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RESEARCH ARTICLE

A RARE CASE OF FOURTH METATARSAL TUBERCULOSIS

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Abstract: ***Background***: Tuberculosis, commonly known as TB continues to pose a challenge to public health especially in regions heavily affected by the disease. Although TB typically targets the lungs it can also manifest in parts of the body, such as skeletal tuberculosis. This case study describes a scenario of tuberculosis affecting the fourth metatarsal bone in a 60-year-old woman who experienced persistent foot pain and swelling. The report emphasizes the difficulties in diagnosing cases due to vague symptoms and the need for imaging tests and biopsies for accurate confirmation. The patient was effectively treated with therapy underscoring the importance of considering tuberculosis when assessing chronic foot pain and swelling for prompt and successful treatment.

Keywords: Tuberculosis, Extrapulmonary TB, Skeletal Tuberculosis, Metatarsal Infection, Antitubercular Treatment.

INTRODUCTION

Tuberculosis is an age infectious disease caused by Mycobacterium tuberculosis that continues to be a major public health concern in countries like Asia, Africa and Europe where it is prevalent (1). While pulmonary TB is common extrapulmonary TB accounts for a notable percentage of cases (10 20%) with skeletal tuberculosis making up a small fraction (1-3%) within this category (2). The spine, hip joints, knees and bones, in the feet are commonly affected by tuberculosis (3, 4). Foot tuberculosis affecting the bones is extremely uncommon making up less than 0.1% of all cases of TB in the skeletal system. It usually involves the calcaneum, talus and first metatarsal bones. Tuberculosis of the metatarsals the fourth one is even rarer with an incidence rate of less than 0.5%. Foot TB contributes to about 10% of all cases involving TB in the joints and bones (3).
Individuals with foot tuberculosis often experience long term pain and swelling symptoms that can be challenging to diagnose due to their nature and the rarity of this condition (4, 5). This particular case study highlights a situation where a 60-year-old woman was diagnosed with tuberculosis in her fourth metatarsal bone underscoring the clinical complexities and emphasizing the importance of considering TB as a possible cause for persistent foot pain and swelling (3, 6). Given the challenges in diagnosing this condition and its potential for complications, early detection and appropriate medical intervention are essential (7, 8).

Case Presentation

A 60-year-old woman visited the outpatient department (OPD) complaining of swelling in her foot that had been ongoing for two months along, with a constant dull ache. She didn't show any symptoms like fever, weight loss or night sweats. There was no mention of any accidents or falls in her past. Her general examination was unremarkable, and all vital signs were within normal limits.
During the physical examination of her left foot there was swelling and warmth all around. Moving the foot showed that bending up and down caused pain while turning it in or out was difficult. Her overall health check didn't reveal any issues. The clinical presentation suggested a chronic inflammatory process given the duration and nature of her symptoms.
Routine blood tests were conducted which came back mostly normal except for an erythrocyte sedimentation rate (ESR) indicating inflammation with a slightly low haemoglobin level at 10.9 g/dL and a total leukocyte count (TLC) of 8700 cells/mm3 suggesting mild anaemia and a non-specific inflammatory response. A Mantoux test showed a positive result with induration larger than 20 mm hinting at tuberculosis infection and the chest X ray showed nothing concerning ruling out lung tuberculosis.

X rays of the foot revealed a hollow spot in the fourth metatarsal bone raising suspicion about an underlying pathological condition (See Figure 2), and This imaging finding prompted further evaluation. An MRI was performed on the foot showing bone marrow swelling and inflammation near the fourth metatarsal bone (see Figure 3). These MRI results indicated a case of osteomyelitis likely related to tuberculosis considering the patients positive Mantoux test and symptoms.

To confirm the diagnosis a surgical biopsy was performed on the metatarsal. The tissue samples were examined for both microbiological and histopathological analyses. The histopathological findings showed features with tuberculosis, such as specific cells and structures characteristic of a granulomatous inflammatory process. The Cartridge Based Nucleic Acid Amplification Test confirmed the presence of Mycobacterium tuberculosis without resistance to rifampicin. The diagnosis of

tuberculosis, in the metatarsal was confirmed based on these results.

The patient began treatment following the National Tuberculosis Elimination Program guidelines (NTEP), which included a combination of medications to manage the infection. The regimen included a combination of isoniazid, rifampicin, pyrazinamide, and ethambutol. The patient was advised to follow the treatment plan and attend regular check-ups to monitor progress and address any potential side effects.

The patient's symptoms clearly highlight the importance of considering tuberculosis in the differential diagnosis of chronic foot pain and swelling, especially in endemic regions. Tuberculosis affecting the bones of the foot is not common and can be easily missed. This case underscores the importance of being vigilant and conducting tests like imaging and biopsy for an accurate diagnosis and proper treatment.

Early detection and proper treatment play a role in preventing complications and ensuring a positive outcome. If diagnosis is delayed it can lead to worsening bone damage, persistent pain and disability. In this case, the prompt recognition and initiation of anti-tubercular therapy (ATT) have set the patient on a path to recovery. She is currently under observation and responding well to treatment with reduced pain and swelling.

The initial examination findings such as swelling and limited movement are depicted in Figure 1. The X ray showing an area in the fourth metatarsal bone can be seen in Figure 2. MRI images provide a detailed view of the affected region as shown in Figure 3.

Figure-1: Clinical presentation of the left foot showing diffuse swelling.

Figure-2: Radiograph of the left foot indicating a lytic lesion in the fourth metatarsal.

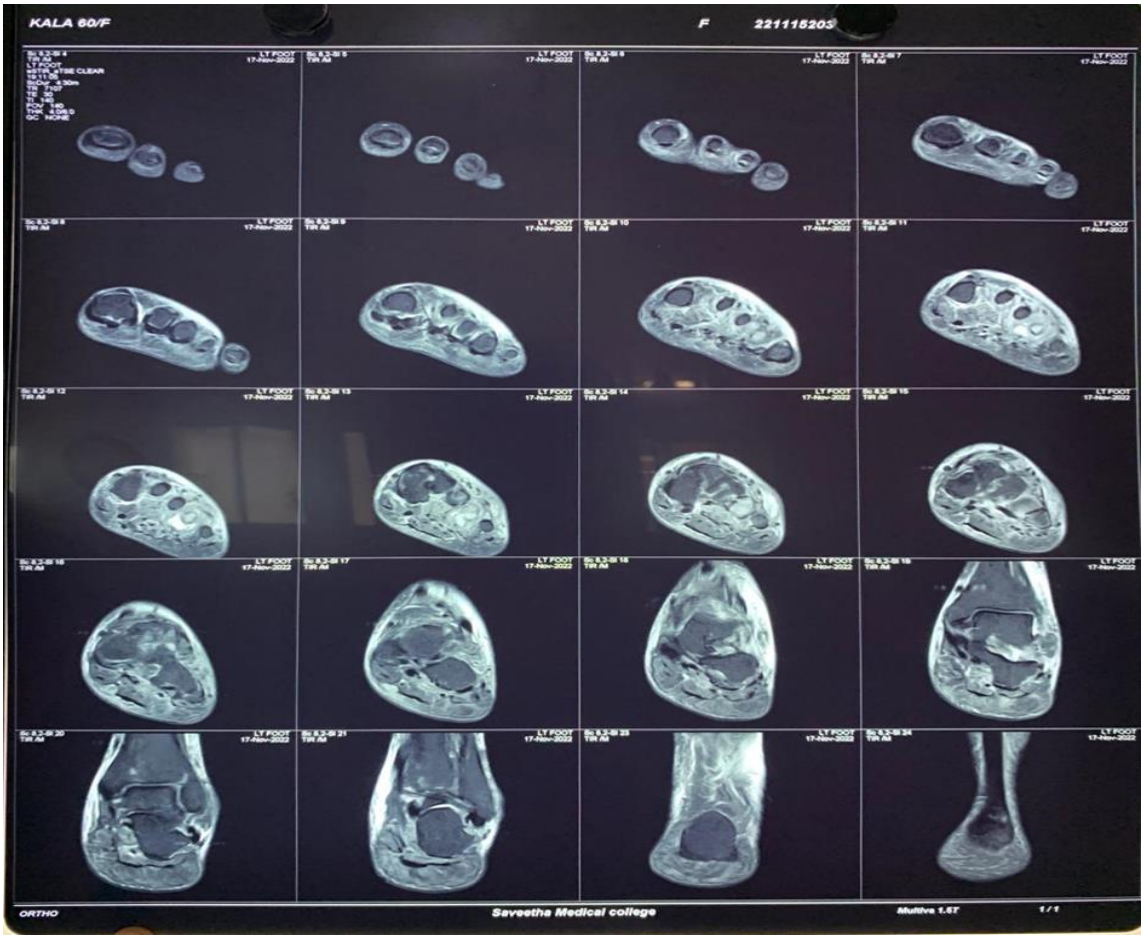

Figure-3: MRI of the left foot indicating bone marrow oedema and perifocal inflammation in the fourth metatarsal.

DISCUSSION

Tuberculosis (TB) remains a health concern worldwide particularly affecting vulnerable populations, in Asia, Africa, and Europe. While pulmonary tuberculosis is more common compared to extrapulmonary TB, which includes TB accounting for 2-5% of all TB cases (1, 4). Osteoarticular TB can impact joints, bones, tendons and bursae. Among these, foot bone TB is extremely rare making up than 3% of all extrapulmonary TB cases and less than 0.5% of metatarsal TB cases (3). The commonly affected bones in the foot by TB are the calcaneum, talus, first metatarsal, navicular and medial and intermediate cuneiforms (3, 5).

Isolated metatarsal bone tuberculosis is not a clinical occurrence. Due to its rarity onset symptoms and resemblance to other conditions such cases often get unreported (3, 9). A prompt diagnosis using radiographic examinations and a biopsy is crucial to initiate anti tubercular treatment early (10, 11).

In this case, a 60-year-old woman presented with swelling and dull aching pain in her left foot, without systemic symptoms or any history of injury. Upon examination of the area revealed generalized swelling, warmth and limited mobility. The routine blood tests showed signs of an inflammation and a strongly positive Mantoux test indicated a potential tuberculous infection. Imaging revealed a a lytic lesion in the fourth metatarsal bone prompting additional assessments using MRI and biopsy. Further analysis through histopathological and microbiological analysis confirmed the diagnosis of tuberculosis in the metatarsal bone (1, 3, 4).

Foot tuberculosis often presents with nonspecific symptoms leading to delays in diagnosis (3). Common signs include pain, stiffness and swelling that can be mistaken for other musculoskeletal disorders (6). Constitutional symptoms are uncommon and patients in later stages may develop sinus tracts (4). About one third of metatarsal TB cases show lung related symptoms, with an incidence among females aged in their 20s or 30s (3). The vague symptoms coupled with the number of bacteria present pose challenges for diagnosis (10, 11). Radiographic findings for TB can be unclear making diagnosis more difficult. They may include swelling,

bone lesions decreased bone density, around joints, bone marrow swelling, tendon inflammation or collections of soft tissue (3, 5, 12). MRI is often the choice for imaging because it provides a clearer view of infected bones and how the infection spreads to nearby areas compared to simple X rays (5, 12). However, definitive diagnosis usually involves confirming through histopathology and microbiology (10, 11). Histopathology typically shows inflammation with caseation necrosis while the Cartridge Based Nucleic Acid Amplification Test (CBNAAT) can identify Mycobacterium tuberculosis and its resistance profile (11, 13).

The primary treatment for metatarsal TB is primarily non-surgical focusing on prolonged tubercular medication (3, 4). The standard treatment plan involves a mix of drugs like isoniazid, rifampicin, ethambutol and pyrazinamide Patients must be closely monitored with serial foot radiographs to assess the response to treatment (3, 4, 11). In cases with significant bone damage or deformities surgical procedures such as debridement, synovectomy and arthrodesis may be necessary (3, 11, 12). These surgical options are typically reserved for intractable disease or as limb salvage methods in patients with hindfoot joint deformities (3, 11).

The infrequency of tuberculosis affecting the bones in the foot, especially the metatarsals emphasize the importance of raising awareness and conducting further research (3, 5, 9). Isolated cases without pulmonary involvement are especially rare, even in immunocompetent patients (1, 4, 13). This rarity often leads to primary care physicians lacking familiarity with cases resulting in delays in diagnosing and treating the condition (3, 5). The use of imaging techniques and access to histopathological and microbiological diagnostic tools play a crucial role in accurately diagnosing and managing this condition (3, 11, 12).
Previous studies have reported occurrences of metatarsal tuberculosis highlighting the need for suspicion when patients present with persistent foot pain and swelling particularly in regions where tuberculosis is prevalent (1). Early detection and proper management are essential to prevent complications and enhance patient outcomes (1, 4, 13). Collaboration among orthopaedic surgeons' infectious disease specialists and microbiologists is vital for managing these complex cases (1, 11).

CONCLUSION

In conclusion tuberculosis affecting the metatarsal bones is a yet serious condition that requires a high level of suspicion, for diagnosis. Diagnosing this type of tuberculosis can be challenging due to the nonspecific clinical and radiographic signs often leading to delays in confirmation. Treatment typically consists of tubercular medications while surgery is considered for severe cases. It is essential for healthcare professionals to be more informed and have access to the diagnostic tools in order to improve patient outcomes. Ongoing research and documentation of unusual tuberculosis cases will help enhance our knowledge and treatment approaches, for this condition.

Authors contribution:
1st, 2nd have been involved in drafting in the manuscript, 3rd had revised the manuscript, 1st, 2nd, and 3rd have participated to surgical care and follow up, 4th have given imaging reading, and ELM have given final approval of the version to be published.

Authors contribution:
Rajamani Kasi and Gangadharan Vadivelu mani have been involved in drafting the manuscript. Anbumaran Parivakkam Mani had revised the manuscript. Rajamani Kasi and Sushmita Vinod have participated in surgical care and follow ups. All authors have given final approval of the version to be published.

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