



Case Report

Possible Entrapment of Sensory Branch of Radial Nerve by Split Brachioradialis Tendon: An Anatomical Variation

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ABSTRACT

Entrapment of superficial branch of radial nerve is a rare clinical condition where it can be compressed at any point along its course in the forearm. The course of superficial branch of radial nerve between two slips of the split brachioradialis tendon may form a potential site of entrapment for the nerve. The incidence of such entrapment is rarely reported in the literature. Here we report a case of split brachioradialis tendon forming a site of entrapment for the sensory branch of radial nerve. During regular dissection classes, we observed the split brachioradialis tendon at about 7 cm proximal to the radial styloid process, in a male cadaver of South Indian origin. The additional slip of the tendon was small and it firmly attached to the muscle fibers of the abductor pollicis longus. The sensory branch of radial nerve passed through the narrow interval formed by the two slips of brachioradialis split tendon, before becoming subcutaneous structure. The knowledge about the anatomical variations of split brachioradialis tendon and the position and possible attachments of additional slips is of clinical importance during surgical decompression of Wartenberg's syndrome.

Keywords: additional slip, brachioradialis, entrapment, superficial branch of radial nerve

INTRODUCTION

The superficial branch of radial nerve (SRN) is the terminal branch of radial nerve at the cubital fossa. After arising from the radial nerve, it courses distally into the forearm deep to the brachioradialis (BR) muscle. SRN becomes subcutaneous structure by traveling between the BR and extensor carpi radialis tendons. Then, it proceeds distally just deep to the skin and reaches the dorsum of the hand where it branches out into dorsal digital nerves to supply the dorsum of the thumb, index, and

middle fingers proximal to the proximal interphalangeal joints. ^[1,2]

BR is the most superficial muscle of posterior compartment of forearm. It arises from the proximal two-thirds of supracondylar ridge of the humerus and anterior surface of the lateral intermuscular septum. Approximately above the level of forearm it ends into a flat tendon which is attached to the distal end of the styloid process. ^[2] Muscle is often proximally fused with brachialis or it may be divided into two bellies, with the second belly attached

distally to the radius or even the ulna. [3] Some cases its tendon may split into two or three slips. [4] The tendon may insert on the lateral face of the radius or distally to the navicular, trapezium, or base of the third metacarpal bone. [3]

Entrapment of SRN is a rare condition; it is compressed at any point along its course in the forearm. In 1922, Stopford was the first person who has described this condition. [5] Successively authors have been reported the incidence of entrapment of SRN. [6,7]

In all the cases the causes of SRN entrapment have been described as trauma, diabetes, repeated exposure to cold, tight fascial bands, over exertion of the hand, de Quervains disease and compression between the tendons of the BR and extensor carpi radialis longus. [8] The anatomic variations of BR also have reported. [4] Herein we report the unusual relationship between the BR and SRN and discuss its clinical importance.

CASE REPORT

During regular dissection classes for medical students, we came across an unusual relationship between the SRN and BR tendon in the left forearm. It was noticed in an approximately 50-year-old male cadaver of South Indian origin. The SRN after arising from the radial nerve just anterior to the lateral epicondyle proceeded distally lateral to the radial artery and behind the BR. Then it passed between the tendons of BR and extensor carpi radialis longus. About 7 cm proximal to the radial styloid process it coursed through the narrow gap between the two slips of split brachioradialis tendon to enter the dorsum of the hand as a subcutaneous structure. BR arose from the upper two-thirds of supracondylar ridge and lateral intermuscular septa and ended into a tendon at the mid forearm level and it is finally inserted to the distal end of styloid

process of the radius. At the mid forearm level it gave an additional slip which was inserted firmly to the muscle fibers of the abductor pollicis longus while crossing the extensor corpi radialis longus tendon. The triangular narrow gap between these two slips was occupied by the SRN (Fig.1 & 2). The branching pattern of the SRN was normal, and its diameter was unchanged after compression. Further, no signs of atrophy were observed. The aberrant insertion of BR and its unusual relationship with SRN was not observed in the right forearm.

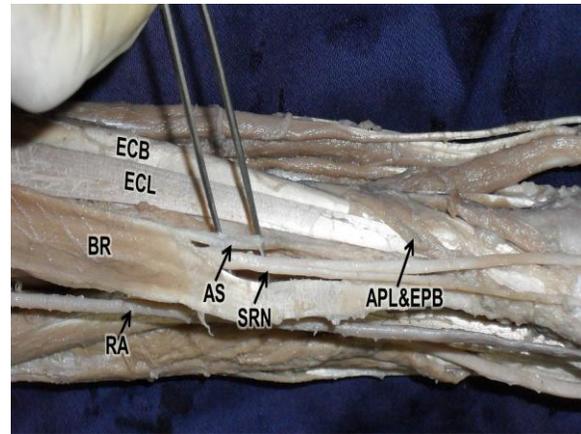


Figure 1: Dissection of right forearm showing the split brachioradialis tendon. Note the course of superficial branch of radial nerve (SRN) through the triangular gap between the main tendon and additional tendinous slip (AS) of brachioradialis muscle (BR). APL: abductor pollicis longus; ECL: extensor carpi radialis longus.

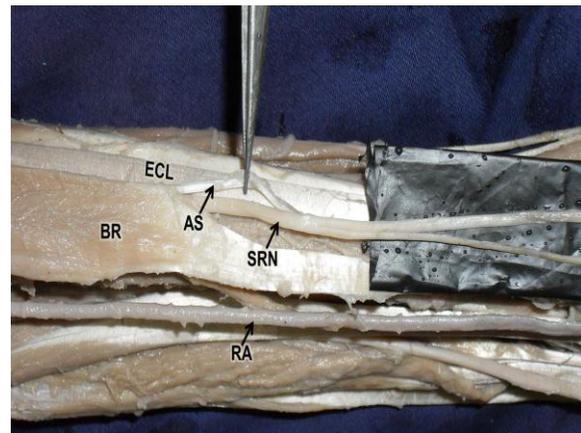


Figure 2: Closer view of the split brachioradialis tendon forming potential site of entrapment of superficial branch of radial nerve (SRN). APL: abductor pollicis longus; AS: additional slip; BR: brachioradialis muscle; ECL: extensor carpi radialis longus.

DISCUSSION

SRN the sensory branch of radial nerve can be compressed along its course in the forearm between the tendons of BR and extensor carpi radialis longus. [8] SRN is relatively at greatest risk of compression at the posterior border of the BR where it becomes subcutaneous structure. [9] This compression is the usual cause of the nerve compression and it is severe during pronation of the forearm. [8] In 1932, Wartenberg described such compression as mononeuritis, which he initially thought that an inflammation of the nerve. He reported a series of isolated neuropathy of the SRN in 5 adult patients and opined that it is clinically very similar to isolated neuropathy of the lateral femoral cutaneous nerve in the lower extremity. He named symptoms associated with the compression of SRN as “cheiralgia paresthetica”. [6] Although earlier other authors had been described the compression neuropathy of the SRN, Wartenberg syndrome and cheiralgia paresthetica have been become synonymous with a compression neuropathy of the SRN. [8]

The external trauma by wearing wrist bands and handcuffs may also cause SRN compression. [10-14] The SRN compression by the anatomic variations of the BR is rarely reported in the literature. [4] The BR shows variations in its origin, insertion and rarely may it show split tendon. [3] Occasionally the SRN may pass between the slips of split BR tendon and by doing so it becomes a potential entrapment site for the nerve. Earlier, Turkof et al, have studied the incidence of SRN compression by the two slips of split BR tendon, in 150 cadaveric dissected arms and it was found in 3.3% of cases. [4] In another study by Tryfonidis et al, unusual topographical relationship between the SRN with BR tendon was observed in 5 out of 20 Caucasian cadaveric upper limbs. [15] A case of radial sensory nerve entrapment caused

by an anatomical variation of the BR tendon was reported in 40-year-old patient. [16] In the present case, we observed an additional tendinous slip of BR forming a potential entrapment site for SRN. Attachment of the additional slip to the muscle fibers of abductor pollicis longus may be of functional significance.

Currently, the CT scan examination and magnetic resonance imaging (MRI) examination and ultrasound examination are also used to diagnose the Wartenberg’s syndrome. Surgical decompression, splinting and nonsteroidal anti-inflammatory drugs are commonly used to relieve the symptoms of SRN compression. The knowledge of anatomic variations of BR especially about the position and attachments of additional slips of BR split tendon is essentially important during the differential diagnosis and surgical decompression of the SRN. [17]

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