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CASE REPORT

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Osteoblastoma of the femur in a patient with recurrent paronychia – case report

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Summary

Background: Osteoblastoma is a rare primary benign bone tumor that has varied radiologic presentation depending on the affected site. In selected cases, differential diagnosis with subacute osteomyelitis is necessary.

Case Report: The authors present the case of a 23 year-old male with recurrent paronychia diagnosed with osteoblastoma of the femur. On the basis of CT and MRI findings, osteosarcoma, ABC, enchondroma, chondromyxoid fibroma, and Brodie's abscess were excluded from differential diagnosis, with the last option being the second most probable diagnosis given the coexistence of chronic pyogenic process.

Discussion: Plain film findings in osteoblastoma and Brodie's abscess may be strikingly similar with an osteolytic lesion surrounded by prominent sclerosis. The nature of the lesion can be further elucidated by cross-sectional imaging. CT helps to assess the lesion matrix and presence or absence of sequestra or fistulae, while MRI defines the extent of the changes in bone marrow cavity and soft tissues.

Key words: osteoblastoma • Brodie's abscess • imaging

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Background

Differentiation between primary bone tumors and osteitis is often difficult. Diagnostic problems are encountered in case of Ewing sarcoma and acute osteitis or tumors of osteoid osteoma / osteoblastoma type and subacute or chronic inflammatory conditions of the bone. We present a case of a primary bone tumor, in which concomitant pyogenic skin infection was a factor complicating differential diagnosis and causing a delay of the diagnostic process.

Case Report

A 23 year-old male visited an orthopedist because of pain in the left thigh and knee of 2.5 year duration. As the patient had trained dancing intensively for 10 years, the symptoms were initially associated with changes due to overload of the knee joint. Since the treatment with chondroprotective agents resulted in no improvement, in August 2007 the patient underwent a static bone scan in search for an overload fracture. The scan revealed a focus of increased ^{99m}Tc-MDP uptake in the left femur (exceeding by 360% that in the right one) with no other pathological uptake sites present. Plain radiography performed in September 2007 revealed an eccentrically located osteolytic focus surrounded by a zone of sclerotic remodeling accompanied by thick, regular periosteal reaction in the femoral shaft (Figure 1). Computed tomography, also performed in September 2007, confirmed the presence of an osteolytic lesion in the cortical layer of the posterolateral portion of the femur, surrounded by a sclerotization zone (Figure 2). The presence of calcifications, occupying a significant portion of the lesion, was visualized. Neither signs of cortical layer disruption nor malignant periosteal reactions were observed. Regular

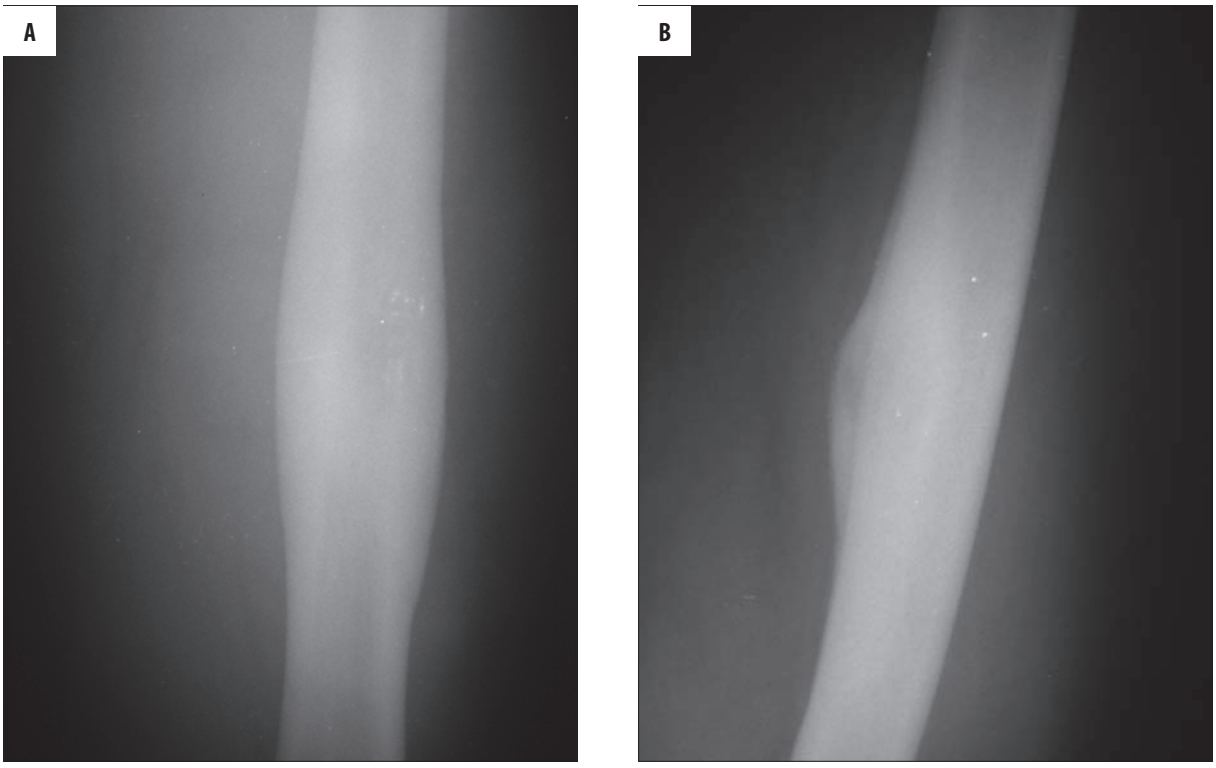

Figure 1. Plain film of the femur. There is an asymmetrical, spindle-shaped thickening of the femoral shaft with osteosclerosis (**A**,**B**). In the central part of the lesion, an osteolytic focus is faintly visible (**B**).

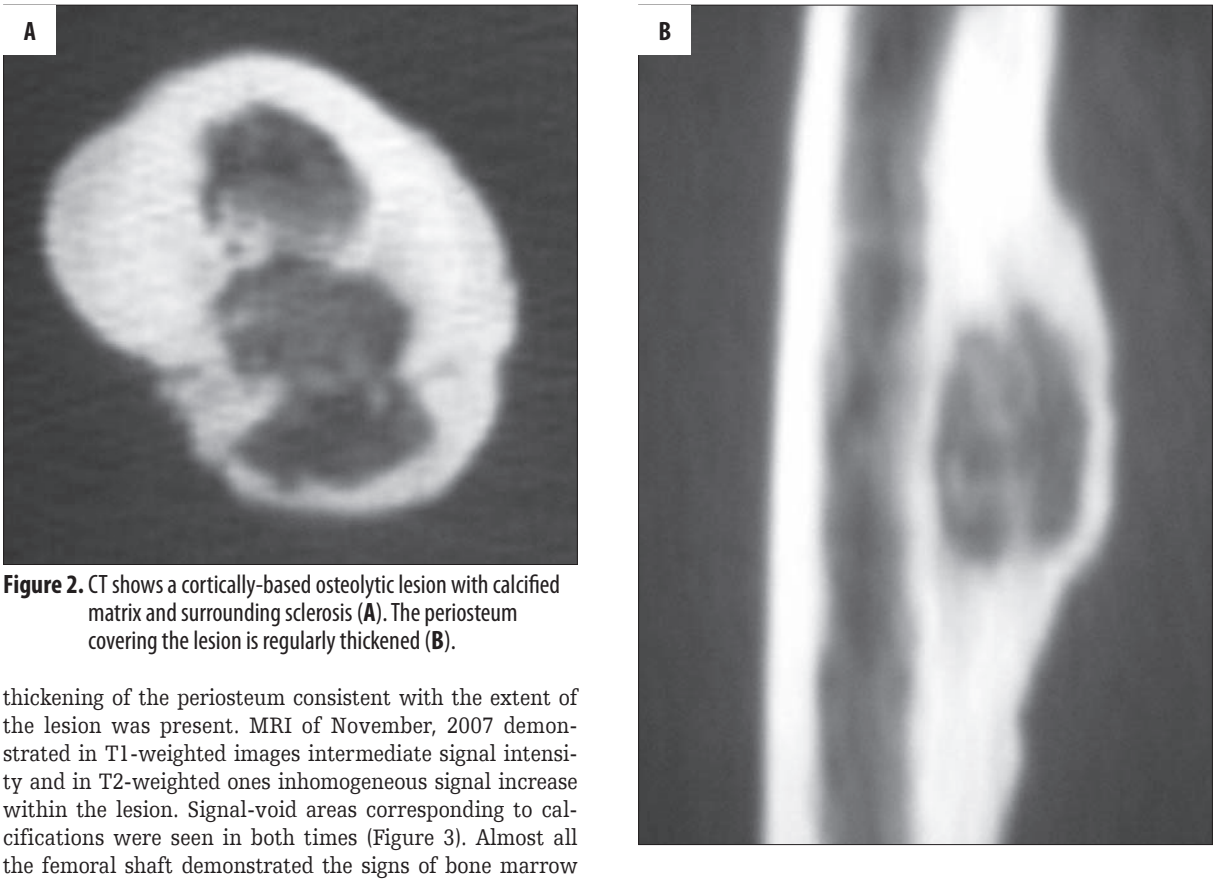

Figure 2. CT shows a cortically-based osteolytic lesion with calcified matrix and surrounding sclerosis (**A**). The periosteum covering the lesion is regularly thickened (**B**).

thickening of the periosteum consistent with the extent of the lesion was present. MRI of November, 2007 demonstrated in T1-weighted images intermediate signal intensity and in T2-weighted ones inhomogeneous signal increase within the lesion. Signal-void areas corresponding to calcifications were seen in both times (Figure 3). Almost all the femoral shaft demonstrated the signs of bone marrow edema, without any abnormalities of the periosseous soft tissues. The lesion demonstrated no significant contrast enhancement. The lesion biopsy was planned. However, the procedure was risky because of paronychia of the left great

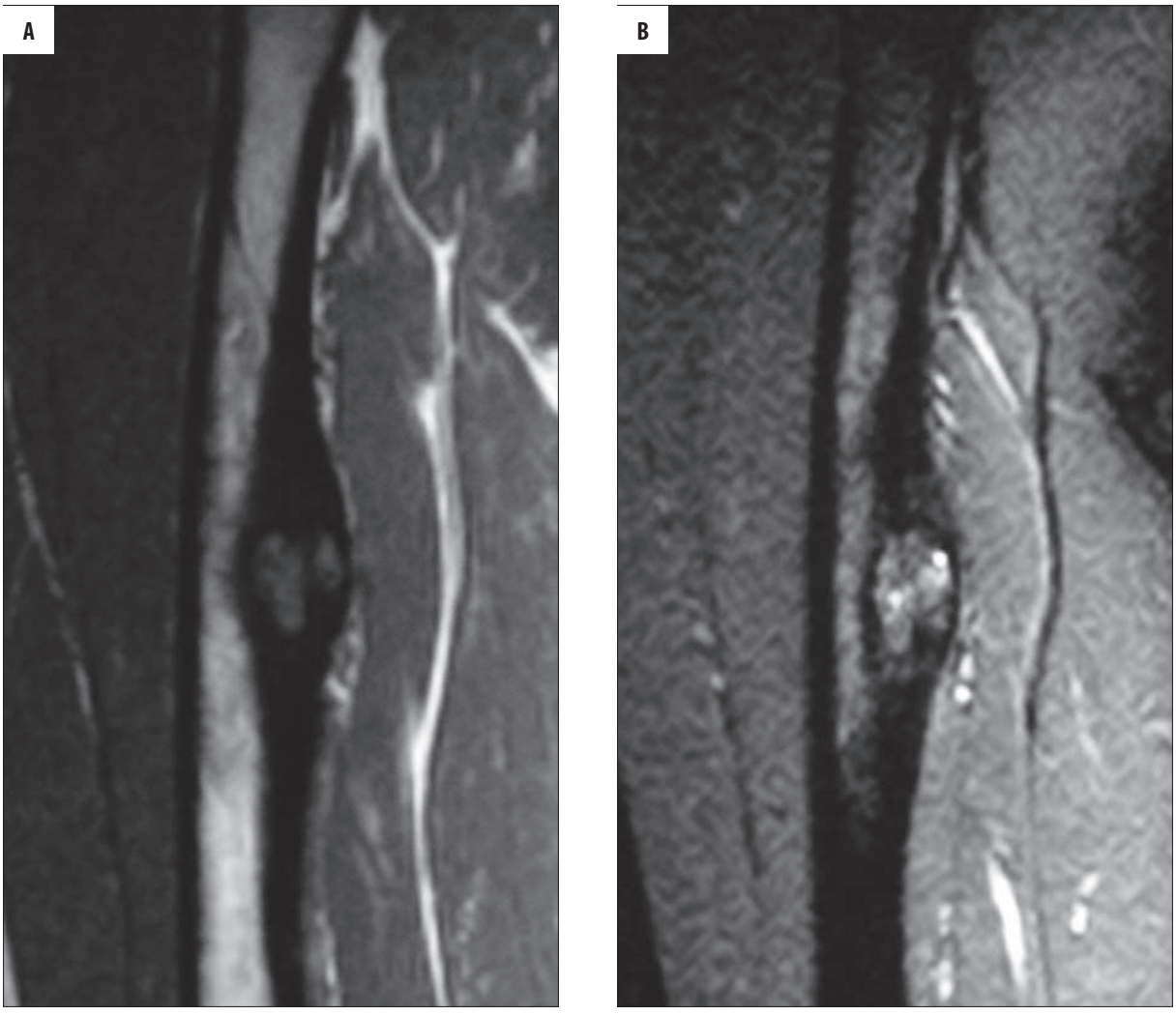

Figure 3. MRI shows a lesion of intermediate signal intensity on T1-weighted images (**A**) and intermediate to high signal on T2-weighted images (**B**) with signal voids consistent with calcifications. T2-weighted fat saturated images reveal accompanying bone marrow edema (arrows) (**B**).

toe the patient had suffered from since January 2007, as well as an infection of the right great toe since November 2007,associated with ingrowing nails. Cultures revealed an infection with mixed bacterial flora (Serratia marcescens, Staphyloccocus aureus, Streptoccocus agalactiae, Moraxella species, Peptostreptoccocus asacharolyticus). The left-sided infection was more extensive than on the right side, which initially suggested inflammatory character of the femoral lesion. The painful symptoms aggravated during the observation, the patient was being treated with a fixed dose of NSAID's (Ibuprom max 2 tabl./day). The patient was afebrile and physical examination revealed no local signs of inflammatory condition. Accessory investigations also showed no signs of inflammation. CBC and peripheral blood smear were within normal limits. Also ESR: 3 mm/h and CRP: 4.39 mg/dl were normal.

In January 2008, surgical debridement of the infection within the great toes was performed. After healing of the infection sites, in April 2008, a surgical biopsy was performed under anticoagulant medication and a single dose of an antibiotic effective *in vitro* against the bacteria which caused the infection of the feet.

The procedure was performed with posterolateral approach under fluoroscopy control. The widest dimension of the lesion was localized easily. The lesion was opened using a hollow reamer with no purulent discharge outflow. No widening of the canal diameter was undertaken to avoid fracture. A curette was used to collect two samples for histological investigations and three for bacteriological tests from the center of the lesion, its periphery and the adjacent portion of the marrow cavity. No further antibiotic doses were administered. The wound healing process was uneventful. After biopsy, the intensity of pain was reduced approximately two-fold. No microorganisms were found in any of the three bioptates. Bone tissue histology after decalcification demonstrated in both fragments the features of osteoid osteoma. Taking into consideration the lesion size, the diagnosis of osteoblastoma was established.

Discussion

Osteoblastoma is a rare primary benign bone tumor, most frequently located in the vertebral column (ca. 40% of cases) and in long bones (30%) [1–3]. The peak incidence is observed in the 2nd–3rd decades of life with 2–3-fold higher

occurrence in male patients [1–3]. Osteoblastoma is histologically similar to osteoid osteoma. However, it is usually larger (over 1.5 cm in diameter) and demonstrates more aggressive growth [4–6]. Pain is usually less severe, and response to salicylates is seldom observed [1,2].

In case of long bone locations, the tumor is usually situated eccentrically in the shaft. Radiological findings may vary, but most often the lesions presents as an osteolytic focus surrounded by an area of sclerotization (so-called giant osteoid osteoma) [7]. Differential diagnosis includes In his case Brodie's abscess, aneurysmal bone cyst (ABC), enchondroma, chondromyxoid fibroma and osteosarcoma [7].

In the reported case, in view of a limited possibility of obtaining histopathological material quickly because of active inflammatory process, it was important in the first place to exclude malignancy, which would enable to plan the biopsy after eradication of the infection. Imaging studies did not indicate any signs of disruption of the cortical layer, pernicious periosteal reactions, soft tissue tumor or chaotic calcification pattern typical of osteosarcoma.

Relatively mild bone expansion and lack of typical fluid levels demonstrating varied signal intensity on MRI excluded the diagnosis of an aneurysmal bone cyst. No chondrous type calcifications and significant signal increase in T2-weighted image allowed to exclude a chondroma, whereas chondromyxoid fibroma is typically located in the metaphyseal portion of the bone and demonstrates no internal calcification and concomitant periosteal reactions [7].

Concomitant pyogenic infection of the lower extremity increased the probability of subacute osteomyelitis, so-called Brodie's abscess, especially in view of the fact that the inflammatory process was more intensive in the ipsilateral foot. Despite no generalized symptoms of inflammatory process and inflammatory markers in laboratory tests, it should be remembered that subacute osteomyelitis usually occurs in case of infections with microorganisms characterized by reduced virulence, or of increased host's immunity [8]. Even in 50% of patients with subacute osteomyelitis, the symptoms may be hardy perceptible, and the laboratory tests negative [9]. Harris and Kirkaldy-Willis described extensive material of patients with subacute osteomyelitis associated with walking barefoot and chronic pyogenic infections of feet of staphylococcal etiology among African population [8].

However, the symptoms observed in diagnostic images aroused doubts concerning an inflammatory process. Non-specific radiographic findings could correspond both to a cortically located Brodie's abscess and to an osteoblastoma, but localization of the change was suggestive of osteoblastoma. Brodie's abscess usually affects the regions of articular bone terminals [10]. In some cases scintigraphy can be helpful, which demonstrates in case of an osteoblastoma the presence of a „hot" focus surrounded by a „warm" area, whereas In case o an abscess a „cold" focus associated with a „warm" area can be seen [11]. However, the diagnostic value of this sign is limited by relatively low spatial resolution of Scintigraphy. No sequestra or fistulas were observed on CT in the reported case, and the calcifications present in the tumor matrix suggested an osteoblastoma. Bone marrow edema visualized by MRI often accompanies osteoblastomas and reflects increased intraosseous pressure [12]. The lack of significant contrast enhancement of the lesion is attributable to marked calcification. Normal presentation of the adjacent soft tissues also decreased the probability of inflammatory process. Therefore, provisional diagnosis of a primary bone tumor, confirmed by histopathology performed after cure of feet infection, was established on the basis of radiological findings.

Conclusions

Identification of characteristic features by imaging diagnostics can be helpful in case of an osteolytic focus surrounded by a sclerotic layer in differentiation between a bone tumor and an inflammatory lesion. Exclusion of malignancy signs allowed in the analyzed case to plan a biopsy after the treatment of paronychia, while the finding of calcified tumor matrix on CT and no necromas, fistula canals and inflammatory lesions in the periosseous soft tissue on MRI allowed to limit the scope of differential diagnostic suggesting a benign bone tumor.

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