



CARPAL TUNNEL SYNDROME ASSOCIATED WITH HYPOTHYROIDISM: A CASE REPORT

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KEYWORDS :

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy, resulting from compression of the median nerve within the osteofibrous carpal tunnel at the wrist. It manifests with sensory disturbances in the median nerve distribution and may progress to motor weakness if left untreated. Hypothyroidism is a recognized but often underdiagnosed systemic cause of CTS due to mucopolysaccharide deposition, fluid retention, and resultant increased intracarpal pressure.

We report the case of a 75-year-old woman with irregularly treated hypothyroidism who presented with persistent nocturnal pain, paraesthesia, and a pin-pricking sensation in the right hand. Despite medical management, her symptoms persisted. Nerve conduction studies confirmed carpal tunnel syndrome. Surgical decompression resulted in immediate and complete symptomatic relief. This case highlights the importance of early recognition of endocrine causes of CTS and timely surgical intervention when conservative management fails.

Case Presentation

A 75-year-old woman presented with pain, paraesthesia, and a pin-pricking sensation in the right hand distal to the wrist for three months. The symptoms were continuous and particularly severe at night, frequently awakening her from sleep.

Medical History

- No history of type 2 diabetes mellitus
- No systemic hypertension
- No ischemic heart disease
- Known bronchial asthma on bronchodilators
- Known hypothyroidism with irregular medication compliance
- Past history of lower segment caesarean section (LSCS) and appendectomy
- Examination
- Radial pulsations: well felt
- No muscle wasting
- Hand grip strength: good
- Tinel's test: negative
- Phalen's test: negative

Investigations

Routine investigations including complete blood count (CBC), urine routine, fasting blood sugar (FBS), lipid profile, liver function tests (LFT), Vitamin B12 levels, chest X-ray, electrocardiogram (ECG), 2D echocardiography, and ultrasound abdomen were performed.

Her thyroid-stimulating hormone (TSH) level was markedly elevated. Thyroxine supplementation was adjusted by an endocrinologist.

Initial management included:

- Vitamin B12 supplementation
- Pregabalin
- Gabapentin

Despite treatment, symptoms persisted. A nerve conduction study confirmed carpal tunnel syndrome.

She was evaluated by a neurophysician and plastic surgeon and subsequently underwent surgical decompression.

Laboratory Investigations

Investigation	Result	Normal Range
Hemoglobin	12.3 g/dL	12–15 g/dL

RBC Count	3.88 million/ μ L	3.8–4.8
WBC Count	$6.45 \times 10^3/\mu$ L	4.0–11.0
Platelet Count	$216 \times 10^3/\mu$ L	150–450
Hematocrit	37.80%	36–46
MCV	97.4 fL	80–100
MCH	31.7 pg	27–33
MCHC	32.5 g/dL	32–36
ESR	25 mm/hr	0–35
HbA1c	5.80%	<5.7
FBS	101 mg/dL	70–99
BUN	15 mg/dL	8–23
Creatinine	0.73 mg/dL	0.60–1.20
Uric Acid	5.7 mg/dL	2.4–5.7
ALT	44 U/L	<33
AST	50 U/L	<32
Total Cholesterol	186 mg/dL	<200
LDL	118 mg/dL	<100
HDL	56 mg/dL	>50
T3	92.64 ng/dL	80–200
T4	4.72 μ g/dL	5.10–14.10
TSH	24.100 μ IU/mL	0.27–4.20
Vitamin D	52.85 ng/mL	30–100
Vitamin B12	593.6 pg/mL	197–771

Hospital Course- The patient underwent right carpal tunnel release and decompression with external neurolysis.

Procedure Summary

- Local anaesthesia
- Palmar incision along distal crease
- Division of transverse carpal ligament
- Median nerve decompression
- External neurolysis
- Layered wound closure with drain placement

Postoperative recovery was uneventful. She received intravenous antibiotics, analgesics, and supportive care. Pain and paraesthesia resolved the same evening. She remained hemodynamically stable and was discharged in satisfactory condition.

DISCUSSION

Carpal tunnel syndrome (CTS) is a common entrapment neuropathy caused by compression of the median nerve within the carpal tunnel at the wrist. It typically presents with gradually progressive sensory and motor symptoms affecting the median nerve distribution.

In this case, the patient's symptoms were characteristic of CTS. The condition often begins with intermittent tingling and numbness involving the thumb, index finger, middle finger, and radial half of the ring finger, while sparing the little finger. Patients frequently describe the sensation as electric shock-like. Symptoms commonly occur during activities such as holding a steering wheel, phone, or newspaper and frequently awaken patients from sleep. Nocturnal exacerbation is a classic feature.

Some patients report radiation of symptoms proximally up the forearm. A typical relieving maneuver is "shaking out" the hand.

As the condition progresses, sensory disturbances may become persistent. Motor involvement may develop, manifesting as weakness of thumb opposition and pinching movements due to impairment of the

thenar muscles innervated by the median nerve. This can lead to difficulty gripping objects and frequent dropping of items.

The underlying pathophysiology involves increased pressure within the carpal tunnel leading to compression and ischemia of the median nerve. Any condition that reduces the size of the tunnel or increases the volume of its contents may precipitate nerve compression.

Several etiological factors and risk modifiers are associated with CTS. Structural abnormalities such as wrist fractures, inflammatory conditions like rheumatoid arthritis and gout, metabolic disorders such as diabetes mellitus, obesity, pregnancy, and menopause are recognized contributors. Thyroid disorders are also strongly associated.

Chisholm (1981) reported that CTS may be the presenting manifestation of previously undiagnosed hypothyroidism and may occur bilaterally. The proposed mechanism involves mucopolysaccharide deposition and myxedematous infiltration within the carpal tunnel, increasing intracarpal pressure.

Karne and Bhalerao (2016) demonstrated a higher prevalence of CTS among patients with primary hypothyroidism, particularly in those with longer disease duration and inadequate hormonal control. This is clinically relevant in our patient, who was irregular with thyroid medication and had markedly elevated TSH levels.

Abuzinadah (2025) showed that hypothyroid patients exhibit significant electrodiagnostic abnormalities, including prolonged distal motor latency and reduced conduction velocity, supporting the importance of nerve conduction studies in endocrine-related CTS. Shiri (2014), in a meta-analysis, confirmed a statistically significant association between hypothyroidism and CTS, establishing thyroid dysfunction as an independent risk factor.

In the present case, uncontrolled hypothyroidism (TSH 24.100 μ IU/mL) likely contributed to median nerve compression. Although thyroid hormone replacement is essential, chronic structural compression may persist, necessitating surgical decompression. The immediate resolution of symptoms following surgery confirms the mechanical component of the pathology.

CONCLUSION

Carpal tunnel syndrome is a multifactorial entrapment neuropathy with a well-established association with hypothyroidism. Screening thyroid function in patients presenting with CTS is essential. While medical correction of hypothyroidism is necessary, persistent or advanced cases may require surgical intervention. Early diagnosis and timely decompression prevent permanent nerve damage and significantly improve patient outcomes.

Patient Perspective

The patient reported complete relief of nocturnal pain and improved quality of sleep immediately after surgery.

Informed Consent

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

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