Tuberculous Tenosynovitis of the Hand: A Case Series

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Declaration of interests: No conflict of interests declared.

Abstract:
Tuberculous Tenosynovitis of the hand usually presents late because of its non-specific nature that starts insidiously and becomes indolent. Although most of the tuberculous tenosynovitis reported has been the primary focus of the disease, tuberculous tenosynovitis of the hand can be the presenting feature of multiple foci skeletal tuberculosis. In this case series we report three cases of tuberculous tenosynovitis with three different presentations; the definitive diagnosis being made by biopsy and tissue culture. Combined early surgical intervention and chemotherapy was the definitive treatment although the courses of treatment and outcomes differed.

Introduction:
Skeletal tuberculosis is an ancient infection which has been found in the remains of Egyptian mummies dating back to 4000 BC. Osteoarticular tuberculosis accounts for up to 35 per cent of cases of extra-pulmonary tuberculosis and, overall, two per cent of all cases. Musculoskeletal tuberculosis involves the spine in half of the cases; the next common site is tuberculous arthritis.

Case Presentation:
Case Report 1
A 25-year-old expatriate housemaid an unmarried female, with a weight of 55 kg and height of 149 cm, was admitted to the emergency unit in February 2009 with an ulcerated lesion of her right hand that had begun live months earlier with gradually increasing swelling, mild pain, and restriction of hand movement. She was afebrile, with a 2x2 cm ulcer on the dorsum of the right hand but no local signs of acute inflammation (Figures 1B and 1C). There was no history of pulmonary tuberculosis. An X-ray of the hand showed a lytic lesion at the head of the second metacarpal bone (Figure 1A). A chest x-ray was normal. Hemoglobin was 13 g/dl, lymphocytes 23.3, and ESR 32. Tissue debridement and extensor synovectomy were done, with tissue samples sent for culture and histopathology. A Ziehl Nielsen stain showed acid-fast bacilli; cultures grew Mycobacterium tuberculosis; and histopathology showed extensive necrotising granulomatous inflammation consistent with tuberculosis. Anti-tuberculous chemotherapy was started with ethambutol 400 mg once daily, pyrizinamide 500 mg once daily, rifampicin 300 mg once daily and INH 150 mg once daily. During three months of follow-up there was improvement with partial secondary intention healing of the ulcer but then the patient left for her home country.

Case Report 2
A 24-year-old, expatriate male right-handed laborer weighing 72 kg and height of 168 cm, was referred to the hand clinic in February 2007 with a right dorsal wrist swelling that had lasted for four months. There was a soft, freely mobile mass on the dorsum of the right wrist provisionally diagnosed as a dorsal wrist ganglion but during exploration there was found abnormal synovium of the extensor tendon (Figure 2C), with umber colored serous fluid and so extensor synovectomy was completed. Tissue samples sent for culture and histopathology showed non-necrotising and focally necrotising granulomatous inflammation, negative for acid-fast bacilli and with no growth of Myco-tuberculosis. Chest and hand X-rays were normal. There were no constitutional symptoms in the patient’s history and no history of pulmonary tuberculosis.

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This case was discussed with a communicable diseases team and the data were not considered sufficient for them to start antituberculous chemotherapy. He was followed in the hand clinic, regained full range of motion and returned to his job. He returned four months later with recurrent extensive swelling extending from the forearm, proximally and distally to the dorsum of the hand (Figure 2A), mild pain, and limitation of movement but he exhibited no constitutional symptoms. X-rays of the hand again appeared normal. He had an ESR of 21 and
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Figure 1 (Case Report 1): Figure A: X-ray showing a lytic lesion at the head of the second metacarpal bone; Figure B: Ulcerative lesion at the dorsum of the hand; and Figure C: Intra-operative photograph.

Figure 2 (Case Report 2): Figure a: Extensive dorsal wrist swelling extending to the forearm four months after extensor synovectomy; Figure b: Cold abscess at the dorsal wrist three months after the second extensor synovectomy; Figure c: Photograph shows the abnormal synovium; and Figure d: histopathology slide.

Hemoglobin of 14.5 g/dl.

Extensive dorsal wrist synovectomy was completed. Tissue samples showed a necrotising granuloma (Figure 2D), no acid-fast bacilli (AFB) but on culture there was a growth of the Mycobacterium tuberculosis complex. A mucosalivary sample was negative for AFBs and produced no tuberculous growth on culture. He was started on ethambutol 400 mg once daily, pyrizinamide 500 mg once daily, Rifampicin 300 mg once daily and INH 150 mg once daily.

Three months later he returned with a fluctuant swelling at the dorsal wrist, consistent with cold abscess (Figure 2B), and an extensor tendon rupture of the ring finger. A sample that was aspirated and sent for culture grew Mycobacterium tuberculosis. The whole follow-up took 16 months with no improvement. He was unable to continue his work and left for his home country.

Case Report 3

An 11-year-old girl, weighing 42 kg and with a height of 146 cm, was referred from the Pediatric Department to the hand clinic in May 2008 with a swelling of the right palm of one month's duration (Figure 3A). During the previous four months she had attended regular follow-up appointments with a paediatrician for unexplained fever. There were no signs of acute inflammation, which raised the suspicion of a cold abscess. Her complete blood count showed hypochromic microcytic anaemia, with an erythrocyte sedimentation rate of 54 and a normal white cell count.
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An X-ray of the hand showed a lytic lesion of the third metacarpal bone (Figure 3B). An MRI of the right hand showed osteomyelitis of the third metacarpal bone with a sub-periosteal collection pointing ventrally toward the palm and gaining access between the third and fourth digits, with thickened tenosynovium (Figure 3E). Further exploration found serous fluid with abnormally hypertrophied tenosynovium of the third finger. Tissue samples sent for culture and histopathology showed a caseating granuloma, negative for acid-fast bacilli although producing on culture a growth of Mycobacterium tuberculosis resistant to pyrizinamide.

She was started on isoniazid 300 mg once daily, rifampicin 150 mg once daily and pyridoxine 40 mg once daily. As the fever persisted it was decided to conduct a bone scan to exclude multicentric involvement. The result of the Tc-99 bone scintigraphy was highly suggestive of multicentric osteoarticular tuberculosis. The role of imaging is complementary and can show the extent of soft tissue involvement which helps in planning the surgical dissection; MRI gives excellent information about soft tissue involvement with synovial thickening and decreased synovial fluid; plain x-rays show only soft tissue swelling and normal chest x-rays.

**Discussion:**

Progressively enlarging, sausage-like swelling and functional limitation are the usual presentations of tuberculous tenosynovitis. The absence of generalised findings and local inflammatory signs contribute to the difficulty of diagnosis with late presentation and the development of irreversible osteoarticular damage and significant morbidity.

Upper extremity tuberculosis has a predilection for the wrist, more than the hand and forearm, with flexor tendon involvement presenting as wrist swelling with median nerve compression occurring twice as often as extensor tendon involvement, which is more rare and usually presents as a progressively enlarging rubbery mass with limitation of movement possibly ending in tendon rupture and finger drop. Bunnel noticed right-hand involvement to be twice as prevalent as left-hand involvement. Foot flexor tendon involvement is extremely rare and usually presents as a progressively growing mass at the ankle region.

The causative organism, Mycobacterium tuberculosis, spreads by haematogenous dissemination with no history of pulmonary tuberculosis. Atypical mycobacterial infections of the hand usually have a history of penetrating trauma or surgery and affect the skin primarily consistent with organism growth at low temperature; the presentation is tender erythematous papulonodular lesions that eventually suppurate during a protracted clinical course.

Confirmation of the diagnosis of typical Mycobacterium tuberculosis infection is by histopathology and tissue culture identifying caseating granulomata containing AFBs whereas in atypical mycobacterium infections the granulomata are non-caseating and may be misdiagnosed as sarcoidosis.

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The clinical courses of Mycobacterium tuberculosis and atypical mycobacterium infections are indistinguishable; identification of the organism is paramount because virulence, growth requirement, drug sensitivity and treatment of various species differ vastly.

The effective management of this disease combines surgical debridement and antituberculous chemotherapy; some advocate excision of the diseased synovium and tendon sheath while others prefer only tendon decompression leaving the tendon sheaths, long term anti-tuberculous therapy up to one year or even more which is usually effective in eradicating the disease, although there is chance of recurrence after one year. Failure of treatment is reported in the literature and is attributable primarily to resistant strains or poor patient compliance.

In our case series we report three cases of right-hand involvement, two of them involving the extensor tendons. The clinical presentation was variable, the first case presenting late as an ulcerative dorsal hand lesion with a five-month history of painless dorsal hand swelling and limitation of movements; the second case presenting as dorsal wrist swelling mimicking a dorsal wrist ganglion; the last case was a palmar swelling with long standing fever over several months.

The radiological findings varied from soft tissue swelling to tuberculous osteomyelitis, the course of treatment showed improvement in the first case, was protracted in the second case without improvement after one year of antituberculous medications with development of cold abscess and extensor tendon rupture, while the third case was cured completely after one year of treatment without any detectable growth problems.

The main challenge to the hand surgeon who encounters tuberculosis of the hand is the difficulty in diagnosing a patient who has been referred late and treated symptomatically. Due to the variable clinical presentation and absence of constitutional symptoms, a high index of suspicion is needed to detect the disease early before development of osteoarticular changes and subsequent morbidity resulting in patients losing their jobs.

References: