Osteoid Osteoma of the Great Toe

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abstract

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Osteoid osteoma is a relatively common osteoblastic lesion of benign skeletal neoplasms and occurs most commonly in the cortex of long bones, especially the femur and the tibia. Radiological characteristics are a nidus that appears as a small, relatively radiolucent zone within an area of extensive reactive sclerosis. Clinically, the lesion presents with increasing pain, is worse at night, and is relieved by nonsteroidal anti-inflammatory drugs (NSAIDs). Osteoid osteomas involving the phalanges of the toes are uncommon, and its accurate preoperative diagnosis is difficult due to the unique clinical and radiological features. The features in the phalanx of the toe are soft tissue swelling and a nidus frequently located in the cancellous without osteosclerosis.

This article presents a case of a 22-year-old man with osteoid osteoma in his distal phalanx of the hallux. A needle biopsy of his great toe revealed a small number of bacteria, so he was initially treated for osteomyelitis but with unsatisfactory results. The particular characteristics of clinical and imaging findings supported a diagnosis of osteoid osteoma in the distal phalanx of the hallux. After surgical removal of the tumor, his symptoms resolved. The pathological examination confirmed the suspected diagnosis.

In a patient with chronic foot pain that changes to become nocturnal and disappears with NSAID administration, it is important to include osteoid osteoma as a differential diagnosis. A detailed assessment of both clinical and radiological features can lead to the correct diagnosis, which must be confirmed with histopathological examination to ensure adequate excision.

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Osteoid osteoma is a common bone lesion that accounts for approximately 13.5% of benign skeletal neoplasms. It is an osteoblastic tumor composed of osteoid and atypical bone, with a predilection for the diaphyseal and metaphyseal regions of long tubular bones, especially the femur and the tibia. Clinically, the lesion presents with progressively increasing pain. When the symptoms progress, pain is usually intense and is often worse at night. The pain is typically relieved by nonsteroidal anti-inflammatory drugs (NSAIDs). Radiologic features of osteoid osteoma are cortical, comprising a small radiolucency, often referred to as the nidus, and associated with dense adjacent bone sclerosis.

This article describes a case of a 22-year-old man who presented with a painful great toe, which was determined to be caused by osteoid osteoma.

CASE REPORT

A 22-year-old man presented with a 6-month history of a painful, swollen left great toe. There was no history of trauma. The pain was described as deep and aching, worse at night, and slightly relieved by NSAIDs prescribed by the family physician. In the first hospital the patient consulted, a needle biopsy of his great toe was performed, and *Staphylococcus* species was isolated from biopsy specimens using the enrichment cultures. His C-reactive protein level was not indicative of acute inflammation. The results of other laboratory evaluation, including white blood cell and erythrocyte sedimentation rate, were all within normal limits. A presumptive diagnosis of osteomyelitis was made, and he was treated with oral antibiotics and NSAIDs for 4 weeks. The patient did not get better from this treatment and consulted our institution 2 months after the first treatment.

On physical examination, no overt clinical abnormalities were observed except for a slightly swollen left hallux. The hallux exhibited no skin or nail abnormalities, and there was no limitation of motion at the interphalangeal or first metatarsophalangeal joints. Inflammatory markers were within normal limits.

Plain radiographs of the hallux showed a faint radiolucent area at the tuft of the distal lateral phalanx of the left hallux (Figure 1). The lesion is centrally calcified and cortical margins are slightly expanded. The lesion was confirmed by computed tomography (CT) scan, which revealed a rounded radiolucent area approximately 3 mm in diameter with a central area of slight calcification (Figure 2). The cortical margin was partially broken, which may be due to the initial biopsy.

On magnetic resonance imaging (MRI) examination, the lesion was poorly visualized, while reactive signal changes were observed in the soft tissue surrounding the tuft of the distal phalanx. The soft tissue around the tuft exhibited low-signal intensity on T1-weighted images and high-signal intensity on T2- and gadolinium-enhanced T1-weighted images (Figure 3). Both the clinical course and imaging studies were suggestive of an osteoid os-
Preoperative diagnosis of osteoid osteoma occurring in the foot may be delayed because of unusual location and atypical symptoms such as sprained ankle, chronic arthritis, os trigonum syndrome, and osteomyelitis. Furthermore, several case reports have suggested that the most characteristic clinical features of osteoid osteoma in the phalanx of the toe are soft tissue swelling and aching pain. Erythema is occasionally present as well. In cases with these symptoms, both the swelling and erythema of the toe can be confused with the same symptoms caused by local subacute infection. Unlike infection, however, osteoid osteoma is not associated with any frank increase in C-reactive protein. Although our patient had only slight swelling and no erythema, detection of a few bacteria on needle biopsy misled the initial providers and delayed the correct diagnosis. We believe that the bacteria were the result of needle biopsy contamination.

The radiologic appearance of osteoid osteoma involving the small bones of the foot is unique. The nidus is commonly located in cancellous bone, and osteosclerosis is usually mild to absent and may be distant from the lesion. Cancellous osteoid osteoma may be difficult to diagnose when a small nidus is located in the end of a bone and/or at a juxta-articular position without reactive osteosclerosis. It is always necessary to perform further investigation with bone scintigraphy, CT scan, and MRI when the lesion is so small that it is not detectable on plain radiographs. Computed tomography scan is an excellent method for evaluation of the nidus itself. In our patient, we observed the typical radiological features of a nidus on CT scan, which strongly suggested a diagnosis of osteoid osteoma involving the distal phalanx of the hallux.

Osteoid osteoma has a highly variable appearance on MRI. It can be difficult to detect the nidus, and it is often associated with extensive reactive changes in the bone marrow and soft tissues. Magnetic resonance imaging is sensitive in detecting nonspecific, reactive changes in the bone marrow and soft tissues that may result in a misleading aggressive appearance. The opportunity for misdiagnosis would be high if clinicians were to rely on MRI alone. Although the reactive changes in the soft tissues surrounding the nidus appeared on MRI in our patient, the clinical and radiologic features before obtaining the MRI were highly supportive of a diagnosis of osteoid osteoma. Therefore, the reactive changes observed on MRI could not be confused with infection. Moreover, we considered the possibility of osteomyelitis was lower because bone marrow signal changes were absent on MRI.

Surgical excision of the nidus has been the gold standard of the treatment for osteoid osteoma. Recent studies have used CT guidance for percutaneous resection or thermocoagulation. In contrast, conservative therapy with regular administration of NSAIDs also has been recommended. The natural history of osteoid osteoma is self-limited, so patients should be offered nonoperative treatment until their symptoms resolve. However, lack of histologic verification of the diagnosis is a disadvantage of these treatments. We believe that surgical excision is the most appropriate treatment for osteoid osteoma in such an unusual localization because most patients have dramatic relief of symptoms and the diagnosis is confirmed by histopathological examination postoperatively.

Shukla et al evaluated 9 cases in which osteoid osteoma occurred in the foot and suggested that the calcaneus was the most common site. Osteoid osteomas involving the distal phalanges of the toes seem to be rare, and we found only 4 reported cases in the current literature.2,3

...commonly are involved. Meanwhile, the phalanges of the toe were rel...
Osteoid osteoma of the distal phalanx of the foot is a relatively rare clinical entity. In a patient with chronic foot pain that changes to becomes nocturnal and disappears with NSAID administration, it is important to include osteoid osteoma as a differential diagnosis. Even if plain radiographs are normal, careful examination with CT scan and MRI should be performed to detect a small nidus. A detailed assessment of both clinical and radiological features can lead to the correct diagnosis, which must be confirmed with histopathological examination to ensure adequate excision.

REFERENCES


