International Journal of Research in Orthopaedics
Nishani M et al. Int J Res Orthop. 2024 May;10(3):700-703
http://www.ijoro.org

DOI: https://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20241127

Case Report

Chondroblastoma of the anterior process of calcaneus: a case report

Manjunath Nishani[1], Tarkik Thami[1]*, Tarvinder Singh[2], Siddhartha Singh[3]

[1]Department of Orthopedics, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India
[2]Department of Radio-diagnosis, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India
[3]Department of Orthopedics, Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS), Lucknow, Uttar Pradesh, India

Received: 17 March 2024
Accepted: 08 April 2024

***Correspondence:**
Dr. Tarkik Thami,
E-mail: thamitarkik@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Chondroblastoma of the calcaneus is a fairly uncommon tumour. Despite being a benign and indolent lesion, chondroblastoma of the calcaneus can lead to functional limitations, due to its location in such a weight-bearing bone. This report presents a rare case of chondroblastoma affecting the anterior process of the calcaneus, which was successfully treated with extended curettage and synthetic bone graft substitute, resulting in favourable functional outcomes at 13 months post-surgery. This case underscores the importance of timely recognition and appropriate management of this uncommon tumour to achieve optimal patient outcomes.

Keywords: Chondroblastoma, Calcaneus, Anterior process, Extended curettage

INTRODUCTION

Chondroblastoma is a rare neoplasm, which typically occurs in patients in the age group of 10-25 years, with a 2:1 male pre-dominance.[1] This tumour is characterized by the abnormal growth of chondroblasts. While chondroblastomas can occur in various bones, their occurrence in the calcaneus is infrequent, comprising only a small percentage of all bone tumours.[2] Despite its benign nature, chondroblastoma of the calcaneus can cause pain, swelling, and functional impairment, particularly due to its location in such a weight-bearing bone.[2,3] The incidence of this tumor in the foot ranges from 3-23% with reports of occurrence in the navicular, medial cuneiform, cuboid, metatarsals and phalanges.[2]

We would like to report a rare case of a Chondroblastoma of the anterior process of calcaneus which was treated with extended curettage and synthetic bone grafting resulting in good functional outcome at 13 months post-surgery.

CASE REPORT

A 19 year old male presented to our outpatient department with the chief complaints of chronic pain and swelling in the right foot since four months. There was no prior history of trauma or infection. His pain was aggravated on prolonged walking and standing, gradually increasing in severity over the preceding 1 month. On inspection, there was a diffuse swelling over lateral aspect of the hind foot, with localised tenderness near the calcaneo-cuboid joint line on palpation. He had a normal range of motion at the ankle joint but painful inversion and eversion at the subtalar joint.

Investigations

Our patient was subjected to lateral and axial radiographs of the foot and ankle. X-rays (Figure 1), CT scan (Figure 2) and MRI (Figure 3) of the foot were done before proceeding for a core needle biopsy. Histopathology

confirmed that the lesion was a chondroblastoma. We recommmended an extended curretage of the lesion after a detailed discussion with the patient. A written informed consent was obtained from the patient, who also consented to publication of the surgical procedure.

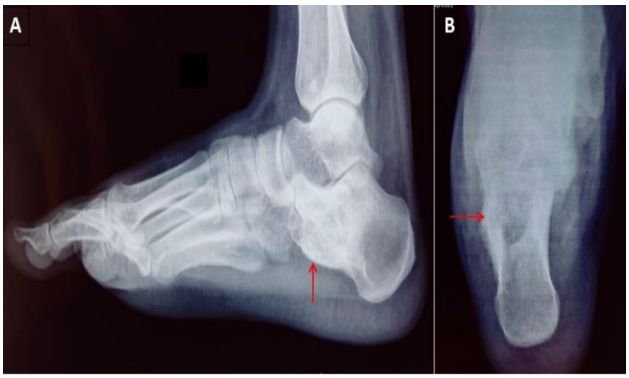

Figure 1 (A and B): Lateral view showing lytic lesion with sclerosis in the anterior process of calcaneus and axial view.

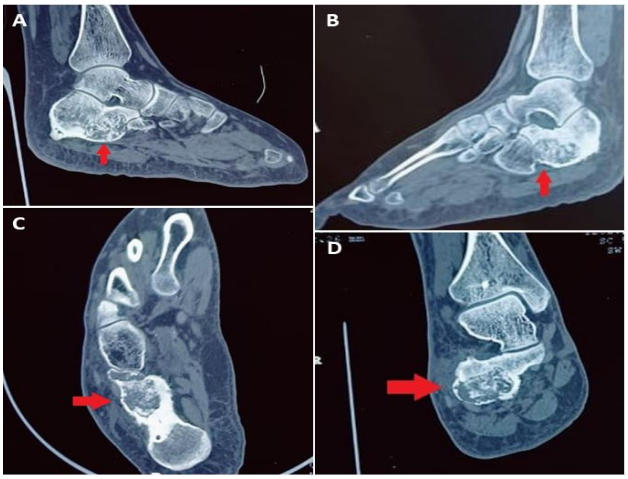

Figure 2 (A-D): Sagittal sections depicting the lesion in the anterior process of calcaneus; axial section showing the extent of lytic lesion and coronal sections.

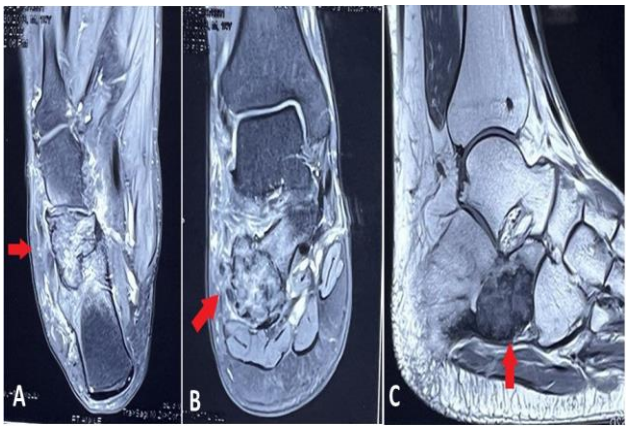

Figure 3 (A-C): Axial, coronal and sagittal sections of the MRI (lesion marked by an arrow).

Intra-operative details

The procedure was performed in a lateral position following induction of regional anesthesia. A pneumatic tourniquet was used but the leg wasn't exsanguinated prior to inflation. A standard extensile lateral approach was used followed by raising full thickness flaps to avoid wound complications. K wires were placed in the lateral malleolus, cuboid and talus and bent to aid in retraction of soft tissue flaps. The lesion was identified through an intra-operative radiograph. Multiple drill holes were created around the lesion (with a 2.5 mm drill bit) to make a 2×2 cm cortical window to facilitate adequate curettage. Curettage was done using a high speed burr along with 5% phenol (used as an adjuvant).

Synthetic bone graft substitute (a combination of calcium hydroxyapatite and beta-tricalcium phosphate) was used to fill the defect, after extended curettage. Intra-operative images (Figure 4) were obtained post curettage. Post operatively, the patient was kept on the partial weight bearing protocol for four to six weeks, followed by full weight bearing. Serial post-operative radiographs were obtained to confirm the incorporation of synthetic bone graft and radiographic healing of the defect.

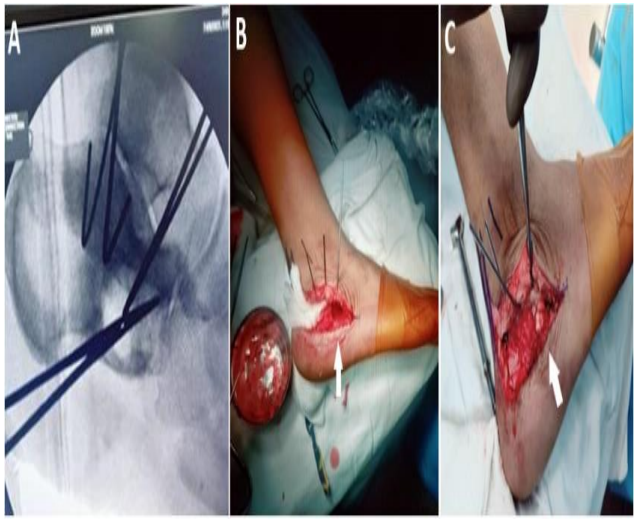

Figure 4 (A-C): Intra-operative radiograph depicting the lesion in the anterior process of calcaneus; bone defect post curettage (arrow) and defect filled with synthetic bone graft (arrow) and covered by the gel foam.

Outcome and follow-up

Our patient was satisfied with a limp free gait at 13-months follow up post-surgery and was able to bear full weight on the affected limb without any discomfort.

He had a near normal range of motion at ankle and subtalar joints. There was no roentgenographic evidence of residual disease (Figure 5). There were no signs of tumor recurrence during our entire follow-up.

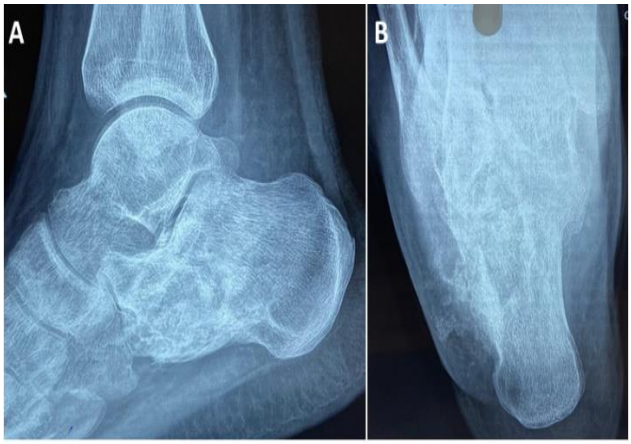

Figure 5 (A and B): Lateral and axial radiographs of calcaneus depicting radiographic healing of the lesion with no evidence of osteolysis.

DISCUSSION

Chondroblastoma is a rare tumor representing less than 1-2% of all primary bone tumors.[1] The anterior process of calcaneus is a rare site for occurrence of chondroblastomas since it is not an apophyseal location. Patients usually present with symptoms of lateral sided pain at the junction of mid-foot and hind-foot. Long standing symptoms may cause a pathological fracture of calcaneus, which should be suspected when patients present with sudden exacerbation of pain in the background of long standing symptoms.[3] It needs to be highlighted that occurrence of a osteolytic lesion in any weight bearing bone of the body warrants a comprehensive evaluation in the form of focused radiographs, a computerized tomography (CT) scan and a MRI scan to plan a biopsy of the lesion. Timely diagnosis and management are key to prevention of occurrence of a fracture due to weakened cortical bone strength.

An MRI is necessary to rule out other differential diagnoses like giant cell tumor (osteoclastoma), osteoblastoma, Chondromyxoid Fibroma, and Eosinophilic granuloma.[2,4] Chondroblastomas usually project a low-intermediate signal on MRI with a fine lobulated well defined margin on both T_1 and T_2 weighted images. Contrast enhanced MRI is required to highlight internal loculations and septations.[5,6]

Symptomatic patients usually require surgical intervention in the form of curettage (preferably with an adjuvant). A 7-35% rate of recurrence has been reported in literature, with a higher risk in cases when a simple curettage is done without the use of adjuvants.[3] Commonly used adjuvants are high speed burr, cryotherapy (with liquid nitrogen) or local lavage with diluted 5% phenol.[7,8] The concomitant use of two adjuvants (like in our case) further decreases the risk of recurrence.[8]

Synthetic bone graft substitutes like calcium hydroxyapatite, tri-calcium phosphate and/or calcium sulphate can be used safely in such cases to fill the defect post curettage.[9] These bone graft substitutes help in avoiding the use of autologous bone graft and hence aid in prevention of graft donor site morbidity in such patients. The use of synthetic graft substitutes also helps in preventing other donor site complications such as lateral femoral cutaneous nerve injury (during iliac crest graft harvest).[10]

We would like to emphasize that it is crucial to make a timely diagnosis to avoid a pathological fracture since it is crucial weight bearing bone of the foot. The key radiographic features (which can be picked up easily) include a well-defined spherical or ovoid shaped osteolytic lesion in the calcaneus which may or may not be surrounded by a sclerotic rim, located eccentrically around the epiphysis or apophysis of the bone.[4]

CONCLUSION

In conclusion, chondroblastoma of the calcaneus is indeed a rare tumour, presenting unique challenges in diagnosis and management. Despite its rarity, early recognition and appropriate treatment are crucial for optimal patient outcomes. Surgical excision remains the cornerstone of treatment, often supplemented with adjuvant therapies as necessary. Long-term follow-up is essential due to the potential for recurrence and complications. Further research and collaboration among clinicians and researchers are warranted to enhance our understanding of this rare entity and to refine treatment strategies for improved patient care.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Park YK. Chondroblastoma. In: Santini-Araujo E, Kalil R, Bertoni F, Park YK. (eds) Tumors and Tumor-Like Lesions of Bone. Springer, London. 2015.
2. Angelini A, Arguedas F, Varela A, Ruggieri P. Chondroblastoma of the Foot: 40 Cases from a Single Institution. J Foot Ankle Surg. 2018;57(6):1105-9.
3. Dutt L, Schade VL, Manoso MW. Calcaneal chondroblastoma with pathologic fracture and recurrence. J Foot Ankle Surg. 2015;54(2):258-67.
4. Fink BR, Temple HT, Chiricosta FM, Mizel MS, Murphey MD. Chondroblastoma of the foot. Foot Ankle Int. 1997;18(4):236-42.
5. Azouz EM. Magnetic resonance imaging of benign bone lesions: cysts and tumors. Top Magn Reson Imaging. 2002;13(4):219-29.
6. Oxtoby JW, Davies AM. MRI characteristics of chondroblastoma. Clin Radiol. 1996;51(1):22-6.
7. Quint U, Muller RT, Muller G. Characteristics of phenol: instillation in intralesional tumor excision of chondroblastoma, osteoclastoma and enchondroma. Arch Orthop Trauma Surg. 1998;117(1-2):43-6.

8. Wang Y, Tian Q, Wu C, Li H, Li J, Feng Y. Management of the Cavity After Removal of Giant Cell Tumor of the Bone. Front Surg. 2021;8:626272.
9. Wu PK, Chen CF, Chen CM, Tsai SW, Cheng YC, Chang MC, et al Grafting for bone defects after curettage of benign bone tumor - Analysis of factors influencing the bone healing. J Chin Med Assoc. 2018;81(7):643-8.
10. Tonk G, Yadav PK, Agarwal S, Jamoh K. Donor site morbidity in autologous bone grafting-A comparison between different techniques of anterior iliac crest bone harvesting: A prospective study. J Orthop, Trauma Rehabilitation. 2022;29(1):340-3.

Cite this article as: Nishani M, Thami T, Singh T, Singh S. Chondroblastoma of the anterior process of calcaneus: a case report. Int J Res Orthop 2024;10:700-3.