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A Case Report and Imaging Review of An Uncommon Case of Tuberculous Dactylitis In An Adult

Case Report

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Abstract

Tuberculous dactylitis, a rare form of osteoarticular tuberculosis (TB), affects the short tubular bones of the hands and feet, such as the phalanges, metacarpals, and metatarsals. This condition is more frequently observed in the hands than the feet and is exceptionally rare in individuals older than five years. The diagnosis of tuberculous dactylitis is often challenging due to its atypical presentation, limited diagnostic methods, and its similarities with other diseases. This case report describes a rare instance of tuberculous dactylitis in an adult patient with no identifiable risk factors, who was successfully treated with anti-tubercular medication, highlighting the need for increased awareness and accurate diagnostic approaches.

Keywords: Tuberculous Dactylitis; Osteoarticular Tuberculosis; Spina Ventosa; Tuberculous Osteitis.

Introduction

Tuberculous dactylitis is an uncommon manifestation of tuberculosis that primarily affects the short tubular bones in the hands and feet, including the phalanges, metacarpals, and metatarsals. This form of skeletal tuberculosis, while constituting a minor portion (2–4%) of skeletal TB cases, is particularly rare compared to other forms. Although osteoarticular TB accounts for a small fraction (1-3%) of all TB infections, tuberculous dactylitis constitutes only 2–4% of skeletal TB cases. It generally affects the hands more than the feet and is seldom seen in individuals over five-year-old.

Diagnosing tuberculous dactylitis presents significant difficulties due to its rare presentation, challenges in diagnostic techniques, and the overlap with other medical conditions. This article explores a rare case of tuberculous dactylitis in an adult patient, emphasizing the importance of thorough diagnostic evaluation and effective treatment with anti-tubercular therapy.

Case Report

We present a case involving a 19-year-old male who came with a complaint of swelling on the dorsum of his left hand, present for two months. The patient had been asymptomatic until two months prior when he noticed a gradually progressive swelling at the base of the third digit. The swelling appeared insidiously and was not associated with any pain. There was no reported history of trauma, cough, weight loss, decreased appetite, or other risk factors. The patient had previously received antibiotic treatment at other healthcare facilities. Upon examination, a firm, rounded swelling was observed at the base of the third digit (Figure 1). There were no signs of local inflammation, although the range of motion in the affected finger was painful and limited.

AP Radiograph of left hand revealed a mild expansile lytic lesion with thin septations and a narrow zone of transition, involving the head and proximal shaft of the third metacarpal bone, without

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periosteal reaction or soft tissue involvement (Figure 2). The differential diagnosis considered were enchondroma, aneurysmal bone cyst, and tuberculous dactylitis.

Given the lytic expansile lesion and the presence of adjacent soft tissue, the clinician recommended a guided biopsy. An ultrasound (USG) showed the bone lesion with associated soft tissue component (Figure 3). Under aseptic precaution and local anesthesia ultrasound guided percutaneous core needle biopsy of the lesion was performed using a co axial 18-gauge semi-automated biopsy gun. The procedure was uneventful. Histopathological examination (HPE) of the obtained tissue confirmed necrotizing granulomatous osteomyelitis due to tuberculosis (Figure 4).

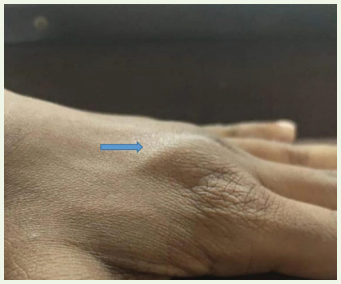

Figure 1: Clinical picture showing firm, rounded swelling is visible at the base of the third digit. There are no signs of local inflammation, but the range of motion in the affected finger is limited and painful.

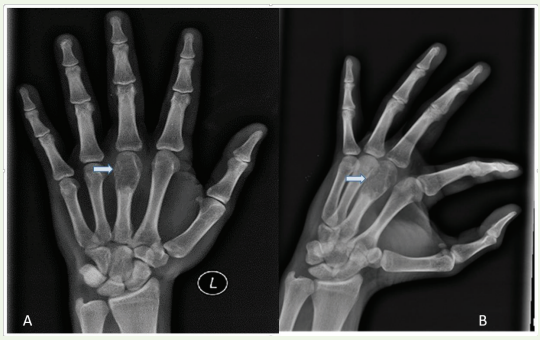

Figure 2: Radiograph of left-hand AP (A) and oblique view (B) showing mild expansile lytic lesion with thin septations and a narrow zone of transition, involving the head and proximal shaft of the third metacarpal bone, without periosteal reaction and with minimal soft tissue involvement.

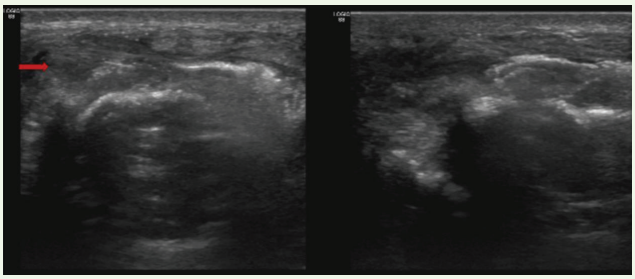

Figure 3: Axial and sagittal axis ultrasound image showing irregularities in the bone cortex with focal disruption. The soft tissues surrounding the affected area exhibit thickening, indicating possible inflammation or fibrosis. No significant fluid accumulation is seen in the soft tissues.

Following the diagnosis, anti-tubercular therapy (ATT) was initiated. At the six-month follow-up, radiographic evaluation showed a reduction in soft tissue swelling clinically, a slight decrease in the lytic component, and increased sclerosis of the lesion (Figure 5).

Discussion

Tuberculous dactylitis, a rare form of skeletal tuberculosis, affects the short tubular bones of the hands and feet, such as the metatarsals, metacarpals, and phalanges. This condition represents a minor fraction (2–4%) of skeletal TB cases and most commonly results from hematogenous dissemination of tuberculosis from the lungs [1,2]. Over 85% of cases affect children with the hands being more commonly affected than the feet [1]. It is more frequently observed in the fingers rather than the toes, with the proximal phalanx of the index and middle fingers being the most commonly involved areas. This disease is rare in individuals older than five years and typically becomes symptomatic 1-3 years post-infection2. In children, tuberculous dactylitis often involves multiple bones due to the abundant blood supply in the tubular bones, leading to the formation of tuberculous granulomas [2]. When the nutrient artery of the affected bone becomes occluded, a sequestrum forms, resulting in endosteal destruction and new bone formation. Radiologically, this condition is termed "spina ventosa" due to its characteristic cystic expansion appearance.

Clinically, tuberculous dactylitis manifests as a chronic, painful swelling of the digits, primarily affecting the proximal phalanx and metacarpals. It is more severe in children or those with immune deficiencies, where multifocal involvement, sequestration, and complications such as abscesses and secondary bacterial infections

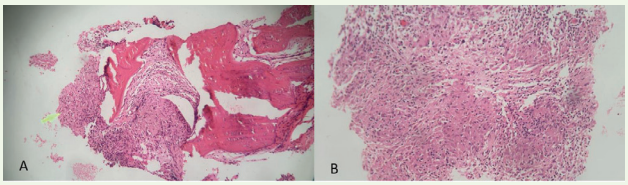

Figure 4: Microscopy of low power [A] and high-power [B] sections showing multiple discrete granulomas composed of epitheloid histiocytes, Langerhans giant cells rimmed by lymphocytes with areas of caseous necrosis.

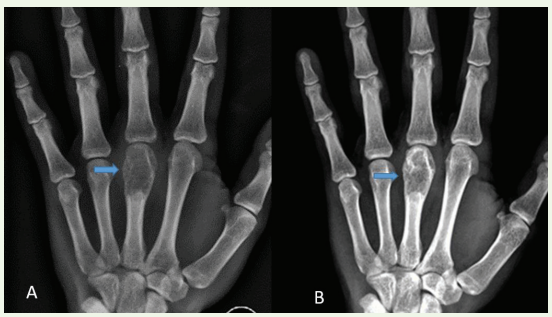

Figure 5: Before and after treatment, at the six-month follow-up, radiographic evaluation showed a slight decrease in the lytic component, and increased sclerosis of the lesion.

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are more common. Radiographic imaging typically shows osteolytic lesions with minimal periosteal reaction, bone sclerosis, and destruction [1,2]. MRI is particularly useful for detecting early marrow and soft-tissue involvement and can reveal features like honeycombing, diffuse infiltration, or cystic lesions. The condition's rare presentation without detectable tuberculosis contagion or immunosuppression is highlighted in this case.

Diagnosis primarily relies on histopathological analysis of biopsy samples, detection of Mycobacterium tuberculosis through Gene-Xpert studies, and Ziehl-Neelsen (Z-N) staining for acid-fast bacilli [2]. Culturing Mycobacterium from bone tissue is the definitive diagnostic method. Routine laboratory tests, including white blood cell counts and inflammatory markers, are not diagnostic but can help rule out other conditions. Treatment involves a prolonged course of anti-tubercular drugs: isoniazid, rifampicin, pyrazinamide, and ethambutol for two months, followed by isoniazid and rifampicin for 6–12 months. Most patients show excellent responses to therapy, though joint ankylosis can be a significant complication. The condition is typically well-managed with chemotherapy, resulting in complete remission in most cases.

Imaging plays a crucial role in diagnosing tuberculous dactylitis, with radiographic findings helping to differentiate it from other musculoskeletal infections3. Previous studies have emphasized the importance of advanced imaging modalities such as MRI and CT in the detection of early disease and assessing the extent of bone involvement. According to Vuyst et al., imaging features of musculoskeletal tuberculosis, including tuberculous dactylitis, demonstrate characteristic bone destruction and periosteal reaction, which are instrumental in differentiating it from other pathologies [4]. The utility of CT imaging for assessing bone changes in advanced stages of the disease is also well-documented, offering clear insights into the structural integrity of the affected bones.

Furthermore, Harisinghani et al. highlight the significant role of radiographic imaging in diagnosing tuberculosis across various body sites, including the musculoskeletal system. They outline the radiographic patterns, such as "spina ventosa" in tuberculous dactylitis,that can help clinicians make an early diagnosis of skeletal tuberculosis [5]. In adult cases, as discussed by Feldman et al., tuberculous dactylitis presents more subtly, and early detection remains challenging due to less typical clinical symptoms and a slower progression compared to pediatric cases [6]. Their findings underscore the importance of a high clinical suspicion and the use of imaging techniques to identify and confirm the diagnosis of this rare condition.

Conclusion

Tuberculous dactylitis, while rare, poses significant diagnostic challenges due to its atypical presentation and the need for distinguishing it from other conditions. The condition's diagnostic process involves a combination of histopathology, advanced imaging, and microbiological studies. Accurate diagnosis and prompt treatment with a comprehensive anti-tubercular regimen are crucial for effective management and recovery. Despite the potential for complications such as joint ankylosis, most patients respond well to treatment and achieve complete remission.

The differential diagnosis for this condition includes several possibilities: Chronic pyogenic osteomyelitis, Syphilitic dactylitis, fungal dactylitis, and bone lesions such as enchondroma or fibrous defects. In cases of pyogenic osteomyelitis of the fingers, one should be alert to symptoms such as localized warmth, significant tenderness, high fever, and impaired finger movement accompanied by elevated white blood cell counts. Tuberculous dactylitis typically follows a more indolent course and rarely presents with systemic symptoms [2]. Key differentiators from pyogenic infections include the absence of sequestration and the presence of diffuse osteopenia in tuberculous dactylitis.

Acknowledgment

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