



# Chondroblastoma of the metatarsal bone and its 17-year follow-up

## *Metatarsal yerleşimli kondroblastom ve 17 yıllık takibi*

**Bulent OZKURT,<sup>1</sup> Kerem BASARIR, Yusuf YILDIZ, Yener SAGLIK**

<sup>1</sup>Ankara Numune Training and Research Hospital Fifth Orthopaedics and Traumatology Clinic;  
Ankara University Faculty of Medicine İbn-i Sina Sina Hospital Orthopaedics and Traumatology Section

Kondroblastom çok nadir görülen kıkırdak doku kökenli bir tümördür; metatarsal kemiklerde yerleşimi çok az olguda bildirilmiştir. Bu yazıda, dördüncü metatarsında kondroblastom saptanan bir hasta sunuldu. Hastada inversiyon tipi ayak bileği burkulmasını takiben ortaya çıkan ve sekiz aydır devam eden ağrı vardı. Radyolojik incelemede dördüncü metatarsal kemikte sklerotik sınırlı, osteolitik bir lezyon saptandı. Lezyona ekstraartiküler küretaj uygulandı ve lezyon kavitesi otogreftle dolduruldu. Hastanın 17 yıllık takip ve kontrolü sırasında hiçbir klinik yakınması olmadı, lokal nüks veya metastaza ait klinik ve radyolojik bulgu saptanmadı.

**Anahtar sözcükler:** Kemik neoplazileri; kondroblastoma/cerrahi; metatarsal kemikler/patoloji.

Chondroblastoma is a rare bone tumor of cartilaginous origin. Metatarsal involvement is very rare, with a few cases. We presented a case of chondroblastoma localized in the fourth metatarsal bone. The patient presented with persistent pain of eight-month duration on the lateral side of his foot, which developed after an inversion ankle sprain. Radiological examination showed a large osteolytic lesion with sclerotic margins in the fourth metatarsal bone. The lesion was treated with extra-articular curettage and autogenous bone grafting. During a 17-year follow-up, the patient had no complaints, and there were no clinical or radiological findings of local recurrence or metastasis.

**Key words:** Bone neoplasms; chondroblastoma/surgery; metatarsal bones/pathology.

Chondroblastoma (CB) is a fairly uncommon, benign, cartilaginous tumor, that usually affects the epiphysis of long bones in children and adolescents.<sup>[1,2]</sup> It is first described as a distinctive clinicopathologic entity most likely arising from chondroblasts by Jaffe and Lichtenstein, as benign chondroblastoma of bone. It has a predilection for long bones most commonly distal femur and proximal tibia. It also occurs in small bones of hand and feet such as talus, calcaneus, cuboid and metatarsal bones.<sup>[1,3,4]</sup> Metatarsal bone is an uncommon location for CB.<sup>[2,3,5]</sup>

This is the report of a case with CB located in the proximal region of the fourth metatarsal, treated with curettage and packing with cancellous bone

and followed up for 16 years without any signs of local recurrence.

### Case report

A 23-year-old male patient was referred by his primary care physician to our center with an eight-month history of persistent pain on the lateral side of his right foot developed after an inversion type ankle sprain.

Initial examination revealed mild swelling on the dorsolateral aspect of the middle part of the foot with normal alignment and gait, also tenderness on palpation. Rest of the physical examination was unremarkable. Active and passive ROM of both feet and ankle were full unrestricted and symmetric. There was no fever, chills, or weight loss. Laboratory tests including complete

blood cell count, alkaline phosphatase, calcium levels, C-reactive Protein, erythrocyte sedimentation rate were normal. There was no lung metastasis investigated by computerized tomography.

Imaging studies including plain radiographs of the right foot were obtained (Fig I). The radiographs demonstrated a large lucent, osteolytic lesion with thin sclerotic borders within the medulla of the fourth metatarsal. There was thinning and expanding on the cortical bone surrounding the lesion. The lesion appeared to involve the proximal half of the fourth metatarsal. The lobulated, expanding, osteolytic lesion had sclerotic margins and was 30 x 20 x 45 mm in dimensions. Computerized tomography scans (Fig II) showed a large defect with scalloped, sclerotic and well-defined margins. There was no evidence of fracture, cortical destruction and soft tissue extension. Intralesional calcification was not present.

The fine needle aspiration biopsy revealed the immature chondrocytes without any signs of malignancy.

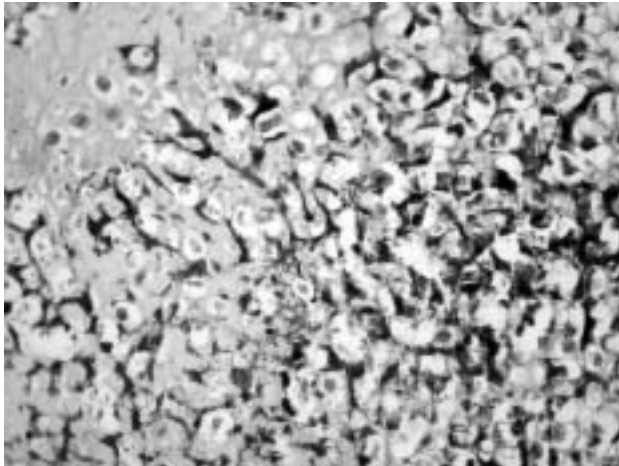
Curettage and packing with cancellous autogenous bone grafting obtained from the iliac crest were performed. Post operative radiographs demonstrated good consolidation of bone graft at 4 months follow up. Microscopic examination of the curettage material revealed uniform, polygonal and round cells with oval or slightly indented nuclei and also multinucleated giant cells in immature chondroid material which supported the diagnosis of CB (Fig III). The patient was called to follow-up at second and sixth weeks, third, sixth and twelfth months and every six months till third year after operation. No complaint was noted after the third month follow-up. There was no clinical and radiological evidence of local tumor recurrence at the sixteen years follow-up (Fig IV).

### Discussion

Chondroblastoma, also known as Codman's Tumor, is a fairly uncommon bone tumor that arises from immature chondroblasts.<sup>[3,6,7]</sup> It accounts for approximately 1 % of all primary bone tumors.<sup>[2,3,6,7]</sup> Cli-



**Figure 1.** (a) Preoperative x-ray of the patient revealing a large lucent lesion within the fourth metatarsal, (b) Preoperative CT scans of the patient showing a 30x20x45 mm expansile, osteolytic lesion with sclerotic margins, (c,d) Graft consolidation occurred at the 17th years follow-up



**Figure 2.** Histopatological evaluation revealed ovoid nucleated, rounded monotypic polygonal cells in immature chondroid material (H-E x40).

nically, CB is relatively non-aggressive and is usually readily curable with curettage and bone grafting.<sup>[7]</sup> Metastasis, malignant transformation and local aggressive behavior have been reported but are extremely rare.<sup>[8,9]</sup>

Approximately 50% of all CB occur in skeletally immature patients with a peak incidence in the second decade. There is a male preponderance ranging from 60% to 81%.<sup>[5,10]</sup> The cases involving the flat bones tend to occur in slightly older patients.<sup>[5]</sup> The age and gender of our patient was no exception.

Chondroblastoma has been reported in numerous locations, predominantly in the secondary ossification centers of long bones, with the distal femur, proximal tibia and proximal humerus.<sup>[3,9]</sup> Chondroblastoma is also reported in talus, calcaneus, patella, cuboid, metacarpal bones, triquetrum, and acromion.<sup>[1,3,4]</sup> Metatarsal bone is an uncommon location for CB with a few number of cases reported up to authors knowledge.<sup>[2,3,5]</sup>

The most common clinical presentation is localized pain and occasional swelling.<sup>[6,9]</sup> Limited range of motion, effusion of the adjacent joint, local warmth and tenderness may be present.<sup>[11]</sup> Pathological fracture may be present in 1 % to 13 % of the cases.<sup>[9]</sup> In our case pain was the main presenting symptom in the absence of swelling, effusion and pathological fracture.

Radiologically, CB frequently has an oval or round configuration at an eccentric epiphyseal location. Chondroblastoma appear as ill-defined, osteolytic le-

sion with a thin sclerotic margin. The tumor size may range from 1 to 10 cm in diameter. The surrounding cortical bone is usually expanded and cortical destruction with adjacent soft tissue mass may be present. Punctuate calcification may be present.<sup>[9,10]</sup> In the present study, radiological features of the tumor are parallel to the previous reports.

Gross examination of the tumor usually reveals grayish-pink material with occasional foci of calcifications, hemorrhages, or necrosis. Microscopic examination reveals oval mononuclear cells, osteoclast like multinucleated giant cells, calcified cartilaginous intra cellular matrix with chicken wire appearance.<sup>[6,10]</sup>

The mainstay of the treatment for CB is removal of the lesion and filling the lesion cavity with bone grafting or synthetic materials.<sup>[9,12]</sup> Recurrences were reported in 10 to 45% of cases after surgical treatment.<sup>[9]</sup> Other adjuvant treatment modalities have been used such as cryosurgery and phenol application, however recurrences may also be seen with these techniques.<sup>[7]</sup> Chemotherapy has no place in the treatment of CB.<sup>[6]</sup> Some authors suggest radiotherapy in the treatment of CB, but there is considerable controversy because of the risk of malignant transformation after irradiation.<sup>[9,13]</sup> We did not prefer radiotherapy because of the probable risk of malignant transformation. In our case, treated with curettage and bone grafting, at the 16 years follow-up visit there is no evidence of local recurrence or metastasis.

## References

1. Caterini R, Manili M, Spinelli M, Santori FS, Ippolito E. Epiphyseal chondroblastoma of bone. Long-term effects on skeletal growth and articular function in 15 cases treated surgically. *Arch Orthop Trauma Surg* 1992;111:327-32.
2. Wu KK. Chondroblastoma of the foot. *J Foot Surg* 1989; 28:72-7.
3. Yurdođlu C, Özbaydar MU, Özcan D, Altun M, Yalaman O. Kondroblastom. *Acta Orthop Traumatol Turc* 1995;29: 272-4.
4. Davila JA, Amrami KK, Sundaram M, Adkins MC, Unni KK. Chondroblastoma of the hands and feet. *Skeletal Radiol* 2004;33:582-7.
5. O'Mara JW Jr, Keeling J, Montgomery EA, Aaron AD. Primary lesions of the patella. *Orthopedics* 2000;23:376-7.
6. Fink BR, Temple HT, Chiricosta FM, Mizel MS, Murphey MD. Chondroblastoma of the foot. *Foot Ankle Int* 1997; 18:236-42.
7. Fritz GR, Irwin RB. Shoulder pain in a 15-year-old boy.

- Clin Orthop Relat Res 1997;(341):283-5, 287-8.
8. Turcotte RE, Kurt AM, Sim FH, Unni KK, McLeod RA. Chondroblastoma. Hum Pathol 1993;24:944-9.
  9. Huvos AG, Higinbotham NL, Marcove RC, O'Leary P. Aggressive chondroblastoma. Review of the literature on aggressive behavior and metastases with a report of one new case. Clin Orthop Relat Res 1977;(126):266-72.
  10. Sterling G, Wilson A. Chondroblastoma of the talus: a case report. J Foot Ankle Surg 2002;41:178-82.
  11. Hanna BG, Donthineni R, Dalinka MK, Lackman RD. Painful ankle in a 19-year-old man. Clin Orthop Relat Res 2003;(415):329-37.
  12. Dorfman HD, Czerniak B, editors. Benign cartilage lesions. In: Bone tumors. St. Louis: Mosby; 1998. p. 253-352.
  13. Anderson AF, Ramsey JR. Chondroblastoma of the talus treated with osteochondral autograft transfer from the lateral femoral condyle. Foot Ankle Int 2003;24:283-7.
  14. Jambhekar NA, Desai PB, Chitale DA, Patil P, Arya S. Benign metastasizing chondroblastoma: a case report. Cancer 1998;82:675-8.