

Rare Distribution of the Palmar Cutaneous Branch of the Median Nerve: A Case Report

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Abstract

This patient with carpal tunnel syndrome presented with a rare branch of the palmar cutaneous branch of the median nerve. The branch diverged from the radial side in the carpal tunnel and immediately penetrated the flexor retinaculum. Upon stimulation of the nerve, numbness radiated to the thenar area without muscle contraction.

Keywords: Carpal tunnel syndrome; Palmar cutaneous branch; Median nerve; Anatomical variation; Carpal tunnel release

Introduction

The Palmar Cutaneous Branch (PCB) of the median nerve is a pure sensory nerve that controls the thenar eminence and the proximal radial part to the palm area. It originates from the radial side of the median nerve and is located proximal to the wrist crease. Iatrogenic injury elicits painful dysesthesia after surgical carpal tunnel release. We report a patient in whom exfoliation of a rare branch of the PCB of the median nerve in a portion of the carpal tunnel yielded symptom abatement.

Case Report

An 84-year-old man complained of numbness in the thumb, index and middle fingers of the right hand. There was no atrophy of the thenar eminence and no paresthesia or dysesthesia of the palmar area or the thenar eminence.

Nerve conduction studies showed that distal motor latency of the median nerve was prolonged by 8.1 m/sec; distal sensory latency of the median nerve evoked no response. This finding resulted in a diagnosis of carpal tunnel syndrome. He underwent surgical carpal tunnel release under a microscope and local anaesthesia. An incision of approximately 2.0 cm was made from the midline of the distal wrist crease to the radial borderline of the ring finger. The carpal tunnel was opened, and the median nerve was addressed by external neurolysis.

A small branch diverging from the radial side of the median nerve in the carpal canal was identified (Figures 1A-1D). It was located under and immediately penetrated the flexor retinaculum. Electrical stimulation of this branch produced irritation radiating to the thenar area. The irritation increased with the intensity of electrical stimulation. There was no muscular contraction. We judged this small branch to be a sensory nerve rather than a recurrent motor branch. Although this abnormal branch of the median nerve was not correlated with his symptoms, it was carefully exfoliated as much as possible. The other PCB of the median nerve could not be identified within the operative field. We did not confirm the presence of a PCB from the median nerve of the forearm because the skin incision was short and there were no symptoms in this area. There were no postoperative complications. His symptoms did not recur in the course of 11-month follow-up. The patient has consented to the submission of the case report for submission to the journal.

Discussion

Iatrogenic injury of the palmar cutaneous branch of the median nerve occurred in 5.9% of operated patients. It elicits symptoms such as

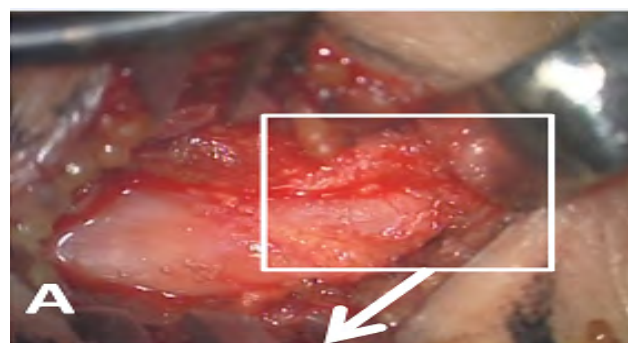


Figure 1A: Intraoperative view after cutting the flexor retinaculum the median nerve was visualized.

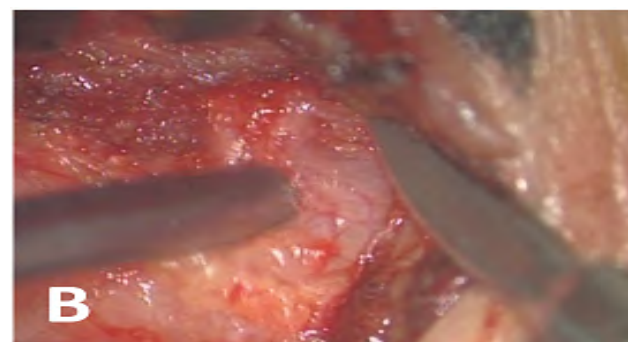


Figure 1B: Magnification of the white square in Figure 1A; Intraoperative view: A small branch is seen to branch off from the radial side of the median nerve in the carpal tunnel. It penetrates the flexor retinaculum.

painful paresthesia, persistent pain and tenderness, and the formation of neuroma. The PCB of the median nerve, a pure sensory nerve, controls

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Figure 1C: Post-operative view: The incision was approximately 2.0 cm long; Slants indicate the area of irritation in the thenar eminence elicited by nerve stimulation.

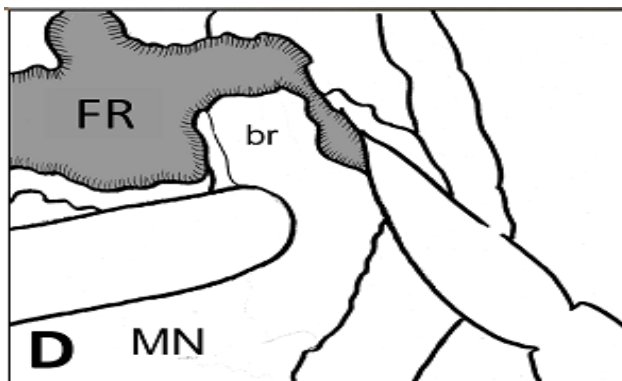


Figure 1D: Schematic view of Figure 1B. [br: Branch; FR: Flexor Retinaculum; MN: Median Nerve].

the thenar eminence and the proximal radial part to the palm area. It originates from the radial side of the median nerve and lies proximal to the wrist crease. It usually runs parallel to the median nerve in the forearm and enters the antebrachial fascia at the centre of the flexor retinaculum. Usually, the PCB branches from the median nerve 2-15 cm proximal to the distal wrist crease.

In 2.5% of operated patients, Amadio [1] detected anomalies of the PCB of the median nerve and penetration of the transverse carpal ligament. However, different from our case, the PCB branched from the proximal portion of the median nerve rather than the transverse

carpal ligament. Lindley et al. [2] encountered a patient whose PCB of the median nerve penetrated the flexor retinaculum at the carpal tunnel; it is not known whether it branched inside the carpal tunnel. As in our patient, it may have forked off on the radial side of the median nerve in the carpal tunnel. Cadaveric studies of Dasilva et al. [3] showed two anatomical variations of the PCB of the median nerve. One is a duplicate PCB of the median nerve that branches off 3 cm distal from the distal wrist crease. This branch forms a sensory loop with a superficial PCB of the median nerve passing through the transverse carpal ligament distal 1 cm from the distal wrist crease. In the second variation, the PCB penetrates the transverse carpal ligament about 1.4 cm from the distal wrist crease and is distributed in the wrist joint and the deep thenar muscle. In our patient, the nerve branched from the radial side of the median nerve in the carpal tunnel and immediately penetrated the transverse carpal ligament inside the carpal tunnel without running parallel to the median nerve. Nerve stimulation did not elicit contraction of the thenar muscle. There have been no earlier reports confirming the sensory distribution and function of the PCB of the median nerve by intraoperative nerve stimulation although the designation 'sensory nerve' was confirmed by tracing the branch to terminal fibres in the skin or subcutaneous tissue.

There are some limitations. Although the PCB of the median nerve may divide into multiple branches, only one among multiple branches may be recognized. We made a short skin incision and did not identify the proximal portion of the median nerve where the PCB tends to bifurcate and where other branches may be present in the proximal forearm. We cannot rule out that the small branch was a sensory rather than a motor nerve as we did not perform special nerve conduction studies of the PCB. However, we did not suspect entrapment of the branch by the transverse carpal ligament because there was neither sensory disturbance in the thenar area nor a positive Tinel sign before the operation.

Conclusion

In patients with carpal tunnel syndrome without sensory disturbance in the thenar area, the PCB of the median nerve may branch on the proximal side of the wrist. Our experience indicates that care must be taken during carpal tunnel release to avoid iatrogenic injury.

References

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