CASE REPORT

An Unusual Presentation of Osteoid Osteoma after Prolonged Foot Pain

MC Sozbilen, H Gunay

ABSTRACT

Osteoid osteoma is a benign bone tumour that causes significant nocturnal pain, cortical thickness and is relieved by salicylates. When it occurs, typical radiologic and clinical features are diagnostic. Radiography and computed tomography show a cortically based sclerotic lesion with a radiolucent nidus within it. The lesion usually involves long bones and most frequently presents in the diaphysis of the femur and tibia. Rare and unusually located lesions lead to misdiagnosis, even if the characteristic symptoms are present. We report an unusual case of osteoid osteoma in the tarsal navicular bone in which the diagnosis was delayed. This case, in which diagnosis was initially missed and treatment was delayed, resulted in a significant functional loss for the patient. A review of the literature revealed only two reported osteoid osteoma cases in the tarsal navicular bone.

Keywords: Benign foot tumours, navicular bone, osteoid osteoma.

INTRODUCTION

Osteoid osteoma is a rare benign bone tumour. It was first described by Jaffe in 1935 (1) and constituted 1.8% of benign bone tumours. The size (less than 1.5 cm in diameter), characteristic radiographic features and clinical presentation of an osteoid osteoma are diagnostic (2). The lesions usually occur in the extremities, with more than 50% of cases in the femur and tibia (3). Tarsal bone tumours are rare and represent only 1%–2% of all bone tumours (4). The most common lesions of osteoid osteoma occur in the talus and metatarsal bones of the foot (4–7).

Osteoid osteoma is characterized by pain which is continuous, not dependent on exercise, usually worse at night and relieved by non-steroidal anti-inflammatory drugs (NSAIDs) (3). Production of prostaglandins by the tumour causes a chronic inflammatory response (8). This process is responsible for periosteal reaction, synovitis, bone sclerosis and pain (8, 9). After removal of the nidus, chronic inflammation and symptoms regress dramatically. In general, radiographs show a cortically based sclerotic lesion with a radiolucent nidus within it. The nidus is demonstrated in 85% of cases. Computed tomography images improve the detection of the nidus. These images are very useful in the evaluation and differentiation of osteoid osteoma from chronic osteomyelitis (10, 11). Although magnetic resonance imaging (MRI) detects marrow oedema and soft tissue oedema, the small nidus may be overlooked, and it is less sensitive than computed tomography (CT) (6). The aim of treatment is the removal of the nidus by the traditional procedure of en bloc resection, curettage or a variety of other methods (3, 12, 13).

In this study, we report a rare case of osteoid osteoma of the tarsal navicular bone. This unexpected location led to late diagnosis, thus delaying treatment. Despite comprehensive literature, only two documented cases of navicular osteoid osteoma were found (7). Even most large retrospective studies do not consider it (6, 7, 14, 15). Thus, this report is presented as the third case in the literature.

CASE REPORT

A 15-year-old girl presented with a 2-year history of pain in her left foot. During the previous three months, her pain had increased dramatically. The pain occurred

From: Department of Orthopaedics and Traumatology, Ege University, Izmir, Turkey.

Correspondence: Dr M Celal Sozbilen, Department of Pediatric Orthopaedics, Dr Behcet Uz Child Disease and Surgery Training and Education Hospital, 35500 Konak, Izmir, Turkey.
Email: muratcelal@hotmail.com, murat.celal.sozbilen@ege.edu.tr

DOI: 10.7727/wimj.2019.012

especially at night and was relieved by analgesic drugs. She usually took acetylsalicylic acid or NSAIDs. There was no history of trauma and no specific medical history. In the month before examination, her pain had become severe during standing and walking. On examination, there was local tenderness at the anterior and medial side of her foot. The mobility of her ankle was normal and painless. Complete blood cell count, sedimentation rate, C-reactive protein, serum electrolytes, alkaline phosphatase and other laboratory studies were normal. Radiologically, plain films demonstrated a well-bordered sclerotic lesion at the navicular bone. Computed tomography scan was then ordered to describe the lesion. The CT scan results confirmed the presence of a 6-mm lucent area and nidus at the navicular bone. (Figs. 1 and 2).

The patient underwent an excisional operation with a 3-cm incision over the navicular bone. After the bone was approached, corticotomy was performed with small osteotomes. The cherry red mass was observed and removed using a curette. The remaining defect was filled with monocortical iliac bone graft. No fixing material was applied after the placement of the bone graft. The specimen was sent to the Department of Pathology. Following the procedure, no cast was placed on the left lower extremity. The patient began partial weight-bearing activity on post-operative day three using crutches. Six weeks following the operation, full weight bearing was initiated. The pathology report confirmed the diagnosis of osteoid osteoma. At the follow-up visit, the patient's pain and other symptoms had regressed dramatically. (Figs. 3 and 4)

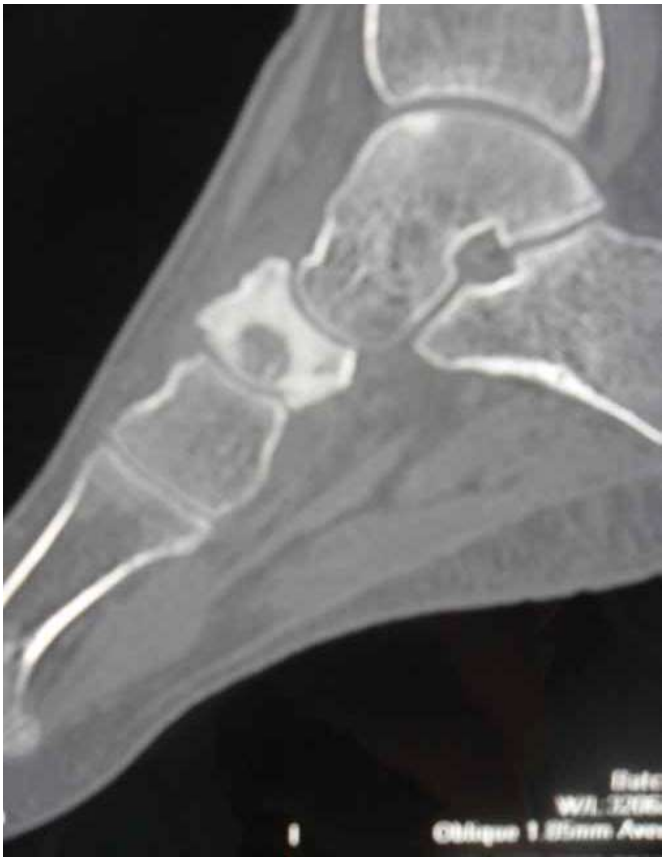

Fig. 1: Pre-operative computed tomography image showing sclerosis and nidus at the navicular bone.

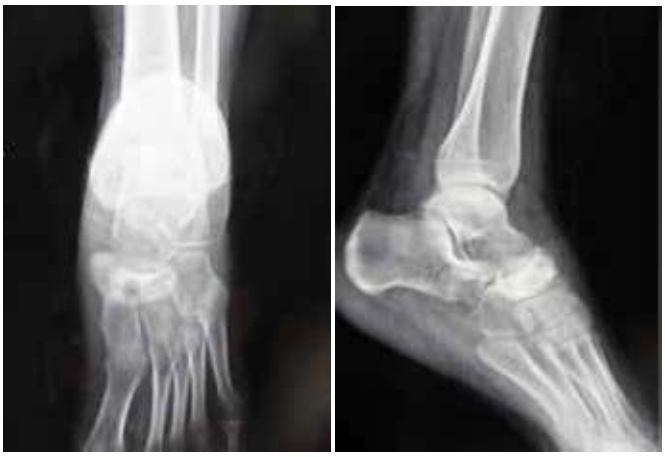

Fig. 2: Plain radiography, anteroposterior and lateral views: circumscribed sclerotic nidus and increased cortical thickness.

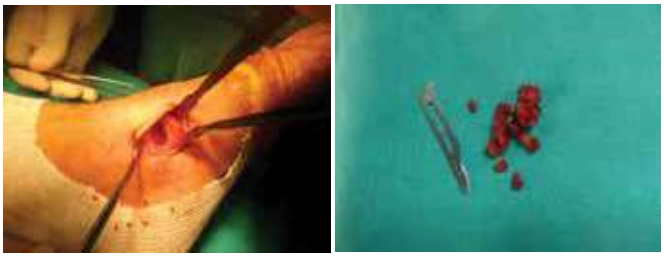

Fig. 3: Perioperative images: the curetted material and remaining defect after excision.

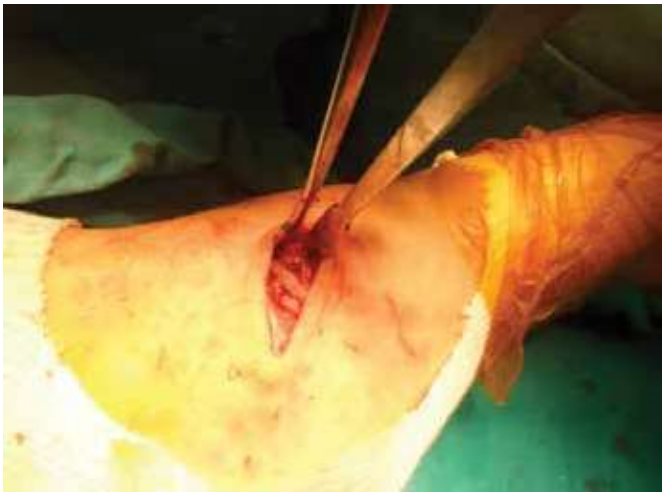

Fig. 4: The remaining gap filled with iliac bone graft.

In the final follow-up examination at 24 months, the patient had normal gait, weight bearing and no pain. On plain radiographs, healed bone was seen clearly with bone graft. The patient was informed that the case could be published. (Figs. 5 and 6)

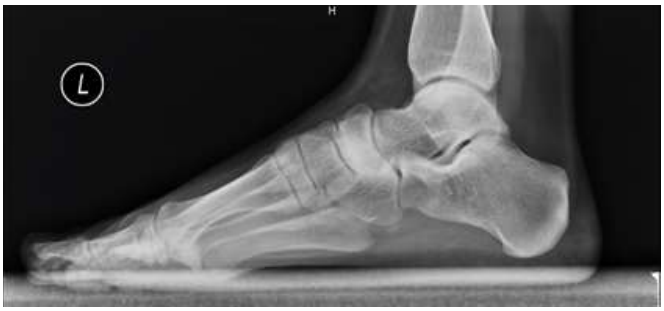

Fig. 5: Post-operative 24-month lateral view.

DISCUSSION

Benign bone tumours of the foot are rare. When they do occur, diagnosis and treatment may be difficult. Osteoid osteoma is a considerably common bone tumour that accounts for approximately 12% of benign bone lesions (16). Osteoid osteoma typically affects young patients in the second or third decades of life.

The diagnosis of osteoid osteoma of the foot is usually difficult because it typically occurs in long bones and rarely in the foot (17). In this case study, the patient's pain was attributed to other pathologies, including plantar fasciitis, stress fracture. When sclerosis became obvious with plain radiography, osteoid osteoma was considered. A definitive radiologic diagnosis was then made when the nidus of the osteoid osteoma was detected on CT scan (18, 19). Magnetic resonance imaging was not necessary because it is equal to CT in demonstrating the nidus (7). Therefore, osteoid osteoma should be considered in young patients with prolonged undiagnosed foot pain.

The treatment of osteoid osteoma is the removal of the nidus. When the nidus is removed, the pain is relieved. There are three main ways to remove the nidus: en bloc resection, excision with curettes and percutaneous CT-guided radiofrequency or laser ablation (14).

Recently, percutaneous radiofrequency ablation has become the preferred treatment option. In a study by Rosenthal (11), 112 of the 126 procedures (89%) completely succeeded clinically. The patients were pain free, did not take medication and did not require additional procedures (14). The percutaneous method is not, however, indicated in most osteoid osteomas of the small bones and the spine. Percutaneous curettage should be used for lesions more than 1 cm in diameter (7, 15). In this case, the navicular nidus was removed by curettage because of the extensive involvement of the navicular bone. After removal of the nidus, bone grafting was used to encourage early bone consolidation and mobilization. Percutaneous CT-guided ablation was not preferred in this case due to the location and diameter of the lesion and the need for bone grafting (5, 11). Excision of the nidus was performed successfully, and the graft that was used accelerated the bone healing.

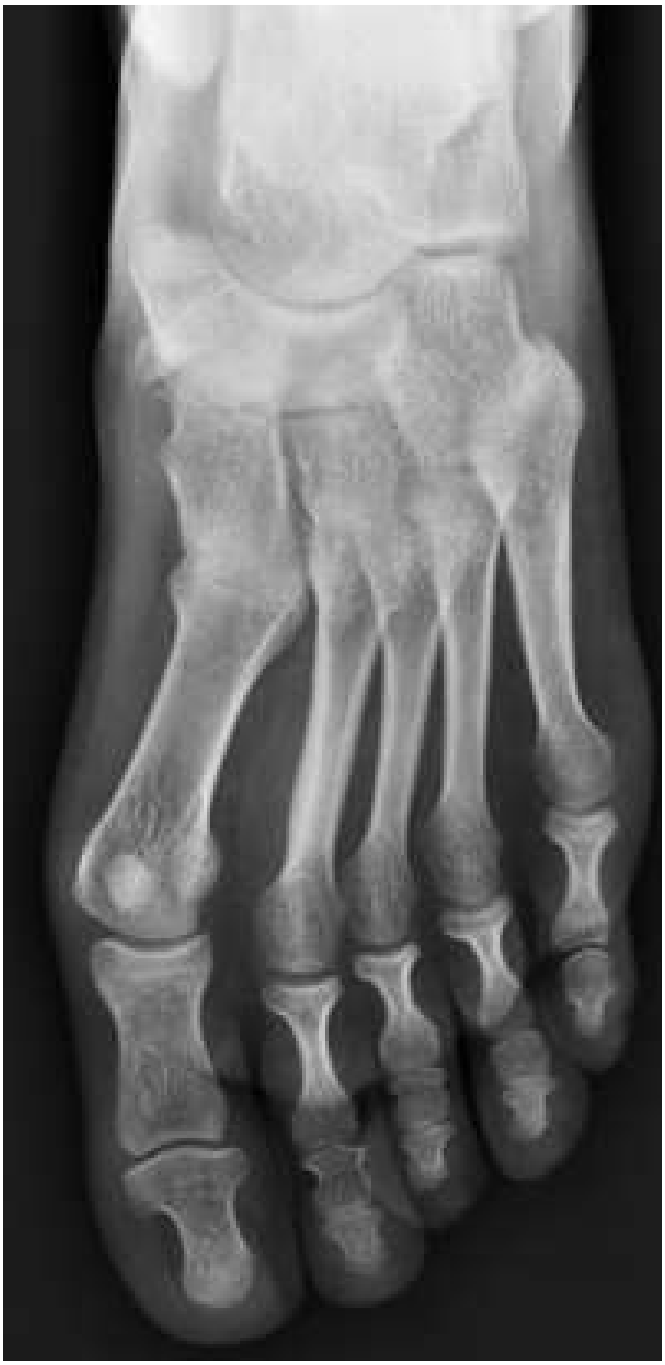

Fig. 6: Post-operative 24-month anteroposterior view.

Bone grafting is involved in most procedures in reconstructive orthopaedic surgery. Autologous bone grafts have excellent biologic and mechanical properties, but donor site morbidity and the limited volume available must be taken into consideration (20).

Osteoid osteoma of the tarsal navicular bone is difficult to diagnose because of its unusual presentation. As a result, it is often misdiagnosed. Navicular osteoid osteoma is responsible for prolonged foot pain and functional loss. Favourable radiologic tests, including plain radiography and CT scan, are necessary to make the diagnosis. The radiologic images and characteristic clinical symptoms have to be evaluated by an experienced radiologist. In this way, functional loss due to misdiagnosis can be prevented.

REFERENCES

1. Jaffe HL. Osteoid-osteoma. Proc R Soc Med 1953; **46:** 1007–12.
2. Healey JH, Ghelman B. Osteoid osteoma and osteoblastoma, current concepts and recent advances. Clin Orthop 1986; **204:** 76–85.
3. Sluga M, Windhager R, Pfeiffer M, Dominkus M, Kotz R. Peripheral osteoid osteoma: is there still a place for traditional surgery? J Bone Joint Surg [Br] 2002; **84B:** 249–51.
4. Mercuri M, Casadei R. Tumours in the foot. Foot Ankle Surg 2002; **8:** 175–90.
5. Greco F, Tamuburrelli F, Ciabattoni G. Prostaglandins in osteoid osteoma. Int Orthop 1991; **15:** 35–7.
6. Mungo DV, Zhang X, O'Keefe RJ, Rosier RN, Puzas JE, Schwarz EM. COX-1 and COX-2 expression in osteoid osteomas. J Orthop Res 2002; **20:** 59–162.
7. Murari T, Callaghan J, Berry B, Sweet DE. Primary benign and malignant osseous neoplasms of the foot. Foot Ankle 1989; **10:** 68–79.
8. Cantwell CP, Obyrne J, Eustace S. Current trends in treatment of osteoid osteoma with an emphasis on radiofrequency ablation. Eur Radiol 2004; **14:** 607–17.
9. Yildiz Y, Bayrakci K, Altay M, Saglik Y. Osteoid osteoma: the results of surgical treatment. Int Orthop 2001; **25:** 119–22.
10. Assoun J, Richardi G, Railhac JJ et al. Osteoid osteoma: MR imaging versus CT. Radiology 1994; **191:** 217–23.
11. Rosenthal DI, Hornicek FJ, Torriani M, Gebhardt MC, Mankin HJ. Osteoid osteoma: percutaneous treatment with radiofrequency energy. Radiology 2003; **229:** 171–5.
12. Ozdemir HM, Yildiz Y, Yilmaz C, Saglik Y. Tumors of the foot and ankle: analysis of 196 cases. J Foot Ankle Surg 1997; **36:** 403–08.
13. Chou LB, Ho YY, Malawer MM. Tumors of the foot and ankle: experience with 153 cases. Foot Ankle Int 2009; **30:** 836–41.
14. Campanacci M, Ruggieri P, Gasbarrini A, Ferraro A, Campanacci L. Osteoid osteoma direct visual identification and intralesional excision of the nidus with minimal removal of bone. J Bone Joint Surg Br 1999; **81:** 814–20.
15. Murari TM, Callaghan JJ, Berrey BH, Sweet DE. Primary benign and malignant osseous neoplasms of the foot. Foot Ankle Int 1989; **10:** 68–80.
16. Dahlin DC, Unni KK. Osteosarcoma. In: Charles C, ed. Bone tumors: general aspects and data on 8547 cases. Springfield, IL: Thomas; 1986. pp. 179–241.
17. Sim FH, Dahlin DC, Beaubout JW. Osteoid osteoma: diagnostic problems. J Bone Joint Surg Am 1975; **57:** 154–9.
18. Swee RG, McLeod RA, Beabout JW. Osteoid osteoma: detection, diagnosis, and localization. Radiology 1979; **130:** 117–23.
19. Rezgui-Marhoul L, Said W, Hajri R, Mestiri M, Zakraoui L, Zlitni M et al. Osteoid osteoma of the tarsal navicular bone: an uncommon localization [in French]. Rev Chir Orthop Reparatrice Appar Mot 2003; **89:** 461–4.
20. Pape HC, Evans A, Kobbe P. Autologous bone graft: properties and techniques. J Orthop Trauma 2010; **24(Suppl 1):** S36–40.