CLINICAL VIGNETTE

Flexor Tenosynovitis due to Streptococcus Group C

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Case

A 75-year-old male with coronary artery disease, atrial fibrillation, and gout presented with one day of right wrist pain and swelling. There was no prior trauma and the patient had been typing most of the days prior to presentation. On examination, there was moderate swelling in the right wrist and at the base of the thumb with slight warmth and no erythema. Wrist xray showed soft tissue swelling without evidence of gout arthropathy, erosion or tophus. The patient reported prior similar episode involving the right first toe that was diagnosed as a gout flare. The patient has chronic renal insufficiency and was prescribed prednisone instead of a non-steroidal anti-inflammatory drugs for the presumed gout flare.

The patient's right hand pain worsened, along with chest pain and shortness of breath and he presented to the emergency room for further evaluation. Vital signs on initial presentation were temperature 37.5, BP 148/96, HR 107, oxygen saturation 99% on room air. In the emergency room, the patient developed atrial fibrillation with a rapid ventricular response and required 2 liters of oxygen/minute to maintain a saturation above 92%. Chest x ray showed interstitial edema. Initial white blood cell count was normal at 6.20 and the next morning the white blood cell count had increased to 14.07 with one of two blood cultures positive for gram positive cocci in chains. The patient was started on IV vancomycin and ceftriaxone to cover for infection and started on colchicine for a possible gout flare. Rheumatology performed arthrocentesis of the wrist which was negative for crystals and culture was negative for infection. The organism in the patient's blood culture was identified beta streptococcus group C. A CT scan of the wrist showed subcutaneous fat stranding of the hand and wrist, most prominent on the dorsal aspect, extending along the medial aspect of the forearm, suggestive of cellulitis. No drainable fluid collection or abscess was seen. The patient had persistent swelling and erythema of the right arm and underwent an MRI 4 days after the CT scan which showed severe flexor compartment tenosynovitis which appeared more loculated at the forearm and palm worrisome for an infectious process. The patient subsequently underwent right forearm and wrist irrigation and debridement which revealed purulent fluid and a significant amount of necrotic fibrinous tissue consistent with abscess cavity in Parona's space, with cultures positive for beta streptococcus group C. The patient was treated with IV ceftriaxone to complete a 3-week course of antibiotics and showed improvement in swelling and erythema of the right wrist.

Discussion

Tendon sheaths consist of a visceral layer and a parietal layer that normally are in close contact with each other to form a closed structure around the tendon. This normally closed space can become filled with fluid in infectious tenosynovitis. Most cases of infectious tenosynovitis of the hand and wrist involve the flexor tendons because extensor tendons lack the retinacular system of flexor tendons that act to localize infection when it develops.

The three common causes of infectious tenosynovitis are direct inoculation, localized spread from a nearby source of infection and hematogenous spread. The bacteria involved in infection are related to the mechanism of infection. Staphylococcus aureus and streptococcus are the most common organisms involved in trauma caused by clean sources. Bite wounds are often polymicrobial. Fresh or saltwater exposure can result in mycobacterial tenosynovitis, and Mycobacterium marinum is the most common cause of mycobacterium infection. Trauma caused by plant thorns can cause fungal infections due to sporotrichosis and fusariosis. Neisseria gonorrhea is a common cause of infectious tenosynovitis caused by hematogenous spread of infection.[1]

Group C streptococci are normal flora of the upper airway and asymptomatically colonize the skin, gastrointestinal tract and the female genital tract. Group C streptococci and are involved in infections such as cellulitis, septic arthritis, osteomyelitis and endocarditis. Infection often occurs in patients with an underlying chronic disease and in one case of 88 patients with group C bacteremia, 72.7% of patients had an underlying chronic disease with cardiovascular disease (20.5%) and an underlying malignancy (20.5%) being the most common. The most common sources of infection were the upper respiratory tract (20.5%), gastrointestinal tract (18.2%) and the skin (17.1%).[2]

Diagnosis

The four cardinal signs of flexor tenosynovitis first identified by Kanavel in 1912 consist of tenderness over the course of the flexor sheath, symmetric enlargement of the affected finger, finger slightly flexed at rest, and pain along the tendon with passive extension.[3] Infectious flexor tenosynovitis should be suspected in a patient who presents with these symptoms. X rays are not useful to diagnose infectious tenosynovitis, but can be used to rule out a foreign body or a fracture. Ultrasound can be used to identify fluid within a tendon sheath and can be used

to guide aspiration of fluid to diagnose the organism causing the infection. MRI can be useful to determine the extent of infection and guide surgical intervention.

Treatment

Patients with suspected infectious tenosynovitis should be treated with empiric antibiotics based upon the mechanism of injury. Early treatment of infectious tenosynovitis with antibiotics and catheter irrigation has been associated with improved range of motion outcomes.[4] Patients that do not show improvement within a few days of empiric antibiotics should undergo surgery and drainage of the tendon sheath. Risk factors for poor outcomes include advanced stage of infection, Group A beta hemolytic strep infection, delayed surgical management,[5] age > 43 years, the presence of diabetes mellitus, peripheral vascular disease, or renal failure, the presence of subcutaneous purulence, digital ischemia, and polymicrobial infection.[6]

Conclusions

In this case, the patient had no trauma prior to developing symptoms, except for possible asymptomatic injury from prolonged typing. He showed slow improvement on intravenous antibiotics and given this and the MRI findings, underwent surgery. The identification of Streptococcus group C from the fluid in the hand confirmed the blood culture results. The patient had complete functional recovery of his right hand following prolonged the course of antibiotics.

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