



SURGERY, TREATMENT OR DIAGNOSIS METHOD? THE INTERESTING ETIOLOGY OF CARPAL TUNNEL SYNDROME. CASE REPORT

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Abstract: Carpal tunnel syndrome (CTS) is well recognized as the most common type of peripheral neuropathy. Encountered causes of carpal tunnel syndrome are rheumatoid arthritis, diabetes mellitus, and trauma. A rare cause of CTS is tophaceous gout. Tophi deposits can accumulate in various structures including the flexor tendons, tendon sheaths, transverse carpal ligament, and even the median nerve, causing various symptoms such as pain, numbness, and weakness. Tophi forming in the carpal canal can compress the median nerve, leading to CTS. Here, it is described a case of a 56-year-old male without a known family history of tophaceous gout who presented with typical CTS symptoms. CTS symptoms were eased through surgical removal of tophi and decompression of the median nerve. This case shows that CTS symptoms could be the initial manifestation of tophaceous gout. Surgical removal of gout tophi and decompression of the median nerve is an effective option for eliminating symptoms.

INTRODUCTION

Carpal tunnel is a passage from the wrist to the hand made of tendons, ligaments and bones.

The carpal tunnel has well-defined anatomical boundaries.

- Roof: Transverse carpal ligament with 4 bony insertions, which creates 2 walls.
- Radial Wall: scaphoid tubercle and trapezium
- Ulnar Wall: hamate and pisiform.
- Floor: proximal carpal row

The median nerve travels down the upper arm, across the elbow, and into the forearm, then passes through the carpal tunnel at the wrist on its way to the hand and fingers. It separates into several smaller nerves along the way, particularly once it reaches the palm. These nerves allow for feeling in the thumb, index finger, middle finger, and the thumb side of the ring finger. It also controls the muscles around the base of the thumb.

Median nerve compression at the wrist is the most commonly recognized nerve entrapment syndrome.(1)

There is an association between carpal tunnel syndrome and a various number of medical conditions, one of them including tophaceous gout. Nerve damage and worsening symptoms can occur if the compression on the median nerve continues. To prevent this permanent damage, surgery for decompression of the median nerve is recommended for some patients.(2)

CASE REPORT

A 56-year-old patient was admitted to the Department of Plastic Surgery Sibiu, Romania on 09/03/2022 complaining about nocturnal pain at the level of the thumb, index, middle and

ring finger of the right hand, accompanied by paresthesia, tingling and burning sensation. The symptomatology started a few months before the presentation, becoming more pronounced in the last two weeks, it consists of paresthesia along the path of the median nerve, pain of increased intensity, which wakes the patient from sleep and does not yield to NSAID (non-steroid anti-inflammatory drugs) treatment. Phalen and Tinel signs and the median nerve compression test are positive, as is the result obtained in electromyography. He had no medical history of any serious illness, no known drug allergies, and he was not taking any medications. A clinical diagnosis of carpal tunnel syndrome was made based on clinical signs. Because the patient had classic symptoms and the diagnosis of compression to the median nerve was certain, other paraclinical investigations such as ultrasonography or MRI were not effectuated. Following the anamnesis, clinical examination and paraclinical investigations, the patient is diagnosed with carpal tunnel syndrome that requires surgical treatment(3) The preoperative paraclinical blood test examination revealed that the uric acid of the patient is above the limit (10,1 mg/dl; N=3,5-7,2 mg/dl) which makes gout a possible cause of the carpal tunnel syndrome. Other modified results were Cholesterol (253mg/dl; N=109-202 mg/dl) and Triglycerides (313 mg/dl; N=50-165mg/dl)

The decision was made to decompress the carpal tunnel with Wide Awake (WALANT) anesthesia. The used technique was with a curve incision, parallel to the thenar fold, with a length of ~ 2-3 cm, which ends distal to the transverse fold of the wrist. The skin incision was made with a No. 15 blade up to the level of the carpal ligament. Then, a blade no. 11 was used to section the carpal ligament simultaneously with the use of a metallic instrument to protect the median nerve. The flexor nerve and tendons are examined in the carpal tunnel. At

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this level, a tumour of 40/25/12 mm (figure no. 1, figure no. 2) with an irregular shape, elastic consistency of gray-whitish colour is discovered, which calls into question the etiology of carpal tunnel syndrome, namely gout. The result of the histopathological examination (table no. 1) confirms the suspicion of the intraoperative diagnosis, tumour formation being tophi gout, in a patient without a history of gout.

Postoperatively, the symptoms have improved, the evolution is favourable, and the recovery lasts ~ 8-12 weeks. The patient was referred to the Rheumatology department for gout-specific consultation and treatment. Gout control is necessary to avoid CTS recurrence.(4)

Table no. 1. Histopathological examination

Macroscopic: 1. Tissue fragment of 40/25/12 mm gray-whitish colour, elastic consistency.
Microscopic: 1. Fragment of fibroconjunctival tissue with the presence of weak eosinophilic amorphous material with fibrous reaction and chronic gigantocellular inflammatory reaction of foreign body. They are not cellular atypia.
Histopathological diagnosis: Histopathological aspect of gouty tophi

Figure no. 1. Intraoperative view with gouty tophi deposition (black arrow) along flexor tendon sheaths



Figure no. 2. Gouty tophi deposition



DISCUSSIONS

Gout is a disease featuring acute arthritis, joint deformity and severe pain caused by the deposition of monosodium urate crystals in and around synovial tissue. Carpal tunnel syndrome is a rare condition in these cases. It indicates the severity of the disease and its delayed treatment. Because of its rare frequency, gout involvement of the flexor tendons and CTS may be overlooked in the differential diagnosis.(5) It was particularly exceptional for this patient, because there were no visible tophi in any part of his body. Gout is more likely to develop in patients whose family members have had gout. It is possible that their genetic makeup predisposes them to gout. Since the patient reported no problem with overconsumption of alcohol, no history of gout, and no visible tophi when he visited the department for local examinations, it was diagnosed as a typical CTS patient. It is well known that a delayed diagnosis can lead to irreversible nerve injury and complications, including articular changes, tendon rupture, and tenosynovitis. Thus, it is imperative to consider all possibilities when analysing the causes of CTS.(6)

Ultrasonography (US) it is an important evaluation of soft tissue masses at the wrist. Gouty tophus situated along the course of the median nerve at the wrist can mimic a nerve tumour. US can accurately visualize wrist structures and can be very useful in determining the intra- or extraneural origin of a mass. If the clinical examination does not offer enough information for diagnosis, US should be the first imaging test in the evaluation of soft tissue masses at wrist.(7), but it has limited evidence that supports not routinely using ultrasound for the diagnosis of carpal tunnel syndrome.(8)

Electromyography and nerve conduction studies (NCS) may be considered, although there are limited evidence supports that a hand-held nerve conduction study device might be used for the diagnosis of carpal tunnel syndrome.

There was one high quality study (Jarvik, 2002) evaluating MRI for the diagnosis of CTS. Findings on MRI had a weak or poor association as a rule out test for CTS as compared to a classic or probable hand pain diagram and nerve conduction study. Only severe fascicular swelling, severe flexor tenosynovitis, or severe increased muscle signal had a strong association with CTS, suggesting that MRI would be insensitive in identifying the diagnosis of CTS in the majority of patients in whom these findings would be unlikely to be present. Moderate evidence supports not routinely using MRI for the diagnosis of carpal tunnel syndrome.(8)

CONCLUSIONS

The particularity of the case is relevant to the rare etiology of CTS and the solution offered by surgery, being both a treatment and a diagnostic method. Gout should be considered in the differential diagnosis for carpal tunnel syndrome, especially in males. MRI is not indicated to be effectuated by routine at CTS patients, but just in specific cases. Although Ultrasonography can accurately visualize wrist structures and intra- or extraneural origin of a mass, it has limited evidence that supports not routinely using ultrasound for the diagnosis of CTS. Carpal tunnel syndrome symptoms could be the initial manifestation of tophaceous gout. This case illustrates the importance of tophaceous gout as a cause of entrapment of nerves at the wrist and also illustrates that its infiltration into healthy tissue can lead to irreversible damage and a potential loss of function.

REFERENCES

1. Miller TT, Reinus WR. Nerve entrapment syndromes of the elbow, forearm, and wrist. *AJR Am J Roentgenol.* 2010;585-594.

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2. Lalonde DH. Evidence-based medicine: Carpal tunnel syndrome. *PlastReconstr Surg.* 2014;1234–1240.
3. Lane LB, Starecki M, Olson A, Kohn N. Carpal tunnel syndrome diagnosis and treatment: A survey of members of the American Society For Surgery of the Hand. *J Hand Surg Am.* 2014;39:2181–2187
4. Lu H, Chen Q, Shen H. A repeated carpal tunnel syndrome due to tophaceous gout in flexor tendon: A case report. *Medicine (Baltimore).* 2017;96:e6245. (PMC free article) (PubMed) (Google Scholar)
5. Rich JT, Bush DC, Lincoski CJ, Harrington TM. Carpal tunnel syndrome due to tophaceous gout. *Orthopedics.* 2004;27:862–863. (PubMed) (Google Scholar)
6. Ogilvie C, Kay NR. Fulminating carpal tunnel syndrome due to gout. *J Hand Surg Br.* 1988;13:42–43. (PubMed) (Google Scholar)
7. Therimadasamy A, Peng YP, Putti TC, Wilder-Smith EPV. Carpal tunnel syndrome caused by gouty tophus of the flexor tendons of the fingers: sonographic features. *Journal of Clinical Ultrasound.* 2011;39(8):463-465.
8. American Academy of Orthopaedic Surgeons. Clinical practice guideline on the diagnosis of carpal tunnel syndrome. 2007. http://www.aaos.org/Research/guidelines/CTS_guideline.