Subperiosteal Osteoid Osteoma in the Hallux of a 9-year-old Female

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Osteoid osteoma arising in the phalanx is rather uncommon, and although the clinical and radiographic findings can be characteristic, the diagnosis is not always clear. In this article, we describe the case of a 9-year-old female who presented with a painful toe that, after careful evaluation and excisional biopsy, was determined to be caused by subperiosteal osteoid osteoma. The lesion was treated successfully with excision of the nidus. Level of Clinical Evidence: 4 (The Journal of Foot & Ankle Surgery 47(6): 579–582, 2008)

Key Words: childhood, excisional biopsy, hallux, phalanx, subperiosteal osteoid osteoma

Osteoid osteoma is an uncommon, benign, bone-forming tumor (1–10). The most common site of origin for this tumor is long tubular bone, and the lesion typically causes pain that responds well to nonsteroidal anti-inflammatory medications (9). However, osteoid osteoma arising in the phalanges of the foot is relatively uncommon, and because of its rarity, osteoid osteoma arising in a pedal phalanx may be difficult to diagnose if the surgeon does not maintain a high index of clinical suspicion. Enlargement, clubbing, swelling, and erythema can be seen along with pain that worsens at night and is relieved by aspirin (1–8). Here, we present a 9-year-old girl with a subperiosteal osteoid osteoma of distal phalanx of her hallux.

Case Report

A 9-year-old girl presented to the outpatient clinic with a complaint of pain in the distal phalanx of her right great toe. The pain had been present for approximately 2 years, having started as mild pain that evolved into acute tenderness with contact and motion. She also described an occasional tingling sensation, and had difficulty wearing shoes because of swelling that localized to the distal aspect of the great toe. The patient gave no history of previous trauma involving the right hallux, was otherwise healthy, and she had not sought any treatment prior to presentation to our service.

On physical examination, she displayed no overt clinical abnormality, except for the pain and enlargement localized to her right hallux. The hallux displayed no sign of skin abnormality, and there was no limitation of motion at the hallux interphalangeal or first metatarsophalangeal joint motion. Her C-reactive protein level was not indicative of acute inflammation, measuring 6.91 mg/L. The results of other laboratory evaluations, including complete blood count and serum chemistries, were all within normal limits.

Plain radiographs of the hallux showed a well-defined calcified mass eroding the cortex of the distal phalanx (Figure 1). The lesion displayed a sclerotic region located distally and dorsally in the distal phalanx, surrounded by a sclerotic rim. Spiral computerized tomography showed a mass containing punctate calcifications located in the middle and distal part of the distal phalanx, with intervening soft tissue element and cortical irregularity (Figure 2).

After discussion with the patient and her parents, the decision was made to undertake an excisional biopsy of the lesion in an effort to eradicate the lesion and alleviate the patient's pain and swelling. The lesion was approached by means of a transverse, fish-mouth incision placed across the distal aspect of the hallux. This approach enabled exposure of the entire distal aspect of the distal phalanx, and allowed for complete excision of the nidus and the surrounding osseous tissue. The resultant defect was backfilled with a small amount of autogenous cancellous bone harvested via a small lateral incision from the ipsilateral proximal tibia prior to excision of the suspected osteoid osteoma. Gross inspection of the specimen revealed a nidus that measured 0.4 cm in diameter, encircled with reactive boney trabeculae embedded in a fibrovascular stroma. The boney trabeculae displayed scant calcifications surrounded

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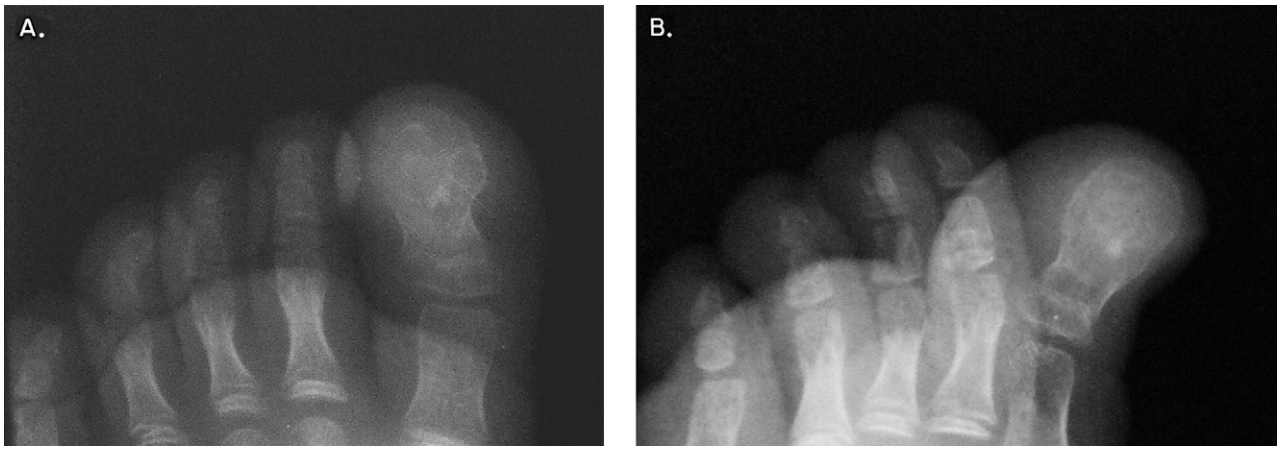

FIGURE 1 Radiographic appearance of the hallux showing well-defined calcified mass localized centrally in the distal portion of the distal phalanx. (*A*) Anteroposterior (AP) view. (*B*) Lateral oblique view.

by chains of osteoblasts and occasional osteoclastic giant cells, and the stroma was rich in cells and displayed dilated and hyperemic vessels (Figure 3). Microscopically, a thin stratum of periosteal bone formation was observed to encircle the nidus (Figure 4). Histopathological inspection of the resected lesion verified the diagnosis of subperiosteal osteoid osteoma. The postoperative course followed an unremarkable recovery, and at 12 months following excision of the lesion, the patient remained asymptomatic without any evidence of local recurrence.

Discussion

Osteoid osteoma is a relatively uncommon osteoblastic lesion of bone that accounts for approximately 10% of all benign bone lesion conditions, is most commonly encountered in children and young adults, and the male-to-female ratio of occurrence is 3:1 (1, 2, 4, 9). More than half of osteoid osteomas occur in the femur and tibia, and the proximal femur is by far the most common location (9). In long bones, the lesion usually localizes near the end of the shaft or in mid-diaphyseal region. When the hand is involved, the lesion usually localizes to the phalanges. Its incidence in the small bones of the foot ranges from 2% to 11%, with the talus being the most common site of pedal involvement (9, 11).

The most common sites for the development of subperiosteal osteoid osteoma include the talus and distal humerus (2), and physical findings associated with the lesion vary with the site of the tumor. In the phalanges of the toes, marked soft tissue swelling and tenderness with accompanying vasomotor disturbances in the overlying skin, such as erythema, increased temperature, and hyperhidrosis are

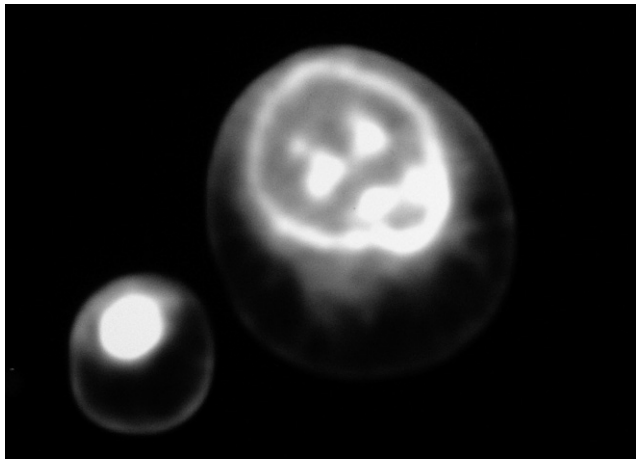

FIGURE 2 Computerized tomographic scan of the involved hallux shows enlarged distal phalanx, the calcified nidus, and scattered calcifications within the lesion.

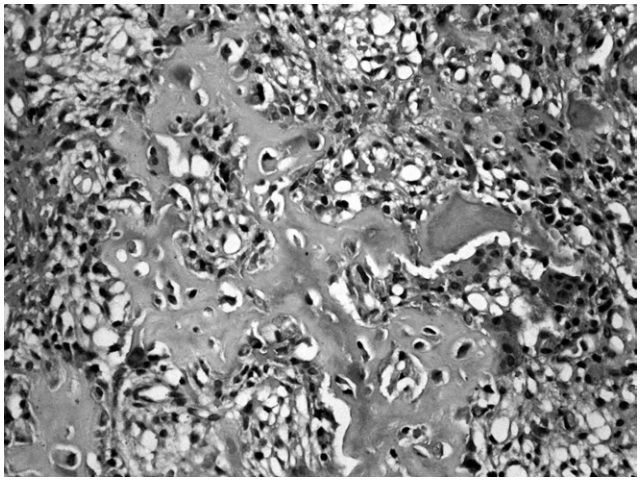

FIGURE 3 Photomicrograph of the nidus shows interconnecting osteoid trabeculae in a fibrovascular stroma, osteoblasts, and multinucleated giant cells (hematoxylin and eosin stain; original magnification, ×200).