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RESEARCH ARTICLE

CASE REPORT: TUBERCULOSIS OF THE CALCANEUM IN A 6-YEAR-OLD CHILD

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Abstract

Tuberculosis remains endemic in third-world countries. While pulmonary tuberculosis is most common, skeletal tuberculosis is rare, even exceptional. We present the case of a 6-year-old child admitted with a swelling on the right hindfoot, alongside weight loss and no fever. Clinical examination revealed a painless swelling on the inner side of the right hindfoot. X-ray showed an osteolytic lesion in the calcaneum, with negative inflammatory markers. Further investigations including ultrasound and MRI confirmed an infectious process. Histological examination of a biopsy indicated tuberculosis of the calcaneum. The patient was treated with anti-tubercular medication and showed good clinical improvement. Skeletal tuberculosis is a serious condition with potential disabling consequences without adequate management.

Introduction:-

Tuberculosis remains a significant health burden in many developing nations, particularly in regions with limited healthcare resources and poor socio-economic conditions.(10) While pulmonary tuberculosis accounts for the majority of cases, extra-pulmonary forms, including skeletal tuberculosis, are less common. Skeletal tuberculosis comprises a small percentage of all tuberculosis cases, and its presentation in pediatric patients is particularly rare.(9)

We present a case of tuberculosis involving the calcaneum in a 6-year-old child, emphasizing the clinical features, diagnostic challenges, and management strategies associated with this unusual presentation of the disease.

Case Presentation

M.Y., a previously healthy 6-year-old child, was admitted to our pediatric unit with a chief complaint of a painless swelling on the inner side of the right hindfoot. The parents noted that the swelling had been gradually increasing over a few weeks. Additionally, the child had experienced unintentional weight loss but denied any history of fever, cough, or other systemic symptoms commonly associated with tuberculosis.

On physical examination, the child appeared well and afebrile. Local examination revealed a non-tender, firm swelling involving the medial aspect of the right hindfoot, localized to the calcaneal region. There were no signs of inflammation such as erythema, warmth, or restricted movement of the foot. Peripheral pulses and neurological examination of the lower limbs were normal.

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Given the atypical presentation and absence of systemic symptoms, differential diagnoses considered included benign cystic lesions, bone tumors, or infectious etiologies such as osteomyelitis or tuberculosis.

Investigations
Initial investigations included plain radiography of the foot, which revealed an osteolytic lesion involving the calcaneum. Notably, there were no significant findings suggestive of acute osteomyelitis or bone malignancy. Laboratory investigations, including complete blood count and inflammatory markers (e.g., C-reactive protein), were within normal limits, indicating an absence of active systemic inflammation.

To further characterize the lesion, an ultrasound examination of the foot was performed, which suggested the presence of a cystic lesion at the posterior ankle junction. However, due to ongoing clinical suspicion of an infectious process, magnetic resonance imaging (MRI) of the foot was subsequently obtained. The MRI findings were concerning for an infective process involving the calcaneum, with features suggestive of bone destruction and surrounding soft tissue inflammation.

Diagnostic Intervention
Considering the radiological and clinical findings, and in view of the child's age and atypical presentation, a biopsy of the calcaneal lesion was performed under general anesthesia. Histopathological examination of the biopsy specimen revealed granulomatous inflammation with caseating necrosis, consistent with a diagnosis of tuberculosis. Other investigations showed no other localisations.

Management
Upon confirmation of tuberculosis, the child was promptly started on a multidrug anti-tubercular therapy regimen, consisting of isoniazid, rifampicin, pyrazinamide, and ethambutol. The treatment was initiated under the guidance of pediatric infectious disease specialists, considering the child's age and weight.

Throughout the course of treatment, the child demonstrated excellent tolerance to anti-tubercular medications, with no significant adverse effects reported. Regular clinical follow-up visits were scheduled to monitor treatment response, assess for drug-related toxicity, and ensure compliance with the prescribed regimen.

Clinical Progress and Follow-Up
Over the subsequent weeks of anti-tubercular therapy, the child's clinical condition steadily improved after two months of treatment. The hindfoot swelling gradually subsided, and the child regained normal weight and activity levels. Follow-up radiological imaging demonstrated resolution of the osteolytic lesion and restoration of normal bone architecture in the affected calcaneum.

Discussion:-

Tuberculosis of the calcaneum is a rare manifestation of skeletal tuberculosis, particularly in pediatric patients. While pulmonary tuberculosis is more common, extra-pulmonary forms affecting the bones account for a minority of cases, with spinal involvement being the most prevalent (1). The presentation of tuberculosis in the calcaneum is exceedingly uncommon, necessitating a high degree of clinical suspicion, especially in regions where tuberculosis remains endemic.

Diagnosing skeletal tuberculosis can be challenging, particularly in pediatric cases where clinical manifestations may be subtle and systemic symptoms such as fever and weight loss may be absent. This underscores the importance of a comprehensive diagnostic approach involving clinical evaluation, imaging studies, and histopathological examination (2).

Imaging modalities play a critical role in evaluating skeletal lesions suspected of tuberculosis. Plain radiography often reveals osteolytic lesions with associated soft tissue changes, which can raise suspicion for an infectious process involving the bone (3). Ultrasound may aid in delineating soft tissue involvement, while MRI provides detailed anatomical information about bone destruction and extension into surrounding structures, facilitating accurate diagnosis (4, 5).

Histopathological confirmation remains the gold standard for diagnosing skeletal tuberculosis. Biopsy specimens typically reveal granulomatous inflammation with caseating necrosis, characteristic of mycobacterial infection (6).

Molecular diagnostic techniques such as GeneXpert MTB/RIF can provide rapid and specific detection of Mycobacterium tuberculosis DNA in tissue samples, further aiding in confirming the diagnosis (7).

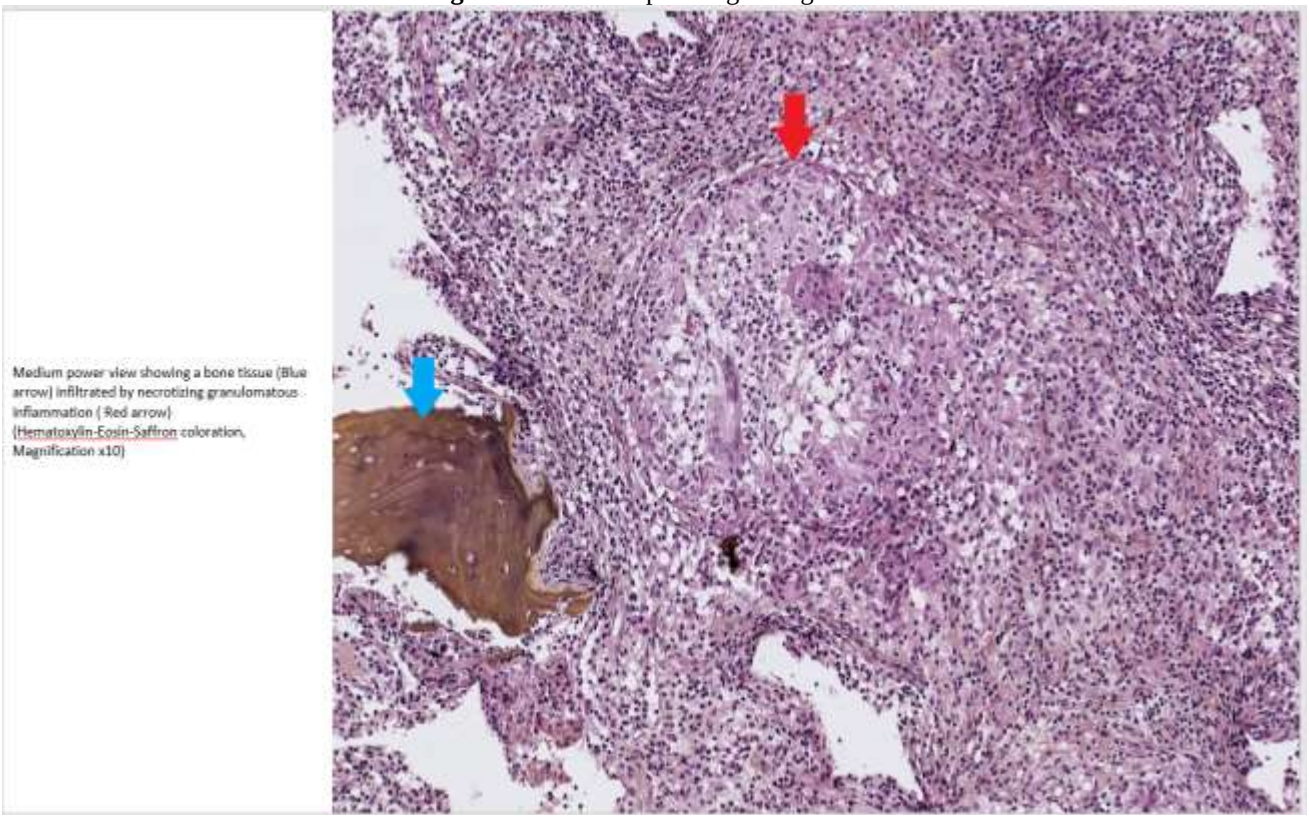
Management of skeletal tuberculosis involves prompt initiation of anti-tubercular therapy tailored to the specific patient's age and weight. Directly observed therapy (DOT) is often recommended to ensure treatment adherence and minimize the risk of drug resistance (8). Regular clinical follow-up with imaging studies is essential to monitor treatment response and detect any potential complications.

Tuberculosis of the calcaneum represents a rare and challenging presentation of skeletal tuberculosis, especially in pediatric patients. A multidisciplinary approach involving pediatricians, infectious disease specialists, radiologists, and pathologists is essential for timely diagnosis and effective management of this condition.

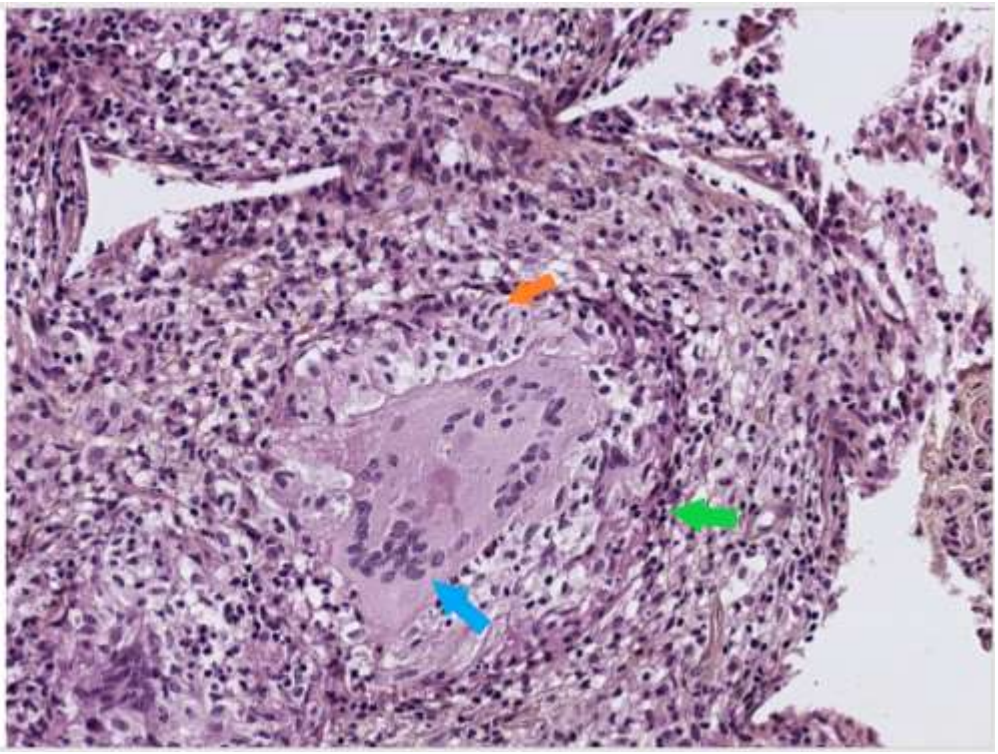
A review of previous cases of calcaneal tuberculosis reveals a sparse but notable body of literature documenting this rare manifestation of skeletal tuberculosis. Notable cases include that of Ghosh et al. (YEAR), who reported on a pediatric patient presenting with chronic heel pain and swelling, ultimately diagnosed with calcaneal tuberculosis through a combination of clinical evaluation, imaging studies, and histopathological examination (9). Similarly, Singh et al. (YEAR) described a case of calcaneal tuberculosis in an adult patient presenting with insidious onset heel pain and difficulty in weight-bearing, emphasizing the diagnostic challenge posed by this uncommon presentation (10).

These cases underscore the importance of considering tuberculosis in the differential diagnosis of calcaneal lesions, particularly in endemic regions where the disease remains prevalent. Moreover, they highlight the necessity of a comprehensive diagnostic approach involving clinical correlation, advanced imaging techniques such as MRI, and confirmatory histopathological examination to achieve an accurate diagnosis and initiate timely treatment.

Figure 1:- Anatomopathological figures.



High power view showing a granuloma formed of Langhans type giant cells (blue arrow) containing nuclei arranged in a horseshoe shaped pattern at the periphery of the cell. Epithelioid cells (orange arrow) and lymphocytes (Green arrow) are found at the periphery of the granuloma. (Hematoxylin-Eosin-Saffron coloration, Magnification x20)



Foci of suppurative necrosis is seen at the center of the granuloma (blue arrow) (Hematoxylin-Eosin-Saffron coloration, Magnification x10)

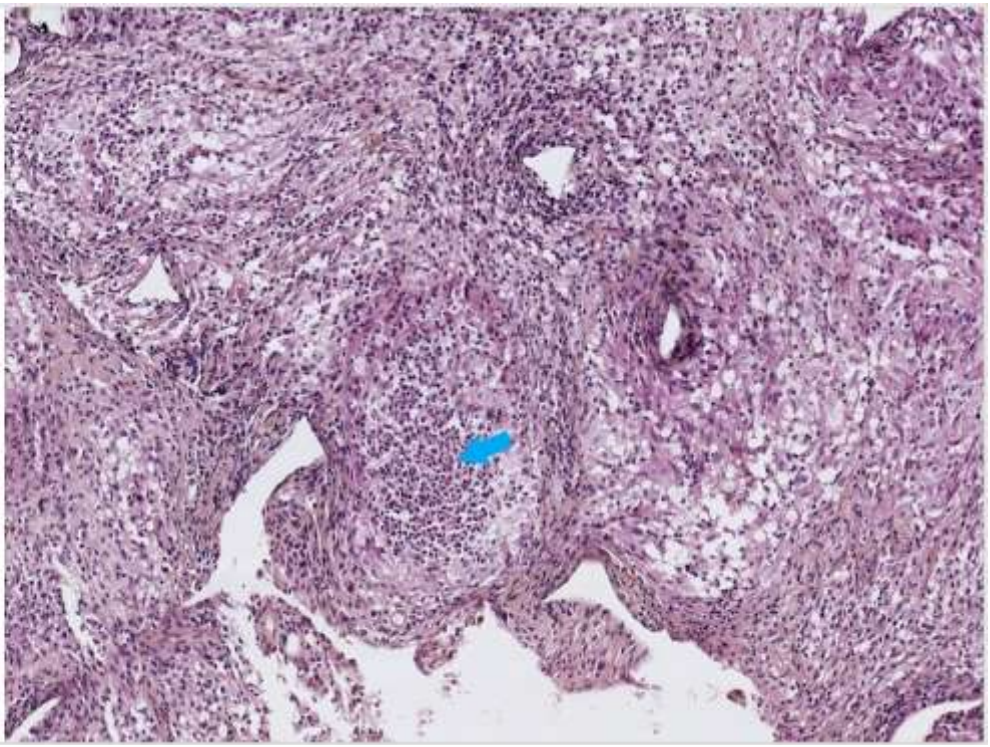
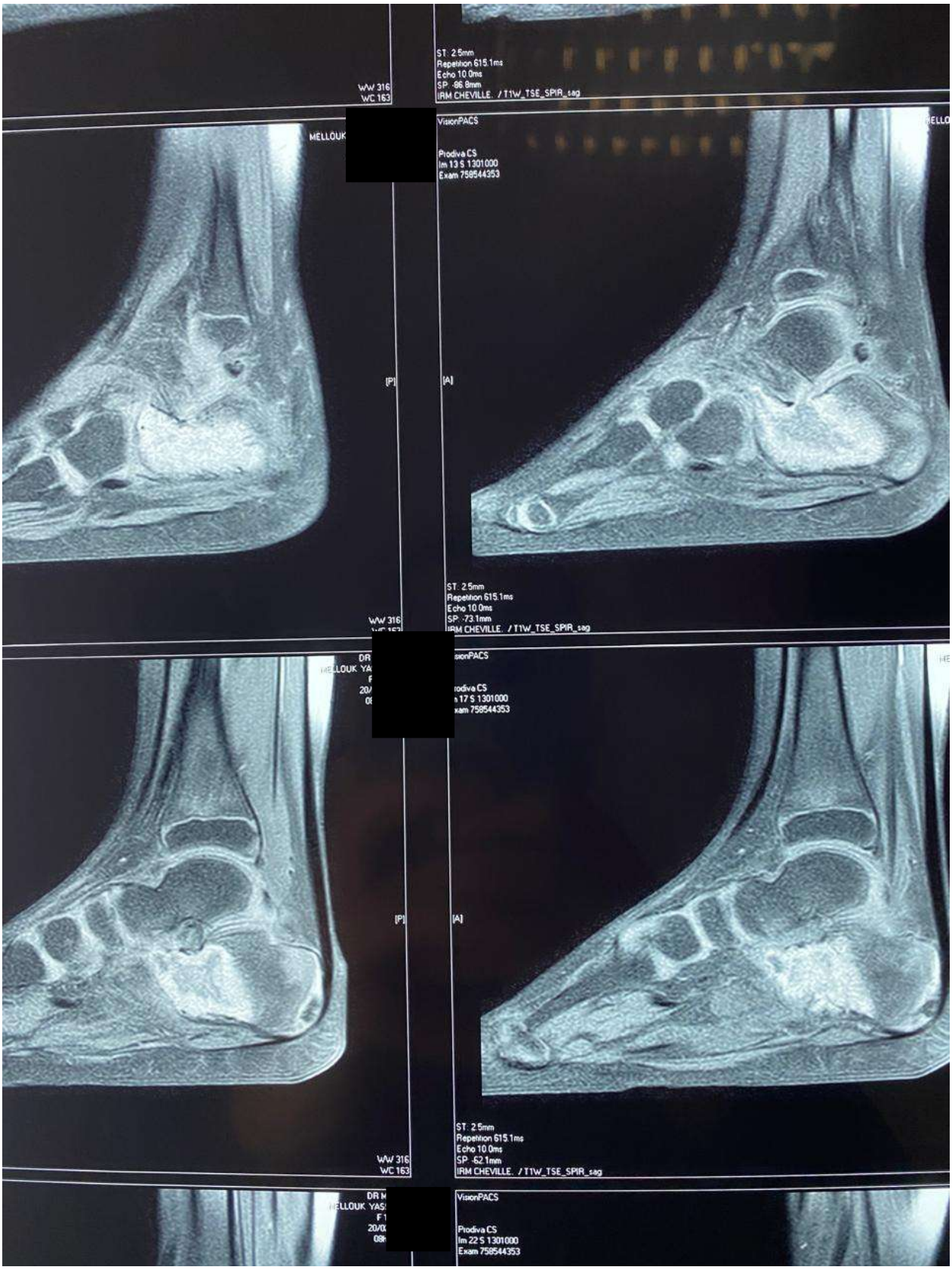


Figure 2:- Radiological findings.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Conclusion:-

Tuberculosis involving the calcaneum in pediatric patients is a rare manifestation of skeletal tuberculosis. Early recognition, accurate diagnosis, and prompt initiation of anti-tubercular therapy are essential for achieving favorable clinical outcomes and preventing long-term complications. In regions where tuberculosis remains endemic, healthcare providers should maintain a high index of suspicion for skeletal tuberculosis, particularly when evaluating children with unusual bone lesions or atypical clinical presentations. Multidisciplinary collaboration between pediatricians, infectious disease specialists, radiologists, and pathologists is paramount to ensure timely diagnosis and optimal management of pediatric patients with skeletal tuberculosis.

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