Case Report

Osteoid Osteoma: An Unusual Cause of Foot Pain

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First described by Jaffe in 1935, osteoid osteoma is a small, benign osteoblastic tumor. It accounts for approximately 11% of all benign bone tumors. It usually occurs in children and young adults, and 50% are found in the femur and tibia. Diagnosis is often delayed due to nonspecific presentation.

Two cases of osteoid osteoma are presented and provide valuable lesson for the investigation of localized musculoskeletal pain in young people.

CASE REPORTS

Case 1

A 16-year-old girl presented with a 6-month history of intermittent pain and swelling in the right ankle, with no history of previous trauma. Her symptoms were worse at night and in the early morning. Pain was relieved by nonsteroidal anti-inflammatory drugs (NSAIDs).

On examination, there was soft-tissue swelling and tenderness over the lateral aspect of the right ankle joint. A computed tomography (CT) scan confirmed the presence of an osteoid osteoma in the anterolateral aspect of the right calcaneus adjacent to the posterior talocalcaneal joint. The osteoma was excised, and the diagnosis was confirmed by histology. The tarsal coalition was not treated. At her 3-year follow-up, the patient was doing well.

Case 2

A 14-year-old boy presented with a 6-month history of pain in the right foot with no history of previous trauma. His symptoms were worse in the morning and improved as the day progressed, but there was no improvement with NSAIDs. He had been treated previously with two rest periods in a below-knee plaster cast for at least 4 weeks on each occasion.

On examination, the right foot was slightly swollen and warmer than the opposite foot. There was tenderness over the second and third metatarsophalangeal joints, and the toes were slightly hyperflexed. He had a reduced range of movement at the right subtalar joint.

Plain radiographs showed a sclerotic area at the base of the third metatarsal, but no nidus of increased uptake in the right calcaneus (Figure 1). Computed tomography (CT) confirmed the presence of an osteoid osteoma in the anterolateral aspect of the right calcaneus adjacent to the posterior talocalcaneal joint (Figure 2).

The osteoma was excised, and the diagnosis was confirmed by histology. The tarsal coalition was not treated. At her 3-year follow-up, the patient was doing well.

Figure 1: Radionuclide scan shows localized uptake of the isotope in the right calcaneus.

Figure 2: Axial CT of the right calcaneus shows the osteoid osteoma adjacent to the posterior talocalcaneal joint demonstrating the central nidus.

was seen. Radionuclide bone scan revealed a focal uptake in this area. Following CT and magnetic resonance imaging (MRI), an osteoid osteoma was diagnosed (Figures 3 and 4). It was excised at surgery, and the patient showed no evidence of recurrence after 2 years.

DISCUSSION

Osteoid osteoma occurs in the bones of the foot in approximately 8% of cases and are two to three times more likely to involve the talus than other sites. In a series of 33 talus osteoid osteomas, 94% were found in the neck and only 6% in the body. Most were located subperiosteally.

The diagnosis may be suspected if a patient gives a typical history of nocturnal pain, relieved by NSAID medica-
The diagnosis may not be suspected, however, if the pain is referred to a distant site or is nonspecific in nature.

Cases are usually investigated in the first instance with plain radiographs. The characteristic appearance seen in 66%-75% of cases is an oval or round radiolucency (nidus) measuring ≤10 mm, which may show central ossification. If it occurs in cortical bone, these features may be obscured by surrounding reactive sclerosis and periosteal reaction. In subperiosteal and juxta-articular sites, sclerosis is often minimal.

Radionuclide imaging, using technetium 99m-labelled methylene diphosphonate, is highly sensitive in cases of osteoid osteoma, showing focal uptake of isotope at the tumor site. If osteoid osteoma is suspected, even if plain radiographs are normal, radionuclide scanning should always be performed. This technique is relatively nonspecific, but a normal scan will exclude the possibility of an osteoid osteoma. Fine cut CT scanning should be performed, directly if the radiographs are suggestive or with a positive radionuclide scan to make the diagnosis, and accurately localizes the tumor prior to surgery.

Thin sections targeted on the area of interest using a bone algorithm are essential. Magnetic resonance imaging gives superior soft-tissue resolution and avoids the risks of ionizing radiation, but is inferior in the assessment of bone detail and in the demonstration of the nidus. It therefore adds little information in these cases.

Treatment of osteoid osteoma usually involves surgery to excise the central nidus. Alternatives to surgery include percutaneous radiofrequency coagulations and chronic suppression with NSAIDs. One report suggests medical treatment leads to complete resolution of symptoms in 66% of patients within 3 years.

Complete excision was possible in both cases presented here due to accurate localization. Therefore, initial radionuclide bone scanning followed by high resolution CT on appropriate window settings are the investigations of choice prior to definitive treatment.

REFERENCES

EDITORIAL DISCUSSION

ORTHEPEDICS: In your experience, have there been instances of osteoid osteomas located within the confines of the joint in which the bone scan was falsely negative?

Birdsell: In our center, we have found the radionuclide bone scan to be a sensitive test for osteoid osteoma and have never seen a falsely negative case. We are aware of only one reported case of a falsely negative scan occurring in the distal femur in a 10-year-old boy.

Intra-articular osteoid osteomas are uncommon and difficult to diagnose. They often present with pain and swelling localized to the joint, and on plain radiographs, the typical periosteal new bone and perifocal sclerosis are lacking. There may be degenerative changes within the joint. We have found bone scan and CT essential to making an accurate and early diagnosis.

ORTHEPEDICS: Can the reactive bone surrounding the nidus cause the bone scan to be positive more than the central nidus itself?

Birdsell: Osteoid osteomas are vascular tumors and avidly accumulate agents such as technetium 99m-labelled diphosphonate in all phases of the bone scan. We have found that the nidus is more positive than the surrounding sclerotic bone, giving rise to the so-called double density sign. This is thought to be due to intense osteoblastic activity in the nidus and relatively less metabolic activity surrounding it.

REFERENCES (EDITORIAL DISCUSSION)