

Case Report

Suppurative Flexor Tenosynovitis: A Case Report

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ABSTRACT

Background: Suppurative flexor tenosynovitis is an infection of the flexor tendon sheath. This case report presents the clinical course and management of a patient diagnosed with suppurative flexor tenosynovitis. The diagnosis is based on history taking, physical examination, and supporting examination findings.

Case Report: A 42-year-old man presented with chief complaints of pain, swelling, and immobility of the index finger of his right hand after being pierced by a fish spine 3 days prior. Physical examination revealed the second digit in a slightly flexed and swollen position, with pain elicited on palpation and passive extension, limiting the patient's range of motion. The patient was diagnosed with suppurative flexor tenosynovitis and treated with antibiotics, debridement, and drainage. Postoperative results were good, with no signs of complications such as spread of infection, tendon necrosis, osteomyelitis, or indications for amputation.

Discussion: The treatment for suppurative flexor tenosynovitis involves a combination of antibiotics and surgery. Surgical interventions typically include open drainage and debridement or closed catheter irrigation. Additionally, postoperative rehabilitation is a crucial aspect that requires careful consideration, as it has been shown to accelerate the healing process.

Conclusion: Suppurative flexor tenosynovitis is a rare but serious condition that demands early detection and a multidisciplinary approach. Timely surgical debridement and targeted antibiotics, guided by the identification of the causative organism, are essential for positive patient outcomes.

Keywords: Case report; Flexor tendon; Good health; Suppurative flexor tenosynovitis; Tenosynovitis

INTRODUCTION

The hands represent the body's most vulnerable area to potential hazards such as injury, loss of skin integrity, and exposure to bacteria like *Staphylococcus aureus*, *Streptococcus-hemolytic*, and gram-negative strains.¹ In situations where infection occurs, the proximity of mobile anatomical structures and synovial membranes increases the risk of spreading the infection to deeper compartments. Hence, it is crucial not to underestimate even minor hand injuries initially,

as they could escalate into infections affecting other compartments.¹ Timely intervention, including drainage, wound debridement, and intravenous antibiotics, is essential to prevent abscess formation, anatomical tissue destruction, and irreversible functional impairment. Failure to promptly diagnose and appropriately manage the condition can lead to severe consequences.¹

Neglected wounds are the primary cause of most hand infections. While the use of antibiotics can mitigate the associated morbidity, hand infections can result in significant impair-



ment, including stiffness, reduced range of motion (ROM), contractures, and in extreme cases, may necessitate amputation.² Infections can be categorized anatomically as superficial (affecting tendons and tendon sheaths), those involving joints or bones, and those affecting the deep compartments of the hand.³ Various microorganisms can be responsible for infections, with a growing prevalence of community-acquired methicillin-resistant *Staphylococcus aureus* (MRSA). Currently, MRSA contributes to up to 65% of *Staphylococcus aureus* infections, adding complexity to medical interventions.²

Numerous non-infectious conditions can mimic hand infections, inducing inflammation and swelling in the soft tissues. These conditions include gout, pseudogout, acute hydroxyapatite deposition, pyogenic granuloma, acute non-infectious flexor tenosynovitis, spider bites, arthritis (like rheumatoid arthritis), and reactions to foreign bodies.³

Suppurative flexor tenosynovitis is a critical condition that necessitates immediate and appropriate management to prevent severe morbidity. The literature on pyogenic flexor tenosynovitis highlights the importance of prompt treatment and systemic antibiotic use.⁴ However, there is a significant knowledge gap regarding the optimal use of antibiotics in cases of septic tenosynovitis, especially in immunocompromised patients and those with comorbidities such as diabetes, human immunodeficiency virus (HIV), and hepatitis C virus (HCV).⁵ These situations present unique challenges due to the complexity of treatment decisions, including antibiotic selection, duration of therapy, and the necessity of surgical intervention. Identifying these knowledge gaps is essential to improving clinical outcomes and expanding our understanding of the most effective management strategies for suppurative flexor tenosynovitis, particularly in challenging patient populations. These efforts will ultimately lead to more efficient treatment plans and improved patient care.

CASE REPORT

A 42-year-old man presented to the orthopedic clinic with the chief complaint of pain, swelling, and inability to move the index finger of his right hand after being pierced by a fishbone 3 days prior. The patient denied any previous similar complaints or a history of diabetes and hypertension.

Physical examination of the right hand revealed swelling and slight flexion of the index finger. There was tenderness to palpation of the index finger and pain with passive extension. Range of motion was limited due to pain. Kanavel's signs were identified during the physical examination and history-taking. The early sign is pain on passive extension, with a later sign being tenderness along the flexor sheath, suggesting proximal progression of the infection. There was also discomfort along the tendon with the attempted extension of the flexed finger. The patient presented with a flexed finger, pain along the tendon sheath, and expansion throughout the finger.⁶

Laboratory evaluation revealed elevated leukocyte and erythrocyte sedimentation rate (ESR) levels, indicating infection. Ultrasonography (USG) demonstrated edema in the superficial soft tissue and fluid accumulation within the flexor tendon sheath. There was no evidence of flexor tendon injury.

The patient was diagnosed with suppurative flexor tenosynovitis of the right index finger based on the physical examination and ultrasonography findings. Debridement, drainage, and antibiotic therapy were performed to prevent further infection. Ceftriaxone 1g Intravenous (IV) every 12 hours was selected as the antibiotic of choice. Ceftriaxone is a third-generation cephalosporin commonly used to treat tenosynovitis, particularly when caused by infection.⁷

A volar Brunner incision was utilized to expose the tendon sheath. Postoperatively, clinical and laboratory evaluations were performed to monitor for infection. The drain was removed



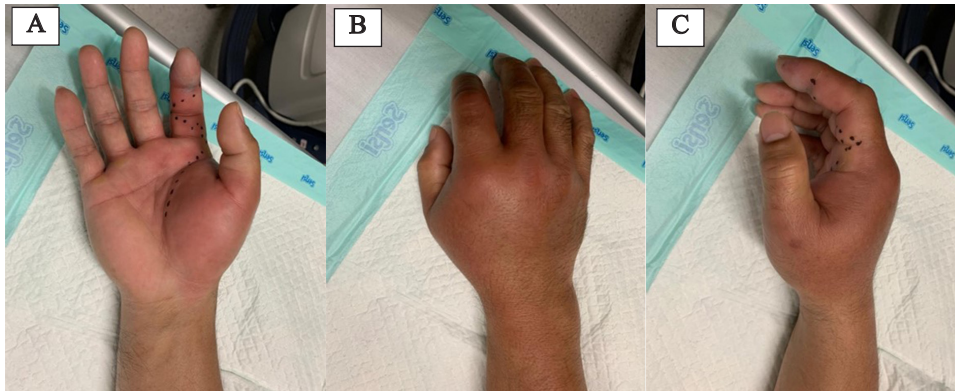


Figure 1. Clinical photo of manus dextra. (A) volar view, (B) dorsal view, and (C) lateral view

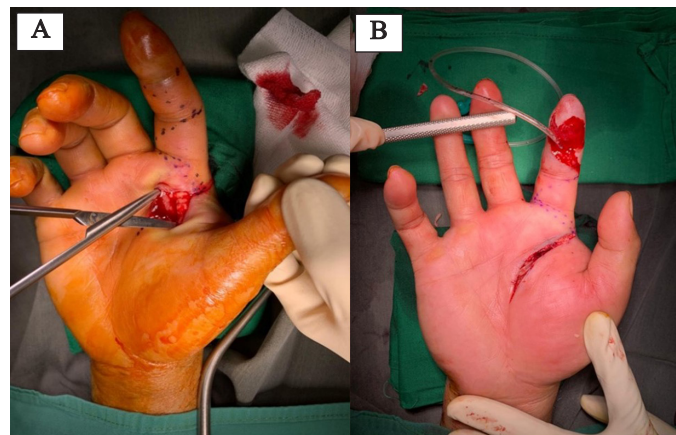


Figure 2. (A) The patient was undergoing debridement; (B) drainage using an NGT tube.

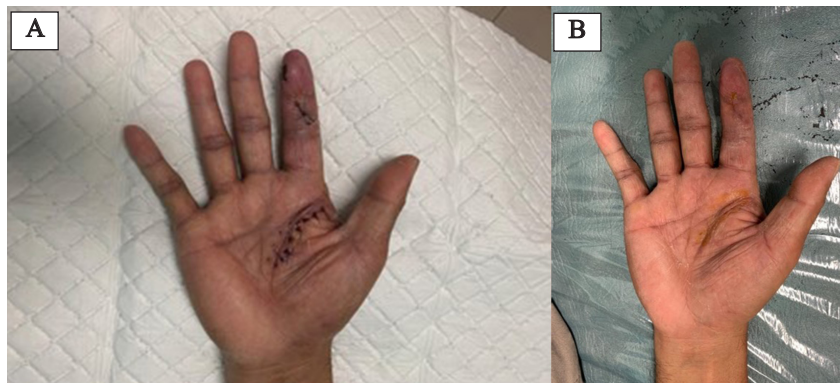


Figure 3. Clinical photos of the manus dextra after surgery (A) Follow-up at 7 days after surgery; (B) Follow-up at 14 days after surgery.

3 days after surgery when the output was minimal. The culture grew *Streptococcus* species. The patient had good results with no signs of complications such as spread of infection, tendon necrosis, osteomyelitis, or indications for amputation.

DISCUSSION

History taking, physical examination, and supplementary tests are used to diagnose suppurative

flexor tenosynovitis. This patient exhibited Kanavel's signs, including significant pain along the tendon with attempted extension of the flexed finger. These findings were elicited during the physical examination and history taking. The patient also presented with a flexed finger, diffuse swelling, and tenderness along the tendon sheath.⁶ Kanavel's signs are used in the clinical diagnosis of this condition. Palpation of the A1 pulley is a variant of Kanavel's sign that has demonstrated greater specificity for detecting



suppurative flexor tenosynovitis compared to the traditional signs. It is crucial to identify these clinical indicators promptly to initiate treatment for suppurative flexor tenosynovitis and prevent long-term sequelae such as digital stiffness, tendon adhesions, and amputation.⁹ Broad-spectrum antibiotics and surgical intervention should be initiated as soon as possible.

Physical examination of this patient revealed swelling in the right hand and slight flexion of the right index finger. Palpation of the right index finger elicited tenderness, and passive extension elicited pain. Range of motion was limited due to pain.

Radiological studies may be performed to help diagnose suppurative flexor tenosynovitis. These examinations are generally performed to evaluate for trauma, retained foreign bodies, or bony erosions. Magnetic resonance imaging (MRI) and USG are the commonly selected imaging modalities. MRI is often not readily available in the emergency department, making ultrasound a more practical option for initial evaluation. Ultrasound has been shown to be more sensitive than clinical examination alone for detecting suppurative flexor tenosynovitis.¹⁰

A typical ultrasound finding indicative of suppurative flexor tenosynovitis is the presence of hypoechoic or anechoic fluid surrounding the flexor tendons. These observations have been correlated with the presence of purulent fluid during surgical intervention. Ultrasound is particularly valuable in diagnosing suppurative flexor tenosynovitis because the tendon sheath is typically not visible. However, when bacterial growth occurs within this space, the purulent exudate separates the visceral and parietal synovial layers, allowing for the visualization of anechoic (black) fluid collections.^{6,7} Another ultrasound finding is tendon thickening by more than 25%, which appears as multiple echogenic parallel lines on longitudinal scans and numerous echogenic fibers on sagittal plane imaging. Inflamed tendons exhibit edema, and a transverse diameter

measurement demonstrating over 25% thickening is indicative of inflammation. Additionally, ultrasound assessment may reveal a loss of normal fibrillar structure due to increased distance between the hyperechoic fibrillar lines caused by inflammation-induced tendon thickening.^{6,7} In this case, ultrasound findings indicated infection within the flexor tendon sheath of the right index finger, confirming the diagnosis of suppurative flexor tenosynovitis.¹¹

Nonoperative treatment may be appropriate for patients with suppurative flexor tenosynovitis who present within 48 hours of penetrating hand trauma. However, if this time period has elapsed, as in this patient, surgical intervention is the preferred treatment. Surgical intervention should be performed promptly, as delays can result in significant morbidity. Potential complications include scar tissue formation within the flexor sheath, stiffness, persistent infection, and ultimately, amputation.¹²

The preferred surgical techniques for treating suppurative flexor tenosynovitis are open drainage and debridement or closed catheter irrigation. Open drainage and debridement were the chosen procedures for this patient. A mid-axial or volar Brunner-type incision can be used to expose the entire flexor tendon sheath for complete debridement, as was performed in this case.¹²

Studies comparing open drainage and debridement with closed catheter irrigation have found no significant difference between the two techniques. Although recent literature has focused more on closed-catheter irrigation due to its minimally invasive nature, these studies demonstrate that both techniques are equally effective in achieving functionally good outcomes and eradicating the infection.⁴ Factors that were found to be statistically significant and negatively affect outcomes include positive *Staphylococcus aureus* culture, prolonged antibiotic administration, and smoking. The study recommends that surgeons utilize the technique



and approach with which they are most comfortable when treating suppurative flexor tenosynovitis. Antibiotics should be administered as soon as culture results are available.¹²

Postoperative rehabilitation is an important aspect of care that requires attention. The success of rehabilitation is influenced by several factors, including the type and extent of the patient's injury (e.g., the number of fingers and zones affected), the surgical technique used, and the rehabilitation program chosen and followed by the patient.¹³ A case series describes a rehabilitation program with good results up to one-year post-surgery.¹⁴

In this case, postoperative rehabilitation was initiated 2 days after surgery. The chosen rehabilitation program consisted of blocking exercises and adductor stretching. The focus of rehabilitation was on the distal interphalangeal and proximal interphalangeal joints with the metacarpophalangeal joints in extension. The patient progressed gradually, initially with manual traction and then using a splint for 1 week postoperatively to maintain range of motion. The outcome of rehabilitation was favorable, with a rapid reduction of postoperative swelling and prompt resumption of daily activities.¹⁴

Recommendations for clinical practice include early recognition, aggressive surgical intervention, and close postoperative monitoring to optimize patient recovery and minimize long-term sequelae. Further research focusing on the comparative effectiveness and long-term outcomes of different surgical techniques in suppurative flexor tenosynovitis management is warranted to enhance treatment protocols and patient care.¹⁵

CONCLUSION

Suppurative flexor tenosynovitis is an uncommon yet serious condition that necessitates a high level of suspicion to facilitate early diag-

nosis and prompt intervention. This case report emphasizes the importance of a prompt and collaborative approach in managing such cases. Timely surgical debridement and appropriate antibiotic therapy, guided by the causative organism when identified, are crucial for favorable patient outcomes.

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