J Orthop Spine Trauma. 2026 August; 12(4): 204-11. DOI: 10.18502/jost.v12i4.22585

Case Series

Bone Tuberculosis Mimicking Bone Sarcoma: A Case Series and Literature Review

Prerna Walia[1], Dhruv Patel[2], Vikas Warikoo[3], Abhijeet Salunke[4], Nandlal Bharwani[2,*], Shashank Pandya[3]

[1] Assistant Professor, Department of Oncopathology, The Gujarat Cancer and Research Institute, Ahmedabad, India
[2] Fellowship in Orthopedic Oncology, Department of Surgical Oncology, The Gujarat Cancer and Research Institute, Ahmedabad, India
[3] Professor, Department of Surgical Oncology, The Gujarat Cancer and Research Institute, Ahmedabad, India
[4] Assistant Professor, Department of Surgical Oncology, The Gujarat Cancer and Research Institute, Ahmedabad, India

[*]Corresponding author: Nandlal Bharwani; Department of Surgical Oncology, The Gujarat Cancer and Research Institute, Ahmedabad, India; Tel: +91-9680880809
Email: nandlalbharwani21@gmail.com

Received: 09 April 2026; **Revised:** 13 June 2026; **Accepted:** 10 July 2026

Abstract

Background: Pulmonary tuberculosis (TB) is routinely encountered in developing countries such as India. However, osteoarticular TB is rarely seen and frequently presents with an atypical clinical-radiological presentation that may mimic bone tumors. For such lesions involving the bones, we need to be more vigilant in both clinical and radiological terms. The aim of this study was to bridge the gap between diagnosis and management for achieving good outcomes.
Methods: This retrospective study analyzed five cases referred to the orthopedic oncology unit with suspected bone sarcoma, based on clinical, radiological, and histopathological examinations (HPE).
Results: A total of five cases (three male and two female patients) with the suspicion of bone sarcomas were included in this study. The mean age of the study group was 20.6 years. The mean values of blood parameters were as follows: hemoglobin (Hb) 9.88 g/dl, white blood cell (WBC) count 10820/µl, erythrocyte sedimentation rate (ESR) 85 mm/h, and C-reactive protein (CRP) 48.8 mg/l. Two patients (40%) had infections as one of the differential diagnoses. Radiological evaluation suggested infection in four of the five patients (80%). A biopsy was planned and sent for both HPE and culture. HPE was positive in all cases (100%), whereas culture was positive in 60% of cases.
Conclusion: For all the aggressive bony lesions, a multidisciplinary team is of utmost importance for the diagnosis. The role of the oncopathologist is crucial in differentiating atypical presentations of osteoarticular TB from malignant bone tumors.

Keywords: Treatment; Biopsy; Osteosarcoma; Osteoarticular; Tuberculosis

Citation: Walia P, Patel D, Warikoo V, Salunke A, Bharwani N, Pandya S. **Bone Tuberculosis Mimicking Bone Sarcoma: A Case Series and Literature Review.** *J Orthop Spine Trauma* 2026; 12(4): 204-11.

Background

In developing countries such as India, approximately 10-15 percent of extrapulmonary tuberculosis (TB) cases are encountered annually. Of all the cases, only 2-5 percent are cases of TB affecting bone and joints (1). The most common sites involved are the spine (thoracic > cervical > lumbar regions) and small bones (2). The involvement of long bones poses a great challenge both clinically and radiologically (3). The absence of characteristic constitutional symptoms, combined with atypical radiological findings, complicates the definitive diagnosis of TB (4). The usual presentation of osteoarticular TB is the presence of lytic bone lesions, which are usually encountered in orthopedic clinics; however, before confirming TB, all other differential diagnoses, including benign or locally aggressive tumors –such as giant cell tumors and aneurysmal bone cysts –as well as malignancies like osteosarcoma and chondrosarcoma, need to be ruled out (5).

To date, there is a paucity of literature explicitly defining the direct differentiating features between bone sarcoma and osteoarticular TB (6). The atypical locations in which these lesions manifest presents a significant diagnostic challenge for clinicians.

For such lesions involving the bones, precise clinical and radiological evaluation is paramount to ensuring accurate diagnosis and effective management, thereby maximizing clinical outcomes.

This study aims to discuss the radiological features of osteoarticular TB and emphasize the importance of histopathological examination (HPE) and biopsy culture in differentiating TB from bone sarcomas.

Methods

This retrospective study was conducted in the Orthopedic Oncology Unit of the Department of Surgical Oncology at a tertiary health care center between January 1, 2022 and December 31, 2024. A total of five patients (three male and two female cases) presenting with clinical and radiological features suggestive of osteoarticular TB with a minimum follow-up period of at least one year were included in the study. After clinical and radiological evaluation, all patients were scheduled for biopsy. Both patients and their families were counselled about the necessity of HPE and culture of collected tissue for definitive diagnosis. For patients presenting with external imaging or histopathological reports, all documentation was reviewed by our oncopathologist and musculoskeletal radiologist, with subsequent multidisciplinary discussion in the tumor board.

The details regarding demographic parameters, clinical features, radiological imaging, bone involved, HPE, and culture reports were noted. The confirmatory diagnosis of osteoarticular TB was performed with HPE. Following a definitive diagnosis of osteoarticular TB, all patients were initiated on anti-tubercular treatment (ATT). The protocol for differentiating osteoarticular TB from

Copyright © 2026 Tehran University of Medical Sciences. Published by Tehran University of Medical Sciences.

This work is licensed under a Creative Commons Attribution-Noncommercial 4.0 International license (https://creativecommons.org/licenses/by-nc/4.0/). Noncommercial uses of the work are permitted, provided the original work is properly cited.

bone tumors was formed based upon the radiological features and HPE, as illustrated in figure 1. Besides, the clinical and radiological details of cases are summarized in table 1.

In all of the cases discussed above, both clinical and radiological improvements were carefully monitored throughout the course of treatment and follow-up. Clinically, assessments focused on the reduction of pain and swelling, as well as the patient's ability to resume their daily activities.

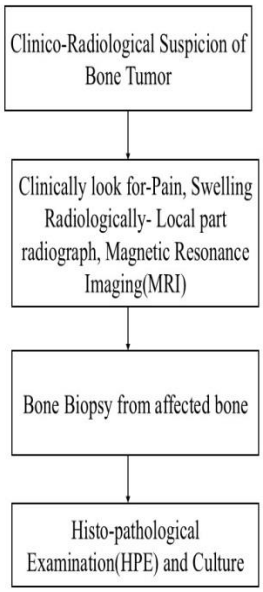

Figure 1. Schematic representation of the diagnostic approach for lytic bone lesions

Radiological evaluation was conducted to observe for osteolytic or osteosclerotic changes, periosteal reaction, and a wide zone of transition within the affected bone. whereas the presence of sclerosis and consolidation of the previously identified bony lesions, as these findings are indicative of healing as illustrated in figures 2 to 4. Additionally, radiographs were scrutinized for any evidence of lesion recurrence to facilitate early clinical intervention.

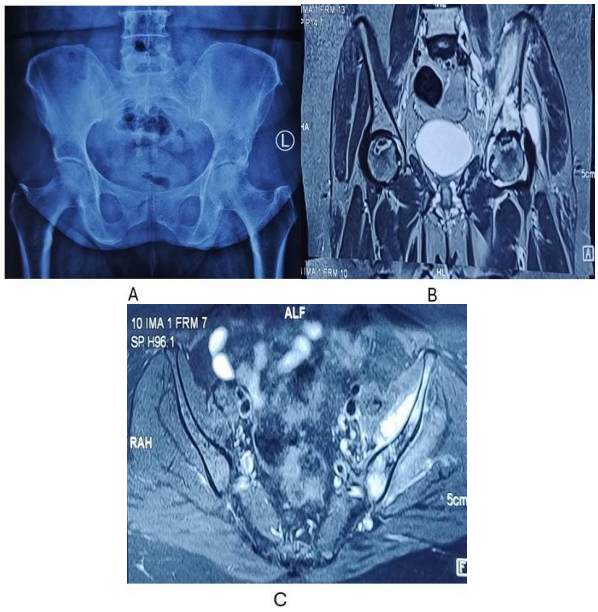

Figure 2. A) Anteroposterior (AP) view of pelvis with bilateral hip joint showing lytic lesion involving peri-acetabular region; B and C) Magnetic resonance imaging (MRI) in the coronal and axial planes showing an osteolytic lesion involving the ilium and peri-acetabular region with soft tissue involvement

Literature Review

A comprehensive review of literature was conducted using the PubMed database for studies published between 2015 and 2024, with the following keywords: "tuberculosis", "bone", and "bone tumor". The present study shows the vital role of radiological examination, HPE, and culture for differentiating osteoarticular TB from bone tumors. The literature review is summarized in table 2.

Table 1. Clinical and radiological characteristics of study participants

Age (year), sex	Side	Affected bone	Laboratory findings	Radiographic findings	CT-scan findings	MRI findings	PET-scan findings	Culture	Follow-up (month)
60, female	Left	Acetabulum	Hb: 11.2 g/dl, WBC: 9500/µl, ESR: 90 mm/h, CRP: 40 mg/l	Lytic lesion of peri-acetabular region	Lytic lesion involving acetabulum and iliac blade (4.4 × 5.7 × 3.4 cm)	Lytic lesion involving left acetabulum, superior pubic rami, and iliac bone with soft tissue component (5.1 × 5.7 × 9.4 cm)	FDG avid mixed lytic-sclerotic lesion of left acetabulum and iliac bone (SUVmax 12.0)	+ve	13
12, female	Right	1st metacarpal	Hb: 10 g/dl, WBC: 10200/µl, ESR: 95 mm/h, CRP: 54 mg/l	Lytic lesion with lamellated periosteal reaction with soft tissue component involving the shaft of 1st metacarpal	-	Lytic lesion involving 1st metacarpal with soft tissue component (2.5 × 2.1 × 1.8 cm)	FDG avid lytic lesion of 1st metacarpal with soft tissue component (SUVmax 8.5)	-ve	12
27, male	Left	Proximal ulna	Hb: 10.5 g/dl, WBC: 9200/µl, ESR: 80 mm/h, CRP: 40 mg/l	Osteolytic lesion, cortical breach, and soft tissue component involving the proximal part of ulna	-	Lytic lesion involving proximal part of ulna with soft tissue component (3.1 × 3.0 × 2.8 cm)	-	+ve	15
1, male	Left	Distal fibula	Hb: 8.2 g/dl, WBC: 13000/µl, ESR: 90 mm/h, CRP: 60 mg/l	Osteolytic lesion, multiple cortical breach, and soft tissue component involving the distal part of fibula	-	Lytic lesion involving distal part of fibula with soft tissue component (2.3 × 2.7 × 3.0 cm)	-	-ve	12
3, male	Right	Femur shaft	Hb: 9.5 g/dl, WBC: 12200/µl, ESR: 70 mm/h, CRP: 50 mg/l	Osteolytic lesion, cortical breach, lamellated periosteal reaction, and soft tissue component involving the femur shaft	-	Lytic lesion involving femur shaft with soft tissue component (8.1 × 7.0 × 4.1 cm)	-	+ve	12

CT: Computed tomography; MRI: Magnetic resonance imaging; PET: Positron emission tomography; FDG: Fluorodeoxyglucose; SUVmax: Maximum standardized uptake value; Hb: Hemoglobin; WBC: White blood cell; ESR: Erythrocyte sedimentation rate; CRP: C-reactive protein

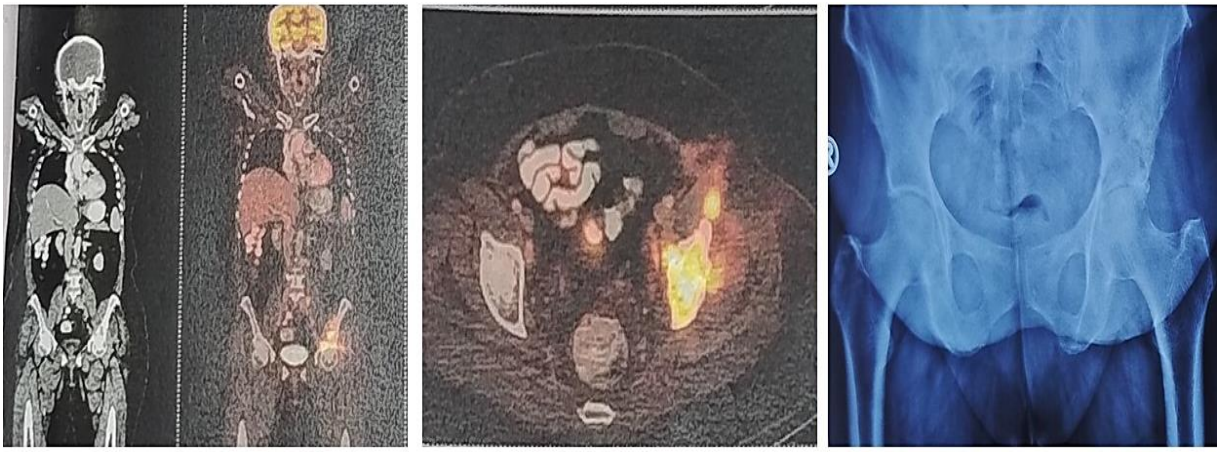

Figure 3. A and B) Positron emission tomography (PET) showing uptake around ilium and peri-acetabular region, with a maximum standardized uptake value (SUVmax) of 12; C) Anteroposterior (AP) view of pelvis with bilateral hip joint showing healed peri-acetabular lesion at last follow-up

Results

A total of five cases were included in this study with the suspicion of bone sarcomas. Based on the clinical features, radiographs, and magnetic resonance imaging (MRI), bone sarcomas and bone infections were considered as the initial differential diagnoses. Two (40%) out of the five patients had infections as one of the differential diagnoses. Radiological evaluation by a radiologist suggested infections in four (80%) out of the five patients. The mean values of blood parameters were: hemoglobin (Hb) 9.88 g/dl, white blood cell (WBC) count 10820/µl, erythrocyte sedimentation rate (ESR) 85 mm/h, and C-reactive protein (CRP) 48.8 mg/l. A biopsy was obtained in all five cases for both HPE and culture. HPE revealed classic features of TB, including the presence of caseous necrosis, granuloma formation, giant cells, and lymphocytes. Only three cases yielded positive cultures for Mycobacterium TB. For all five patients, the diagnosis of osteoarticular TB was confirmed primarily via HPE (Figure 5).

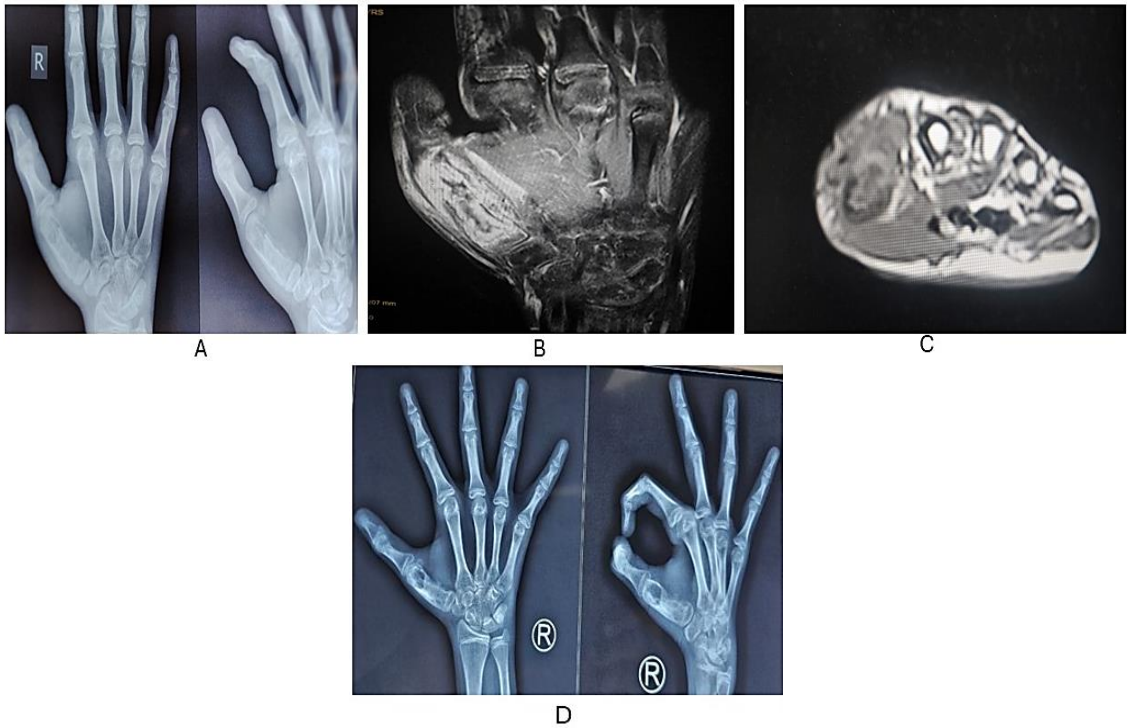

Figure 4. A) Anteroposterior (AP) and oblique views of hand showing osteolytic lesion involving 1st metacarpal with lamellated periosteal reaction; B and C) Magnetic resonance imaging (MRI) in the coronal and axial planes showing osteolytic lesion involving 1st metacarpal and extensive soft tissue involvement; D) AP and oblique views of hand showing healed lesion of 1st metacarpal at final follow-up

Table 2. Review of literature on osteoarticular tuberculosis (TB) of the appendicular skeleton

Study	Number of cases	Mean age	Sex (M:F)	Affected bone	Clinical feature	Radiological feature	CT-scan findings	MRI findings	HPE	ATT	Surgical treatment	Follow-up	Complications
Lemme et al. (7)	1	3 years	Male	Distal femur	Pain, swelling, limping	Lytic lesion involving medial femur condyle with soft tissue swelling	-	Lesion of medial femur condyle (2.6 × 1.7 × 1.5 cm) with surrounding soft tissue extension and inflammation	Tuberculosis	Total duration: 12 months, 1. H (10 mg/kg), R (10 mg/kg), Z (15 mg/kg), E (15 mg/kg) for 2 months, 2. H (20 mg/kg), R (15 mg/kg) for 10 months	Biopsy	1 year	-
Hakimi et al. (1)	4	13.5 months (range: 10-16)	2:2	Distal tibia, distal femur, distal radius (n = 2)	Pain, swelling	1. Involvement of postero-medial aspect of distal tibia with periosteal reaction and soft tissue involvement 2. Involvement of distal femur metaphysis with periosteal reaction and soft tissue involvement 3 & 4. Single lytic lesion in metaphyseal region of distal radius	-	-	Tuberculosis	Total duration: 9 months 1. H, R, Z, E for 2 months 2. H, R for 7 months	Biopsy	9 months	-
Rasool (8)	53	6 years (range: 1-12)	40:13	1. Long bones (n = 44) (a) Metaphysis (n = 36) (b) Diaphysis (n = 4) (c) Epiphysis (n = 4) 2. Small tubular hand, foot bones (n = 10) 3. Flat bones (pelvis, clavicle) (n = 8) 4. Small round bones (talus, patella, navicular) (n = 3)	Pain, swelling, limping, restricted range of motion, fluctuant abscess, discharging sinus	1. Cystic lesion with sclerotic margins \ 2. Bony lysis 3. Periosteal reaction 4. Solitary and multifocal lesions	Used to define the lesions in small bones and for planning biopsy	-	Tuberculosis	H, R , Z for 12 months	1. Biopsy 2. Curettage 3. Bone grafts to fill the defects	2.5 years (range: 12 months-15 years)	1. Growth disturbances (n = 6) (a) Coxa vara (n = 4) (b) Short thumb (n = 1) (c) Hypoplastic distal humerus (n = 1) 2. Avascular necrosis (n = 3) (a) Femoral head (n = 2) (b) Navicular (n = 1) 3. Joint contracture (n = 8) (a) Hip (n = 4) (b) Knee (n = 2) (c) Elbow (n = 2)
Elmi et al. (9)	1	25 years	Female	Medial femoral condyle	Pain, swelling	No lysis seen	Lytic lesion with surrounding sclerosis	Lytic lesion involving medial femoral condyle (1 × 1 cm)	Tuberculosis	ATT for 12 months	Curettage	1 year	
Erol et al. (10)	8	4 years (range: 2-6)	5:3	1. Distal femur (n = 3) 2. Proximal tibia (n = 5)	Pain, limping, swelling	1. Radiolucent metaphyseal lesion 2. Periosteal reaction			Tuberculosis	Total duration: 12 months 1. H (10 mg/kg/day), R (10 mg/kg/day), Z (35 mg/kg/day), S (15 mg/kg/day) for 2 months 2. H, R for 10 months	One-stage procedure (n = 5) Two-stage procedure (n = 3)	4 years (range: 2-7)	
Fairag and Hamdi (11)	1	36 years	Female	Proximal interphalangeal joint of 5th finger	Painless swelling	Peri-articular erosions, joint space narrowing, and subluxation	-	Features of osteomyelitis	Tuberculosis	1. H (300 mg), R (450 mg) for 18 months 2. Z (1.5 mg), E (800 mg) for 3 months	-	1.5 years	-
Ye et al. (12)	1	54 years	Female	Olecranon	Pain, swelling	Poorly defined osteolytic lesion in olecranon	Lytic lesion involving intercondylar region of distal humerus and olecranon	Lytic lesion (7.0 × 0.9 cm) involving olecranon	Tuberculosis	ATT	-	3 months	

Table 2. Review of literature on osteoarticular tuberculosis (TB) of the appendicular skeleton (continue)

Study	Number of cases	Mean age	Sex (M:F)	Affected bone	Clinical feature	Radiological feature	CT-scan findings	MRI findings	HPE	ATT	Surgical treatment	Follow-up	Complications
Wiratnaya et al. (5)	2	35.5 years	1:1	1. Distal radius 2. Distal ulna and radius	Pain, lump	1. Lytic lesion involving distal radius and soft tissue involvement 2. Lytic lesion involving distal radius, distal ulna, carpals, and soft tissue involvement			Tuberculosis	1. H (10 mg/kg) 2. R (10 mg/kg) 3. Z (15 mg/kg) 4. E (15 mg/kg)	1. Debridement, curettage, and bone grafting 2. Debridement and wrist arthrodesis	-	
Dlimi et al. (13)	1	60 years	Female	1. Distal tibia (left) 2. proximal tibia (right)	Pain, swelling	Well-defined lytic lesion without periosteal reaction in both tibia			Tuberculosis	1. H (300 mg), R (450 mg), E (800 mg), P (500 mg) for 2 months 2. H, R for 7 months Total duration: 18 months	Drainage, evacuation, and curettage (left)	1 year	
Gahlot et al. (14)	1	2 years	Male	Tibia shaft	Pain, swelling	Lytic lesion involving tibia shaft	-	Intramedullary lytic lesion with cortical breach and thickening	Tuberculosis	1. H (10 mg/kg), R (15 mg/kg), Z (35 mg/kg), E (20 mg/kg) for 2 months 2. H, R, E for 6 months 3. H, R for 10 months Total duration: 18 months	-	2 years	
Kumar et al. (15)	1	19 years	Male	Lateral malleolus	Pain, limping, skin induration, discharging sinus	Well-defined lytic lesion with sclerotic rim involving lateral malleolus and cortical breach on postero-inferior aspect	Well-defined lytic lesion with sclerotic rim involving lateral malleolus and cortical breach on postero-inferior aspect of lateral malleolus	Ill-defined lesion of altered signal intensity in the calcaneum with no cortical breach and a collection around peroneal tendons	Tuberculosis	1. H (5 mg/kg) 2. R (10 mg/kg) 3. Z (15 mg/kg) 4. E (25 mg/kg) for 2 months 2. H, R, Z for 7 months 3. H, R for 9 months Total duration: 18 months	-	3 years	
Rafaoui et al. (16)	5	39 years	3:2	1. 4th metatarsal 2. Calcaneum 3. Cuboid 4. All 3 cuneiforms and navicular 5. Calcaneum	Pain, swelling, limping, fistula	1. Complete osteolysis of 4th metatarsal 2. Lytic lesion involving calcaneum with no soft tissue extension 3. Lysis of cuboid bone suggestive of osteitis 4. No lysis in bone seen 5. Lytic lesion involving calcaneum	1. Involvement of 4th metatarsal bone 2. Involvement of calcaneum 3. None 4. None 5. None	1. None 2. None 3. None 4. Involvement of all 3 cuneiforms and navicular bone 5. None	Tuberculosis	ATT for 9 months in all 5 cases as per national protocol	1. Abscess drainage and excision of necrotic tissue 2. None 3. Bone biopsy 4. None 5. Biopsy + curettage	-	
Yadav et al. (17)	1	12 years	Male	5th metatarsal	Pain, swelling	No bony lesion seen	-	Involvement of 5th metatarsal with no cortical breach, soft tissue edema, and sinus tract on plantar surface	Tuberculosis	Total duration: 12 months 1. H, R, Z, E for 2 months 2. H, R, E for 10 months	Open biopsy and debridement	1 year	-
Mo et al. (18)	1	2 years	Female	Ulna shaft	Pain, swelling, deformity	Lytic lesion involving proximal ulna extending up to lower shaft with thinning of lateral cortex	Lesion involving the ulna shaft with lesion length around 9.3 cm	-	-	1. H, R, Z, E for 3 months 2. H, R for 9 months	Incision and drainage	1.5 years	

Table 2. Review of literature on osteoarticular tuberculosis (TB) of the appendicular skeleton (continue)

Study	Number of cases	Mean age	Sex (M:F)	Affected bone	Clinical feature	Radiological feature	CT-scan findings	MRI findings	HPE	ATT	Surgical treatment	Follow-up	Complications	
Nukaly et al. (19)	1	15 years	Male	Middle phalanx of index finger	Pain, swelling, fungating lesion	-	-	Altered signal intensity in middle phalanx with proximal interphalangeal joint and soft tissue extension	Tuberculosis		1. H (300 mg), R (600 mg), Z (2500 mg), levofloxacin (750 mg) for 1 month	Open biopsy, debridement, and synovectomy	-	-

CT: Computed tomography; MRI: Magnetic resonance imaging; HPE: Histopathological examination; ATT: Anti-tubercular treatment; H: Isoniazid; R: Rifampicin; Z: Pyrazinamide; E: Ethambutol; S: Streptomycin; P: Pyrazinamide

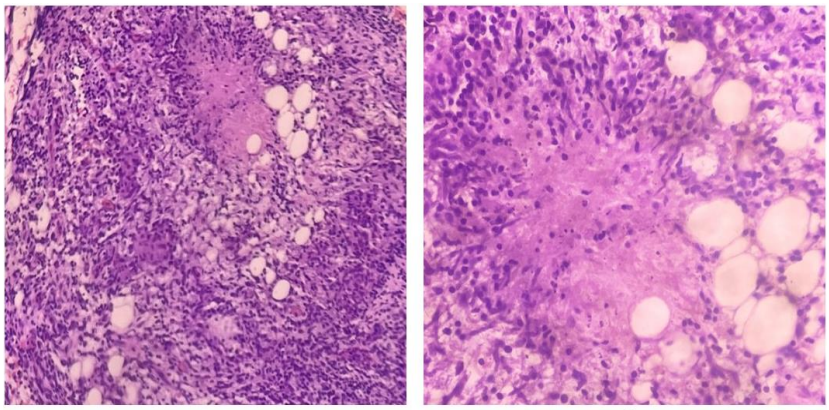

Figure 5. Low-power (A) and high-power (B) histopathological images showing epithelioid granulomas with caseous necrosis surrounded by a peripheral rim of lymphocytes

Discussion

The present study shows difficulty in diagnosing osteoarticular TB due to the lack of familiarity with lesions and their atypical presentations. The primary diagnostic challenge lies in the potential for misdiagnosis in cases with such atypical presentations, where a malignant tumor may be missed, which can lead to a more adverse effect. Consequently, these diagnostic complexities necessitate referral to an orthopedic oncologist. It is estimated that the clinical accuracy of orthopedic oncologists and musculoskeletal radiologists, based on clinico-radiological features, ranges between 60% and 70% (6). The radiological features observed in the present study included osteolytic lesions, periosteal reaction, soft tissue involvement, and cortical breach, all of which are highly suggestive of bone malignancy. For all cases, MRI of the affected bone was performed, as it facilitates earlier lesion assessment compared to plain radiographs. The low- and high-signal intensity of bone marrow is seen on T1- and T2-weighted MRI with contrast medium. On contrast-enhanced MRI, a key differentiator between bone tumors and osteoarticular TB is the pattern of enhancement: TB typically demonstrates peripheral rim enhancement, whereas tumor cells often display a relatively uniform enhancement pattern (20).

In this study, all cases underwent 18F-fluorodeoxyglucose positron emission tomography/computed tomography (18F-FDG-PET/CT) for lytic lesions that show uptake in and around the lesion; however, the diagnostic utility of this modality in the specific context of osteoarticular TB is still questionable (8).

We also analyzed the blood parameters like Hb, WBC, ESR, and CRP for all the cases present in the study. The study by Wagh et al. showed that WBC counts were normal, ESR was slightly elevated, and CRP was positive in only 40% of cases (6).

Tissue biopsy is of utmost importance for making diagnoses in atypical cases. In our institution, all the biopsies were sent for HPE and culture.

The diagnosis of osteoarticular TB was confirmed in all cases via HPE that is characterized by the presence of caseous necrosis, epithelioid granuloma, and Langerhans giant cells. The study by Enache et al. showed the importance of biopsy for diagnosis of osteoarticular TB, whereas culture was positive in only three cases in the present study and the final diagnosis was confirmed on the basis of HPE (21).

The osteoarticular TB is characterized by a paucibacillary nature, and the literature emphasizes a multifaceted diagnostic approach, incorporating HPE, tuberculin skin test, acid-fast bacilli (AFB) staining, culture, and polymerase chain reaction (PCR). Of all the above-mentioned investigations, PCR is highly sensitive, and reports are available within 24 hours (20, 22).

For aggressive-looking lesions on radiographs, evaluation should be conducted on a clinical and radiological basis, and if required, a biopsy should be performed by an experienced surgeon. The biopsy should be taken by the operating surgeon so that it is in line with the final incision, which helps in preventing the dreaded surgical outcomes during the final surgery and ensures the collection of adequate tissue specimens for culture and HPE (23, 24).

This study is limited by the small number of patients with solitary bone lesions, which can closely mimic both benign and malignant bone tumors. Therefore, careful radiological assessment and HPE remain essential for establishing a definitive diagnosis.

Conclusion

For all the aggressive bony lesions, a multidisciplinary team is of utmost importance for the diagnosis. If aggressive features like a sclerotic lesion with periosteal reaction, soft tissue component, wide zone of transition, and the Codman's triangle are present, osteoarticular TB must be included in the differential diagnosis, along with both benign and malignant bone tumors.

The role of the oncopathologist is crucial in differentiating atypical presentations of osteoarticular TB from malignant bone tumors. For each sample, HPE and culture should be performed for the management of the patients.

Conflict of Interest

The authors declare no conflict of interest in this study.

Acknowledgements

The authors would like to thank all patients who participated in this study. We also acknowledge the support of the Orthopedic Oncosurgery Unit and Surgical Oncology and Oncopathology Department of the institution

for their assistance in patient care and data collection.

References

1. Hakimi M, Hashemi F, Mirzaie AZ, Pour AH, Kosari H. Tuberculous osteomyelitis of the long bones and joints. *Indian J Pediatr*. 2008;75(5):505-8. doi: 10.1007/s12098-008-0078-6. [PubMed: 18537013].
2. Burrill J, Williams CJ, Bain G, Conder G, Hine AL, Misra RR. Tuberculosis: a radiologic review. *Radiographics*. 2007;27(5):1255-73. doi: 10.1148/rg.275065176. [PubMed: 17848689].
3. Raviglione MC, Narain JP, Kochi A. HIV-associated tuberculosis in developing countries: clinical features, diagnosis, and treatment. *Bull World Health Organ*. 1992;70(4):515-26. [PubMed: 1394786]. [PubMed Central: PMC2393393].
4. Dhillon MS, Aggarwal S, Prabhakar S, Bachhal V. Tuberculosis of the foot: An osteolytic variety. *Indian J Orthop*. 2012;46(2):206-11. doi: 10.4103/0019-5413.93683. [PubMed: 22448060]. [PubMed Central: PMC3308663].
5. Wiratnaya IGE, Susila I, Sindhughosa DA. Tuberculous Osteomyelitis Mimicking a Lytic Bone Tumor: Report of Two Cases and Literature Review. *Rev Bras Ortop (Sao Paulo)*. 2019;54(6):731-5. doi: 10.1016/j.rboe.2017.11.015. [PubMed: 31875074]. [PubMed Central: PMC6923653].
6. Wagh Y, Reddy R, Gundavda M, Agarwal M, Agashe VM, Bajwa S. Tuberculosis (T.B.) masquerading as tumor. An 8-year study on 25 cases of long bone tuberculosis presenting as tumors. *Sicot j*. 2020;6:14. doi: 10.1051/sicotj/2020011. [PubMed: 32463012]. [PubMed Central: PMC7254868].
7. Lemme SD, Kevin Raymond A, Cannon CP, Normand AN, Smith KC, Hughes DP. Primary tuberculosis of bone mimicking a lytic bone tumor. *J Pediatr Hematol Oncol*. 2007;29(3):198-202. doi: 10.1097/MPH.0b013e31803b959f. [PubMed: 17356403].
8. Rasool MN. Tuberculosis-the masquerader of bone lesions in children. *SA Orthop J*. 2009;8(1):21-5.
9. Elmi A, Tabrizi A, Tolouei FM. Skeletal tuberculosis presenting as a small cystic lesion in the medial femoral condyle. *Arch Bone Jt Surg*. 2013;1(2):112-5. [PubMed: 25207301]. [PubMed Central: PMC4151416].
10. Erol B, Topkar MO, Basar H, Caliskan E, Okay E. Solitary cystic tuberculosis of the distal femur and proximal tibia in children. *J Pediatr Orthop B*. 2015;24(4):315-20. doi: 10.1097/bpb.0000000000000193. [PubMed: 26035351].
11. Fairag R, Hamdi A. Tuberculous Dactylitis : Case Presentation and Functional outcome. *J Orthop Case Rep*. 2016;6(3):22-4. doi: 10.13107/jocr.2250-0685.484. [PubMed: 28116260]. [PubMed Central: PMC5245928].
12. Ye C, Hu X, Yu X, Zeng J, Dai M. Misdiagnosis of cystic tuberculosis of the olecranon. *Orthopade*. 2017;46(5):451-3. doi: 10.1007/s00132-017-3401-y. [PubMed: 28235992]. [PubMed Central: PMC5418322].
13. Dlimi F, Abouzahir M, Mahfoud M, Berrada MS, El Bardouni A, El Yaacoubi M. Multifocal bone tuberculosis: a case report. *Foot Ankle Surg*. 2011;17(4):e47-50. doi: 10.1016/j.fas.2011.05.002. [PubMed: 22017914].
14. Gahlot N, Saini UC, Chouhan DK. Diaphyseal tuberculosis - a rare manifestation. *BMJ Case Rep*. 2017;2017:bcr2017221617. doi: 10.1136/bcr-2017-221617. [PubMed: 28939619]. [PubMed Central: PMC5747779].
15. Kumar P, Dhillon MS, Rajnish RK, Jindal K. Tubercular involvement of the lateral malleolus and adjacent calcaneus: presentation of a rare case and review of the literature. *BMJ Case Rep*. 2019;12(12):e231533. doi: 10.1136/bcr-2019-231533. [PubMed: 31826905]. [PubMed Central: PMC6936488].
16. Rafaoui A, Lamris MA, El Kassimi C, Fnini S, Rafai M. Diagnosis and treatment of osteo-articular tuberculosis of the foot and ankle (a five case series). *Int J Surg Case Rep*. 2023;111:108739. doi: 10.1016/j.ijscr.2023.108739. [PubMed: 37690276]. [PubMed Central: PMC10498164].
17. Yadav S, Rawal G, Jeyaraman M. Tuberculosis of the Right Fifth Metatarsal and Fourth Web Space without Pulmonary Involvement: A Rare Case. *Cureus*. 2023;15(6):e41160. doi: 10.7759/cureus.41160. [PubMed: 37525777]. [PubMed Central: PMC10387166].
18. Mo Q, Wei X, Xia X, Li Y, Nan G, Ling C. Ulnar bone tuberculosis in children: Case report and literature review. *Medicine (Baltimore)*. 2024;103(25):e38611. doi: 10.1097/md.0000000000038611. [PubMed: 38905359]. [PubMed Central: PMC11191969].
19. Nukaly HY, Ahmed RA, Mousa AH, Moallem AA, Zubair MTM, AlAidarous HAA, et al. Left Middle Phalanx Tuberculous Dactylitis Masquerading as a Tumor: First Case Report in Saudi Arabia. *Plast Reconstr Surg Glob Open*. 2024;12(9):e6142. doi: 10.1097/gox.0000000000006142. [PubMed: 39286609]. [PubMed Central: PMC11404913].
20. Jain AK, Jena SK, Singh MP, Dhammi IK, Ramachadran VG, Dev G. Evaluation of clinico-radiological, bacteriological, serological, molecular and histological diagnosis of osteoarticular tuberculosis. *Indian J Orthop*. 2008;42(2):173-7. doi: 10.4103/0019-5413.40253. [PubMed: 19826523]. [PubMed Central: PMC2759633].
21. Enache SD, Plesea IE, Anusca D, Zaharia B, Pop OT. Osteoarticular tuberculosis–a ten years case review. *Rom J Morphol Embryol*. 2005;46(1):67-72. [PubMed: 16286988].
22. Colmenero JD, Ruiz-Mesa JD, Sanjuan-Jimenez R, Sobrino B, Morata P. Establishing the diagnosis of tuberculous vertebral osteomyelitis. *Eur Spine J*. 2013;22 Suppl 4(Suppl 4):579-86. doi: 10.1007/s00586-012-2348-2. [PubMed: 22576157]. [PubMed Central: PMC3691410].
23. Agarwal M. Biopsy for Musculoskeletal Tumors – An Orthopaedic Surgeons Guide. *J Clin Orthop*. 2016;1(1):21-8.
24. Vorster M, Sathekge MM, Bomanji J. Advances in imaging of tuberculosis: the role of ^{18}F-FDG PET and PET/CT. *Curr Opin Pulm Med*. 2014;20(3):287-93. doi: 10.1097/mcp.0000000000000043. [PubMed: 24614238].