Journal of Morphological Sciences
J Morphol Sci
Brazilian Society of Anatomy

Case Report
J Morphol Sci 2023;40:314-316

Superficial Branch of Radial Nerve Entrapped Between Two Slips of Brachioradialis – A Rare Aspect of Wartenberg`s Syndrome

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Disclose and conflicts of interest: none to be declared by all authors

ABSTRACT

Introduction: radial nerve is a branch from the posterior cord of the brachial plexus. It divides into its two terminal branches, the superficial (SBRN) and the deep branch (Posterior interosseus nerve) at the level of the front of the lateral epicondyle of humerus. Normally, Superficial branch is found to lie deep to the brachioradialis muscle (BR) in the forearm and passes deep to its tendon before winding round the lateral side of the lower end of radius. In this present case, the superficial branch of radial nerve passes between the two slips of brachioradialis before entering the dorsum of the hand. Compression of the superficial branch of radial nerve at this level produces a clinical condition called `WARTENBERG`S SYNDROME' which has been reported in various parts of the world as a rare case. So far very less cases have been reported in India during the search of literature, which makes this study clinically important.

Keywords: Superficial branch of radial nerve; Wartenberg's syndrome; Nerve entrapment.

Introduction

Brachioradialis is a muscle of forearm. It arises from the upper two third of lateral supracondylar ridge and lateral intermuscular septum. It gets inserted into the base of styloid process of radius. It flexes the forearm at elbow joint and helps in pronation and supination at radio-ulnar joints. Sometimes brachioradialis presents an accessory slip. When Superficial Branch of Radial Nerve passes between the two slips, gets compressed producing a very rare condition called WARTENBERG`S SYNDROME[1,2].

Case Report

During our routine anatomy dissection, a variation was found on the right upper extremity of an adult male cadaver. Brachioradialis muscle is found to have an accessory slip. The accessory slip arises from the middle one third of the lateral supracondylar ridge. This accessory slip as it descends forms the lateral boundary of cubital fossa. The accessory slip joins the tendon of extensor carpi radialis brevis and gets inserted into the base of the third metacarpal bone. The superficial branch of radial nerve is found to transit from submuscular to subcutaneous position by passing between the two slips of brachioradialis. After piercing the superficial fascia, SBRN lie superficial to brachioradialis muscle in the forearm. It continues its course palmer to radial styloid to reach the first web space giving branches towards the radial aspect of the dorsum of the hand and thumb as well as second and third web spaces. All these branches except the ones to the dorsum of the thumb originate distal to radial styloid.

Discussion

The superficial branch of radial nerve is a purely sensory nerve that takes its origin from the radial nerve in the elbow region. It travels distally underneath the brachioradialis and transits from submuscular to subcutaneous position by passing between the tendons of brachioradialis and extensor carpi radialis longus muscle and piercing the deep forearm fascia joining these two tendons.

During Pronation, a scissoring action of the Brachioradialis Muscle Tendon and Extensor carpi radialis longus tendon occurs as the latter slides under the Brachioradialis muscle tendon and thus pinching the Superficial branch of Radial nerve.

During ulnar flexion, longitudinal gliding of the Superficial branch of radial nerve is required, but this is partially restricted as the nerve is proximally tethered at the locus of fascia at the site of its emergence into the subcutaneous tissue.

This anatomical relationship is one of the main predisposing factors for the development of chronic Superficial Branch of Radial Nerve compression neuropathy (Wartenberg's syndrome). Despite the paraesthesia, dysaesthesia and pain, sensory loss is usually limited to a small area on the ulnar side of the dorsum of the thumb due to the large overlap with the lateral cutaneous nerve of forearm[3].

DOI: 10.51929/jms.40.316.2023
ISSN 2177-0298

This anatomical anomaly could predispose the Superficial Branch of Radial Nerve to compression neuropathy either by the pinching effect on the nerve or by increasing the risk of oedema and subsequent fibrosis following chronic mechanical trauma by repeated radial extension-ulnar flexion.

Turkof E, *et al*. 1995 did a retrospective study in 143 patients operated for wartenberg's syndrome, of which the variation in superficial branch of radial nerve entrapped between two slips of brachioradialis was found in 7 patients[2].

Lanzetta M, *et al*. 1993 treated 52 cases of wartenberg's syndrome, of which 50% cases was found to be associated with De Quervain's disease[4].

Wartenberg`S Syndrome (Chronic Compression Neuropathy)
(Cheiralgia Paresthetica)

Superficial Branch of Radial Nerve nerve goes through a tight region in the forearm as it travels from deep to the muscles to reach the skin.

When the forearm turns and the hand pronates, the radial sensory nerve gets pressed and the blood flow to the nerve slows down. As the blood flow decreases, the nerve sends a message of numbness and tingling. During ulnar flexion, the longitudinal gliding movement of nerve is restricted. As a result, there is a traction force on the nerve which leads to chronic compression resulting in Pain. Patients present with symptoms of Pain over the distal radial forearm and Paresthesia over the dorsal radial aspect of hand. Symptoms include numbness, tingling, and weakness of the posterior aspect of the thumb. Also called Cheiralgia paresthetica. These symptoms increase with wrist movement or when tightly pinching the thumb and index digit. There will be a positive Tinel sign over Superficial Branch of Radial Nerve and during hyper pronation of forearm[5,6].

Surgically the superficial branch of radial nerve identified deep in tissues under compression is released to relieve from pain. Presence of accessory slip of brachioradialis and variation in the origin of the nerve from deep muscular layers to the superficial layer results in dorsal tendinous ban compression preventing gliding movements in ulnar flexion leading to pain. The anatomical knowledge of such variation is important for neurologists and surgeons while performing operative procedures in Wartenberg's disease, de Quervain's disease and Arthroscopy. Therefore, while treating Wartenberg's syndrome, a thorough investigation of the site of emergence of radial sensory nerve should be mandatory and, if the nerve emerges through a split brachioradialis tendon, the anomalous tendon slip should be divided.

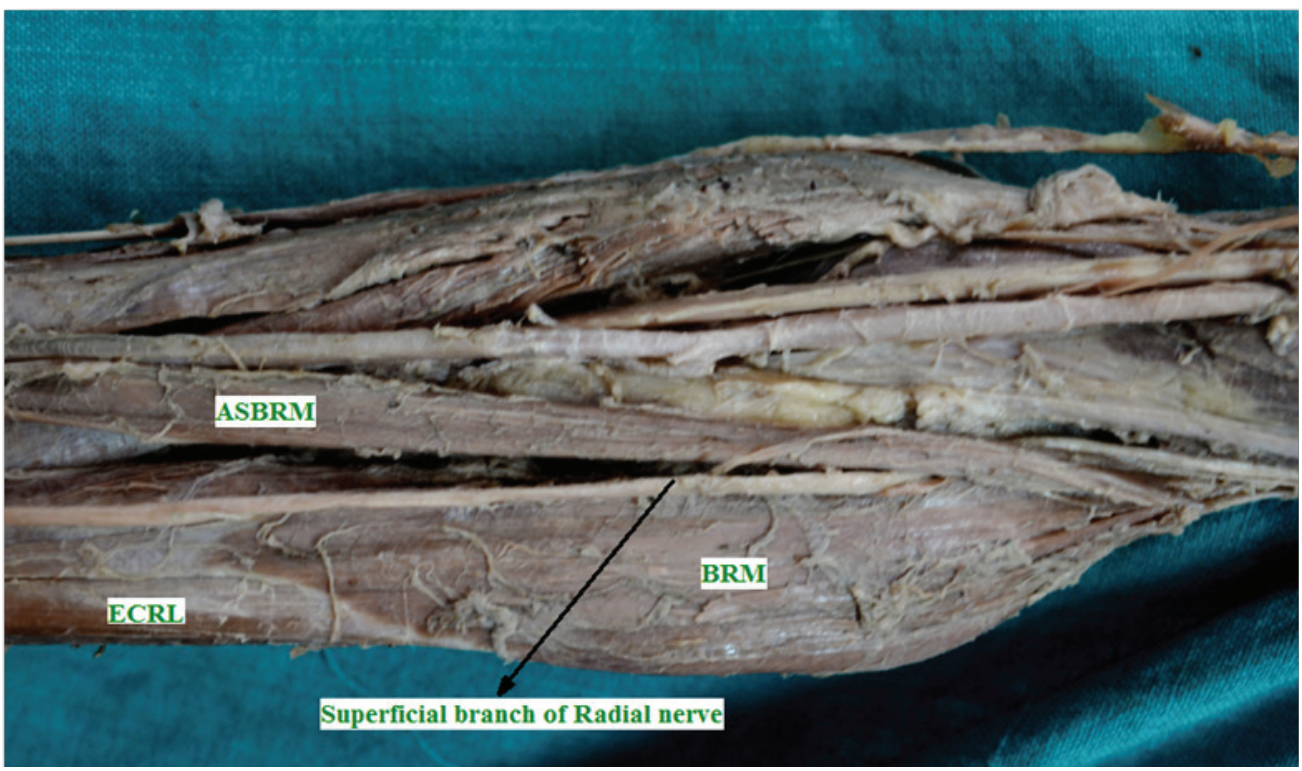

Figure 1. Origin of accessory slip of brachioradialis.
ASBRM – accessory slip of brachioradialis muscle
BRM – brachioradialis muscle
ECRL – extensor carpi radialis longus

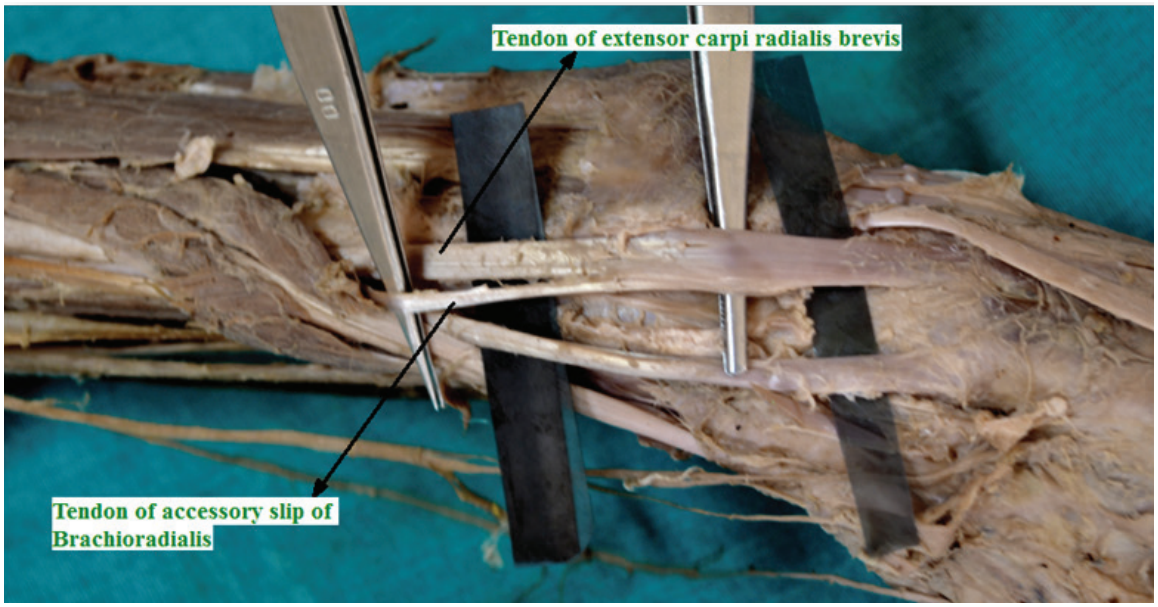

Figure 2. Insertion of the accessory slip of brachioradialis.

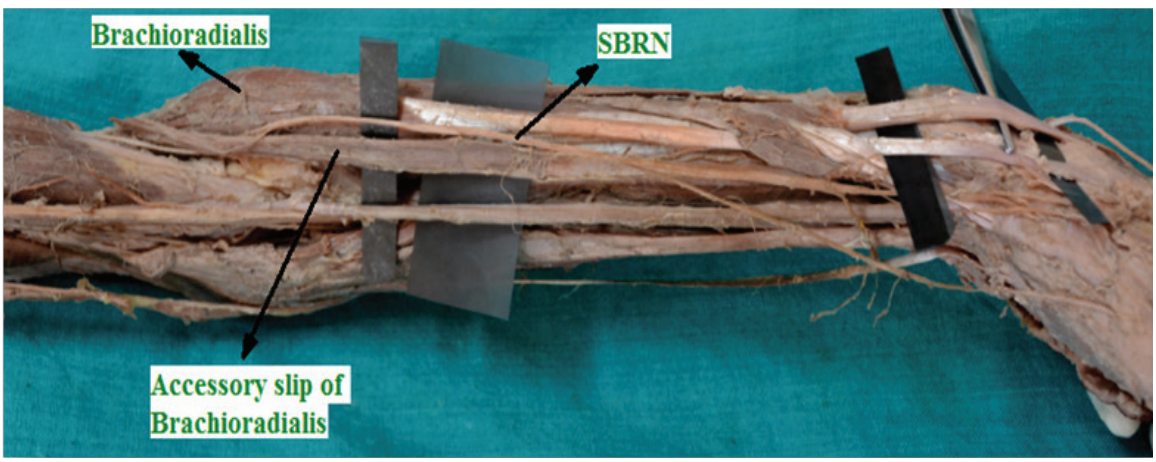

Figure 3. Course of superficial branch of radial nerve.
SBRN – superficial branch of radial nerve.

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Received: January 23, 2023
Accepted: May 3, 2023

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