Case Report

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Orthopaedics Section

Giant Cell Tumour of the Metatarsal: A Rare Case Managed with Excision and Partial Amputation

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ABSTRACT

Giant Cell Tumour (GCT) of bone is a benign but locally aggressive tumour that usually affects the ends of long bones. Its occurrence in the small bones of the foot is uncommon, and involvement of the metatarsals is particularly rare. This is a case of a 45-year-old female who came with a gradually increasing swelling over the left foot for three years. On examination, the swelling was noted over the region of the first and second metatarsals. Radiographs showed a lytic expansile lesion, and further evaluation with ultrasonography and Fine Needle Aspiration Cytology (FNAC) suggested a GCT. MRI was performed to assess the extent of the lesion and involvement of surrounding structures. Considering the extent of disease, the patient underwent wide excision of the tumour with amputation of the first metatarsal and stabilisation of the second metatarsal under spinal anaesthesia. The diagnosis was confirmed on histopathological examination, supported by immunohistochemistry. Postoperatively, the patient recovered well, with the wound healing satisfactorily. She was started on physiotherapy and gradual weight-bearing, and showed good functional improvement on follow-up. GCTs at uncommon sites like the metatarsals can present late and may behave more aggressively. This case highlights the importance of timely diagnosis and appropriate surgical planning in achieving good outcomes. Reporting such rare presentations is useful in guiding management in similar clinical situations.

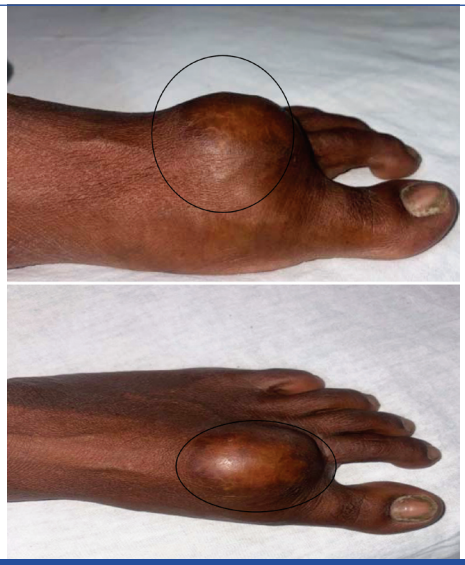
Keywords: Bone neoplasm, Foot tumour, Osteoclastoma

CASE REPORT

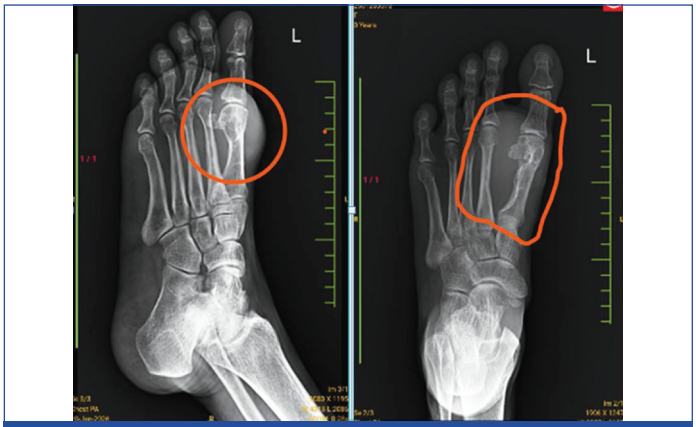
A 45-year-old female presented with complaints of pain and gradually increasing swelling over the left foot for the past three years. Initially, the pain was mild and occasional, but over time it became more persistent and bothersome. In the last few months, especially after a trivial fall, the pain increased in intensity and started interfering with her ability to walk and carry out routine activities. It was more pronounced on weight-bearing and relieved to some extent with rest and analgesics. There was no history of fever, weight loss, or similar complaints in the past. She had not received any definitive treatment earlier, apart from occasional pain medications. There was no significant past medical or surgical history.

On examination, a diffuse swelling was noted over the dorsum of the left foot in the region of the first and second metatarsals [Table/Fig-1]. The swelling was firm, mildly tender, and not associated with local warmth or skin changes. The margins were not well defined. Movement around the adjacent joints was slightly limited due to pain, but distal neurovascular status was intact. Based on the clinical findings, possible diagnoses considered included GCT, aneurysmal bone cyst, enchondroma, and chronic osteomyelitis.

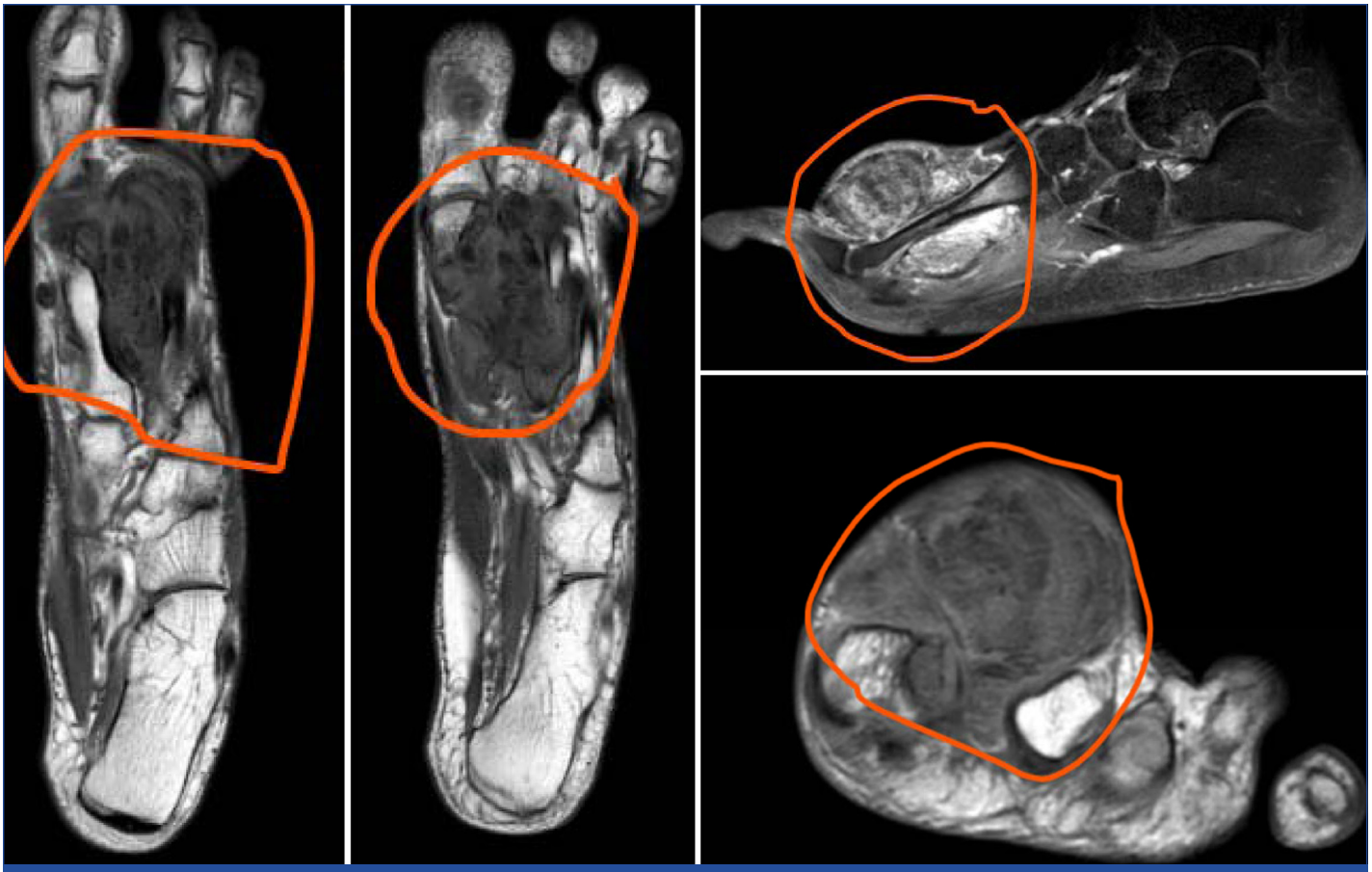
Plain radiographs showed an expansile lytic lesion involving the first metatarsal with thinning of the cortex and a pressure effect on the adjacent second metatarsal [Table/Fig-2]. Ultrasonography revealed a heteroechoic lesion with internal vascularity measuring approximately 5.8×2.5 cm in the first interdigital space [Table/Fig-3]. FNAC demonstrated numerous osteoclast-like giant cells in a background of mononuclear stromal cells, raising suspicion of a GCT. MRI further helped in defining the extent of the lesion, showing a lobulated mass involving the first web space and extending between the first and second metatarsals. The differential diagnosis for this apart from suspected GCT is aneurysmal bone cyst, enchondroma, chondroblastoma, osteomyelitis, brown tumour, metastasis, eosinophilic granuloma, and giant cell reparative granuloma. Taking all findings together, a diagnosis of GCT was made and surgical treatment was planned.



[Table/Fig-1]: Represents clinical image of the patient.



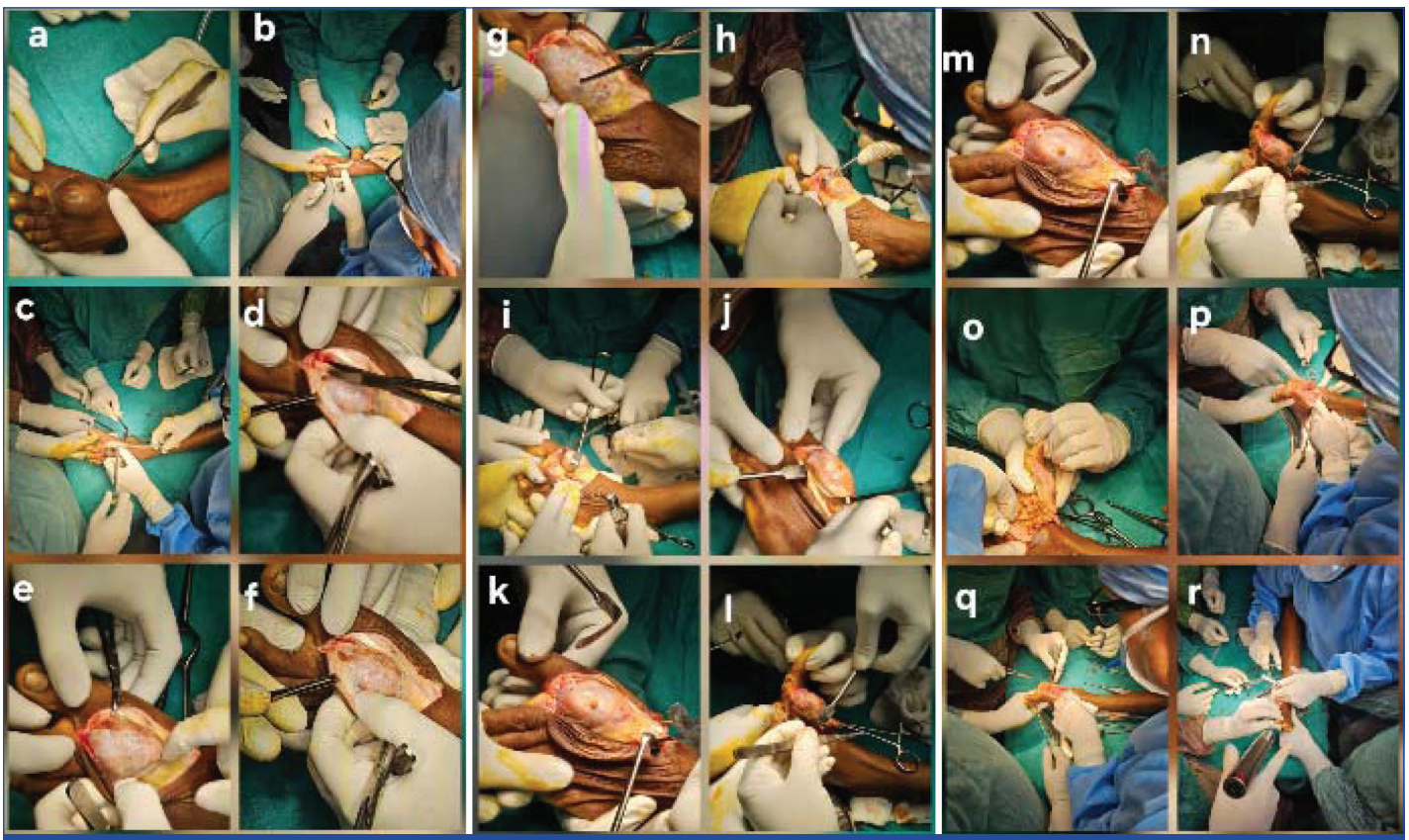
[Table/Fig-2]: Represents X-ray foot of the patient left-side.



[Table/Fig-3]: Represents MRI report and images of the aspiration from Giant Cell Tumour (GCT) left foot.

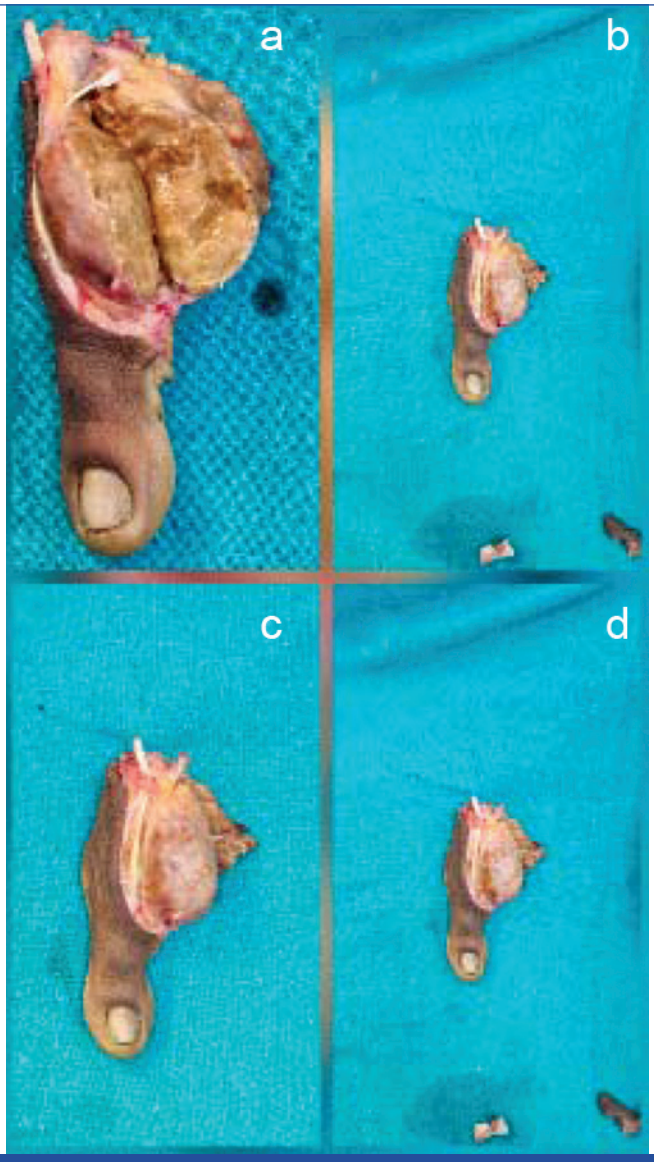
Under spinal anaesthesia, a dorsal approach was used. After making a longitudinal incision over the first web space, careful dissection was carried out to expose the lesion while safeguarding the surrounding structures. The tumour appeared expansile with areas of softening and necrosis. Considering the extent of involvement, wide excision along with amputation of the first metatarsal was performed. The tumour was resected up to base of first metatarsal and amputation was carried out [Table/Fig-4a-l]. The second metatarsal, which was subluxated due to pressure from the lesion, was reduced and stabilised using K-wire fixation.

The excised specimen consisted of the tumour along with the first metatarsal [Table/Fig-5]. The wound was closed in layers after achieving adequate haemostasis. Postoperative radiographs confirmed complete removal of the lesion and satisfactory

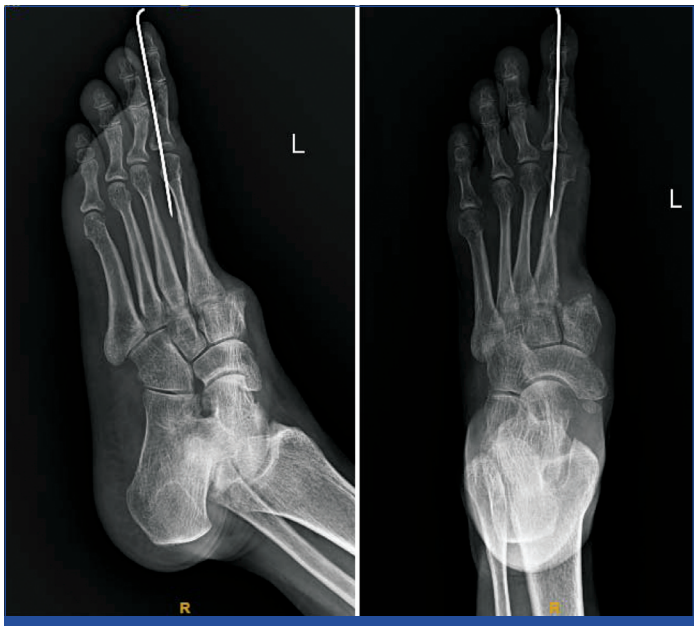


[Table/Fig-4]: Represents intraoperative images of wide excision Giant Cell Tumour (GCT).

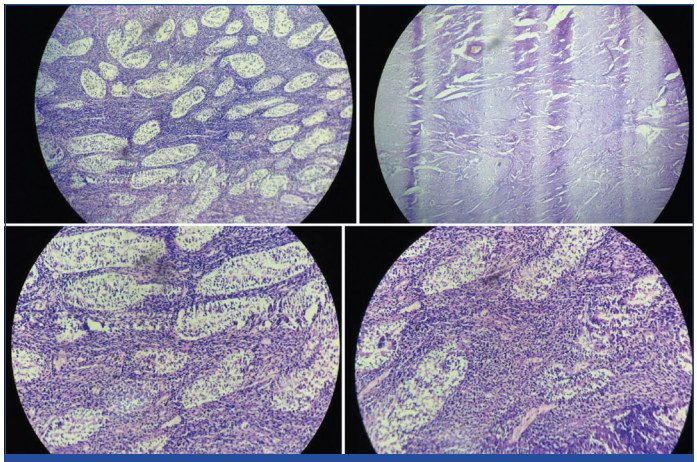
alignment with fixation of the second metatarsal [Table/Fig-6]. Immunohistochemistry findings supported the diagnosis of GCT. Histopathological examination showed sheets of mononuclear stromal cells interspersed with evenly distributed osteoclast-like multinucleated giant cells, consistent with a GCT [Table/Fig-7]. No malignant features were seen.



[Table/Fig-5]: Represents excised tumour with the first metatarsal left-side.



[Table/Fig-6]: Postoperative X-ray of the patient.



[Table/Fig-7]: Represent histology images with 10x magnification of Giant Cell Tumour (GCT) patient stained with haematoxylin and eosin.

The postoperative course was smooth. The patient was kept non-weight bearing initially and then gradually progressed to partial and full weight-bearing with support. Physiotherapy was started early to aid recovery. At six months follow-up, she was able to walk comfortably and had no clinical or radiological signs of recurrence.

DISCUSSION

The GCT of bone most commonly affects the epiphyses of long bones, and its occurrence in the foot is distinctly uncommon, accounting for less than 2% of cases [1]. Within the foot, involvement of the metatarsals is particularly rare [2-4]. However, when GCT arises in these small bones, it is often observed to behave more aggressively, with rapid progression and a tendency for cortical destruction and soft-tissue extension [5]. Because of its unusual location, diagnosis is frequently delayed. Patients usually present with vague complaints such as pain and swelling, which can easily be mistaken for minor trauma or inflammatory conditions. Radiographs typically reveal an expansile lytic lesion with cortical thinning or breach. MRI is especially useful in these cases, as it helps in assessing the true extent of the lesion, including any soft-tissue involvement, which is important for surgical planning [3,6]. Despite these imaging findings, histopathological confirmation remains essential for establishing the diagnosis [7,8].

Management of GCT in the metatarsals can be challenging. While intralesional curettage is commonly used for lesions in long bones, its role in small bones is limited due to a higher risk of recurrence [4,9]. The confined anatomy of the foot often makes it difficult to achieve adequate clearance with curettage alone. As a result, more definitive procedures such as wide excision or ray amputation are frequently considered, especially in aggressive or extensive lesions [3,4]. In terms of prognosis, GCTs in the foot are associated with relatively higher recurrence rates compared to those in conventional locations [5,9]. This is likely related to delayed presentation and the difficulty in achieving tumour-free margins. Nevertheless, with appropriate surgical intervention, good functional outcomes can still be achieved [8].

In the present case, the lesion involved the first metatarsal extensively and was causing pressure effects on the adjacent second metatarsal. Considering the extent of involvement and the known aggressive nature of GCT in small bones, wide excision with partial amputation was chosen. This approach allowed adequate tumour clearance while aiming to preserve as much function as possible [3,4]. Similar cases reported in the literature have also highlighted the aggressive nature of metatarsal GCTs and the limitations of curettage in such locations [2-4]. Many authors advocate wide excision or ray amputation to reduce recurrence, especially in cases with cortical breach or soft-tissue extension [5]. The management in our case is consistent with these recommendations, emphasising the importance of tailoring treatment based on tumour extent and location.

Recent advances include the use of denosumab, which targets the RANK/RANKL pathway and has shown promising results in selected cases, particularly in unresectable or recurrent tumours [10,11]. However, surgery continues to be the mainstay of treatment in most cases [12].

CONCLUSION(S)

The GCT involving the metatarsal is rare and can behave aggressively in the small bones of the foot. Early diagnosis with proper imaging and histopathological confirmation is important for planning appropriate treatment. In the present case, wide excision with partial amputation helped achieve good functional recovery without evidence of recurrence during the 6-month follow-up period. However, as recurrence in GCT can occur even after 2-3 years, longer follow-up is necessary for proper assessment and continued surveillance.

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