A rare confusing presentation carpal tunnel syndrome as first sign of Hypothyroidism and Rheumatoid arthritis: A case report

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Research Article

Keywords: Carpal tunnel, hypothyroidism, rheumatoid arthritis, median nerve, digital ulceration

Posted Date: October 31st, 2022

DOI: https://doi.org/10.21203/rs.3.rs-2139802/v1

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Version of Record: A version of this preprint was published at SN Comprehensive Clinical Medicine on January 4th, 2023. See the published version at https://doi.org/10.1007/s42399-022-01384-x.
Abstract

Introduction: Carpal tunnel syndrome (CTS) can be an initial sign of underlying undiagnosed disorders like hypothyroidism or rheumatoid arthritis. The erosive type of CTS is rare and generally requires carpal tunnel release surgery as a treatment modality.

Case: A 55-year-old gentleman presented with paraesthesia and spontaneous digital ulceration of the distal finger in both hands over 5 months. Initially managed as some vascular disorder by physicians. Later on, in nerve conduction studies, CTS was diagnosed. The patient was further investigated for etiology leading to the diagnosis of hypothyroidism and rheumatoid arthritis. These were managed with medications and CTS was managed with the surgical release. The paraesthesia was relieved post-surgically and digital ulceration healed over a few weeks.

Conclusion: Digital ulcerations can be a presentation of CTS rather than vascular/vessel disorder. The physician should be aware of CTS erosive variety and further investigate the etiology like hypothyroidism, and rheumatoid arthritis. The etiological factors should be treated first before embarking on surgical carpal tunnel release.

Introduction

Carpal tunnel syndrome (CTS) is one of the most common entrapment neuropathy affecting the hands [1]. While the most common etiology is considered to be idiopathic or repetitive/vibrational wrist injuries but there are other medical causes also including hypothyroidism and rheumatological disorders [2]. The presentation varies from paraesthesia in hand to digital ulceration. The ulcerative variety occurs rarely and occurs due to severe damage to the motor, sensory and autonomic fibres of the median nerve [3, 4]. Digital ulcerations are mostly seen at the fingertips with skin atrophy, acroosteolysis, and nail changes [5]. The patient presenting with digital ulcerations as the first presenting symptom of rheumatoid arthritis and hypothyroidism has never been reported in English literature. This case report depicts the presence of digital ulceration as the first sign of hypothyroidism and rheumatoid arthritis.

Case report

A 55-years old male gentleman presents with digital ulcerations at the distal phalange of the index and middle fingers in both hands (Fig. 1). The ulcers appeared spontaneously and progressively increased over the period of 5 months. Initially patient had stiffness in both hands for the past 1 year with no joint pains elsewhere. There was numbness and paraesthesia in both hands along the radial aspect. Gradually the patient lost the sensations of temperature and fine touch with swelling and pain in proximal and distal interphalangeal joints. The patient was previously treated by a dermatologist and a vascular surgeon for peripheral vascular disease and non-healing ulcers. The patient had no history of similar ulceration on the foot or elsewhere in the body. The patient was a non-smoker, non-alcoholic, and non-diabetic with no occupational injury. On examination, the non-tender ulcers were present along with skin
atrophy and onchyodystrophy. There was thenar wasting in both hands as compared to hypothenar eminence. Although the patient was able to make a fist with difficulty owing to pain and stiffness in interphalangeal joints. The muscle power was comparable on both sides. The radial and ulnar pulses were comparable on both sides. There was significant sensory loss along with the median nerve distribution in both hands. The Phalen’s test, as well as the compression test for CTS, were positive. The electrodiagnostic studies depicted median nerve sensory conduction velocities (Digit 2 Antidromic) of 32 m/s (left) and 39 m/s (right). The median nerve motor conduction velocities were normal as compared to the ulnar nerve.

The patient was further investigated for rheumatoid arthritis and hypothyroidism as these are most commonly associated with CTS. The laboratory investigations (Table 1) depicted the acute flare of rheumatoid arthritis and hypothyroidism. Rest liver function tests, renal function tests, blood glucose profile, and complete blood count were all within normal range throughout the treatment course. The radiographs showed degenerative changes in the interphalangeal joint along with osteopenia. The patient was managed with sulphasalazine (dose: 1gm twice daily), hydroxychloroquine (dose: 200mg twice daily for 1 month), methotrexate (dose: 10gm once a week along with folic acid 5 mg daily), prednisolone (dose: 10mg daily), and thyroxine (dose: 25 mcg daily) for 2 months. The pain and stiffness reduced with the treatment but the ulcers progressed in size with the worsening of surrounding skin and nails. The laboratory investigations suggested subsidence of rheumatoid arthritis flare and maintenance of thyroid hormone levels.

<table>
<thead>
<tr>
<th>S.no</th>
<th>At presentation</th>
<th>At 2 months</th>
<th>At 6 months</th>
<th>At 1 year</th>
</tr>
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<tbody>
<tr>
<td>ESR (mm/hr)</td>
<td>72</td>
<td>48</td>
<td>23</td>
<td>18</td>
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<tr>
<td>CRP (mg/L)</td>
<td>36.6</td>
<td>12.8</td>
<td>5.5</td>
<td>2.4</td>
</tr>
<tr>
<td>RA factor (IU/ml)</td>
<td>94.6</td>
<td>23.4</td>
<td>20.7</td>
<td></td>
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<tr>
<td>Anti-CCP (U/ml)</td>
<td>Positive (8.9)</td>
<td>5.6</td>
<td>Negative (2.4)</td>
<td></td>
</tr>
<tr>
<td>T3 (nmol/L)</td>
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<td>1.7</td>
<td>1.8</td>
<td>1.8</td>
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<tr>
<td>T4 (nmol/L)</td>
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<td>62.7</td>
<td>64.8</td>
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<tr>
<td>TSH (mU/L)</td>
<td>10.2</td>
<td>4.9</td>
<td>4.6</td>
<td>4.6</td>
</tr>
</tbody>
</table>

The patient was then planned for bilateral CTS open release. Standard single incision open CTS release was performed on the right side followed by the left side. During the surgery, there was tight fascia present along with a tight band over the roof of the carpal tunnel. The carpal tunnel release was performed. The median nerve was found to be flattened and compressed in carpal tunnel in both hands (Fig. 2). No surgical intervention was performed for digital ulcerations. The postoperative period was uneventful followed by immediate relief in paraesthesia in both hands. Over the period of 2 weeks, the
surgical wound healed and paraesthesia, as well as sensory loss, had completely recovered. The treatment with DMARDs (Sulphasalazine and Methotrexate) and thyroxine was continued. The digital ulcerations healed completely over the next 2 weeks without any intervention or dressing. The hand grip strength as well as stiffness improved with treatment. The patient was satisfied with near-complete functional recovery of both hands during the follow-up of 1 year (Fig. 3).

Discussion

CTS is a common entrapment neuropathy seen in various conditions. The carpal tunnel is a narrow space with tendons and median nerve passing through it. The exact mechanism of neuropathy is still not fully understood but various factors have been pointed out. Rheumatological disorders and other autoimmune disorders are commonly associated with CTS[6]. Such patients with medical causes for CTS generally have bilateral affection [7]. The pathogenesis involves synovial hypertrophy, fat depositions, ganglion cyst, mucinous/mucopolysaccharides deposition on the median nerve, and compression from surrounding soft tissues and bones. In hypothyroidism, synovial hypertrophy and mucinous deposition are mainly responsible for CTS [8]. This all leads to compression neuropathy of the median nerve. Many times, the correction of the underlying medical cause can result in the resolution of CTS symptoms. A similar approach was performed in this patient to tackle the underlying rheumatoid arthritis and hypothyroidism disorder. But it has been seen hypothyroid patients persistently have CTS symptoms even when they are on thyroid replacement therapy or in the euthyroid state [9]. Kasem A et al. [10] reported the CTS can be reversed with 3 months of hormone replacement therapy. Although the combination of rheumatological disorder and hypothyroidism might be the cause for this being a resilient CTS in this patient. The patient was treated for both the disorder for 2 months and laboratory investigations depicted the rectification of the deranged values. The patient still has signs and symptoms of CTS and was thus surgically intervened for the resolution of the disorder. The symptoms of CTS can vary from just discomfort or paraesthesia along the median nerve distribution to ulcerative variety depicting severe sensorimotor deficit. The compressive neuropathy gradually increases and leads to loss of sensation including temperature sensation. Due to repetitive thermal injury or pressure injury, the distal phalanges of such affected fingers develop ulcers. These are associated with onchyodystrophy and skin atrophy. These trophic ulcers progressed with time and do not heal spontaneously. The lack of neurotropin and sensation might lead to this progression and non-healing state of these ulcers [11]. This was surprising, the patient presented with digital ulceration as the first sign of rheumatoid arthritis and hypothyroidism. The patient had minimal stiffness and no other subtle signs of these autoimmune disorders. The patient was initially treated by a dermatologist and vascular surgeon for peripheral vascular disease or some dermatological disorder. Only the presence of non-healing digital ulcers has led to the diagnosis of rheumatoid arthritis and hypothyroidism. This was a rare case with the such first sign of rheumatoid arthritis and hypothyroidism.

The surgical intervention has helped to relieve the symptoms and resulted in the healing of digital ulcers. Such ulcers heal with the treatment of the underlying neurological cause. This emphasizes the need of
suspecting rheumatological disorder and hypothyroidism in patients with digital ulceration as a part of CTS. This prevents unnecessary investigations and delays in the treatment.

**Conclusion**

Digital ulcers present as non-healing ulcers as a part of CTS. The commonly associated underlying cause of CTS including rheumatological disorders and hypothyroidism should be suspected and treated early. This prevents unwarranted investigation and delay in treatment. The medical and surgical management of CTS helps in the healing of these ulcers without any local site intervention.

**Declarations**

i. Funding: None

ii. Conflicts of interest/Competing interests: None

iii. Ethics approval: taken from the institute

iv. Consent to participate: taken from the patient

v. Consent for publication: taken from the patient

vi. Availability of data and material: Yes

vii. Code availability: not applicable

viii. Authors Contribution: Dr. Bushu Harna: Manuscript conceptualization, proof reading

Dr. Shivali Arya: Data collection and manuscript writing

**References**


Figures

![Figure 1](image)

**Figure 1**

Depicting the digital ulceration in distal phalanes of the finger in both hands
Figure 2

Intra-operative picture depicting flattened median nerve
Figure 3

Follow-up at 6 weeks depicted healed digital ulcerations