at the relationship between SBRN and BRMT and they found that SBRN emerged from deep to superficial position by piercing the BRMT near its dorsal border in 4 limbs [7].

Compression of the SBRN during the transition of nerve between two divided BRMT can lead to nerve inflammation [7]. In addition to the anatomy of forearm, knowledge of such variations of muscles and nerves in this region are critically important for neurologists, orthopedist, physiotherapist and surgeons for diagnosis of Wartenberg's syndrome and other diseases for implementing successful surgical interventions with minimal complications.

CONFLICT OF INTEREST

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Contributions

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