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Osteoid Osteoma: A Painless Enlargement of the Great Toe

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Abstract: Solitary bone lesions involving the lesser digits are a rare entity. Without pain but significant deformity the rightdiagnosis can be challenging. A 14 years old boy was admitted with a painless enlargement and clubbing involving the distal phalanx of the right great toe. X-rays were normal, only computer tomography and MRI showed a small round structure in the distal phalanx. Because of progression and unknown dignity a surgical excision was performed. Histologic examination of the painless lesion found an osteoid osteoma. No malignant change or recurrence appeared and the patient remained free of symptoms 2 years after operation.

Key words: Painless, osteoid osteoma, surgical excision, phalangeal bone, bone tumor, great toe

INTRODUCTION

Solitary bone lesions involving the toes can cause a significant deformity (Sproule *et al*., 2004; Tsang and Wu, 2008). Various differential diagnoses consist of Brodie's abscess, subungual exostosis, Garre's sclerosing, osteomyelitis, fibrous dysplasia, healing fracture, Ewing's sarcoma, osteochondritis dissecans, chronic bone abscess, benign and malignant bone tumors, chondroblastoma, monoarticular arthritis or osteoid osteoma (Cerase and Priolo, 1998; Kahn *et al*., 1983). The incidence of osteoid osteoma is approximately 10% in all benign bone tumors and 2-3% of all primary bone tumors (Kransdorf *et al*., 1991). Involvement of the phalanges of the toes is uncommon and consequentially, misdiagnosis is frequent. Especially, if the symptom pain is missing. Though, a clear differentiation between malignant and benign osteoblastic tumors is extremely important (Cerase and Priolo, 1998; Greenspan, 1993). This study describes for the first time a painless osteoid osteoma involving the distal phalanx of the great toe in an adolescent with emphasis on the clinical presentation, radiographic appearances, pathological features and treatment.

MATERIALS AND MATHODS

Case report: A 14 years old caucasian boy was admitted to the Pediatric Surgery Department with painless progressive enlargement of the distal phalanx of his great right toe. The slow growing enlargement was first recognized half a year ago while buying new shoes but remained painless. The patient was first treated conservatively with different topical agents without any success. His general health was good and his past medical history was unremarkable. There was no positive family history of gout, unknown fever or trauma to the area.

Physical examination: It revealed a bulbous enlargement of the distal segment of the great toe (Fig. 1). The nail and the soft tissue of the pulp were hypertrophied with obliteration of the normal angle between the base of the nail and the skin. There was no accompanying erythema or increase in local temperature and no pain occurred in moving. Mild tenderness was present without any limited range in motion. Vascular and neurologic parameters were normal. The remaining physical examination was within normal limits.

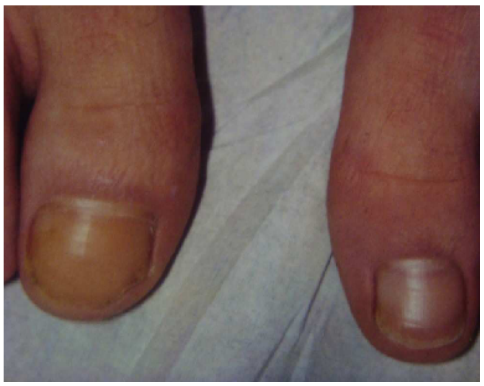

Fig. 1: Entargement and clubbing of the distal phalanx of the right great toe with obliteration of the normal angle between the base of the nail and skin

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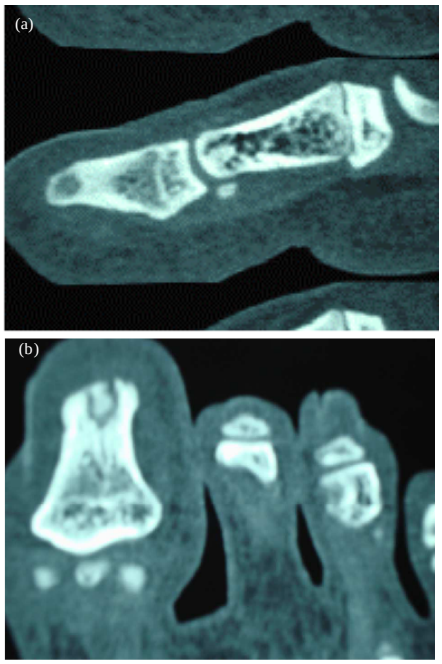

Fig. 2: Preoperative computered tomography of the distal right hallux with the central nidus (a) oblique view (b) dorsoplantar view

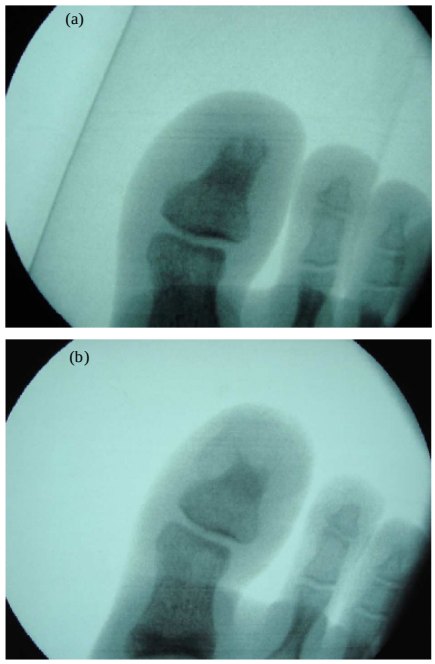

Fig. 3: Intraoperative fluoroscope of the right hallux (a) before surgerydemonstrating a radiolucent area at the distal phalanx (b) after en bloc resection

Radiographic examination: It was already done outside by the referring physician. No abnormal findings could be seen on first routine roentgenograms. One month before admission computered tomography and MRI revealed a suspicious 0.5×0.7 cm, ovoid circumscribed area of radioluceny and cortical defect at the tip of the distal phalanx of the right hallux (Fig. 2a, b). The radiologist's interpretation indicated the possibility of acute osteomyelitis, subungual exostosis, osteochondroma and osteoma.

In light of diagnostic findings, the decision to excise the lesion was made. At surgery following aseptic preparation, attention was first directed to the nail plate which was avulsed until the nail fold. Then, the nail bed was dissected and preparation followed. With dissecting scissors and osteotome the lesion was shelled out completely (Fig. 3a, b). After deep structures were coaptated with absorbable sutures, the nail bed was reconstructed and the nail was put in place fixed by non-absorbable sutures. The patient's postoperative course was uneventful.

Pathologic examination: It revealed an oval piece of bone with irregular surface partly covered by cartilage, measuring 0.5×0.7×0.5 cm. Microscopic section

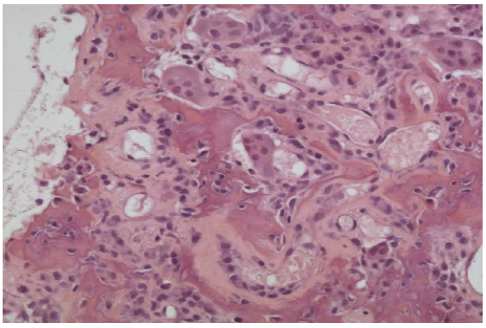

Fig. 4: Histologic staining of the lesion revealed interconnecting osteoid trabeculae with osteoblasts aligned about their margis in a fibrovascular stroma (Haematoxylin and Eosin, x 200)

demonstrated bone remodelling with alternating areas of osteoblasts, osteoid and bone trabeculae with spindle-shaped fibrous tissue.

Some multinucleated giant cells were seen with calcified areas of newly formed bone, surrounded by numerous vascular channels (Fig. 4). Altogether, histopathologic examination was characteristic of osteoid osteoma. After 2 years the follow-up physical examination showed no recurrence, toe clubbing and swelling gradually subsided.

RESULTS AND DISCUSSION

Osteoid osteoma is a benign bone tumor with a predilection for the weight-bearing long bones (Jaffe, 1945; Kransdorf *et al*., 1991). It is extremely rare in the foot and small bones. Jaffe described in his first publication of osteoid osteoma in 1935 only one osteoid osteoma in the middle toe of the right foot (Jaffe, 1935). Afterwards few cases of typical osteoid osteomas in the foot or phalange were published (Kahn *et al*., 1983; Sproule *et al*., 2004). Osteoid osteomas are most common in the 10-30 years age group and males are affected twice as often as females like in the case (Kransdorf *et al*., 1991). The most principle complain is local pain usually increasing and often severe enough to interfere with sleep but characteristically relieved by salicylates (Adler *et al*., 1997; Spinosa *et al*., 1985; Sproule *et al*., 2004). The case is the first describing a painless osteoid osteoma in the great toe. Although, pain is not always localized at the exact site of the lesion and is sometimes referred to a neighbouring joint in the case no pain occurred even in motion or by touching (Hamilos and Cervetti, 1987). Depending on the growth, the effusion and the developing pain, the duration of symptoms ranges on the average from 6 month to 2 years before the patient seeks medical assistance (Ekmekci *et al*., 2001; Kahn *et al*., 1983; Spinosa *et al*., 1985; Sproule *et al*., 2004). In the case, the boy was only admitted to a physician because he had to buy new shoes within half a year. Although, the etiology of osteoid osteoma is unknown, it is believed to be delivered from an inflammatory, infectious condition or as a reactive, reparative change caused by trauma (Kransdorf *et al*., 1991). The diagnosis of these bone tumors should be made on the basis of a combined clinical and radiographic evaluation. Osteoid osteomas can be classified as cortical, intramedullary (cancellous) and subperiostal (Kransdorf *et al*., 1991). Cortical osteoid osteomas are the most common type.

When osteoid osteoma arises in the spongiosa, the surrounding rim of spongy bone which is of variable thickness, becomes densely sclerotic. If the lesion develops in the cortex, the adjacent cortical bone becomes strikingly thickened by periosteal new bone formation. A review of the literature shows that almost 35% of all cases have an atypical radiographic presentation like in the patient (Tsang and Wu, 2008).

His primary X-rays of his toe showed no remarkable pathology. This led to further radiologic investigation by a CT scan 2 months later. Typically radiography will show a small lytic lesion with surrounding sclerotic change and nidus formation that is usually, <1.5 cm in diameter. Though, the nidus like focus is the osteoid osteoma, the total abnormal area in the affected bone can be very large since there may be a perifocal zone of bone thickening or sclerosis extending for a considerable distance beyond the nidus (Jaffe, 1945).

In patients suspected of having osteoid osteoma with no standard radiographic abnormality, tomography or MRI may be helpful in diagnosis (Cerase and Priolo, 1998). Treatment of choice is the en bloc excision of the lesion (Adler *et al*., 1997; Ekmeci *et al*., 2001; Sproule *et al*., 2004). To reach a definitive diagnosis and clear the dignity in the patient who did not suffer from pain at night but showed up due to the isolated growing of his great right toe, the lesion was totally excised.

The post surgery prognosis of osteoid osteoma is excellent, recurrence is only reported following incomplete excision of the lesion or unsuccessful radio frequnecy (Ekmeci *et al*., 2001; Ghanem *et al*., 2003; Hamilos and Cervetti, 1987; Kahn *et al*., 1983; Sluga *et al*., 2002).

CONCLUSION

A painless osteoid osteoma is rarely seen and it can be easy misdiagnosed if it occurs in an atypical location such as the subungual area of the great toe. Surgical excision is advised because it solves the diagnostic uncertainty.

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