The palmaris profundus, a rare sight during carpal tunnel release

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Published online: 15 October 2014
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Abstract Palmaris profundus is a rare anatomical anomaly that may complicate carpal tunnel release. We discuss a recent case of carpal tunnel syndrome and its surgical release, whilst reviewing the published anatomical and surgical literature.

Introduction

Carpal tunnel release is one of the most common procedures carried out in hand surgery units worldwide. Various anatomical anomalies within the carpal tunnel have been described in the past and awareness of same should be reiterated to prevent iatrogenic injury to other structures, particularly the median nerve.

Case

We report a case of a 55-year-old right hand dominant female. She presented with an 18-month history of bilateral paraesthesia in the distribution of the radial four digits. Her right hand was the most symptomatic, most troublesome at night, but also aggravated by gripping activities during the day. Night splinting was found to be partially beneficial in terms of symptom relief. Past medical history included type II diabetes mellitus, hypertension and hypercholesterolemia.

Clinical examination was positive for Tinel's sign at the level of the wrist—but was otherwise unremarkable. Nerve conduction studies revealed a partial median nerve latency with moderate compression, notably more severe on the right when compared to the left wrist. After due discussion, an open

decompression of the right carpal tunnel was carried out under local anaesthetic; this was uneventful with complete resolution of symptoms.

Four months later, the left carpal tunnel was released. After release of the flexor retinaculum, a white glistening structure was noted, lying volar to the median nerve (Image 1). The structure appeared to be a tendon attaching distally to the palmar aponeurosis but coursing deep to the flexor retinaculum. It was not possible to determine its proximal origin, as this would have required extension of the palmar incision into the distal forearm. After identification of the palmaris longus tendon, flexor pollicis longus tendon and the long finger flexor tendons of the hand, the visible portion of the anomalous tendon was resected (Image 2). The median nerve and its motor branch were visualized and released adequately. The postoperative course was uneventful, and standard nerve gliding exercises commenced as per departmental protocol. At review 3 months later, complete resolution of preoperative symptoms on both sides were noted—and both hands were asymptomatic.

Discussion

Palmaris profundus is a rare anatomical structure, usually found incidentally during cadaveric dissection. Reimann et al. in 1944 described a single case in a group of 1600 cadaveric upper limb dissections [8]. It was initially thought to be an anomalous palmaris longus but later was acknowledged to be a separate structure as it coexisted with the said tendon, only to differ in its origins. More recently, it has been found to be associated with carpal tunnel syndrome [1, 7]. The origin is very variable and includes the flexor digitorum superficialis, the proximal/mid-third of radius [13], the anterior surface of ulna, the common flexor origin, the palmaris longus [10] and the epimysium of the flexor pollicis longus [12] in the forearm. However, the insertion would appear to be

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Image 1 Anomalous palmaris profundus tendon identified overlying the median nerve

constant, lying deep to the flexor retinaculum and inserting into the palmar aponeurosis [2, 11, 12].

The usual anatomical orientation of the palmaris profundus has been described to be mostly tendinous in its distal attachment, with a proximal muscular belly at its origin [12]. However, other variants have been found, such as the reverse

Image 2 Palmaris profundus tendon now divided distally before a segment resected completely

palmaris profundus with a proximal tendon and distal muscle and the tendon-muscle-tendon subtype of Sanchez-Lorenzo [10]. Innervation varies and can arise from the median nerve, anterior interosseous nerve or the ulnar nerve. The anomalous structure has also been found bilaterally [2, 7, 13].

The course followed by the palmaris profundus to its constant distal insertion varies and relates to its origin; in the radially based variants, more often than not it crosses the median nerve obliquely. The tendon has also been reported not only to be in close approximation to the median nerve but also investing in the same nerve sheath; hence the name coined by Sahinoglu [9] (the *musculus comitans nervi mediani*). In addition, it has been described with a bifid nerve [3]. Due to its variable origin and course, the palmaris profundus tendon has the potential to cause direct compression of the median nerve, ulnar nerve, anterior interosseous nerve and even the palmar cutaneous branch of the median nerve [6]. Lange et al. [4] and Jones et al. [3] strongly recommend resection of the tendon in the carpal tunnel should it be found in an open decompression procedure to reduce the risk of persistent or recurrent symptoms. This recommendation was based on two cases of persistent median nerve compression—which were alleviated by subsequent resection of the tendon whilst carrying out a repeat decompression. In addition, this structure has been found to obstruct surgery during endoscopic carpal tunnel release [5].

In our case, the distal part of the palmaris profundus tendon was traversing directly over the median nerve, enclosed in a common sheath. After division of the tendon distally, it was apparent the area of nerve in contact with the anomalous tendon had been compressed by it.

Conclusion

Palmaris profundus is a rare anomaly in the carpal tunnel that should be identified easily from its anatomical orientation, but its direct relationship to median nerve compression remains unclear.

Conflict of Interest Katherine M Browne declares that she has no conflict of interest.

Ziham Fauzi declares that he has no conflict of interest.

Michael O'Shaughnessy declares that he has no conflict of interest.

Statement of Human and Animal Rights All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5).

Statement of Informed Consent Informed consent was obtained from all individual participants included in the study.

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