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RESEARCH ARTICLE

RECURRENT TARSAL-METATARSAL BONE TUBERCULOSIS PRESENTING WITH OSTEOMYELITIS: A CASE REPORT

***Kailash Ramesh Bhovi**

Pharm D intern at Rajiv Memorial Education Society's College of Pharmacy, Kalburagi-585102

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***Corresponding author:**
Kailash Ramesh Bhovi

ABSTRACT

Background: Tuberculosis (TB) remains a major global health concern, with extrapulmonary tuberculosis accounting for a significant portion of cases. Osteoarticular TB, particularly involving the tarsal and metatarsal bones of the foot, is rare and often leads to delayed diagnosis and increased morbidity due to its insidious presentation. The management of such cases is complex, requiring prolonged anti-tubercular therapy (ATT) and sometimes surgical intervention. Treatment adherence is critical for successful outcomes; however, non-adherence remains a major challenge contributing to disease relapse and the emergence of drug resistance. Clinical pharmacists, as integral members of the healthcare team, play a pivotal role in optimizing treatment outcomes through patient education, medication management, monitoring adverse drug reactions, and promoting adherence. **Case Presentation:** We report a case of a 24-year-old female presenting with pain and swelling in the left foot, initially diagnosed with tarsal-metatarsal bone TB and secondary osteomyelitis. After undergoing surgical debridement and commencing standard ATT, the patient discontinued therapy prematurely. She returned with recurrent symptoms including pain, swelling, low-grade fever, and a discharging sinus. Investigations confirmed active infection with rifampicin-sensitive Mycobacterium tuberculosis. ATT was restarted alongside wound management and adherence counseling. **Discussion:** This case highlights the complexities of managing extrapulmonary TB and underscores the critical role of clinical pharmacists in improving patient adherence and preventing treatment failure. Through targeted pharmaceutical care interventions and collaboration within multidisciplinary teams, clinical pharmacists help mitigate complications, support prolonged therapy requirements, and improve clinical outcomes. **Conclusion:** Clinical pharmacist involvement is essential in the comprehensive management of osteoarticular TB to enhance adherence, monitor therapy, and ultimately reduce relapse rates and drug resistance. This case exemplifies the need for integrated care models in managing complex TB cases.

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INTRODUCTION

Tuberculosis (TB) remains a significant global health challenge, with extrapulmonary manifestations accounting for approximately 10–15% of all TB cases. Among these, osteoarticular TB is relatively rare, with foot involvement being particularly uncommon, leading to diagnostic delays and increased morbidity.[1] Effective management of TB requires a multidisciplinary approach, wherein clinical pharmacists play a pivotal role. Their responsibilities encompass patient education, monitoring for adverse drug reactions, ensuring medication adherence, and collaborating with healthcare teams to optimize therapeutic outcomes.[2] Studies have demonstrated that pharmacist-led interventions significantly enhance patient adherence to anti-tubercular therapy (ATT). For instance, a systematic review highlighted that pharmaceutical care interventions, including education and counseling, improved treatment outcomes among patients with pulmonary TB.[3] Furthermore, clinical pharmacists contribute to the early identification and management of drug-related side effects, which is crucial in preventing treatment interruptions and the development of drug-resistant TB strains. Their involvement is particularly vital in cases with complex presentations, such as TB osteomyelitis, where prolonged treatment durations and potential surgical interventions necessitate meticulous medication management and patient counseling.[4] In addition to

direct patient care, clinical pharmacists are instrumental in implementing and managing collaborative practice agreements (CPAs), which allow for a more integrated approach to TB management. CPAs facilitate the delegation of certain clinical responsibilities to pharmacists, enabling timely interventions and adjustments to therapy, thereby improving patient outcomes.[5] This case report details the recurrence of tarsal-metatarsal TB with osteomyelitis in a 24-year-old female, emphasizing the integral role of clinical pharmacists in ensuring treatment adherence, managing adverse effects, and facilitating interprofessional collaboration to achieve favorable patient outcomes.

Case Presentation

A 24-year-old female presented to the Orthopedic Outpatient Department (OPD) with complaints of pain and swelling in her left foot, persisting for the past five months. The pain was insidious in onset, gradually progressive, and associated with difficulty in walking and weight-bearing. There was no significant past medical history of pulmonary tuberculosis, diabetes mellitus, trauma, or immunosuppressive conditions.
On initial evaluation five months prior, radiological and microbiological investigations confirmed the diagnosis of tarsal-metatarsal tuberculosis with secondary osteomyelitis. The patient underwent surgical debridement to manage the local infection and was initiated on a standard first-line anti-tubercular therapy (ATT) regimen, consisting of Isoniazid, Rifampicin, Pyrazinamide, and Ethambutol (HRZE). However, after four months of treatment, the patient discontinued ATT on her own due to symptomatic improvement and a lack of understanding about the importance of completing the full treatment course. She did not attend scheduled follow-ups and was lost to care. One month after discontinuation, she returned to the OPD with recurrent symptoms, including increased pain and tenderness in the left foot, restricted mobility, and low-grade fever. On physical examination, localized swelling, warmth, and a discharging sinus were observed on the dorsum of the foot, suggestive of relapse with active infection

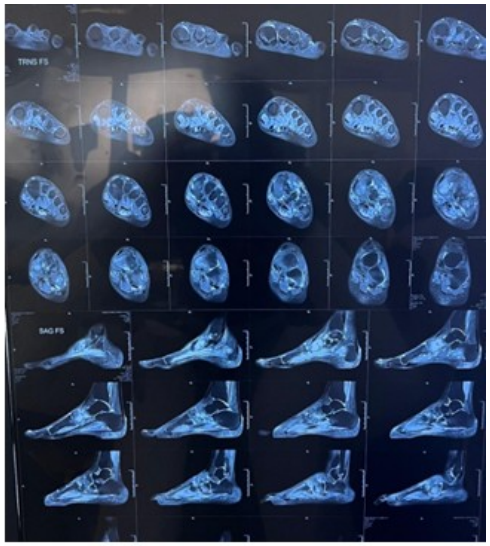
Investigations: On laboratory evaluation, the complete blood count (CBC) showed a hemoglobin level of 10.2 g/dL, white blood cell count of 11,500/mm³, and an elevated erythrocyte sedimentation rate (ESR) of 62 mm/hr, indicating a chronic inflammatory response. The C-reactive protein (CRP) was also elevated at 48 mg/L. Radiographic imaging (X-ray of the foot, AP and lateral views) revealed bony lysis involving the tarsal bones and the 2nd to 4th metatarsals, consistent with ongoing osteomyelitic changes. Further confirmation with Magnetic Resonance Imaging (MRI) showed marrow edema, cortical irregularity, and soft tissue abscess formation, supporting the diagnosis of recurrent tuberculosis with osteomyelitis. Microbiological testing using CBNAAT (GeneXpert) on pus aspirate from the sinus was positive for Mycobacterium tuberculosis, with no resistance to rifampicin. A Mantoux test was also positive, indicating prior exposure to TB. Liver and renal function tests were within normal limits, supporting the continuation of standard ATT without dosage modification.

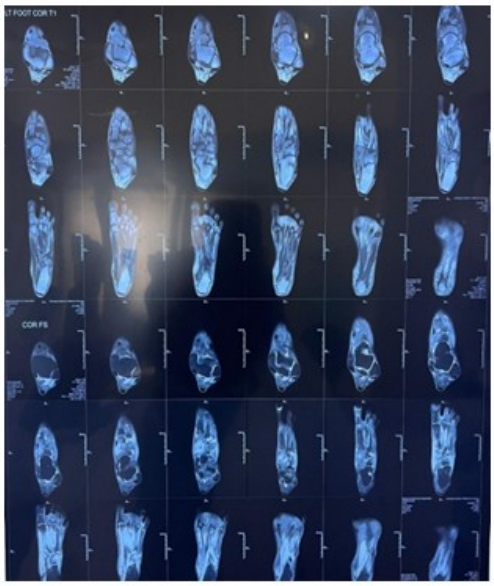
Treatment Plan: The patient was re-initiated on the full anti-tubercular therapy (ATT) regimen, with an intensive phase consisting of HRZE (Isoniazid, Rifampicin, Pyrazinamide, Ethambutol) for two months, followed by a continuation phase of HR (Isoniazid and Rifampicin) for ten months, given the extrapulmonary site and previous interruption of therapy. She underwent repeat wound debridement under local anesthesia to drain the abscess and remove necrotic tissue. Supportive therapy included Calcium and Vitamin D supplementation to aid bone healing, and analgesics such as Paracetamol were prescribed for pain relief. A major focus was placed on medication adherence and patient counseling. The clinical pharmacist played a central role in educating the patient about the importance of completing the full course of ATT, monitoring for potential side effects, and ensuring follow-up compliance. Strategies such as using fixed-dose combinations, setting reminders, and caregiver involvement were implemented to support adherence and reduce the risk of future recurrence.

DISCUSSION

Tuberculous osteomyelitis is an uncommon but serious manifestation of extrapulmonary tuberculosis that predominantly affects weight-bearing bones, including the tarsal and metatarsal bones of the foot, as seen in this case. The pathophysiology of tuberculous osteomyelitis involves hematogenous dissemination of Mycobacterium tuberculosis from a primary pulmonary focus or lymph node to the bone marrow, where it establishes a chronic granulomatous infection.[1] The infection leads to progressive destruction of bone tissue, resulting in lytic lesions, cortical irregularities, and, if untreated, abscess and sinus formation, contributing to pain, swelling, and impaired mobility.[1] The diagnosis of tuberculous osteomyelitis is often delayed due to its insidious onset and nonspecific symptoms, which may mimic other infectious or inflammatory conditions. Imaging modalities such as X-rays and MRI are essential for assessing the extent of bone involvement and detecting complications like abscesses. Microbiological confirmation by CBNAAT or culture remains the gold standard for diagnosis and for detecting drug resistance.[1,6] Management of tuberculous osteomyelitis requires a prolonged course of anti-tubercular therapy (ATT) combined with surgical intervention when necessary. The patient's relapse after premature discontinuation of ATT in this case highlights a significant challenge in TB management—treatment adherence.[2,3] Clinical pharmacists play a crucial role in addressing this challenge through patient education, counseling, adverse effect monitoring, and follow-up, which have been shown to significantly improve adherence rates and treatment outcomes.[3,4]

Pharmaceutical care interventions, including personalized counseling and medication management, have demonstrated reductions in treatment interruptions and improved clinical outcomes in TB patients.[7] Moreover, the implementation of collaborative practice agreements (CPAs) involving clinical pharmacists allows for timely identification of drug-related problems and facilitates prompt therapeutic adjustments, which are essential in complex cases like extrapulmonary TB with osteomyelitis.[5] Recent studies also emphasize the importance of multidisciplinary care teams, including physicians, pharmacists, and nurses, working synergistically to optimize TB treatment, prevent the development of multidrug resistance, and enhance patient quality of life.[8,9] This integrated approach is particularly vital in managing extrapulmonary TB, which often requires individualized treatment plans and longer durations of therapy. In conclusion, this case underscores the importance of clinical pharmacists as key members of the TB management team, particularly in





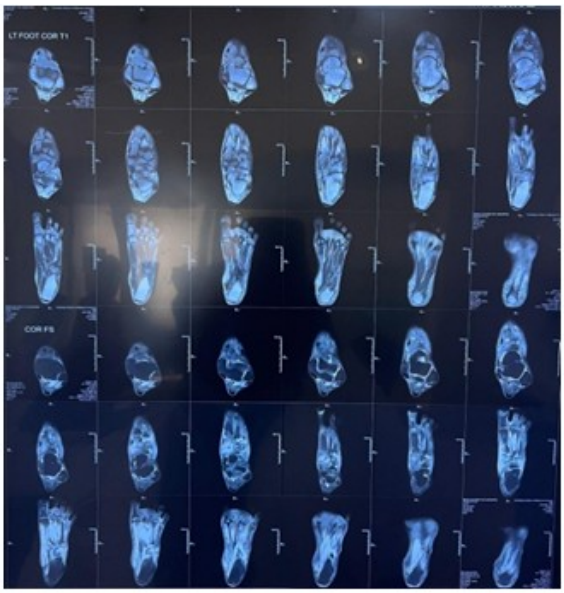


Fig. A,B,C MRI images of the left foot in transverse, sagittal, and coronal planes reveal marrow edema, cortical destruction, and bony lysis involving the tarsal and metatarsal bones. Soft tissue swelling, abscess formation, and a possible sinus tract extending to the dorsal surface are evident, consistent with tuberculous osteomyelitis.

Fig D. X-ray of the left foot (anteroposterior and oblique views) showing lytic lesions, joint space narrowing, and bony destruction involving the tarsal and metatarsal bones. The findings are consistent with chronic osteomyelitis secondary to tuberculosis, with evident cortical irregularities and possible subluxation.

preventing relapse by ensuring adherence and monitoring therapy. Their involvement not only improves patient outcomes but also contributes to controlling the spread of TB and drug resistance.

CONCLUSION

This case of tarsal-metatarsal bone tuberculosis with osteomyelitis illustrates the challenges posed by extrapulmonary TB, especially when treatment adherence is compromised. Clinical pharmacists play a vital role in preventing such complications by providing patient-centered pharmaceutical care, including thorough counseling on the importance of completing anti-tubercular therapy, monitoring for adverse drug reactions, and managing drug interactions. Their active involvement in adherence monitoring and education helps reduce the risk of relapse and development of drug resistance. Integrating clinical pharmacists into multidisciplinary TB care teams ensures continuity of care and optimizes therapeutic outcomes. Proactive strategies led by clinical pharmacists, such as regular follow-ups and personalized support, are essential to avoid premature treatment discontinuation and improve overall patient prognosis in complex TB cases.

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