International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

A Rare Case of Enchondroma Mimicking Giant Cell Tumor in the Metatarsal Bone: Diagnostic and Therapeutic Challenges

Dr. Deepak Kumar Sonkar[1], Dr. Sariput Gajbhare[2], Dr. Dishant Singla[3], Dr. Siddheshwar Andhale[4]

[1]Senior Resident, Government Medical College, Gondia)
Mobile number: 7206418909

[2, 3, 4]Senior Resident, Indra Gandhi Government Medical College and Hospital, Nagpur

Abstract: ***This case study presents a 14yearold female with a rare instance of enchondroma in the metatarsal bone, initially masquerading as a giant cell tumor based on clinical and radiological findings. Through histopathological examination, the lesion was accurately diagnosed as an enchondroma. The case emphasizes the importance of considering differential diagnoses in bone lesions and highlights the surgical management undertaken to ensure a favorable outcome.***

Keywords: Enchondroma, Giant Cell Tumor, Metatarsal Bone, Histopathology, Differential Diagnosis

1. Introduction

Enchondroma, a subclass of Chondroma, is one of the most common benign osseous lesions of chondroid derivation; i.e. consists primarily of lobules of hyaline cartilage which occurs within the medulla of the bone. It tends to occur in young adults, usually affecting the appendicular skeleton, and is mostly found as an incidental finding. Benign bone tumors on the lower extremities have an incidence of less than 37% of the cases and more specifically between 1–5% when on foot [1,2].

This paper will specifically address the benign ones, which can be subdivided into osteomas, osteochondromas, osteoblastomas, osteoid osteomas, aneurysmal bone cysts, fibrous dysplasia, giant cell tumors, and enchondromas. Each one of them has specific characteristics and requires different treatments and prognoses [3].

A giant cell tumor (GCT) of bone, also called osteoclastoma, is a locally aggressive, usually benign, osteolytic neoplasm primarily affecting skeletally mature young adults. While the most common location for an enchondroma is in the small bones of the hand and feet, a GCT is most commonly found in the knee region as it arises from epiphysis of the distal femur or proximal tibia in over 50% of cases and less commonly seen in small hand and feet bones, craniofacial bones, sacrum, etc. These two identities have distinct clinical presentation, radiological and histopathological features, their co-existence is extremely rare.
Different types of benign bone tumors are described in the literature, finding the following incidence: osteochondroma 30%, osteoblastoma 14%, osteoid osteoma 12%, aneurysmal bone cyst 9.1%, fibrous dysplasia 5–7%, giant cell tumor 20% and enchondroma 2.6% [3].

Herein, we report an unusual presentation of a solitary bony lesion in the head of the 2nd metatarsal region appearing as GCT radiologically but was found to be enchondroma on histopathological examination, which to the best of our knowledge has not been previously reported, and this initially presented as a painless swelling over the dorsal aspect of the foot.

2. Case Report

A 14-year-old female, student by occupation, reported to our center with a chief complaint of swelling over the dorsal aspect right foot for the past 6 months which was insidious in onset and gradually progressive and not associated with any pain. There was no history of trauma associated with the swelling. There was no history of any other similar osseous or non-osseous swelling elsewhere in the body, no other constitutional symptoms or comorbidities were stated.

On inspection, there was a solitary localized swelling measuring approximately 3x2 cm near the base of the 1st web space region. The overlying skin was normal with no scars or sinuses.

On palpation, the swelling was firm in consistency, slightly tender, and immobile with a smooth surface and well-defined edges. Movements of the great toe, 2nd and 3rd phalanges were restricted.

3. Investigation

In this paper, we will discuss specifically the enchondromas, since this was the histopathological diagnosis the patient received.

Enchondromas are very rare benign tumors; only 2.6%of all benign tumors are enchondromas and they are usually asymptomatic. They are found in all age groups but mostly occur in the 2nd and 4th decades. The majority of lesions occur on small bones of the hand and feet and enchondromas indeed the most common bone neoplasm.
The average size is about 3cm and they are in most cases benign; in the rare case that enchondromas are found to be bigger than 5cm, we should consider low-grade malignancy. (4)

All the routine blood work like complete blood count, serum calcium levels, erythrocyte sedimentation rate, C-reactive protein level, alkaline phosphatase levels, coagulation profile, etc., were within normal limits.
Radiographs (AP and oblique views of right foot) showed an ovoid, intramedullary, concentric, expansile, and lytic lesion in the metaphyseal region of the 2nd metacarpal. Cortical thinning of the affected area could be appreciated. The lesion had well-defined boundaries, and no evidence of a calcified matrix or periosteal reaction was seen.

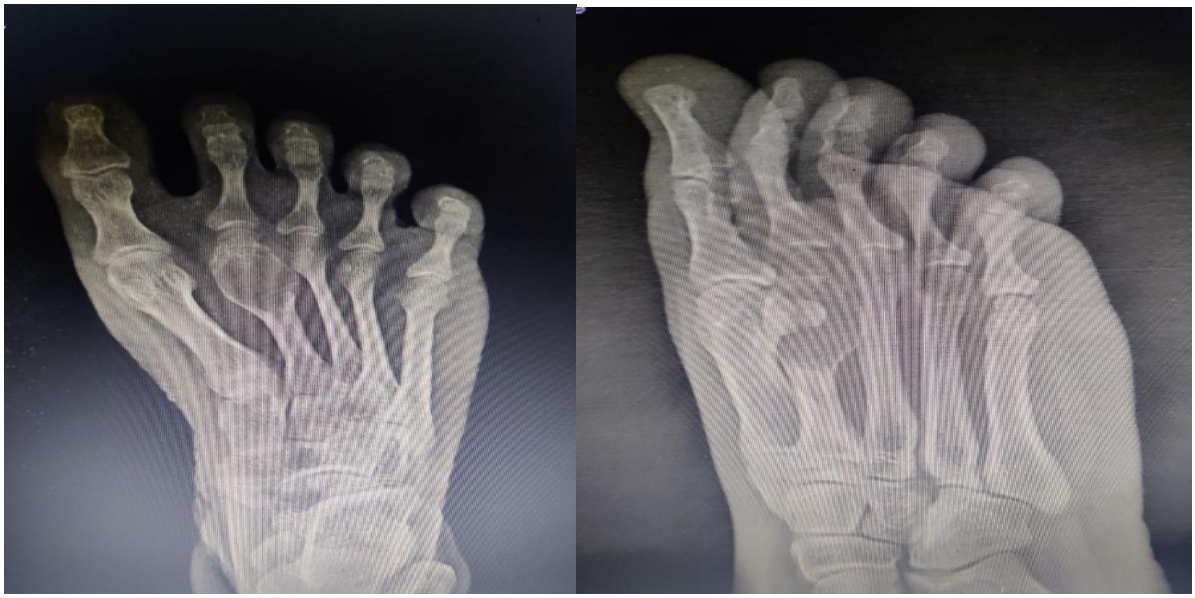


Figure 1: Anteroior-Posterior and Oblique x ray of foot

Differential diagnosis must include all bone tumors; however, the most important differentiation has to be made between enchondroma and chondrosarcoma, given that the latter is malignant. According to Vanel et al., enchondromas are composed of "islands of intramedullary hyaline cartilage surrounded by marrow fat, and a chondrosarcoma, a diffuse cartilaginous replacement (invasion) of the marrow which leads to complete 'trapping' of host lamellar bone trabeculae"; he proposes that the marrow around the cartilage should be visible in a Magnetic Resonance Image (MRI). In his study we can find that in some cases this is true; however, not enough to make it a gold standard and not enough to take the risk of not performing surgery to obtain a histopathological diagnosis [7].

4. Treatment

The patient and her parents were counseled about the condition and after doing all the necessary paperwork and obtaining proper consent, the patient was posted for marginal resection surgery.

Under tourniquet control, a longitudinal incision was taken over the lesion and it was removed along with its capsule.

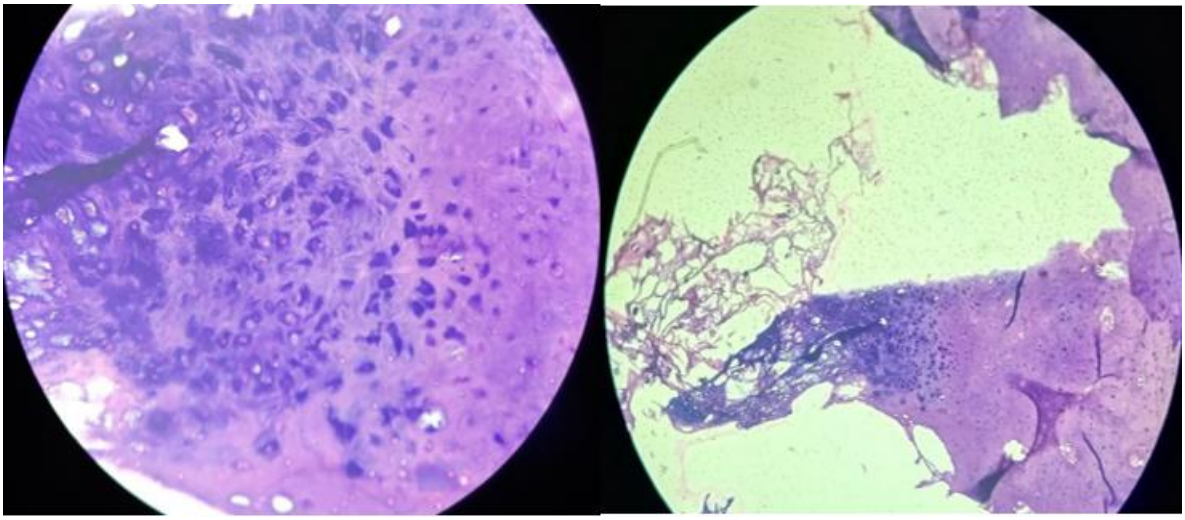
An iliac crest cortico-cancellous bone graft was harvested as a bone strut and fixed over the bone defect with the help of 2 k-wires placed in a crossed manner from the metatarsal head to the base. The K-wires were buried in the soft tissues and skin closure was done. The phalanges and ankles were immobilized with a below-knee slab.

Macroscopically, it was a mass of spongy bone approximately 2.5x2x1cm, firm to hard in consistency, congested, and bluegray in color.

The sample was sent for Histopathological examination:

Microscopy- Lobules of hyaline cartilage separated by fibrovascular septae, foci of myxoid degeneration, and focal areas of hemorrhage.

Histologic features are benign cartilage forming Tumour- Chondroma.



5. Follow Up

The patient was followed up after 2 weeks, 4 weeks, and 6 weeks and further on. An adequate follow-up is fundamental to achieve the best prognosis; in this case, the patient had the below knee slab for 6 weeks, on every follow-up, x-ray studies were used to verify the absence of the tumor or any other tumor in this site. No pathological signs were found in these x-rays and rehabilitation started after 6 weeks after rehabilitation the patient was able to walk normally without assistance.

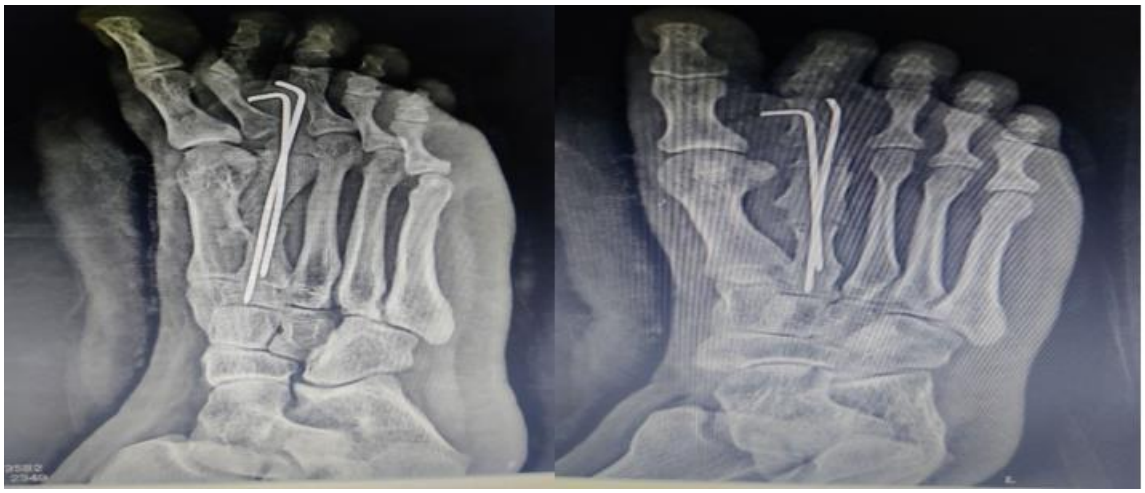


Figure 2: Immediate post of x-ray foot

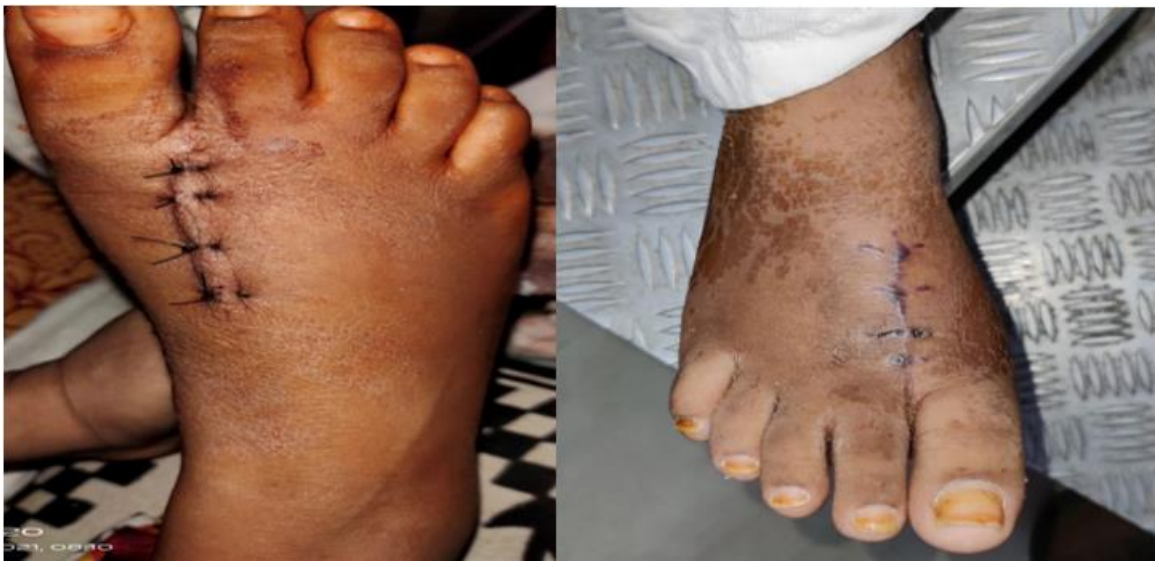


Figure 3: Clinical photos

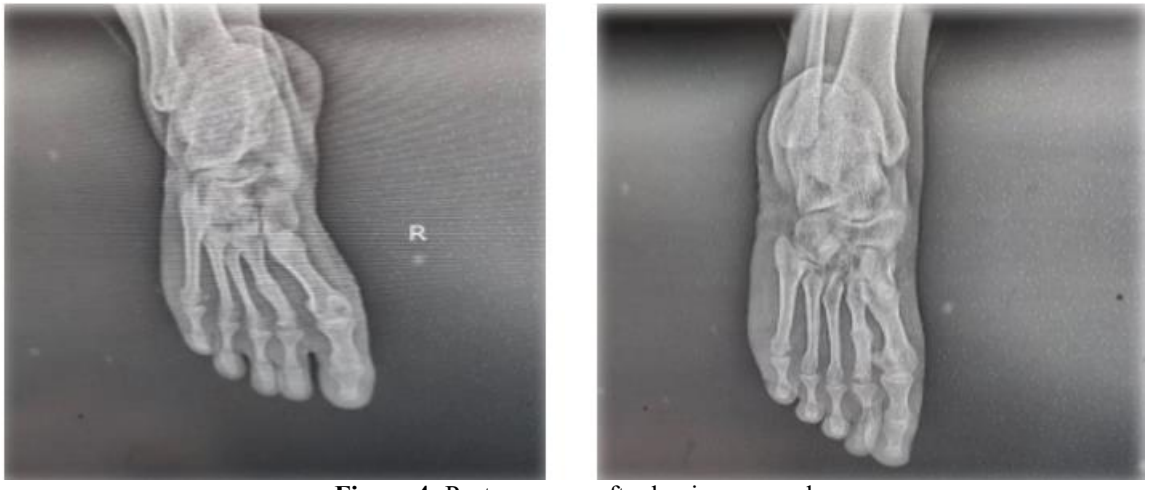


Figure 4: Post-op x-ray after k wire removal

6. Discussion

Chondromas are benign lesions of hyaline cartilage that usually arise in the medullary canal where they are referred to as enchondromas. Although they can be found in any bone in the body, the phalanges of the hand and feet are the most common. These are mostly asymptomatic and come to attention in 3rd and 4th decades of life as an incidental finding. There is no sex predilection.

Multiple enchondromas (enchondromatosis) are often termed Ollier disease or Maffucci syndrome if associated with soft tissue hemangiomas. These tumors are believed to arise from physical rests of cartilage that become trapped in the metaphysics of growing bone. Rather than becoming mature bone, the trapped chondrocytes retain their chondroid features and form a nidus of growing cartilage within the bone. However, the growth of this trapped cartilage is arrested around the age of fusion of bony physics. Radiographs demonstrate a well-demarcated lucent lesion typically centrally located in the diaphysis, less commonly metaphysis, of the involved bone.

Enchondroma centered in the epiphysis is an uncommon presentation, representing 2-5% of cases. The contour of the lesion is usually lobular. It is associated with endosteal scalloping and calcified matrix with typical 'arcs and rings' or 'pebble' appearance. Periosteal reaction, cortical destruction, and soft tissue extension are unusual findings.

CT and MRI (7) imaging can be done to delineate the mineralized matrix and marrow replacement, respectively. The microscopic appearance of an enchondroma is that of a mature hyaline cartilage. It usually appears bland and hypocellular. Marrow containing hematopoietic elements may be identified between the lobules. Encasement of the lamellar bone around the lesion may also be seen in certain cases.

Treatment of patients with solitary enchondromas usually consists of observation with serial radiographs.

Surgical treatment is not always necessary. Curettage and packing with bone graft is the typical method of surgical excision when required. Enbloc resection is another surgical option available for treatment. Recurrence is rare following this mode of therapy. Rarely amputation of a digit is required.

Complications associated with enchondromas majorly consist of pathological fractures and transformation to sarcoma (4). Pathological fracture has been reported in over 30% of cases and is a common reason for enchondroma to come to attention.

Transformation to a sarcoma, usually chondrosarcoma, is less seen with the solitary lesion, the incidence being 3-5%. However, the risk increases with multiple enchondromatosis conditions as explained above to 5-30%.

Herget et al. have performed a literature review about enchondromas, enchondromatosis, and the risk of secondary chondrosarcoma; in this review, they mention that the enchondroma is usually found incidentally since in many cases it is completely asymptomatic. They also found that most of these hyaline cartilage-forming tumors are found in the diaphysis of long bones and, in many cases, they are found as a single lesion, also known as a solitary enchondroma [5].

As we said before, the most common place to find an enchondroma is on the diaphysis of long bones, but concerning the exact location of the tumor, a study made by Potter et al., found that the proximal part of the humerus is the most common place for single enchondromas to be found, appearing in 30% of the 33 patients studied, followed by the distal part of the femur 18%, the proximal part of the femur 15%, and the proximal part of the tibia 12% [8]

In conclusion, this case highlights a rare presentation of enchondroma mimicking a giant cell tumor in the metatarsal bone. Accurate diagnosis through histopathological examination and appropriate surgical management resulted in a positive outcome. This case serves as a reminder of the importance of thorough differential diagnosis in rare bone lesions.

References

[1] Lindfors Nina C., Koski Ilona, Heikkilä Jouni T., Mattila Kimmo, Aho Allan J. A prospective randomized 14-year follow-up study of bioactive glass and autogenous bone as bone graft substitutes in benign

bone tumors. *J. Biomed. Mater. Res.* 2010; **94B** (1) [PubMed] [Google Scholar]

[2] Ramos Pascua L.R., Sánchez Herráez S., Fernández Hernández Ó., Sladaña Díaz A. Tumores óseos del pie. *Rev. Del Pie Tobillo.* 2011; **XXV** (1):6–18. [Google Scholar]

[3] Hakim David N., Pelly Theo, Kulendran Myutan, Caris Jochem A. Benign tumors of the bone: a review. *J. Bone Oncol.* 2015; **4**:37–41. [PMC free article] [PubMed] [Google Scholar

[4] Kakrala Subbaro, Benign cartilage lesion, J.Med.Sci.Res. 1(1) (2013) 29-36

[5] Herget G.W., Strohm P., Rottenburger C., Kontny U., Krauss T., Bohm J., Sudkamp N., Uhl M. Insights into Enchondroma, Enchondromatosis and the risk of secondary Chondrosarcoma. Review of the literature with an emphasis on clinical behavior, radiology, malignant transformation, and follow-up. *Neoplasma.* 2014;**61**(4):365–378. [PubMed] [Google Scholar]

[6] Vanel D., Kreshak J., Larousserie F., Alberghini M., Mirra J., De Paolis M., Picci P. Enchondroma vs. chondrosarcoma: a simple, easy-to-use, new magnetic resonance sign. *Eur. J. Radiol.* 2013;**82**(12):2154–2160. [PubMed] [Google Scholar]

[7] Sánchez-Torres L.J., Santos-Hernández M. El arte de diagnosticar tumores óseos. *Acta Ortopéd. Mex.* 2012;**26**(1):57–65. [PubMed] [Google Scholar]

[8] Potter Benjamin K., Freedman Brett A., Lehman Ronald A., Jr., Shawen Scott B., Kuklo Timothy R., Murphey Mark D. Solitary epiphyseal enchondromas. *J. Bone Jt. Surg.* 2005;**87**(A):1551–1560. [PubMed] [Google Scholar]