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Case report

Tibial Hydatid Disease Mimicking Osteosarcoma: A Case Report and Diagnostic Challenges

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Abstract

Background: Hydatid disease is a parasitic infection caused by Echinococcus granulosus, most commonly involving the liver and lungs. Osseous involvement is rare and can mimic malignant tumors, leading to diagnostic challenges and potential delays in treatment.

Case Presentation: We report the case of a 25-year-old woman presenting with a rapidly progressive, painful swelling of the anterior right leg. Imaging studies suggested an aggressive bone lesion consistent with osteosarcoma. However, ultrasound findings raised suspicion of osseous hydatidosis, which was later confirmed by aspiration cytology and histopathological analysis. The patient underwent surgical excision of the cyst with intraoperative sterilization, followed by histopathological confirmation of tibial hydatid disease.

Discussion: Osseous hydatidosis remains a diagnostic challenge due to its nonspecific clinical and radiological features. The main differential diagnoses include osteosarcoma, osteomyelitis, and benign cystic lesions. Imaging modalities such as ultrasound, computed tomography and magnetic resonance imaging play a crucial role, but definitive diagnosis relies on histopathological examination. Treatment involves surgical excision combined with antiparasitic therapy to prevent recurrence.

Conclusion: This case highlights the importance of considering hydatid disease in the differential diagnosis of lytic bone lesions, especially in endemic regions. Early recognition and appropriate management are essential to prevent complications and improve patient outcomes.

Keywords: Hydatid disease; Osseous echinococcosis; Tibia; Osteosarcoma mimic; Diagnostic challenge

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1. Introduction

Hydatid disease is a zoonotic infection caused by the larval form of the tapeworm Echinococcus granulosus. It remains endemic in many regions worldwide. Primary hosts are usually dogs and wolves, whereas sheep and cattle are the most common intermediate hosts. Humans are accidental intermediate hosts. The infestation typically occurs in the viscera, with bone involvement being rare. Cystic osseous echinococcosis accounts for only 0.5–4% of all cases of cystic echinococcosis [1].

Despite its rarity, osseous hydatidosis poses significant diagnostic challenges due to its ability to mimic aggressive tumors such as osteosarcoma. This case highlights the importance of maintaining a high index of suspicion, particularly in endemic regions, and underscores the role of multidisciplinary collaboration in avoiding misdiagnosis.

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2. Case Report

We report the case of a 25-year-old woman with no significant medical history, who presented with a swelling on the anterior aspect of the right leg, progressing over a two-week period. The mass was painful and rapidly enlarging. There was no fever or alteration in general condition. Clinical examination revealed a subcutaneous mass on the anterior aspect of the right leg, measuring approximately 6 cm in its greatest dimension, poorly defined and adherent to deep planes.

Plain radiography of the leg showed an expansive metaphyseal–diaphyseal osteolytic lesion involving the upper and middle thirds of the right tibia, measuring 85 mm in length and 21 mm in diameter. The margins were ill-defined in some regions. There was a thin mineralized periosteal reaction involving the external cortex of the tibia and the internal cortex of the fibula at the level of the lesion. The soft tissues in the anterior compartment of the leg were thickened (Figure 1). Ultrasound examination revealed an expansile osteolytic lesion of the tibial diaphysis with extension into the soft tissues of the anterior compartment of

the leg. The lesion exhibited a heterogeneous echostructure consisting of multiple cysts with anechoic content and no vascularized tissue component on Doppler imaging. It measured 87 × 38 × 24 mm. The lesion was in contact with the anterior tibial artery, which remained patent (Figure 2). This ultrasound appearance initially suggested osseous echinococcosis with extension into the soft tissues.

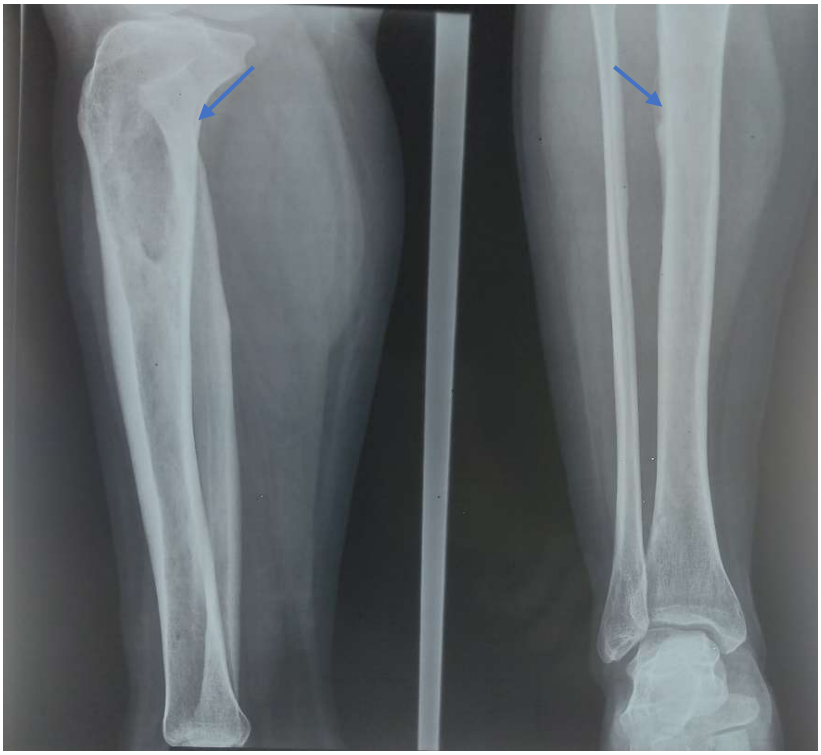

Fig. 1. Leg X-ray showing an expansive metaphyseal-diaphyseal osteolytic lesion in the upper and middle thirds of the right tibia

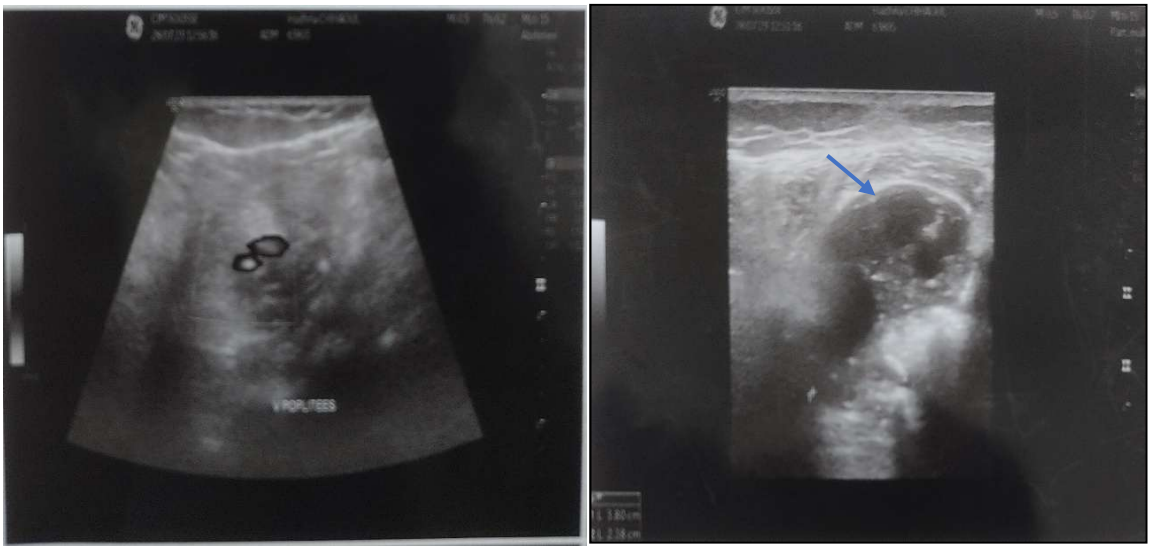

Fig. 2. Ultrasound showing heterogeneous echostructure consisting of multiple cysts with anechoic content

In contrast, magnetic resonance imaging (MRI) revealed features more suggestive of tibial osteosarcoma, including subtle T1 hyperintensity, STIR hyperintensity, heterogeneous T2 signal, and heterogeneous enhancement (Figure 3). Based on these findings, a search for scolices was conducted on the aspirated fluid from the cystic mass. The result was positive, with the presence of a hydatid membrane. The patient underwent surgical treatment, consisting of the removal of a multilobulated cyst and intraoperative sterilization using a hypertonic saline solution.

Histopathological examination of the surgical specimen revealed that the cyst wall was composed of a finely eosinophilic laminated membrane, internally lined by a thin germinal membrane. This structure was surrounded by fragmented bony trabeculae, fibro-adipose tissue, and striated muscle, showing an abundant chronic and polymorphic inflammatory infiltrate (Figure 4).

These findings confirmed the diagnosis of tibial hydatid disease. The patient was started on antiparasitic therapy, with a favorable outcome.

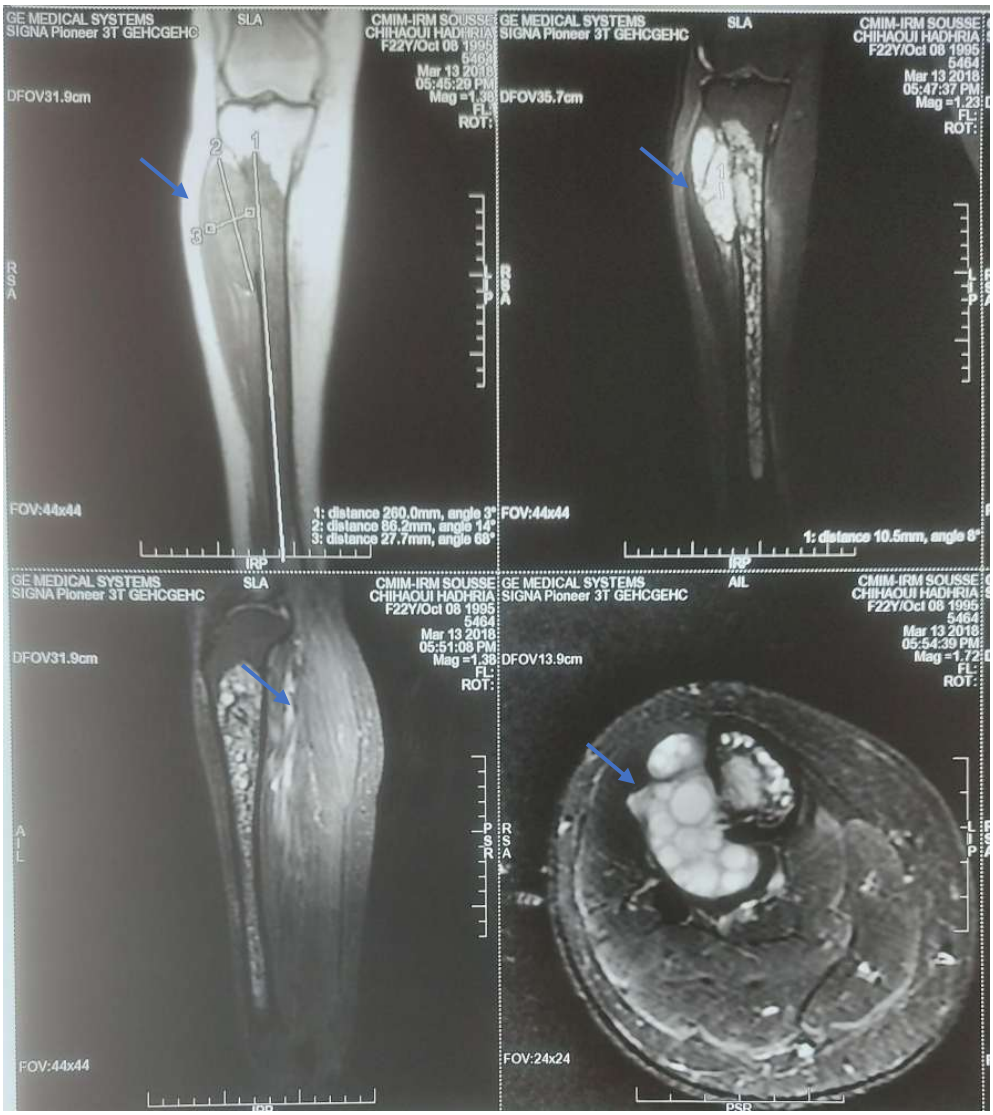

Fig. 3. MRI showing an osteolytic mass in the proximal metaphysis of the tibia extending to the subchondral bone displaying a heterogeneous appearance and enhancement that delineates cystic areas
(A: Sagittal T1-weighted, B+C: Sagittal section STIR image, D: Axial section STIR image)

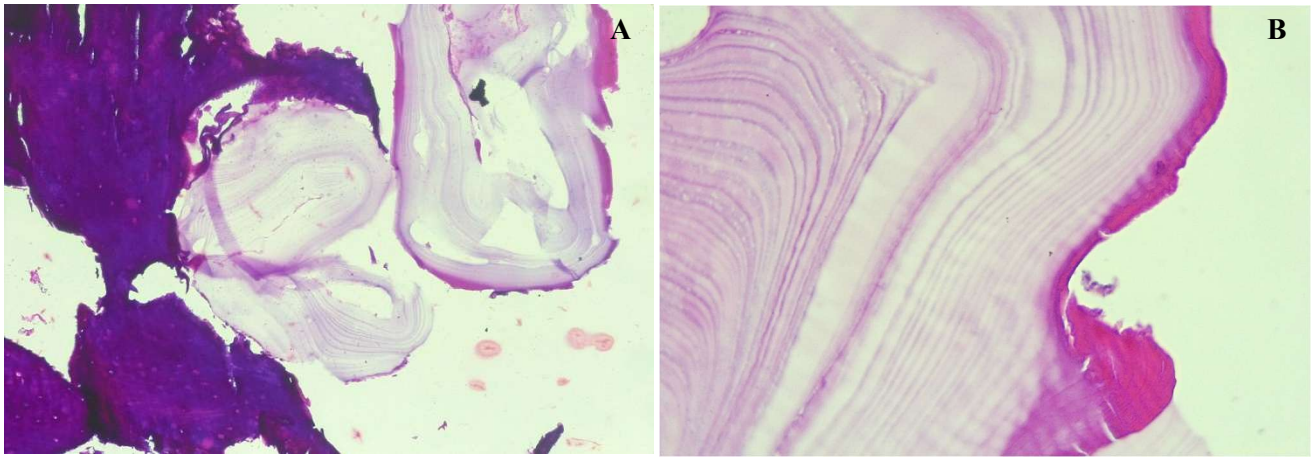

Fig. 4. Photomicrographs of osseous hydatid disease A. fragmented bony trabeculae associated with fibrous tissue and finely eosinophilic membrane (Hematoxylin and Eosin, HE x40). B. The presence of cuticular lamellar membrane confirmed the diagnosis (HE x400)

3. Discussion

Hydatid disease remains endemic in several areas, particularly in South America and Australia, as well as around the Mediterranean basin and in Central Europe [3]. In Tunisia, an average of 12.6 cases per 100,000 inhabitants per year was recorded between 2001 and 2005, with 6,249 surgically treated cases reported during that period. While this represents a slight decrease compared with the 1970s (15 per 100,000 inhabitants), it confirms the persistence of endemic transmission [4].

The disease usually affects the viscera and occurs most frequently in the liver (60–70%) and lungs (20–30%) [5]. Bone involvement is uncommon. It can affect any bone in the body, but approximately 45% of cases involve the spine [6]. The incidence in other skeletal sites is lower, particularly in long bones, with an occurrence rate of 2% in the humerus and only 1% in the tibia [1], as observed in our patient. Some studies report that men and women are equally affected [5], whereas others suggest a female predominance, as most reported cases have occurred in women [7], as in the present case.

The pathogenesis of osseous hydatid disease is not fully understood. It is usually hematogenous, with possible secondary bone invasion from adjacent soft tissue involvement [5]. In most cases, the disease is confined to bone and rarely involves other organs [1]. It is characterized by an infiltrative, diffuse, slow, and progressive pattern of growth, featuring numerous microvesicles without parasitic encapsulation, a feature reflected in its radiological appearance [5].

Hydatid infection may remain clinically silent for prolonged periods, leading to significant delays in diagnosis and treatment. Patients usually maintain a good general condition, without pain or fever [3]. As a result, they often undergo multiple investigations before a correct diagnosis is established. Pain typically occurs when the parasite exerts pressure on surrounding structures. Clinical examination may also reveal signs of neurological involvement.

Standard radiography remains the cornerstone of diagnosis, typically demonstrating poorly defined lytic lesions with a characteristic “honeycomb” appearance, usually without periosteal reaction or regional decalcification [3].

Ultrasound is primarily used to evaluate soft tissue involvement and detect possible osseous abscesses. Together with chest radiography, it contributes to the assessment of hydatid disease by identifying associated visceral localizations that may support the diagnosis. Computed tomography and MRI provide detailed evaluation of bone destruction, assess locoregional extent, and are valuable tools for monitoring disease progression.

Radiological differential diagnosis remains challenging and includes chronic osteomyelitis, fibrous dysplasia, osteosarcoma, and benign cystic lesions. However, the presence of marked periosteal reaction, osteocondensation, calcifications, and well-defined lesion margins generally argues against osseous hydatid disease.

In our case, the thin periosteal reaction and soft tissue thickening in the anterior compartment of the leg initially led clinicians to suspect a malignant bone tumor. However, the multicystic echostructure observed on ultrasound raised the possibility of bone cystic echinococcosis.

Histological examination may reveal nonspecific destructive bone lesions consistent with osteitis. Hydatid elements within bone trabeculae—including the outer acellular laminated membrane, germinal layer, and scolices—may be identified, typically in the absence of an adventitial layer.

A frequent discrepancy exists between the macroscopic and microscopic extent of parasitic invasion, which explains the high recurrence rate observed despite apparently extensive surgical excision.

Treatment is site-dependent. Surgical excision remains the cornerstone of management for localized lesions, with the goal of achieving complete removal while preserving function and minimizing recurrence. When lesions are confined to a single bone segment, radical resection of the affected long bone is preferred. However, in cases of extensive involvement, limb-sparing surgery may be impossible, leaving amputation as the only viable option [8]. Postoperative bone defects are commonly managed using techniques such as bone cement filling or bone grafting.

Nevertheless, due to the infiltrative and often disseminated nature of the disease, complete surgical excision may be difficult to achieve. Adjunctive antiparasitic therapy with anthelmintic agents such as albendazole or mebendazole is therefore essential, aiming to sterilize cyst contents, reduce cyst size preoperatively, and prevent postoperative recurrence. Medical treatment also targets small residual cysts that may not be detected during surgery.

Conclusion

This case highlights the diagnostic challenges posed by tibial hydatid disease, which can closely mimic osteosarcoma in both clinical and radiological presentations. The unusually rapid progression observed in this case underscores the importance of considering this parasitic infection in the differential diagnosis, particularly in endemic regions. While imaging studies provide valuable clues, histopathological confirmation remains mandatory for accurate diagnosis. Treatment requires a combination of surgical intervention and antiparasitic therapy; however, the infiltrative nature of bone involvement often complicates complete resection and increases the risk of recurrence. This report emphasizes the need for greater clinical awareness of hydatid disease as a potential mimic of malignant bone tumors. Early recognition, together with a multidisciplinary approach to diagnosis and management, is crucial to avoid treatment delays and optimize patient outcomes in these complex cases.

Patient Consent

The patient's written informed consent was obtained for participation in this study.

Consent for Publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Conflict of Interest

The authors declare no conflicts of interest.

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None.

Authors' Contributions

All authors contributed to the manuscript and have read and approved the final manuscript.

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