Chondroblastoma of the Talus. Case Report and Literature Review

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ABSTRACT

Chondroblastoma (CB) is a rare benign bone tumor that represents between 1% to 2% of all primary bone tumors. Because only about 4% of them are located in the talus, the literature is scarce. We present the case of an 18-year-old male patient who presented with a chondroblastoma located in the right talus. He had an uneventful recovery, with no complications at his last follow-up at 15 months. We also reviewed the published literature to discuss the diagnosis and treatment of chondroblastoma in the talus.

Key words: Chondroblastoma; talus; surgical treatment.
Level of Evidence: IV

Condroblastoma de astrágalo. Reporte de un caso y revisión de la bibliografía

RESUMEN

El condroblastoma es un tumor óseo benigno infrecuente que representa el 1-2% de todos los tumores óseos primarios. Como aproximadamente solo el 4% se localiza en el astrágalo, la bibliografía es escasa. Se presenta a un varón de 18 años con un condroblastoma localizado en el astrágalo derecho. El paciente tuvo una buena evolución, sin complicaciones a los 15 meses de la cirugía. Revisamos los casos ya publicados para analizar la forma de presentación y la evolución luego del tratamiento quirúrgico.

Palabras clave: Condroblastoma; astrágalo; cirugía.
Nivel de Evidencia: IV

INTRODUCTION

Chondroblastoma is a rare benign bone tumor that accounts for 1% of all primary bone tumors.[1-4] The peak incidence occurs in the second decade of life, with a male:female ratio varying between 5:1 and 2:1. This tumor is locally aggressive and, in more than 80% of cases, is located in long bones, such as the femur, tibia or humerus. Chondroblastoma is usually visualized as a characteristic radiological image with eccentric radiolucency, a well-defined sclerotic margin, and intralesional calcifications. Most of these lesions are confined to the affected epiphysis or process, but some may pass through the physis to also involve the adjacent metaphysis.[5-7]

Chondroblastoma often affects flat bones, the short tubular bones of the hand, and rarely the bones of the foot.[1-8] Although the talus is the most frequent location in the foot, there are very few published cases. When it appears in this location, the image is usually less typical, which makes diagnosis difficult. We report the case of a patient with chondroblastoma located in the right talus bone. We reviewed the published cases to analyze the form of presentation and the evolution after surgical treatment. The patient and his parents were informed that the data related to the case would be sent for publication and they gave their consent.

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CLINICAL CASE

An 18-year-old male, with no pathological history, consulted for left ankle pain in the Emergency Department. The patient reported a history of untreated first-degree sprain that had taken place two months before the consultation. Initially, he had been treated with physical therapy, without a favorable response, so he was referred to the specialist's office. When evaluated in the Foot Department, he reported pain of 6/10 on the visual analog scale. On physical examination, lateral ankle pain was detected (anterior tibiofibular ligament ++/+++, calcaneofibular ligament +/+++, stable to stress maneuvers). The radiograph showed a posteromedial lytic lesion of the talus, without cortical fracture. Non-contrast magnetic resonance imaging and computed tomography revealed a polycystic formation of partially sclerotic edges of 17 x 17 x 19 mm, with superior and inferior cortical thinning of the talus without evident fracture, some incomplete septa and no calcifications (Figure 1).

Due to the benign characteristics of the lesion, we decided to perform an intralesional resection through a medial approach (Figure 2).

A dark, friable gray material was obtained and sent to pathological anatomy and the defect was filled with bone substitute (hydroxyapatite + 30% tricalcium beta-phosphate) and autologous bone marrow.

The pathological report indicated that the material corresponded to a chondroblastoma. The postoperative protocol used was four weeks with immobilization without weight-bearing and four weeks with partial weight-bearing. The patient began physical therapy at the second postoperative week and impact activities were restricted for up to six months. Radiographic and tomographic controls at three months showed good integration without graft resorption. In the last control at 15 months after surgery, the patient had no symptoms, no pain when performing activities of daily living, and the score on the visual analog scale was 0/10 (Figure 3).

DISCUSSION

The term chondroblastoma was first described by Ewing in 1928 as a calcified giant cell tumor, and then by Codman in 1931,[6] as an epiphyseal giant cell tumor of the proximal extremity of the humerus. However, it was not until 1942 that Jaffe and Lichtenstein[7] defined it as chondroblastoma. Although it has been known for decades, published articles, in general, are scarce and talar involvement is even more limited. From 1960 to date, only four papers have been published with small samples and few case reports of chondroblastoma of the talus (Table).[1,2,8-19]

This injury mainly affects male patients during the second decade of life.[1,7,20] Chondroblastomas located in the foot usually occur in older age groups with an average of 25 years,[21] which differs from our patient who was 18 years old. Most chondroblastomas are located in the epiphysis of long bones (femur, tibia, and humerus).[10-22] Chondroblastomas located in the talus account for only about 4%, although they are one of the main benign tumors in this location.[23] Clinically, patients usually present with moderate pain and a limited range of motion. Anatomically, the most frequent location is in the posterior region of the body,[1] at the subchondral level with cortical reaction in most cases.[10-13] In radiographic images, a well-defined lytic lesion is usually observed in the epiphysis, with cortical reaction.[13,14] In magnetic resonance imaging, the axial plane in the PD Fat Sat sequence is where the fluid-fluid levels of this type of tumor can best be observed. Differential diagnoses include aneurysmal bone cyst, giant cell tumor of bone, chondromyxoid fibroma, and clear cell chondrosarcoma.[15] Giant cell bone tumor has a bone distribution similar to that of chondroblastoma, but usually occurs in older patients. Histologically, these tumors do not present calcifications and have clustered and elongated cells. If the histological features do not confirm a diagnosis, an S100 stain may be performed that will be positive for chondroblastoma. Clear cell chondrosarcoma differs in that it shows higher degrees of calcification and stains positively for type II collagen. Chondromyxoid fibroma usually has a different distribution, with a greater preference for the metadiaphysis of long bones.[21]

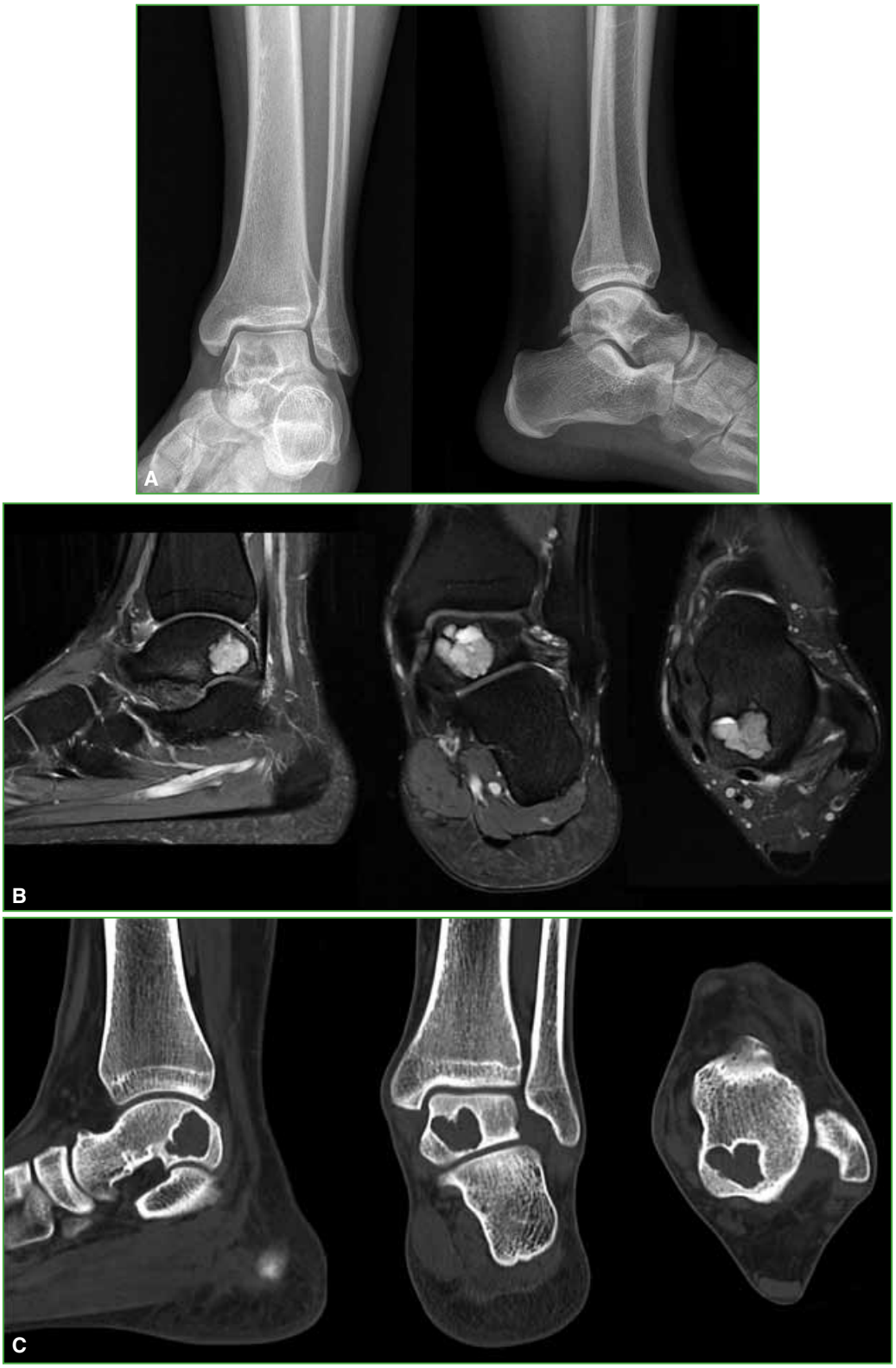

Figure 1. **A.** Anteroposterior and lateral foot radiographs. **B.** CT scan of the foot, sagittal, coronal, and axial planes. The posterior and subchondral location of the lesion is observed with medial cortical thinning. **C.** Magnetic resonance imaging of the foot, sagittal, coronal and axial planes, T2 sequence. The absence of soft tissue involvement is confirmed.

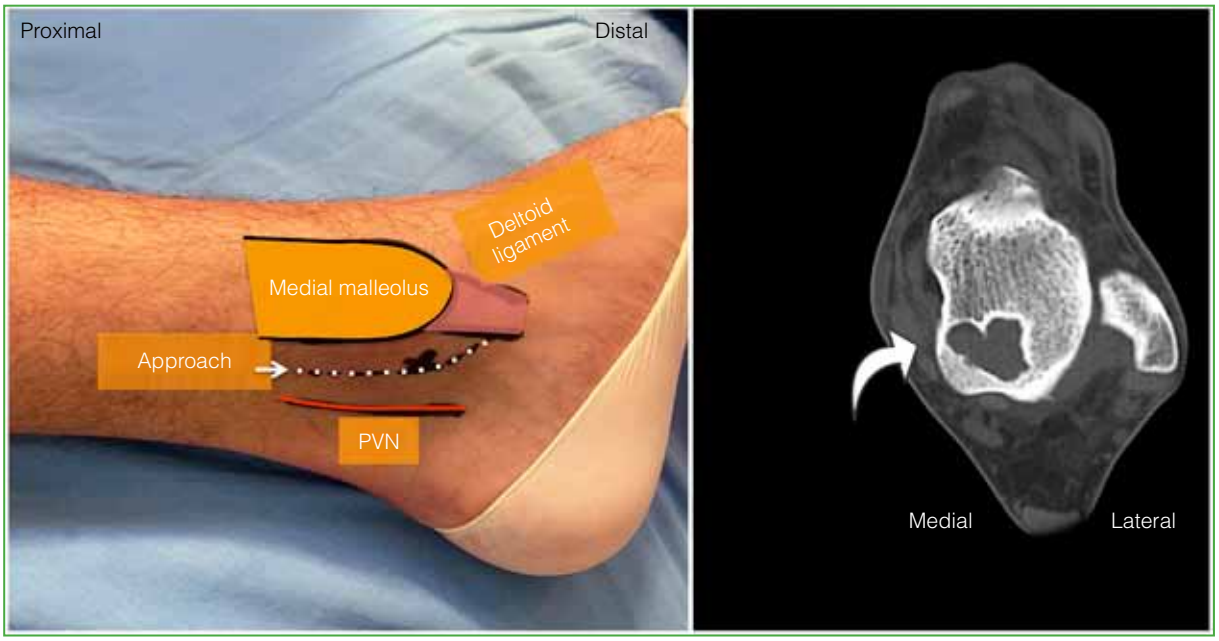

Figure 2. Medial approach.

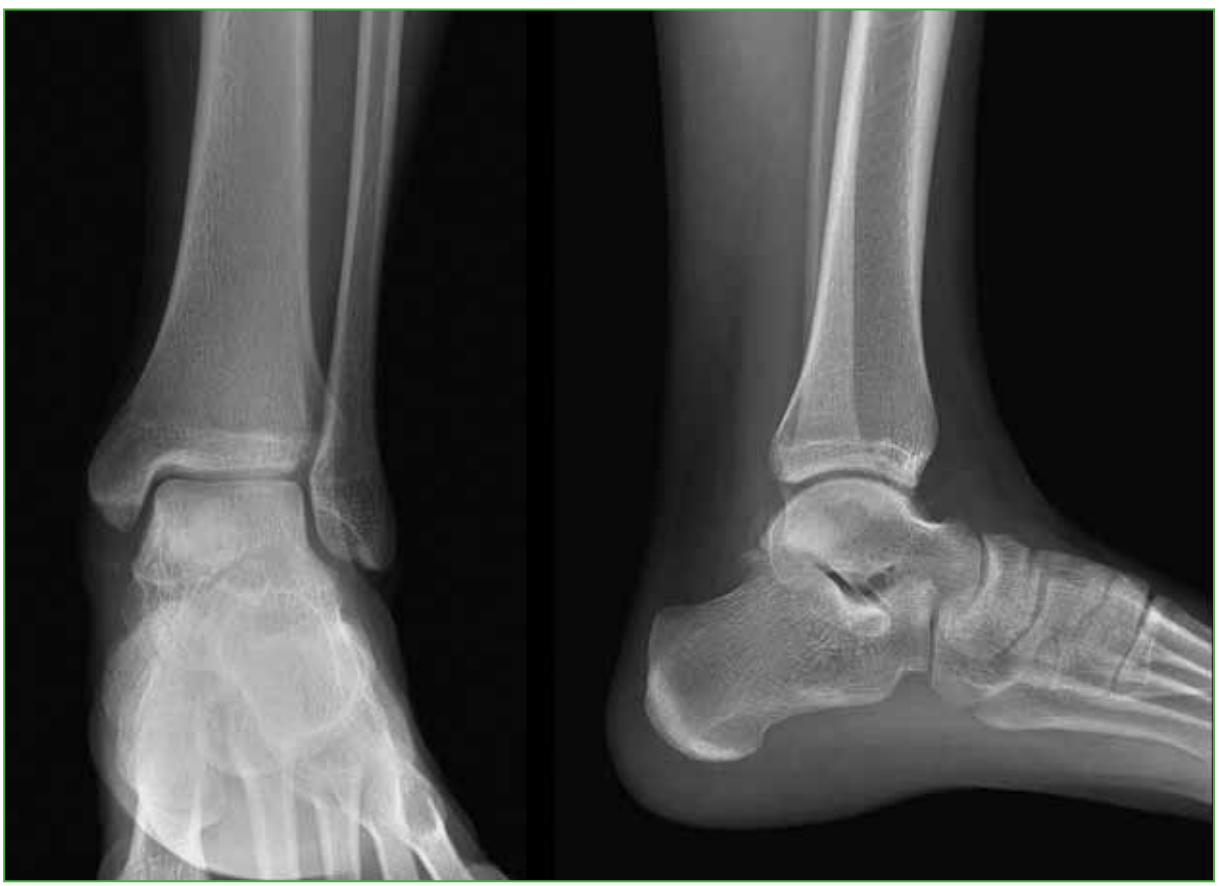

Figure 3. Anteroposterior and lateral foot radiographs 15 months after surgery.

Table. Published articles on chondroblastoma of the talus.

Author	Year	n	Age	Sex	Associated injuries	Treatment	Recurrence
Ochsner et al.[24]	1988	1	5	M	No	Curettage + grafting	No
Xu et al.[19]	1996	1	18	M	No	Curettage + grafting	No
Fink et al.[8]	1997	20	25.5	NR	NR	NR	NR
Sterling and Wilson[9]	2002	1	NR	NR	No	Curettage + grafting	No
Anderson and Ramsey[10]	2003	1	NR	NR	No	Curettage + grafting	No
Davila et al.[11]	2004	8	24-27	M	ABC	NR	NR
Atalar et al.[12]	2007	1	23	F	No	Curettage + grafting	No
Zhang et al.[13]	2012	1	22	M	No	Curettage + grafting	No
Ningegowda et al.[14]	2013	1	13	M	No	Curettage + grafting	No
Sun et al.[15]	2015	1	NR	NR	ABC	Curettage + grafting	NR
Munoz and Heldt[16]	2016	1	27	M	NR	En bloc resection	No
Angelini et al.[1]	2017	20	25	4:1 M:F	ABC (2)	Curettage + grafting	No
Angelini et al.[2]	2017	5	NR	NR	No	Curettage + grafting	No
Outani et al.[17]	2020	2	NR	NR	No	Curettage + grafting	No

M = male, F = female, NR = not reported, ABC = aneurysmal bone cyst.

Radiofrequency ablation has been proposed as an alternative to surgical treatment in very selected cases.[22] However, its use in extensive injuries, weight-bearing joints, and those that are close to the articular cartilage is discouraged, as there is a risk of joint collapse and recurrence. Surgery is the primary and definitive treatment of choice. While most chondroblastomas of the talus are located in the posterior region, there is no published evidence on the best approach. Anderson and Ramsey,[10] and Zhang et al.[13] used the anterolateral approach with a window on the neck of the talus, while Sterling and Wilson,[9] and Xu et al.[19] used the lateral approach by the tarsal sinus. Although some are technically more demanding, such as the posterior approach, being a tumor with a subchondral location and with periosteal reaction in most cases, we believe that the choice should be the most direct to the lesion where the most weakened cortical is located to avoid violating healthy cortical bone and unaffected bone tissue. In our patient, we initially proposed a posteromedial approach, but when analyzing the axial sections of the computed tomography, we understood that the medial wall was the weakest, so we considered that a medial approach of the talus was the most appropriate for this patient. Although it is technically more difficult than the posterior approach, it allowed us to access the injury more directly, avoiding injuring healthy tissue.

Intralesional curettage (with or without adjuvant with phenol or another agent) and autograft or allograft filling achieve very good outcomes, with a recurrence rate ranging from 10% to 15%.[1,22] About 15-32% may be associated with a secondary aneurysmal bone cyst.[20,23] Angelini et al.[1] mentioned that the rate of recurrence in the foot would be lower than in other locations; however, there are no studies that correlate the location and the rate of recurrence. Other authors argue that recurrence would be related to both the aggressiveness of the tumor and inadequate resection.[23] Although no recurrences have been recorded in the 64 cases that have been published, recurrence could be treated with the same principles as other locations: repeating curettage or with en bloc resection and reconstruction.

CONCLUSIONS

Chondroblastoma is a rare benign tumor that is rarely located in the talus. Intralesional curettage and filling allowed, in this case, to eliminate the tumor and obtain a good functional outcome. The literature review suggests that the evolution would be more favorable in this location, with a lower rate of recurrence.

Conflict of interests: The authors declare they do not have any conflict of interests.

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