

Simultaneous Presence of a Transligamentous Recurrent Motor Branch of the Median Nerve and Palmaris Profundus Tendon in a Patient with Carpal Tunnel Syndrome: A Case Report

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Abstract

Carpal tunnel syndrome (CTS) is the most frequently encountered entrapment of the peripheral nerves in the upper extremity. Abnormal anatomical variations involving the recurrent motor branch of the median nerve and presence of a palmaris profundus tendon have been reported. We present a 53-year-old man in whom open carpal tunnel release led to complete resolution of numbness, tingling, and pain in the right hand by 1 month postoperatively. Intraoperatively, the simultaneous presence of a transligamentous recurrent motor branch of the median nerve and palmaris profundus tendon in the carpal tunnel was found and excised. Surgeons should be aware of the potential presence of these abnormalities in successfully treating patients with CTS.

Introduction

Carpal tunnel syndrome (CTS) is the most commonly noted entrapment to peripheral nerves in the upper extremity, with an incidence rate of 1 person per 20 per lifetime in the United States. About 500,000 surgical procedures are performed per year for treating this condition, generating an annual cost greater than two billion US Dollars.^{1,2} CTS typically affects the radial three digits. In patients with chronic CTS, symptoms can include pain and paresthesia at night. During the day, similar symptoms typically result from physical activities, loss of dexterity in hand function, and weakness with pinch and grip. Because of the anatomical configuration of the carpal tunnel and its contents, the median nerve is at risk for compression, which can result in decreased levels of epineurial blood flow and clinical symptoms of the syndrome.

Development of CTS is broadly categorized according to anatomic anomalies, systemic medical conditions, and occupational-related exposure to vibratory power tools.³ Recognizing and understanding the various potential

causes of CTS are essential in accurate diagnosis and appropriate treatment recommendations. In planning operative treatment, anatomical variations in the carpal tunnel should be considered and, if encountered, addressed to improve the overall success of treatment.

We describe a 53-year-old patient who presented with pain and numbness in his right hand. Evaluation of medical history, results of physical examination, and findings of diagnostic studies were consistent with CTS. Notably, a transligamentous recurrent motor branch of the median nerve and palmaris profundus tendon in the carpal tunnel were identified intraoperatively.

Case Report

A 53-year-old, right-handed laborer with an uncomplicated medical history presented with an 8-month history of pain in the right wrist and hand, with numbness affecting the thumb, index, and long fingers. The patient did not identify a specific trauma-related event or other clear inciting factor associated with the onset of his symptoms. His occupation required routine manual labor with heavy loads and repetitive tasks, which worsened the symptoms.

Findings of the initial physical examination revealed localized tenderness to palpation in the mid-carpal area, mildly restricted range of motion in the wrist, and weak grip strength relative to the uninjured hand. Additionally, results of a carpal compression test were positive for CTS, and findings of Tinel's sign were positive for irritated nerves at the wrist. No muscle atrophy was observed. Results of diagnostic imaging showed mild ulna minus variance and type 3A avascular necrosis of the lunate bone. Findings of electrodiagnostic studies indicated a prolonged latency of 5.6 ms at the right median motor and decreased amplitude (4.6 mV); sensory latency of 2.4 ms with decreased amplitude (19 μ V); and chronic neurogenic changes in the abductor pollicis brevis but not flexor pollicis longus, consistent with damage to the peripheral median nerve of the wrist.

Based on patient preference, open carpal tunnel release was performed. Intraoperatively, a transligamentous recurrent motor branch of the median nerve was identified. It was carefully dissected free of the transverse carpal ligament and maintained in continuity. Additionally, while inspecting the contents of the carpal tunnel, a palmaris profundus tendon was noted adjacent to the ulnar side of median nerve, and it was excised (Figure 1). No complications were noted postoperatively.

At 1 month postoperatively, the patient reported complete resolution of numbness and tingling in the previously affected digits. He described no pain in the right hand and returned to previous levels of physical activity at work, without restrictions or limitations. The timing for surgical treatment of avascular necrosis in the lunate bone was deferred at the most recent follow-up, pending results of treatment of an unrelated medical condition.

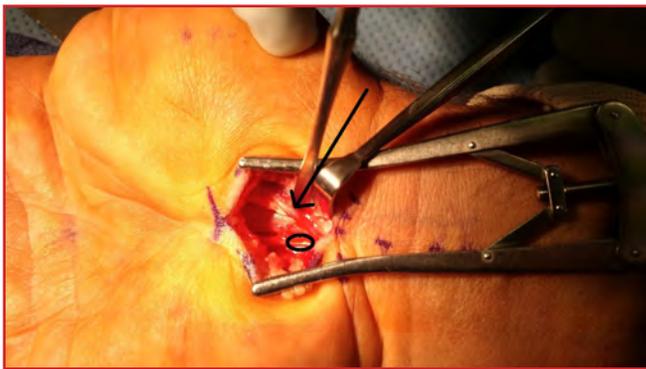


Figure 1. Intraoperative view of the hand during carpal tunnel release, showing the recurrent motor branch (arrow) and the palmaris profundus tendon (circled).

Discussion

Multiple cadaveric and clinical studies have described and reported observations of the anatomy and variations in the recurrent motor branch of the median nerve.⁴⁻⁷ A classification scheme by Poisel⁸ described three subtypes or branching patterns of the recurrent motor branch of the median nerve as extraligamentous (type I), subligamentous (type II), or transligamentous (type III). It subsequently was modified and expanded by Lanz⁹ to include variation in the course of the thenar branch (type I), accessory branches at the distal portion of the carpal tunnel (type II), high division of the median nerve (type III), and accessory branches proximal to the carpal tunnel (type IV).

The variability of the branching patterns noted in studies may reflect inconsistency in interpreting and reporting findings. The presence of a palmaris profundus tendon in the carpal tunnel is rare, with one study¹⁰ noting only 7 other reports, with patients aged 19 to 70 years. In five

of these patients, the results of electrodiagnostic studies were positive for CTS. However, no study has described abnormality of the motor branch. Yet other anatomical variabilities in the carpal tunnel have been noted such as synovitis or proximal origin of a lumbrical muscle.¹¹

In the current case, the transligamentous pathway of the motor branch of the median nerve was directly deep to the palmar fascia perforating the transverse carpal ligament, and a palmaris profundus tendon within the carpal tunnel was also found. The palmaris profundus tendon crossed the median nerve and could have contributed to the nerve compression. Meticulous dissection of both the aberrant motor branch and the tendon may have been essential in successful treatment of our patient. Because such a simultaneous presence is rare yet possible, we recommend careful inspection of the carpal tunnel and median nerve to note any anatomical variations when performing carpal tunnel release.

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Conflict of Interest

The authors report no conflicts of interest.

Informed Consent

The patient was informed that the data concerning the case would be submitted for publication, and he provided verbal consent.

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