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Research

Idiopathic Bilateral Carpal Tunnel Syndrome in a Young Female: Early Diagnosis and Successful Surgical Outcome - A Case Report

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Abstract

Background: Carpal tunnel syndrome (CTS) is a common entrapment neuropathy caused by median nerve compression within the restricted carpal tunnel, producing characteristic sensory and motor deficits in the hand. While often linked to repetitive wrist strain, endocrine disorders, or inflammatory conditions, idiopathic CTS in young individuals without systemic comorbidities may be under-recognized. Timely identification of the condition is crucial to avoid irreversible nerve injury and maintain optimal hand function.

Case Presentation: A 32-year-old woman presented with chronic right-hand pain, tingling, and nocturnal numbness without any history of trauma, systemic disease, or repetitive occupational activities. Physical examination demonstrated positive Tinel's and Phalen's signs. Nerve conduction studies revealed bilateral median nerve compression, more pronounced on the right. The patient underwent right-sided surgical decompression through an open carpal tunnel release. Postoperative recovery was uneventful, with significant improvement in sensory symptoms and hand function. She was discharged with instructions on wrist care, ergonomic modifications and follow-up electrophysiological assessment.

Conclusion: Idiopathic CTS can present subtly in otherwise healthy young adults and may easily be overlooked without thorough clinical and electrophysiological evaluation. Early identification, combined with timely surgical decompression when indicated, is crucial for optimal recovery and prevention of irreversible neuropathy. Comprehensive postoperative guidance further enhances long-term functional outcomes.

Keywords: Case Reports, Carpal Tunnel Syndrome, Decompression, Surgical, Early Diagnosis, Idiopathic Diseases, Surgical Procedures, Operative.

INTRODUCTION

Carpal Tunnel Syndrome (CTS) is the most frequent type of compressive neuropathy around the globe, attributable to restriction of the median nerve within the anatomical boundaries of the carpal tunnel, as a result of thyroid diseases, trauma, pregnancy or rheumatoid arthritis. CTS is predominant among female and middle-aged patients ranges from1 to 5%. Symptoms encompass weakness, discomfort and paranesthesia along the median nerve distribution. Bilateral CTS affects approximately 22% to 87% of patients, and if left untreated, it may result in muscle weakness and permanent sensory loss. [1,2] Although conditions such as diabetes, thyroid disorders, and rheumatoid arthritis, as well as repetitive occupational wrist movements, are recognized risk factors, the manifestation of idiopathic cases in young adults without apparent predisposing factors poses a significant diagnostic challenge. Early recognition and intervention are essential to prevent irreversible nerve damage. [3] This report presents a rare case of bilateral idiopathic CTS in a young female, emphasizing the role of timely diagnosis and surgical management in achieving favorable outcomes.

CASE PRESENTATION

Clinical Presentation and Diagnostic Workup

A 32-year-old right-handed woman reported a 6-month history of persistent pain localized to the right-hand flexor region, accompanied by intermittent tingling sensations extending into the wrist and palm. The symptoms progressively interfered with her daily activities. She reported no prior trauma, occupational strain or systemic illness such as diabetes, hypertension, asthma or epilepsy. On examination, no swelling, erythema or tenderness was observed, active movements of fingers and wrist were preserved and digital pulses felt normal. Neurological examination was suggestive of median nerve involvement. Laboratory investigations revealed hemoglobin 9.9 g/dL, platelets 324 × 10^3/μL, renal and liver function tests within normal limits. Electrophysiological testing with nerve conduction velocity (NCV) and electromyography (EMG) showed prolonged bilateral median motor distal latencies and sensory latencies, confirming bilateral Carpal Tunnel Syndrome, with greater severity on the right. The diagnostic tests for cervical radiculopathy showed no evidence of nerve root compression or disc herniation, and physical examination maneuvers like Spurling's test were negative. Nerve conduction studies and electromyography results indicated normal nerve function except for localized median nerve impairment consistent with carpal tunnel syndrome, ruling out generalized peripheral neuropathy. Laboratory tests for rheumatoid arthritis, including rheumatoid factor and inflammatory markers, were within normal limits, and no clinical signs of joint inflammation were present, effectively excluding rheumatoid arthritis as a diagnosis.

Surgical Management and Postoperative Care

The patient was counselled and prepped for surgical decompression. Under aseptic conditions with the patient supine and the right forearm supinated, a longitudinal incision was made on the flexor aspect of the right wrist. Skin and subcutaneous tissues were carefully dissected to expose the palmar fascia. The transverse carpal ligament was meticulously identified and released proximally and distally to decompress the median nerve fully, ensuring no injury to the nerve or adjacent structures. Haemostasias was secured, and the wound was closed in anatomical layers with sterile dressing applied. There were no intraoperative complications. Postoperatively, the patient was given analgesics including paracetamol 500 mg TDS, tramadol 150 mg BD, diclofenac BD, and prednisolone BD, alongside vitamin C and calcium supplementation. Daily sterile dressings were maintained and the patient was encouraged to perform gentle wrist and finger mobilization exercises as tolerated.

Outcome and Clinical Significance

The patient tolerated the procedure well and reported significant reduction of pain and paranesthesia by postoperative day 3. She was discharged on day 5 in stable condition with advice for outpatient follow-up. At one-month review, she demonstrated near-complete resolution of symptoms with restoration of hand function and no signs of surgical complications. This case underscores the clinical importance of early diagnosis and readiness to perform surgical release in idiopathic CTS, highlighting that even young and otherwise healthy individuals may develop bilateral CTS requiring intervention.

DISCUSSION

Carpal Tunnel Syndrome remains a common cause of hand disability worldwide. While secondary CTS linked to diabetes, hypothyroidism, pregnancy, or repetitive occupational activity is well described, idiopathic forms, especially bilateral presentations in young adults without identifiable risk factors are less frequently reported. For instance, as highlighted in a complex case study involving a patient with gout, multifactorial aetiologies including anatomical variations can complicate diagnosis and management, underscoring the importance of thorough evaluation.[4] Conservative and novel treatment approaches, such as the modified neurodynamic combined with general exercises reported in a case report, demonstrate promising improvements in symptom relief and functional outcomes, particularly in mild to moderate CTS.[5] Meanwhile, in populations with underlying neurological conditions like Parkinson's disease, mechanical factors related to tremor may contribute to CTS development, emphasizing the need for personalized management strategies.[6] Diagnosis relies heavily on clinical features supported by electrophysiological confirmation showing delayed median nerve motor and sensory latencies. Although conservative approaches may suffice for milder symptoms, persistent or progressive deficits warrant surgical decompression. The transverse carpal ligament release offers effective nerve decompression, leading to symptomatic relief and functional improvement, as observed in this patient.[7] Early surgical intervention is pivotal to prevent irreversible axonal damage that may lead to muscle atrophy and permanent functional loss.[8] Our case adds to accumulating evidence encouraging vigilance among clinicians to consider idiopathic CTS in differential diagnosis despite absence of systemic disease, enabling prompt referral and optimal treatment.

CONCLUSION

The case of idiopathic bilateral Carpal Tunnel Syndrome in a young, healthy female underscores the importance of maintaining clinical vigilance and utilizing electrodiagnostic studies for accurate diagnosis. Despite lacking typical risk factors, this condition can present bilaterally and requires timely surgical decompression to prevent irreversible nerve damage and ensure functional recovery. Early recognition and intervention are critical for achieving optimal patient outcomes and minimizing long-term disability.

PATIENT CONSENT

Written informed consent was obtained from the patient for publication of this case report.

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