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Chondroblastoma of the Medial Cuneiform Bone in a 32-Year-Old Woman

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ADE 1 **Murat Arıkan**
AE 1 **Erdem Aktas**
BF 1 **Guray Tođral**
CF 1 **Ahmet Yıldırım**
AC 2 **Olcaı Kandemir**

1 Department of Orthopedic Oncology, Ankara Oncology Training and Research Hospital, Ankara, Turkey
2 Department of Pathology, Ankara Oncology Training and Research Hospital, Ankara, Turkey

Corresponding Author: Erdem Aktas, e-mail: drerdem2007@gmail.com
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Patient: Female, 32
Final Diagnosis: Chondroblastoma
Symptoms: Pain
Medication: —
Clinical Procedure: —
Specialty: Oncology

Objective: Unusual clinical course





Background: 1% of all bone tumors are Chondroblastomas. Chondroblastomas, initially considered to be an osteoclastoma variant are benign, cartilaginous tumors which usually occur in the epiphysis of long bones, especially in the humerus, tibia, and femur, most common in children and young adults between the ages of 10 and 20 years. 4% of all chondroblastomas settle in the talus whereas cuneiform and other tarsal bones are very rare sites for the development of this benign chondroid lesion.

Case Report: A case of chondroblastoma involving the medial cuneiform of the left foot of a 32-year-old woman is described. The patient presented with moderate localized pain and tenderness over the medial aspect of her left foot. Radiographs showed a lytic expansile lesion within the right cuneiform bone indicating a bone tumor. Biopsy demonstrated cellular areas made up of round, polygonal cells, with round-oval nucleus and chondroblasts that appear with a thin calcification rim. Intralesional curettage and synthetic bone grafting with PRP (Platelet-Rich Plasma) application was performed for its treatment. After 18 month follow up, osteointegration was observed with the defect completely filled and the patient was free of disease and pain.

Conclusions: A painful, expansile, thin, sclerotic lesion detected at the cuneiform should arise suspicion for chondroblastoma even at age over 20 years. Meticulous curettage of the lesion from a small window with removal of the lesion followed by injectable phosphocalcic cement application with autologous PRP can be considered as a curative and technically simple treatment method.

MeSH Keywords: Bone Substitutes • Chondroblastoma • Platelet-Rich Plasma

Full-text PDF: <http://www.amjcaserep.com/abstract/index/idArt/890684>

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Background

Chondroblastomas, also known as Codman's tumor, are fairly uncommon bone tumors that arise from immature chondroblasts, and account for approximately 1% of all primary bone tumors [1]. In 1942, Jaffe and Lichtenstein first described the lesion as a chondrogenic tumor developing at the epiphysis of a long bones and was initially considered to be an osteoclastoma variant [2]. Chondroblastomas are rare, benign, cartilaginous tumors that usually occur in the epiphysis of long bones, especially in the humerus, tibia, and femur [3]. Although chondroblastomas can occur throughout life, they are most common in children and young adults between the ages of 10 and 20 years [4]. Feet are very uncommon sites; with only 1 case report demonstrating multiple tarsal bone involvement in a patient [5]. Four percent of all chondroblastomas settle in the talus, whereas cuneiform and other tarsal bones are very rare sites for the development of this benign chondroid lesion [6,7]. Our report describes a case of chondroblastoma of the left medial cuneiform bone in a 32-year-old women, which appears to be unique in terms of anatomical localization, age of patient, and treatment method.

Case Report

The data collection was in conformity with the Institutional Ethics Committee and the study was in adherence to the tenets of the Declaration of Helsinki. The aim of the study was described and informed consent was received from the patients prior to inclusion in the study.

A 32-year-old woman presented with a 6-month history of pain in the medial aspect of her left foot. The pain had an insidious onset and had gradually worsened during the 2 months before presentation, causing gait difficulty. The patient did not have a history of trauma or infection in that region. Upon physical examination, she displayed tenderness and mild swelling of the medial aspect of her left foot. She had difficulty standing and was unable to bear weight on her foot for protracted periods. The patient did not display any neurologic disability in her left lower extremity, but there was limited ankle dorsiflexion and tenderness over the medial cuneiform bone.

Conventional radiographs of the left foot showed an irregular, patchy, lytic, radiolucent area within the cuneiform bone, suggesting a bone tumor. The affected bone showed septations and minimal calcifications with mild expansion. The tumor occupied the entire medial cuneiform bone, with no involvement of the adjacent tarsal bones (Figure 1). T1-weighted magnetic resonance images (MRI) showed a hypointense lesion (Figure 2A), whereas the lesion was hyperintense on T2-weighted images (Figure 2B). MRI sequences showed the involvement of the



Figure 1. Conventional radiograph of the left foot showing an irregular, patchy, lytic lucent area within the right cuneiform bone.

entire medial cuneiform bone, sparing the navicular and first metatarsal bone. On the basis of the clinical findings and imaging studies, the differential diagnosis initially suggested an aneurysmal bone cyst, giant-cell tumor, or a bone cyst. A mini-incision open biopsy was performed and indicated a benign chondroid tumor. The microscopic examination of the tissue revealed sheets of cells exhibiting oval-to-elongated nuclei in a background of chondroid matrix (Figure 3A, 3B). The histopathological diagnosis was reported as chondroblastoma. After the patient was informed about the diagnosis, aggressive intralesional curettage of the lesion was performed. After performing electrocauterization of the debrided cavity, we filled the defect with 15 mL of synthetic bone substitute (Cementek LV™, France) combined with autologous platelet-rich plasma (PRP).

During the first 3 months of clinical follow-up, the patient was allowed to partially bear weight on her affected foot and walked with the assistance of a crutch. By the third week, the patient was free of pain and had a full range of motion in her ankle. A radiographic examination performed 18 months postoperatively showed full integration and consolidation of the synthetic graft, without recurrence of the lesion (Figure 4).

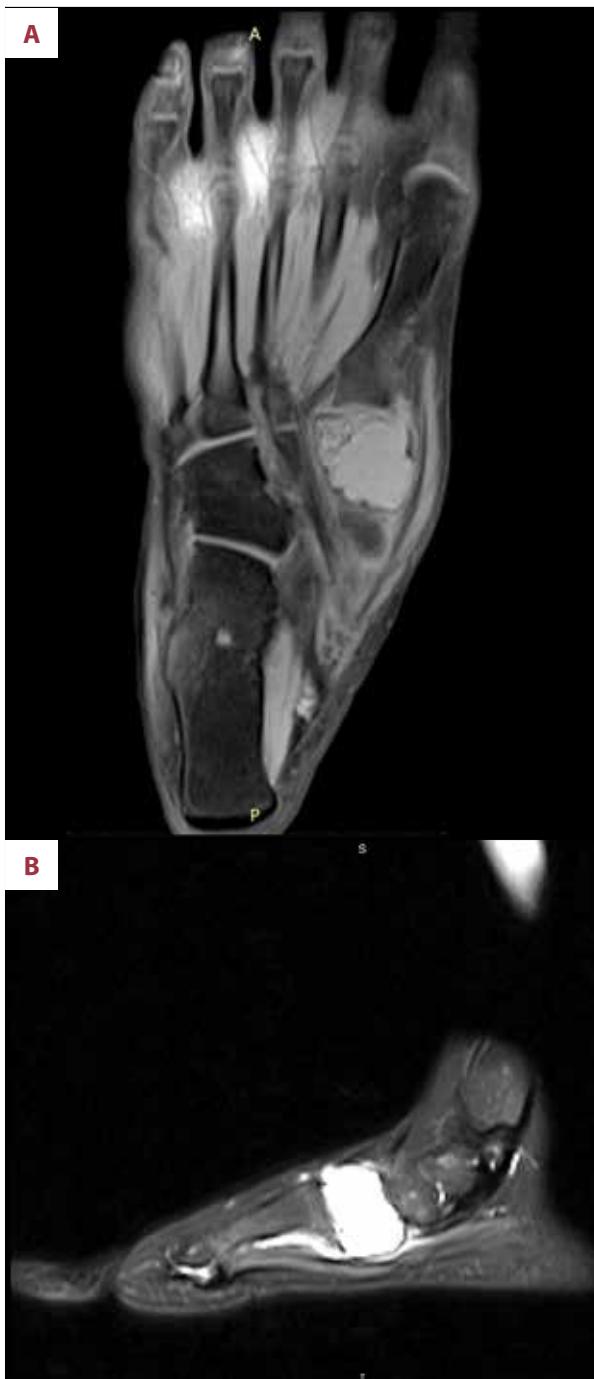


Figure 2. (A) Magnetic resonance imaging. T1-weighted image with the lesion appearing hypointense. (B) Magnetic resonance imaging. T2-weighted image with the lesion appearing hyperintense.

Discussion

Although chondroblastomas are typically identified in adolescents and young adults, with 80% of the affected patients being 10–20 years old, the presented 32-year-old woman in this

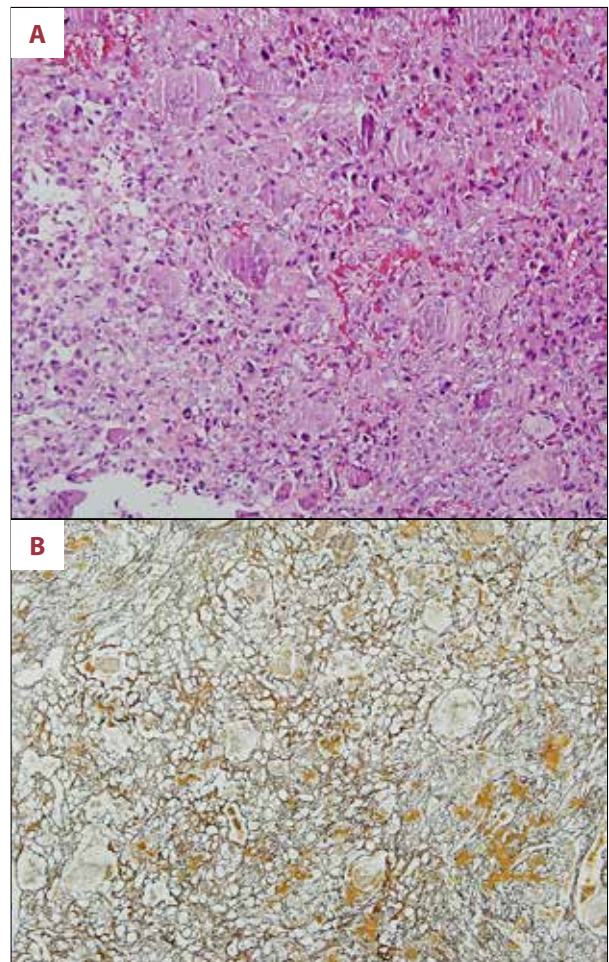


Figure 3. (A) Microscopic examination of the lesion. Hematoxylin-eosin stained tissue showing sheets of cells with oval to elongated nuclei on a background of chondroid matrix ($\times 200$). (B) Microscopic examination of the lesion. Reticulin stain ($\times 200$).

case is over the upper age limit, with an atypical localization of the tumor. Most patients complain of localized pain on contact or motion, and the lesion typically develops in the epiphysis of a long bone. The tumor is typically located adjacent to the growth plate, with the majority extending into the metaphysis. Calcification, present in approximately 60% of the lesions, has an intercellular distribution and often has a “chicken wire” or “picket fence” appearance [8]. The tumor is composed of cellular and matrix-rich areas, with the cellular component comprised of round or polygonal chondroblasts and oval or round nuclei in an eosinophilic cytoplasm.

Although a high percentage of chondroblastomas are diagnosed with the above-described radiographic and histopathologic features, it would very likely be excluded from the differential diagnosis in this case due to its atypical localization and the patient’s age. Fink et al. reviewed 322 cases of chondroblastoma



Figure 4. 18-month follow-up radiograph with complete filling and osteointegration of the defect.

and reported that only 42 involved the foot. They also noted that, in the foot, chondroblastoma was common, especially in the posterior, subchondral areas of the talus, calcaneus, and calcaneal apophysis [9]. Zhang et al. presented a case report with chondroblastoma of the talus and concluded that 4% of all chondroblastomas arise from the talus [10]. Similar results were found in a retrospective review of 82 cases of benign pedal bone tumors at Memorial Sloan-Kettering Hospital (New York, NY, USA) where Bakotic and Huvos indicated that chondroblastomas in the medial cuneiform bone is a very unique localization of the tumor [11].

Although methods such as curettage alone, endoscopic curettage, endoscopic curettage with cementation, curettage with fat implantation, resection with allograft replacement, marginal resection radiofrequency ablation, and osteochondral autograft transfer have also been used with some success, we preferred curettage and electrocauterization without compromising the thin cortex, followed by injectable synthetic bone substitute (Cementek LV, France) to fill the defect and autologous PRP to enhance healing [12]. The allograft we used is a phosphocalcic bone substitute and is known to be

a biocompatible, resorbable, osteoconductive agent and had the advantage to be easily applied via a syringe from our biopsy window. In this case we did not prefer to use polymethyl methacrylate (PMMA) bone cement, since during the exothermic free-radical polymerization process, the cement heats up and this polymerization heat reaches temperatures of around 82–86°C in the body. This high temperature is superior to the critical level for the protein denaturation in the PRP, whereas the polymerization process for phosphocalcic bone substitute produces a temperature only half that of PMMA.

Growth factors and antiinflammatory cytokines in PRP are known to accelerate bone and soft tissue regeneration without any risk of transmissible diseases in selected cases. In orthopedic oncology, PRP has recently gained popularity, especially in benign lesions such as simple bone cysts either with allografts or autografts, and in maxillofacial surgery for the treatment of mandible tumors. Researchers have concluded that PRP enhances the treatment of bone cysts in children, with no resulting complications, and this method combined with allogenic bone grafts appears as a promising method for the treatment of benign solitary bone tumors [13,14]. It has also been concluded that PRP application in maxillofacial tumors is a safe, biocompatible, and effective method to enhance bone graft uptake [15]. Although PRP application with allografts or autografts has been demonstrated with favorable results in particular bone tumors, it has not yet been used for the treatment of a benign chondroid tumor. Besides the potential to accelerate bone healing and graft uptake, combination of PRP with a synthetic bone substitute also has the advantage of decreasing harvest site morbidity and recurrence rates.

Conclusions

Although chondroblastomas are benign cartilaginous lesions of long bones, usually developing from the epiphysial region, an expansile, thin, sclerotic lesion detected at tarsal bones even after 20 years of age should create clinical suspicion. When occurring juxtaposed to articular cartilage, treatment should be directed at removal of the tumor with preservation of the articular cartilage. A meticulous curettage from a small window with removal of the lesion followed by injectable phosphocalcic cement application combined with PRP can be considered as a safe and curative treatment method for chondroblastomas revealing atypical characteristics.

Conflict of interest

No funds were received in support of this study. No benefits in any form have been or will be received from a commercial party related directly or indirectly to the subject of this manuscript. The authors declare that they have no conflicts of interest.

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