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Riddles in the diagnosis and treatment of osteoid osteoma in child foot: A concisive study

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ABSTRACT

Background: Osteoid osteoma in child foot is very unusual. We investigate its polymorphism and difficulties in approach.
Methods: We retrospectively studied 12 children (7 girls, 5 boys) treated in our department from February 1995 until February 2010. Mean age was 12 years (range 8–16 years) and average follow up time 5 years (3–8 years). The lesion affected mostly the talus (8 cases), calcaneus in 3 and once the fourth metatarsal. En bloc excision of lesion was the surgical method of choice.
Results: Children's symptoms lasted average 2 years (14 months to even 4 years). Nocturnal pain and relief with NSAIDs occurred only in half cases. Atypical symptoms were hip referring pain, tenosynovitis of foot extensors and achilles' tendon atrophy. Complete cure and no recurrencies were noted.
Conclusions: Diversity of symptoms and delay in diagnosis still remain troublesome and the absolute modality of treatment for child foot osteoid osteomas urges further investigation. Minimally invasive surgical techniques have recently emerged but orthopaedic surgeons must not forget that open excision remains the most safe and documented method for pediatric foot osteoid osteomas.
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1. Introduction

Osteoid osteoma is a benign osteoblastic tumor of unknown origin, firstly described by Jaffe in 1935 [1]. The lesion is relatively common accounting for 10% of all benign bone tumors [2]. It generally occurs in the second and third decade of life (75% of the cases are in patients younger than 25), and men outnumber women at a ratio of 2 to 1 [3]. Foot is an infrequent site for osteoid osteomas, comprising 4–16% of all locations but osteoid osteoma is the most prevalent benign bone tumor affecting the foot and ankle, accounting for up to 35% of all biopsied benign neoplasms [4–6]. Talus is the most common site (31–59%) with calcaneus following in 12.5–22% of cases involving the foot [7]. Talar and calcaneal osteoid osteomas are usually subperiosteal or cancellous. Metatarsals, cuboid and cuneiforms are very rare sites of occurrence for OO (from now on in this paper osteoid osteoma will be referred as OO) [8–10]. Despite the extensive research, the exact prevalence of foot OO in children has not ever been published but it is a common belief that it is a rare tumor which poses many diagnostic and treatment challenges problems to orthopaedic surgeons. Reports of large case series of pediatric foot OO lack in the literature and one can typically find few, isolated or rare cases. Herein we provide a concisive study of a large case series demonstrating our experience with this rare pediatric foot tumor during fifteen consecutive years.

2. Methods

After obtaining institutional scientific committee approval, the medical records of all children with foot osteoid osteomas treated in our department during fifteen years between February 1995 and February 2010, were reviewed. Twelve patients, 7 girls and 5 boys, aging 12 years old at average (range 8–16) were included. Mean follow up time was 5 years (ranging 3–8 years). It must be noted that the relevant long time of follow up was achieved by consulting parents to strictly come up for clinical and imaging workup at one-year intervals for the first 3 postoperative years. Talus was affected in most cases (8 children-67%) followed by calcaneus (3 cases-25%) and shaft of 4th metatarsal (9%). Demographic data and the site of the lesions are shown in Table 1.

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Table 1
Demografic data of the children, location of the tumor, delay to diagnosis, presence of characteristic findings for osteoid osteoma, atypical symptoms and diagnostic modalities applied.

No.	Gender/age (years)	Location (side)	Time to diagnosis (months)	Noct. pain relief NSAID	Symptoms (atypical)	Ro	Scan	CT	MRI
1 Paracetamol	M/12 Ankle sprain	Talus (Rt)	48	Nocturnal	Synovitis	(+)	n/A	n/A	(+)
2	F/12	Calcaneus (Lt)	17	Nocturnal	Hip referred pain	(+)	(+)	(+)	(+)
3	M/10	Calcaneus (Lt)	19	Nocturnal Aspirin	Subtalar Synovitis	(+)	(+)	(+)	n/A
4	M/8	Talus (Rt)	Achilles'	Atrophy	(+)	(+)	(+)	n/A	
5	F/14	Talus (Rt)	24	Aspirin	Extensor tendinitis	(+)	(+)	(+)	n/A
6	F/13	Talus (Rt)	18	Nocturnal Aspirin	Peroneal spasm	(+)	(+)	(+)	n/A
7	F/16	Talus (Rt)	30	Aspirin	Ankle stiffness	(+)	(+)	(+)	n/A
8	F/13	4th MTT (Lt)	14	Nocturnal	Toe referred pain	(+)	(+)	(+)	n/A
9	F/11	Calcaneus (Rt)	21	Ibuprofen	Equinus contracture	(+)	(+)	(+)	(+)
10	M/10	Talus (Rt)	27	(+)	(+)	(+)	n/A		
11	F/13	Talus (Rt)	22	Nocturnal	Ankle impingement	(+)	(+)	(+)	(+)
12	M/12	Talus (Lt)	25	Aspirin	(+)	(+)	(+)	n/A	

All children were operated by the same pediatric orthopaedic consultant (J.M.) and medical records were reviewed by both authors. En bloc excision of the lesion with the surrounding sclerotic bone, under general anaesthesia, Esmarch tourniquet and c-arm guidance, was the method of choice for all patients in this series. All excised tissue was sent for histologic examination and culture although the suspicion of infection was not strong. Talar OOs were approached via anterolateral or anteromedial approach but in one case we had to perform medial malleolar osteotomy to gain access to a lesion located in the posteromedial aspect of the talar dome. The osteotomy was fixed with a 4.0 mm full-threaded AO cancellous screw, which was removed under topical anaesthesia six weeks later (Fig. 1). Calcaneal OOs were approached via lateral mini incisions and for the intrarticular lesion we had to operate through the sinus tarsi (Fig. 2). The metatarsal OO had been occupying a relatively big extent of the shaft and subsequently resulted into a segmental postoperative defect, so we decided to protect it with an intramedullary K-wire which was removed 3 weeks later and full weight bearing was permitted (Fig. 3). In all other patients sutures and posterior ankle splint were removed two weeks postoperatively and full weight bearing was encouraged. Follow ups took place at 1, 3, 6 and 12 monthly intervals and then yearly until 3 years were completed.

3. Results

Pain and swelling were the principal and most common symptoms amongst all children. The pain was described as continuous, deep, aching and intense with various quality and severity. It must be noted that two patients presented with pain not on the site of OO's occurrence but elsewhere such as the hip in a calcaneal OO and the big toe in the OO in the 4th MTT. Moreover, we highlight that approximately only half of patients complained for nocturnal pain and nearly the same percentage of the 12 children found relief in analgesics, with no correlation between the two findings. We marked a tendency of lesions proximal to joints to respond better to analgesics: 3 responders to aspirin out of 4 joint-adjacent lesions (75%) versus 3 responders out of 8 nonadjacent OOs (38%), but samples are too small for a safe conclusion. On the other hand our findings are opposite to those of

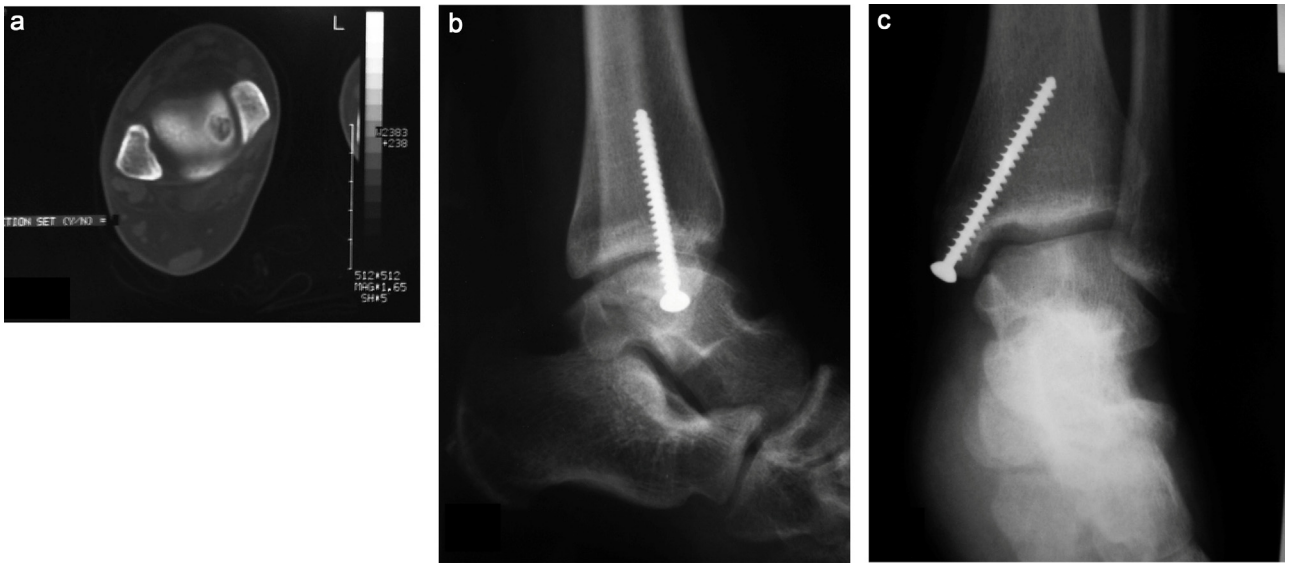

Fig. 1. Case no. 5 – Female 14-year old with OO in posteromedial aspect of right talar dome. (a) CT transverse view, (b and c) osteotomy fixation before the removal of the screw.

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