

Case Reports

Acute Carpal Tunnel Syndrome Secondary to Reactive Tenosynovitis Following a Cat Bite: Case Report

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A 76-year-old male developed acute carpal tunnel syndrome (ACTS) due to reactive tenosynovitis and lymphangitis after a cat bite on his thumb. Non-operative treatment failed, leading to worsening pain, swelling, and paresthesia, requiring surgery. Exploration revealed pyogenic swelling and tenosynovitis in the flexor carpi radialis sheath and Space of Parona. Serous fluid was drained, and antibiotics were administered. The patient experienced significant pain reduction and regained full hand function after occupational therapy. This case highlights the importance of early recognition and intervention, especially in atypical CTS presentations, as timely surgical decompression can prevent long-term nerve damage.

INTRODUCTION

Acute carpal tunnel syndrome (ACTS) is a rare but serious condition involving sudden median nerve compression within the carpal tunnel. It presents with rapid-onset symptoms, including severe pain, swelling, and impaired motor and sensory function in the affected hand.¹ Unlike the gradual progression of chronic carpal tunnel syndrome, acute cases develop abruptly within minutes to hours and are often linked to trauma, infection, inflammation, or vascular compromise.^{2,3} Immediate diagnosis and urgent surgical decompression are critical to prevent irreversible nerve damage and lasting functional deficits.

Pyogenic flexor tenosynovitis (PFT) is a particularly challenging cause of ACTS. PFT is a closed-space infection of the flexor tendon sheath, often resulting from penetrating injuries like lacerations or puncture wounds that can rapidly progress. These injuries introduce infective organisms, leading to pus accumulation, increased compartment pressure, and median nerve compression.⁴ Although cat bites are a documented cause of PFT, ACTS arising from reactive tenosynovitis following a distal cat bite is exceptionally rare, making this case noteworthy.⁵ Highlighting such uncommon presentations aims to emphasize the importance of broadening differential diagnoses and maintaining a high index of suspicion, which are essential for effective management and ideal patient outcomes.

CASE REPORT

A 76-year-old right-hand dominant male presented with a superficial cat bite on the lateral aspect of the right thumb. His past medical history was significant for diabetes, hypertension, and hyperlipidemia.

The day after the bite, he developed right-hand swelling, progressively worsening volar aspect pain at the wrist, and fingertip paresthesia, mainly on the radial side [Figure 1 a-b]. The patient could actively flex and extend his fingers and thumb; however, passive extension of the fingers caused discomfort at the wrist. Nonoperative management with oral antibiotics failed to improve pain and swelling and instead resulted in worsening wrist pain and numbness in the radial-sided fingers. He denied fever, chills, elbow pain, and other constitutional symptoms.

An incision over the cat bite on the lateral aspect of the thumb revealed superficial involvement with intact deep tissue and no tracking towards the flexor pollicis longus (FPL). Since the pain was focused over the volar aspect of the wrist and distal forearm, a longitudinal incision over the flexor carpi radialis (FCR) tendon and proximal to the wrist crease was made. The FCR tendon was explored, and the sheath was opened. Mild to moderate swelling of the Space of Parona (SOP) with fluid extravasation was observed. The FPL muscle bulk was found to be dusky. The synovium surrounding the FPL tendon, and the bulging

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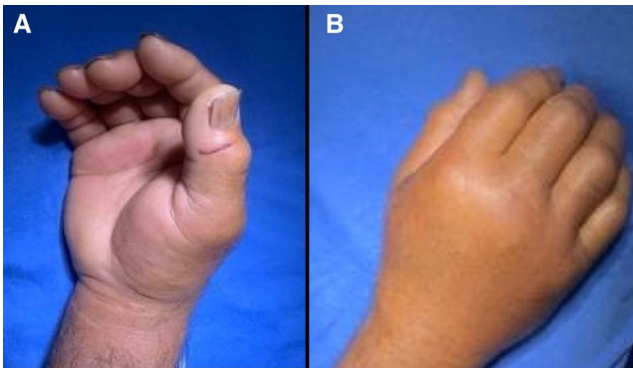


Figure 1. (a) This image shows the palmar and (b) the dorsal aspect of the hand prior to surgery, showing hand and wrist swelling and the cat bite laceration along the lateral border of the thumb.



Figure 2. This image shows the healed incisions along the lateral aspect of the thumb, over the cat bite laceration, as well as the distal forearm incision for drainage of the reactive flexor tenosynovitis and inflammation of the Space of Parona, two weeks post-operatively.

muscle bulk was opened to reveal a substantial amount of fluid. The area was explored further to ensure no residual cyst was present. A culture swab was taken and irrigation was performed using saline. Ampicillin/sulbactam was continued with a plan to transition to amoxicillin/clavulanate and doxycycline when the patient was discharged.

On the day prior to surgery, the white blood cell count was 14,000/ μ L and the C-reactive protein (CRP) was 93.3 mg/L. These improved to 10,500/ μ L and 24.6 mg/L, respectively, six days post-surgery. Intraoperative cultures were negative for infection. The patient reported substantial pain relief and resolution of numbness in the fingers following decompression of the tenosynovitis. Occupational therapy and finger range of motion exercises were started the day after surgery. The patient reported immediate improvement after surgery and gained a full range of motion by his two-week follow-up appointment [Figure 2].

DISCUSSION

PFT typically results from penetrating trauma to a digit, allowing skin flora, such as *Staphylococcus aureus*, to invade the flexor tendon sheath.^{6,7} However, it is likely that our patient's superficial cat bite, located distal to the flexor tendon, led to ACTS that resulted from a reactive flexor tenosynovitis and lymphangiopathy in the SOP. Our patient's swab culture was negative, which was potentially due to antibiotic use before surgery or the presence of a reactive fluid collection. Furthermore, Kanavel's signs are a diagnostic tool for identifying PFT; yet, our patient could actively flex and extend the thumb, which contradicts one of the four hallmark signs.^{2,8}

Regional lymphadenopathy can happen following a cat bite which may affect the medial elbow and axillary nodes; however, there is no defined anatomical presence of lymph nodes in the distal volar aspect of the forearm.⁹ The SOP is a deep potential space in the distal volar forearm, bordered by the carpal tunnel, flexor digitorum profundus, and pronator quadratus.¹⁰ Infections in this space are rare but can cause complications, potentially threatening the limb. As the SOP communicates with the radial and ulnar bursa and the mid-palmar space, it can facilitate the spread of inflammation, creating a risk of developing ACTS.¹⁰ Managing flexor tenosynovitis and lymphangitis requires extended IV antibiotics and surgical drainage that is tailored to disease progression.⁸

ACTS can arise from reactive flexor tenosynovitis and lymphangitis in the SOP due to remote cat bite. Prompt surgical intervention and drainage of the loculated infiltration can alleviate symptoms, shorten therapy duration, and potentially prevent long-term nerve compression effects. Given the rapid progression of this condition, maintaining vigilance is essential to ensure timely orthopedic intervention.

DECLARATION OF CONFLICT OF INTEREST

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DECLARATION OF ETHICAL APPROVAL FOR STUDY

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DECLARATION OF INFORMED CONSENT

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