A Rare Anomalous Muscle -Palmaris Profundus-Which Has Potential to Cause Carpal Tunnel Syndrome: Cadaveric Study

CARPAL TUNNEL SENDROMU'NA NEDEN OLABİLECEK NADİR BİR KAS –PALMARİS PROFUNDUS-: ANATOMİK BİR ÇALIŞMA

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Summary

Purpose of the Study: This report was prepared to call the surgeon's attention to the presence of the rare muscle-Palmaris profundus-, (and) its proximity to the radial artery and median nerve, and its possibility to compress the median nerve in the carpal tunnel.

The Case Report: In the course of an anatomical dissection, the rare muscle-Palmaris profundus–which has the potential to cause carpal tunnel syndrome, was found on the right upper extremity of an embalmed cadaver.

Result: In patients with a negative history of synovialitis, trauma and metabolic disease one has to consider rare muscle variations as a cause of the Carpal Tunnel Syndrome.

Key Word: Palmaris profundus muscle, Musculus comitans nervi mediani, Carpal Tunnel Syndrome

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Özet

Amaç: Bu makale cerrahların nadir bir kas olan Palmaris profundus'un varlığına, (ve) radial arter ve median sinire yakınlığına, ve median sinire carpal tunnel'de bası yapma olasılığına dikkatlerini çekmek için hazırlanmıştır.

Olgu Sunumu: Anatomik çalışma sırasında, solusyonda fikse edilmiş bir kadavranın sağ üst ekstremitesinde, Carpal Tunnel Sendromu'na neden olabilecek bu nadir kasa rastladık.

Sonuç: Synovialit, travma yada metabolik hastalığı bulunmayan hastalarda nadir kas varyasyonlarının Carpal Tunnel Sendroma neden olabileceği dikkate alınmalıdır.

Anahtar Kelime: Palmaris profundus kası, Muskulus komitans nervi mediani, Carpal Tunnel Sendromu

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Palmaris profundus muscle was first described in 1908 by Frohse and Fraenkel (1). Reimann et al. found the muscle once in 530 limbs and reported its incidence as 0.18% based on that study (2). This rare muscle is generally described as arising from the lateral edge of the radius in its middle third near the radial tuberosity, lateral to flexor digitorum superficialis and deep to pronator teres. Its tendon passes beneath the flexor retinaculum on the radial side of the median nerve and, after traversing the carpal canal, it broadens in the palm to insert into the deep side of the palmar aponeurosis (3).

Anomalies of the muscles and tendons in the hand and wrist have been associated with various neuropathic conditions involving the median nerve. The neuropathy is associated with compression, constriction or mechanical irritation of the nerve within a constricting tunnel. The carpal tunnel syndrome, the most common distal compression syndrome of the median nerve, was first described by Hunt (4). Weakness in the hand, hypestesia or paresthesias in distribution of the median nerve, aggravation of the symptoms as the patient uses the hand, awakening with numbness in the fingers and pain in the wrist or distal forearm are the presenting symptoms of the syndrome. Distal lancinating paresthesias in the distribution of the median nerve

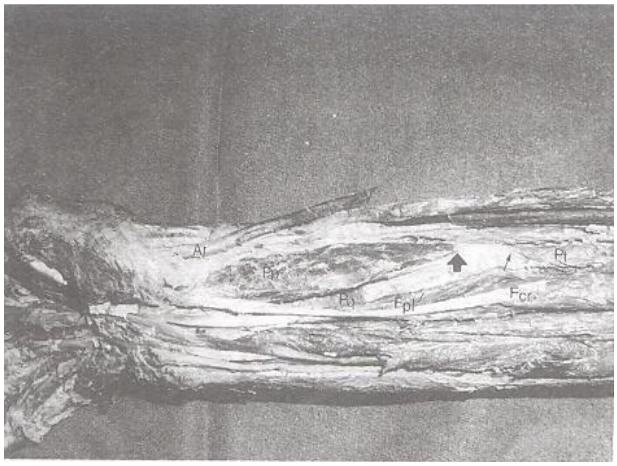

Figure 1. The belly of the muscle arose from the anterolateral aspect of the radius.
Ar: Radial artery,
Pp: Palmaris profundus,
Pq: Pronator quadratus,
Fpl: Flexor pollicis longus,
Fcr: Flexor carpi radialis,
Pt: Pronator teres,
: Origin of palmaris profundus,
: Insertion of pronator teres.

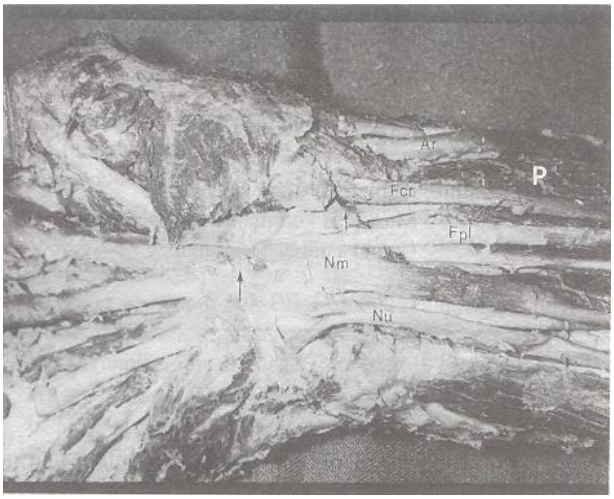

Figure 2. Insertion to the most proximal and lateral part of the deep carpal ligament, just above the tendon of pollicis longus and next to median nerve.
Ar: Radial artery,
Fcr: Tendon of flexor carpi radialis,
: The gate of the tunnel for flexor carpi radialis,
Fpl: Flexor pollicis longus' tendon,
Nm: Median nerve,
Nu: Ulnar nerve,
P (white): Belly of palmaris profundus,
: Deep carpal ligament.

with percussion of the nerve at the wrist are suggestive of the syndrome and reproduction of symptoms with the wrist flexion test as described by Phalen is generally diagnostic (5).

Case Report

These observations were made on the right upper extremity of an embalmed adult male cadaver. The origin of the muscle was found to be on the anterolateral aspect of radius (Figure 1) and mostly inserted into the most proximal and lateral part of the deep carpal ligament, just superficial to the tendon of flexor pollicis longus and adjacent to the median nerve (Figure 2). It didn't not traverse the carpal ligament. Its most proximal origin was 9 cm and most distal origin was 6.2 cm proximal to the styloid process of the radius, being attached to the radius for the first 2.8 cm of its length. The total length of muscle belly was determined to be 11.2 cm and the widest portion of its belly was 1.4 cm. Its most proximal origin was also 2 cm distal to the insertion of pronator teres and the origin of flexor pollicis longus (Figure 1). It was not overlapped by pronator teres as described by Bergman et al. (3). The origin was partly overlapped by the tendon of brachioradialis and, the tendon of brachioradialis and extensor carpi radialis brevis located on its lateral margin. It was accompanied by the radial artery throughout its anterolateral aspect (Figure 1). Its medial margin was accompanied by the belly of flexor pollicis longus and its tendon. Above to this muscle, the tendon of flexor carpi radialis was located and pronator quadratus was the only muscle beneath it (Figure 1).

As it was about to terminate, the palmaris profundus tendon crossed and encircled flexor carpi radialis' tendon and formed a tunnel around it, sending some fibres to the scaphoid at this level (Figure 2).

Discussion

The palmaris profundus is a rare muscle variation that usually takes origin from the deep fibro-osseous structures of the palmar aspect of the proximal forearm, extends to and passes through the carpal tunnel, and inserts into the inner or deep surface of the palmar aponeurosis. And also its variations mimic palmaris longus in its wide spectrum of variational forms (6-9).

Palmaris profundus was first-ever described by Frohse and Fraenkel in 1908 (1). In patients with unilateral or bilateral carpal tunnel syndrome and a negative history of synovialitis, trauma and metabolic disease one has to consider rare muscle variations as a cause of the syndrome (10-27). Besides variations of the lumbrical muscles, palmaris longus and the superficial flexor digitorum muscles, palmaris profundus muscle, because of the location of the tendinous origin or belly of this muscle, can be the causative anomalous structure (14-16,19,23-25,27). Şahinoğlu et al. reported two forms of this muscle enclosed within a single fascial sheath with the median nerve and, proposed the name 'musculus comitans nervi mediani' (28).

Palmaris longus is a well-known and widely used muscle by both the Plastic and Hand Surgeons for various purposes. Palmaris profundus is a rare muscle. Though it is a very rare muscle, its presence and anatomical variations should be well known by the surgeons dealing with the hand. We should be fully aware of its proximity to radial artery, median nerves and symptoms related to entrapment and compression due to this muscle and its variations.

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