

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

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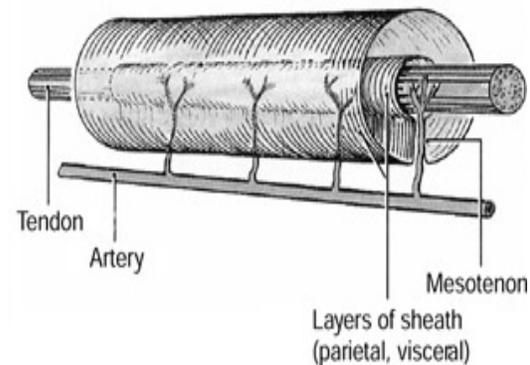
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Pyogenic Flexor Tenosynovitis

A 64-year-old female with a PMH significant for DM-2, HTN, HCV presents to the ED with right hand pain and swelling persisting for the past 24 hours. She denies any recent trauma, bites, illicit drug use, fevers, numbness, tingling. Patient has a temperature of 99.9F and the rest of her vitals are within normal limits. On physical exam, patient has the fourth digit held in flexion, diffuse erythema and swelling, severe pain with active and passive range of motion, and tenderness to palpation about the entire hand. Her capillary refill is < 2 sec, decreased sensation distal to the PIP on the palmar aspect of the fourth digit. Sensation is intact to light touch throughout the rest of her hand; AIN, PIN, Radial, and Ulnar nerves are intact. Remainder of RUE exam is within normal limits. What is the next best step in this patient's management?



- A. Prescribe oral antibiotics and discharge home
- B. IV antibiotics, X-Rays, and immediate hand surgeon consult
- C. Incision and drainage, antibiotics, and discharge
- D. IV antibiotics and admit to the floor for observation



Tendon Sheath Overview

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

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The correct answer is B.

Given the flexed position, fusiform swelling, and pain with passive motion, the patient is at high risk for Pyogenic Flexor Tenosynovitis (PFT) and therefore needs immediate consultation with hand surgery for irrigation and drainage. If not addressed in a timely manner, the infection may spread along the tendon sheath resulting in severe dysfunction to the tendon. The patient is also at a risk for osteomyelitis, sepsis, and may even require amputation.

Discussion

Tenosynovitis refers to inflammation of a tendon and its synovial sheath; this condition occurs most frequently in the hands and forearm but can occur in any joint. PFT accounts for 2.5% - 9.4% of all hand infections. PFT results from bacterial invasion into the flexor tendon sheath, a closed space between the visceral epitenon layer and the outer parietal layer. As a result, pressure buildup leads to distention between the visceral and parietal layers and subsequent disruption of the adjacent anatomical barriers. The fascial planes of the hand and adjacent bursa can then harbor infection. Due to the poor vascularization of synovial sheaths from vinculae and small vessels, bacterial proliferation is rapid, the host defense mechanisms and antibiotic penetration are limited, thus the infection can spread rapidly within the sheath through the space of Parona.

The mechanism of infection and the causative pathogen dictate the nature of the clinical presentation. Most infectious tenosynovitis presents as acute infection via traumatic direct inoculation, contiguous spread from infected adjacent soft tissues, or hematogenous spread. Common isolates include *S. aureus* (most common cause), MRSA, *S. epidermidis*, GAS, and *P. aeruginosa*. If a history of human or animal bite is described, *Eikenella* or *P. multocida* should be considered.

Differential Diagnosis

In 1912, Dr. Allen B Kanavel initially described signs to differentiate other common conditions that mimic acute PFT such as cellulitis, abscesses, felons, herpetic whitlow, gouty arthritis, and septic arthritis. These signs (Table 1) were

published in 1939 and remain the cornerstone of clinical diagnosis today. However, there have not been enough studies to ascertain the sensitivity and specificity of Kanavel signs.

Evaluation

As with most hand infections, a diagnosis can be made based on clinical examination such as the presence of pain, erythema, abnormal swelling, fluctuance, or drainage. Fever may or may not be present.

Lab studies can provide supportive evidence for a diagnosis of PFT. A CBC may demonstrate an elevated WBC count and left shift. Blood cultures and lactic acid can be obtained to isolate an organism and rule out sepsis. ESR and CRP may be elevated but are nonspecific.

Radiographs are usually not necessary, but may be useful to rule out a foreign object, free air, periosteal elevations, or occult fractures. MRI is the modality of choice for evaluating soft tissues and the extent of involvement, however it cannot distinguish infectious flexor tenosynovitis from inflammatory, nor is it readily available in many ED settings. Point of care ultrasound is a viable alternative and is readily available. Common ultrasound findings for PFT are hypoechoic or anechoic edema with a potentially thickened tendon sheath, as well as the presence of abnormal hypoechoic material within the synovial sheath. However, due to user variability, there are currently insufficient studies to validate ultrasound diagnostic criteria.

Treatment

Treatment should be initiated immediately in the ED. Initial management should include referral to a hand surgeon and empiric antibiotics. Empiric antibiotic therapy should target the likely pathogen. A reasonable approach is to combine vancomycin with ciprofloxacin (500 mg orally every 12 hours or 400 mg intravenously every 12 hours) or ceftriaxone (1 g intravenously every 24 hours). Patients presenting with water related injuries or bites should have coverage for *P. aeruginosa* or *Eikenella* and *P. multocida*, respectively. Duration of therapy and tetanus status should be addressed on an individual basis.

For a list of educational lectures, grand rounds, workshops, and didactics please visit BrowardER.com and click on the "Conference" link.

All are welcome to attend!

Immobilization in a position of function to protect the affected area, prevent tissue plane motion restricting infection spread, reduce pain, and protect against contracture formation and stiffness. Elevate the limb to reduce edema and improve lymphatic return.

Ultimately the clinical severity of symptoms and patient-provider joint decision making determine the immediate need for surgical irrigation and debridement or continuing conservative treatment for 24 hours and reassessing the patient.

Prognosis

The prognosis of PFT is related to the severity of the symptoms and time to treatment. Complications may include finger stiffness, deformity, adhesions, tendon necrosis, tendon rupture, deep space infections, osteomyelitis, sepsis, and amputation. Risk factors associated with poor outcomes include: an age > 43, patient history of diabetes mellitus, peripheral vascular disease, or renal failure, presence of subcutaneous purulence, and digital ischemia at presentation.

Table 1: Kanavel Signs

• Digit held in partial flexion at rest
• Fusiform swelling
• Tendon sheath tenderness to palpation
• Pain with passive extension of the digit

Take Home Points

- Pyogenic Flexor Tenosynovitis is primarily a clinical diagnosis based on Kanavel's signs and supported by laboratory and imaging studies.
- Treatment involves prompt antibiotic administration, immobilization, elevation, and referral to hand surgery for prompt irrigation and debridement.
- Empiric treatment may include (depending on severity): observation for 24 hours with vancomycin and ciprofloxacin (400mg IV q 12) or ceftriaxone (1g IV qd). However, surgical irrigation and debridement along with IV antibiotics is the standard of care.



ABOUT THE AUTHOR

This month's case was written by William Monahan. William is a 4th year medical student from LECOM-Bradenton. He did his emergency medicine rotation at BHMC in January 2018. William plans on pursuing a career in Orthopedic Surgery after graduation.

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