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A Rare Case of Osteoid Osteoma in Distal Phalanx Of Toe In A 20 Year Old Male: A Case Report

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Abstract

Introduction: This article reports a case of Osteoid Osteoma in the distal phalanx of 2nd toe of left foot in a young, healthy male, managed with surgical excision and curretage of the tumour with amputation of the distal phalanx involved.

Osteoid osteomas are small, bone-forming lesions consisting of a central nidus less than 2 cm in diameter containing capillaries, osteoclasts, and osteoblasts forming large volumes of disorganized osteoid.

Most osteoid osteomas occur in children and adolescents. They cause considerable pain, classically worse at night. Typically aspirin provides better pain relief than other medications.

Osteoid osteomas occur most frequently in the diaphysis and metaphysis of long bones (especially femur), but they can develop in any bone.

Case Presentation: A 20 year old male presented to OPD with chief complaint of swelling in distal part of 2nd toe of left foot since 2 years, accompanied with pain since 8-9 months. The swelling was spontaneous, insidious in onset, initially not associated with pain, with no associated history of trauma, no history of fever, no history of colour changes, no h/o discharging sinus. The pain started 8-9 months back, gradually progressive, initially mild and inconstant, and later becoming more severe with nocturnal exacerbation, relieved to some extent by prescribed NSAIDs. Physical examination revealed only swelling and tenderness was noted over the distal phalanx of 2nd toe of left foot. X-ray of the left foot revealed mild sclerosis of distal phalanx of 2nd toe of left foot with surrounding mild soft tissue swelling. An MRI of the left foot was advised, which showed features suggestive of a primary bone forming tumour, likely Osteoid Osteoma. Patient was managed with complete excision of tumour with amputation of the involved distal phalanx. Radio-histological correlation was achieved for the final diagnosis of Osteoid Osteoma. Pain relief was achieved within 3 days post operatively, and patient did not have a similar complaint throughout the follow up period for 1 year, indicating absence of recurrence of disease in this time period.

Conclusion: An Osteoid Osteoma of the toe is very rare. Therefore, osteoid osteoma arising in a pedal phalanx may be difficult to diagnose, and must always be included in the differential diagnosis of a patient presenting with symptoms emphasizing on nocturnal complaints without systemic symptoms. Diagnosis can be reached by history correlating with radiological investigations, and can be managed with various modalities of treatment such as percutaneous radio frequency ablation, currettage and en bloc resection using the burr down technique, or by amputation of the affected part of the toe.

Keywords: Osteoid osteoma, distal phalanx of toe, surgical excision

Introduction

Osteoid osteoma is the third most common benign bone tumor. It is a small, distinctive, nonprogressive, benign osteoblastic lesion that is usually accompanied by severe pain. Jaffe[2] was the first to report the identification of this osteoblastic lesion in 1935. It represents 11% to 14% of benign bone tumors. 2% to 3% of excised primary bone tumors are osteoid osteomas.[3]

Osteoid osteoma can manifest at any age, but the majority of patients are aged between 5 and 20 years, with 50% of patients aged between 10 and 20 years. Osteoid osteomas are 1.6 to 4 times more prevalent in males. In the majority of cases, osteoid osteoma occurs in long bones, affecting the metaphysis or diaphysis. The most common loci are the femur and the tibia, with the most characteristic site being the femoral neck and the intertrochanteric region.[4] Less commonly affected are the spine and the small bone of the hand and feet. It can involve the talus (involved in 2-10% of cases[5]), predominantly the talar neck. The other bones of the foot are less frequently involved but include the calcaneus (2.7%), phalanges (2%) and metatarsals (1.7%).[6]

The majority of foot osteomas are cancellous or subperiosteal where the periosteal reaction is minimal or absent. The pathogenesis is unknown, some postulate it is due to neoplasia and others propose it is an attempt at repair after no apparent injury. A high level of prostaglandins is produced at the centre of the nidus resulting in increased tension and oedema that stimulate nerve endings causing pain. This explains the high level of relief obtained when using non-steroidal anti-inflammatories (NSAIDs). The clinical presentation can vary dependent on the location of the lesion, but a patient with osteoid osteoma can present with tenderness, swelling or effusion, stiffness and/or restricted activities. The classic presentation of night pain and relief with NSAIDs are common findings.[7]

The typical appearance of an osteoid osteoma on plain radiograph is of a core or nidus cavity of 1–2 cm surrounded by a distinctive zone of reactive bone. However cancellous and subperiosteal lesions often show no periosteal response. Bone scans have been reported to be positive in 100% of cases but they seldom clearly demonstrate the lesion and often show only generalised uptake. Magnetic resonance imaging (MRI) has been reported to miss the diagnosis in 33–35% of cases although oedema within the marrow of the affected bone is usually seen. Computerised tomography (CT) is superior to MRI and typically demonstrates a low attenuation nidus with focal central calcification and perinidal sclerosis.[7]

The condition can spontaneously regress with reports suggesting the majority resolve between two and six years. However, if symptomatic than surgical excision was the traditional treatment with success reported between 88-100% of cases. En bloc resection with excision of the entire lesion and surrounding reactive zone reduces risk of recurrence. Alternative treatments of include percutaneous trephine or drilling, ethanol injection and thermal destruction with either laser or radiofrequency ablation.[1, 7]

Case Presentation

A 20 year old male presented to OPD with chief complaint of swelling in distal part of 2nd toe of left foot since 2 years and pain in that part since 8-9 months. The swelling was spontaneous, insidious in onset, initially not associated with pain, no associated history of trauma, no history of fever, no history of colour changes, no h/o discharging sinus. The pain started 8-9 months back, gradually progressive, initially mild and inconstant, and later becoming more severe with nocturnal exacerbation, relieved to some extent by prescribed NSAIDs.

On physical examination, swelling and tenderness was noted over the distal phalanx of 2nd toe of left foot with no hyperaemia or local rise of temperature (Fig. 1).

X-ray of the left foot revealed mild sclerosis of distal phalanx of 2nd toe of left foot with surrounding mild soft tissue swelling (Fig. 2).

MRI of the left foot showed evidence of a small, round to oval lytic, mildly expansile lesion of diameter 7mm involving the distal phalanx of the 2nd toe, with a central calcified nidus and cortical irregularity and erosion, as well as marrow edema surrounding the lesion and mild soft tissue edema extending in the subungual region, suggestive of a primary benign bone forming tumour, most likely osteoid osteoma (Fig. 3).

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The patient was taken up for surgery after complete pre-anaesthetic workup, with the plan being excision of tumour. A longitudinal incision at the medial side of the distal phalanx of the toe was taken for surgical exposure of the tumour. The mass was completely excised by curettage and nidus removal, with amputation of distal phalanx of the toe, and closure done. Soft and bony tissue samples were obtained for histopathological examination and microbiological culture. Microbiological cultures revealed no pathogenic organism. The diagnosis was pathologically confirmed by the presence of fibrovascular tissue with immature bony trabeculae rimmed by prominent osteoblasts.

Post operatively, the patient's pain resolved immediately after the operation. 3 monthly follow up for a year revealed no recurrence of the disease (Fig. 4).

Figure 1: Clinical photo at presentation

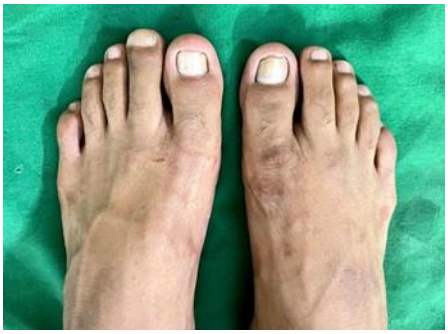


Figure 2: Radiographs at presentation.

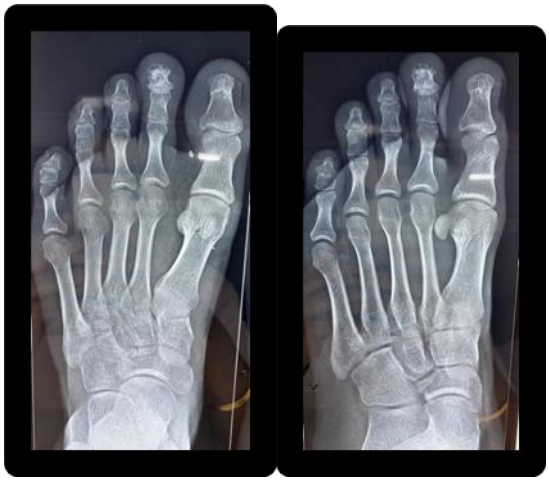
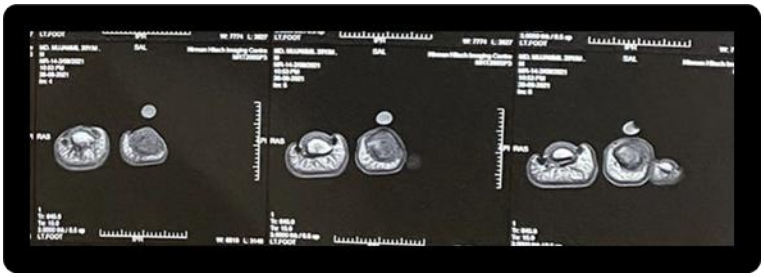


Figure 3: MRI at presentation



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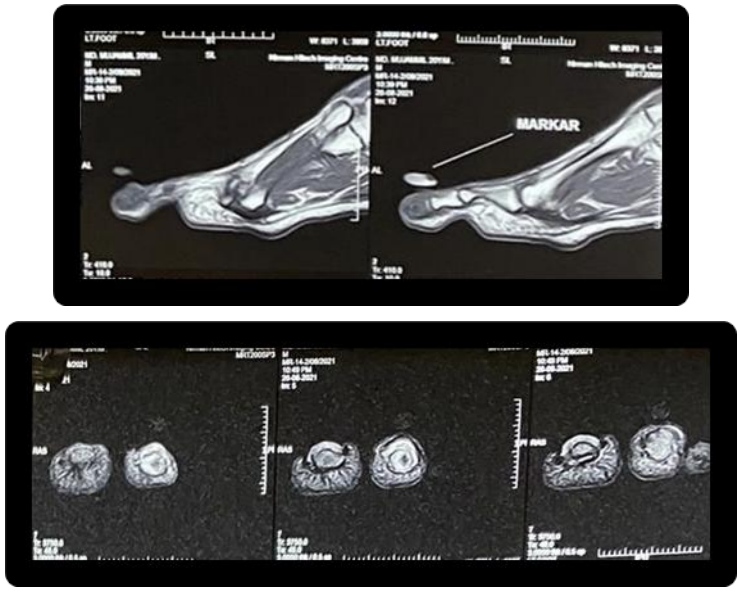
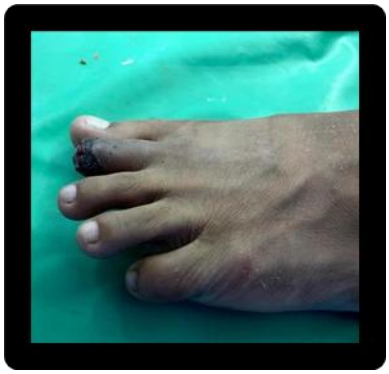


Figure 4: Post operative pictures



Discussion

Osteoid osteoma is the third most common benign bone tumor with wide variations in presentation. It tends to present in the second decade of life, with pain that is worse at night and is relieved by salicylates. The natural history is for regression to occur within 6 to 15 years with no treatment; but, this can be reduced to 2 to 3 years with the use of aspirin and non-steroidal anti-inflammatory drugs.[8]

When the lesion is located in typical locations (intracortical bone and the diaphyses of long bones), both characteristic clinical and radiological features are diagnostic. However, osteoid osteoma is a multifaceted pathology that can have unusual presentations, such as intraarticular osteoid osteoma, epiphyseal location, lesions at the extremities and multicentric nidi, and frequently present atypical clinical and radiological manifestations.[9]

Osteoid osteoma is characterized by an intracortical nidus with a variable amount of calcification, as well as cortical thickening, sclerosis, and bone marrow edema. However, osteoid osteoma may display imaging findings that can be misleading, and it can be difficult to differentiate osteoid osteoma from other conditions such as infection, inflammatory and noninflammatory arthritis, and other tumors. In addition, stress fracture, intracortical abscess, intracortical hemangioma, chondroblastoma, osteoblastoma, and compensatory hypertrophy of the pedicle may mimic osteoid osteoma. To make the correct diagnosis, it is necessary to identify the nidus,

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and it is important to be familiar with the radiologic findings of osteoid osteoma and its mimics.[10]

CT is considered the modality of choice for osteoid osteoma, as the nidus can be obscured on radiographs. The central calcification may be punctate, amorphous or ring-like, and it is usually regular and centrally located. On CT scans, a "vascular groove" or "CT vessel" sign can be identified, represented by low-density grooves entering the nidus and corresponding to the enlarged vessels that arise from the periosteum to irrigate the hypervascular nidus.

The Osteoid osteoma nidus shows variable signal intensities on MRI scans with a target-like appearance. The presence of bone marrow edema may help locate the nidus, serving as a red flag and suggesting a more thorough evaluation be conducted in the area of the tumor. Edema is also useful for distinguishing osteoid osteoma from other pathologies that do not promote marked inflammatory changes.[9]

Non-operative treatment can be considered as an option since the natural history of osteoid osteoma is that of spontaneous healing. Use of aspirin or other nonsteroidal anti-inflammatory medications (NSAIDs) decreases the usual time of spontaneous resolution (6 to 15 years) to 2 to 3 years, with risks the potential side effects of protracted NSAID treatment.

Surgical treatment is an option for patients with severe pain and those not responding to NSAIDs, patients not willing to tolerate pain and those at particular risk of long-term renal and gastrointestinal complications of NSAIDs. Moreover in children with open physes, continued presence of these tumors can lead to growth disturbances like limb length discrepancies, scoliosis and osteoarthritis. Available procedures include CT-guided radiofrequency (RF) ablation, en bloc resection, and CT guided percutaneous excision.[11]

Conclusion

Delay to diagnosis is prevalent in osteoid osteomas of the foot and ankle. This reflects both the high number of differential diagnoses and the difficulties with radiograph interpretation. A high index of suspicion is required in the presence of typical symptoms and an understanding of the appropriate imaging is required for timely identification and treatment. Surgical excision is the traditional treatment, with trends to newer treatment modalities still under study and showing varying rates of success.

Clinical Message

Osteoid Osteoma is a benign tumour of bone which can present with indolent symptoms which have to be evaluated appropriately clinically (history and examination), and can be managed with surgical excision with excellent post operative outcome.

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