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Case Report

Acute Carpal Tunnel Syndrome Secondary to Gout Flare and Outcomes at 18 Months After Open Carpal Tunnel Decompression



Alexei Buruian, MD, * Daniel Peixoto, MD, * Susana Ângelo, MD, * André Carvalho, MD, * António Mendes, MD, * Carlos Pereira, MD *

* Department of Orthopaedics, Hospital Distrital da Figueira da Foz, Figueira da Foz, Portugal

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ABSTRACT

Acute carpal tunnel syndrome is a rare condition that requires immediate surgery. Although numerous causes have been described in the literature, only 7 reports of acute carpal tunnel syndrome secondary to gout have been reported, all with short follow-ups. We report, to our knowledge, the first case of carpal tunnel syndrome presenting with total anesthesia of the fingers innervated by the median nerve and complete recovery of the sensory and motor function after carpal tunnel decompression, with no recurrence at the 18-month follow-up. To prevent irreversible damage to the nerve, treatment should not be delayed.

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Acute carpal tunnel syndrome (CTS) is characterized by progressive worsening of the median nerve function, with an onset measured in minutes to hours. It is a surgical emergency and is usually caused by wrist or hand trauma. Atraumatic acute CTS is a rare condition that can be caused by a variety of factors, including tophaceous gout.¹ A PubMed query on October 22, 2021 using the key word “acute carpal tunnel gout” revealed 7 cases published to date (Table).^{2–7} Cases of chronic CTS (symptoms lasting more than 3 months) were excluded.⁴

In this article, we have reviewed the clinical cases reporting acute CTS secondary to gout flare and presented an original case that was treated with carpal tunnel decompression, synovectomy, and excision of the intratendinous and intramuscular tophi.

All procedures performed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Written informed consent was obtained from the patient included in the study.

Declaration of interests: No benefits in any form have been received or will be received by the authors related directly or indirectly to the subject of this article.

Corresponding Author: Alexei Buruian, MD, Department of Orthopaedics, Hospital Distrital da Figueira da Foz, 3094-001 Figueira da Foz, Portugal.
 E-mail address: alexei.buruian@gmail.com (A. Buruian).

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Case Report

A 52-year-old right-handed man presented to the emergency department with a history of progressive wrist pain, edema, and numbness in the distribution of the median nerve of the left hand during the previous 4 days. The pain and edema began at the volar wrist, progressed distally, and were accompanied by a tingling sensation throughout the first 4 fingers that gradually got worse, especially at night. The pain was so excruciating that he was unable to sleep the night before going to the emergency department and was unable to hold any object or move his fingers without severe pain. Over-the-counter pain relievers were no longer effective. The patient denied having experienced any prior symptoms. His past medical history included gout and dyslipidaemia; he was treated with allopurinol and atorvastatin but had low adherence to a low uric acid diet. Physical examination revealed a swollen thenar region and wrist, with a soft tissue mass visible and palpable on the volar wrist and marked pain with passive finger mobilization (Fig. 1). Motor strength assessment was not possible because of severe pain. A pinprick test revealed total anesthesia of the first 3 fingers and the radial half of the fourth finger. Additional findings included tophi on the dorsal interphalangeal joints of the left thumb and olecranon. The uric acid level was 4.4 mg/dL (range, 3.5–7.2 mg/dL) before surgery. Radiographic images were unremarkable. No further imaging was obtained in order not to delay the treatment.



Figure 1. Wrist edema causing skin bulging (arrow).



Figure 2. Yellow opaque liquid infiltrating the carpal tunnel.

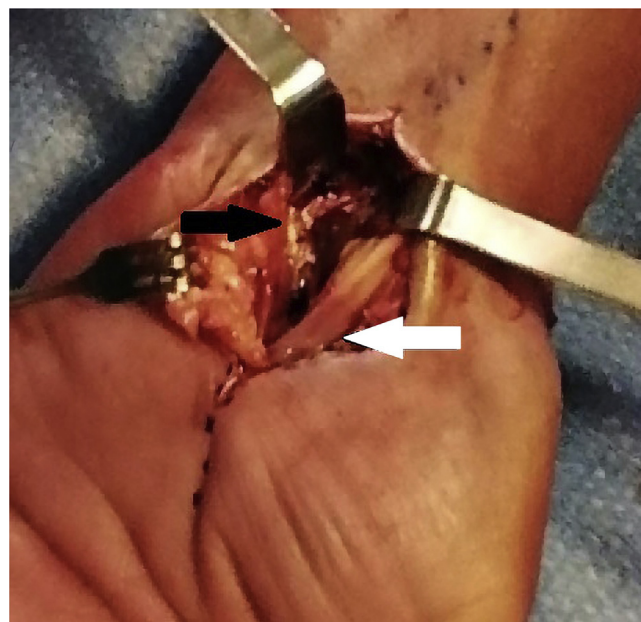


Figure 3. Signs of median nerve ischemia after carpal tunnel release (black arrow), and chalky white substance within the quadratus muscle (white arrow).



Figure 4. Chalky white substances within the flexor tendon sheets.

Given the patient's history of gout, a recent onset of volar wrist edema at the carpal tunnel, and anesthesia of the median nerve hand distribution, we speculated that this was a case of acute CTS secondary to a gout flare.

The patient was admitted for urgent carpal tunnel decompression. A longitudinal incision was made over the carpal tunnel, with a proximal extent to the forearm. Extensive synovitis was present within the flexor tendon sheaths, and a yellow opaque liquid infiltrated the carpal tunnel (Fig. 2), causing the median nerve bulging. The transverse carpal ligament was divided, achieving complete decompression of the median nerve (Fig. 3). Further inspection of the flexor tendons revealed chalky white substances within the superficialis and profundus tendon sheets and quadratus pronator muscle (Figs. 3, 4). Synovectomy and excision of the intratendinous and intramuscular tophi were performed. Skin sutures and dressings were applied in the same way as in a standard carpal tunnel release procedure.

The day after the surgery, the patient reported relief from the pain and a return of the normal sensation of the fingers. Active mobilization was advised. The wound healed without complications. Microbial cultures and staining were negative. The diagnosis

of gout was confirmed by histologic examination, which revealed fibrillar material, surrounded by histiocytes (Fig. 5). At the 18-month follow-up, the patient reported no recurrence. The only complaint noted was occasional, mild pruritus over the scar (Fig. 6). The hand presented a full, painless range of motion, with a Disabilities of the Arm, Shoulder, and Hand score of 0. The patient was offered dietary counseling and maintenance therapy of allopurinol to avoid recurrence.

Discussion

Our patient presented with demographic traits similar to those reported in the literature, namely being a male individual aged between 28 and 70 years. Five of seven individuals presented with complains in the right hand; our case is the second case with left-hand

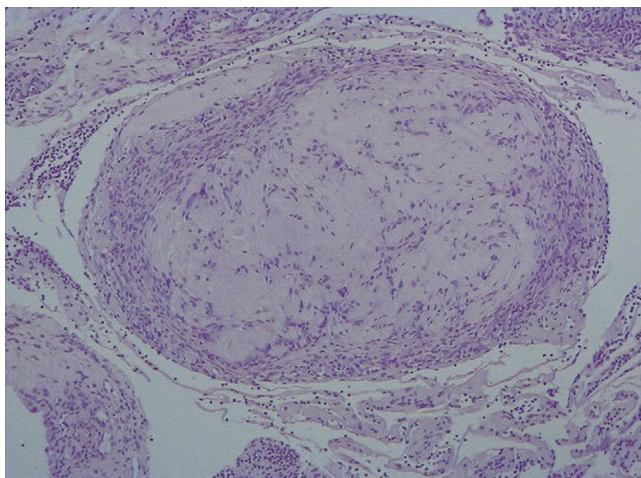


Figure 5. Deposition of fibrillar material, surrounded by histiocytes (Hematoxylin-eosin stain; magnification × 100).



Figure 6. Surgical scar at the 18-month follow-up.

involvement. According to Bădulescu et al,⁸ the normal serum uric acid levels do not exclude a gouty origin of the flare. In fact, in their study, 63.3% of patients had normal uric acid levels during an acute gout attack. The rapid rise in pressure in the carpal tunnel, causing median nerve numbness over the course of hours to days, distinguishes acute CTS from chronic CTS.³ Unlike acute CTS, chronic cases may present with thenar muscle wasting and firm masses representing mature tophi.⁴ To our knowledge, our case was the first to report paresthesia in the distribution of the median nerve that progressed to total anesthesia of the involved fingers before surgery. The intraoperative findings and interventions are similar to those reported in other studies.^{2–7} The few cases published to date show that open carpal tunnel release has good early clinical outcomes (Table). According to some reports, an onset after 4 days may be considered a late release. We believe that the progressive nature of the symptoms over the 4-day course before the carpal tunnel release and a thorough debridement of the gouty substance and flexor tenosynovectomy contributed to achieving a satisfactory clinical outcome. To our knowledge, no published case has reported a follow-up longer than 6 months; ours is the first to report the absence of recurrence at 18 months after surgery and the only one to

Table
Review of Acute Carpal Tunnel Cases Published in the Literature

Case	Year	Sex	Age, y	Side	Uric Acid Level Before Surgery (mmol/L)	Duration of Symptoms	Presentation	Intraoperative Findings	Additional Procedures Besides Open Carpal Tunnel Release	Follow-Up	Complications
Sakti et al ²	2019	M	51	R	9.2	1 mo	Inability to extend the long finger, and a slowly enlarging mass over the volar aspect of the right distal forearm within the past year. Numbness at the thumb, index, and long finger, which worsened when the long finger was extended. Decreased grip strength and flattening of the thenar eminence. Positive Tinel sign	White chalky mass, which had infiltrated the flexor digitorum superficialis tendon. Median nerve compression	Excision of the nodular tophus	1 mo	-
Carr et al ³	2015	-	32	R	-	4 d	Tenderness, swelling, and erythema of the palm and wrist; progressive paresthesias in the thumb, index, and middle fingers; and inability to actively flex and extend fingers. Positive Tinel sign over the carpal tunnel	Median nerve bulging, liquefied tophaceous gouty mass adherent to the proximal floor of the carpal tunnel and distal edge of the pronator quadratus	Synovectomy of all 9 flexor tendons, removal of the tophaceous mass	6 mos	-
Joseph et al ⁴ (case A)	2015	M	41	R	0.73	2 mos	Numbness in the distribution of the median nerve. Finger stiffness, volar swelling, dorsal ulnar mass, and wrist pain	Tenosynovitis, tophi from floor of the median nerve. Finger stiffness, volar swelling, dorsal ulnar mass, and wrist pain	Tenosynovectomy, floor clearance	-	-

Joseph et al ⁴	2015 (case B)	M	28	R	0.75	2 mos	Numbness in the distribution of the median nerve. Thumb locked in flexion, volar mass, and wrist pain	Tenosynovitis, tophi infiltrating flexor pollicis longus	Neurolysis, tenosynovectomy, debulking flexor pollicis longus	-	-
Rand et al ⁵	2010	-	38	R	-	Signs of acute carpal tunnel syndrome	Clinical diagnosis of carpal tunnel, soft tissue mass palpable on the volar aspect of the wrist, and grade 4 triggering of the middle finger	Compression of the medial nerve. Tophaceous mass affecting the tendon of flexor digitorum superficialis of the middle finger	Debulking of the tendon, tendon repair using the tubularization technique	-	-
Pai and Tseng ⁶	1993	M	70	L	Mildly elevated	10 d	Pain and paresthesias in the distribution of the median nerve. Diminished sensation over the 3 radial fingers. Swelling, heat, and tenderness over the wrist. Limitation to the active motion of the wrist and fingers. Positive Tinel and Phalen tests. The radiography showed some calcific spots on the floor of the carpal tunnel	Edematous median nerve and apparently compressed by the surrounding tissues. Flexor tendons, synovium, and floor of the carpal tunnel heavily infiltrated by a chalky white substance	Flexor tenosynovectomy and calcific deposits on the carpal tunnel floor removal	6 mos	-
Ogilvie and Kay ⁷	1988	M	55	R	-	2 d	Pain and paresthesia in the distribution of the median nerve. Wrist tenderness. Positive Tinel test. Radiography with degenerative changes consistent with gout	Edematous tissues, median nerve compression. Flexor tendon infiltration with gouty deposits	-	-	Discharge of gouty material through wound for 6 wks. Acute renal failure with complete recovery
This study	2022	M	52	L	4.4	4 d	Total anesthesia of the first 3 fingers and the radial half of the fourth finger and marked pain with passive finger mobilization. Swollen thenar region and wrist, with a soft tissue mass visible and palpable on the volar wrist (Fig.1)	Extensive tenosynovitis within the flexor tendon sheaths, liquefied gout, median nerve bulging. Chalky white substances within the superficialis and profundus tendon sheets and quadratus pronator muscle	Synovectomy and excision of the intratendinous and intramuscular tophi.	18 mos	Occasional, mild pruritus over the scar

report mild occasional pruritus over the surgical scar. The only other complication reported in the literature was the continuous discharge of gouty material through the wound that resolved after 6 weeks.⁷

In conclusion, acute CTS is an orthopedic emergency. Normal serum uric acid levels should not exclude a gouty origin of the flare. Timely carpal tunnel decompression allows a return to normal sensation and function of the hand.

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