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Case Report

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Giant Cell Tumour with Two Lesions- Case Report

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Abstract:
Giant cell tumour (GCT) is one of the most common benign bone tumours, affecting the age group of 20 till 40 years. The epiphysis or metaphysis of long bones are most commonly affected. The author reports the case of a 15-year-old South East Asian who presented with pain and swelling in left distal tibia. Upon investigation and biopsy, a giant cell tumour with multiple lesions was identified in the left distal tibia which was successfully treated.
Keywords: multiple lesions; pain; swelling; tumour; distal tibia; benign

Introduction:

Giant cell tumor is one of the most common benign bone tumors, occurring in young adults ages 20–40 years [1]. GCT usually occurs at the epiphyses of long bones [2]. It has a significantly higher incidence among Asians compared with western populations [1]. Clinical symptoms are nonspecific and may include local pain, swelling [3]. The only curative treatment for GCTB is adequate surgery [2], options are: Intralesional Curettage, Intralesional Curettage and bone grafting, Intralesional Curettage and insertion of polymethylmethacrylate (PMMA), Primary resection, Radiation therapy, Embolization of the feeding vessels [2].

Case presentation:

A 15-year-old female, from Baluchistan, Pakistan presented with a 2-year history of pain and swelling at the left medial ankle which initiated after a history of trauma with ankle dislocation.

On general physical examination the patient was responsive but unable to walk without support and her movements were limited in left leg. Her vitals were BP: 116/63 mmHg, pulse: 74 beats per minute, respiratory rate: 20 breaths per minute, temperature: 96 Fahrenheit, O2 saturation: 98% at room air. Musculoskeletal examination revealed red oedematous swelling on the medial aspect of the left ankle. Central nervous system was intact with Glasgow Coma Scale 15/15. Examination of the abdomen and cardiovascular system did not reveal any abnormalities. There was no history of fever or weight loss.

Clinical investigation was non-significant (table 01). Upon radiological imaging

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X-ray *(image 1)* revealed a well-defined two expansile, eccentric, lucent lesions with internal septation in the radial epiphysis of left distal tibia, most likely neoplastic lesions. Mild soft tissue swelling was also seen. Normal joint space with no gross evidence of acute displaced fracture or dislocation. There was no significant family history of malignancy or neoplastic tumours.

HBsAg (immunochromatography	Negative
Anti HCV (immunochromatography)	Negative
Hb	12.3 gm/dL
HTC	39 %
MCV	84fL
Total WBC Count	8.1 x 10E9/L
Neutrophils	61%
Lymphocytes	32%
Monocytes	05%
Eosinophils	02%
Platelet Count	376 x 10E9/L

Table 01: Lab Investigation.

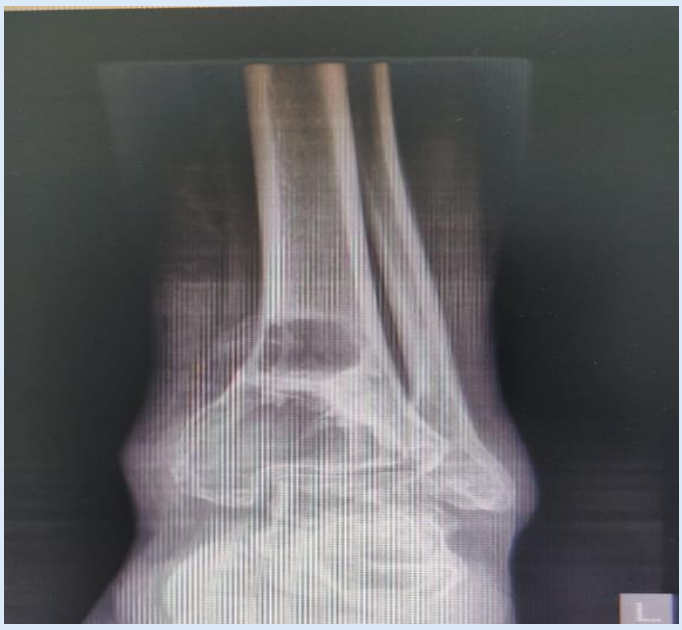

Image 01: Ankle Xray of 15-year-old female, AP/LAT(LT). revealed two well defined eccentric, expansile lucent lesions in radial epiphysis.

Based on the clinical and radiological findings a diagnosis of giant cell tumour was suspected. An incisional biopsy was performed and the histopathological examination showed multiple tan-white irregular soft tissue pieces that measures 7 x 7.5 x 2.5 cm in aggregate. Sections examined revealed bony trabeculae and connective tissue exhibits a lesion composed of scattered clusters of multinucleated osteoclastic giant cells. The surrounding background was haemorrhagic. Immunohistochemical stain H3G34W was positive. Upon confirmation of the diagnosis the patient was scheduled for surgical resection of the bone. Excision giant cell tumour with bone cementing and bone grafting were done under general anesthesia. Incision was given at distal tibia anteriorly. Tumour cavity was curetted and excised along with the necrotic tissue followed by another biopsy. Bone graft taken from the left iliac crest was grafted inside the hollow distal tibia along with bone cement followed by Dynacast short leg application. The patient showed satisfactory recovery and was advised for no weight bearing for 15 days and complete weight bearing without support after 60 days followed with physical therapy. Regular follow up visits were scheduled to monitor the patient's progress.

Discussion:

In 1818, Cooper and Travers published the first account of the giant cell tumour of the bone. Its potential for malignancy was highlighted by Virchow, while Nelaton emphasised on its local aggression [4].

Giant cell tumor (GCT), commonly occurring benign bone tumor in young adults (20–40 years), has a significant rate of recurrence and the potential to become aggressive [1]. Giant cell tumors of the bone usually affect skeletally mature people, highest in incidence in the third decade of life and have a pronounced female preponderance [5]. Although primary and recurrent giant cell tumors of the bone are typically benign, they can occasionally transform into malignant tumors. Giant cell bone tumors can develop malignancies that are either primary (near a benign giant cell bone tumor at the time of the initial diagnosis) or secondary (at the site of a giant cell bone tumor that has already undergone treatment) [6]. GCT are relatively common, accounting for 5% of all tumours, 20% of benign bone tumours, and 20% of all tumours [1]. In the Asian population, GCTs make up 18% of all non-hematogenous primary bone tumors, as reported in a recent study. The incidence of GCT in the immature skeleton is only mentioned in Western literature, and ranges from 1.8% to 10.6%. According to Schutte and Taconis, the epiphysis is never involved in tubular bones with open epiphyseal growth plates, and epiphyseal involvement increases with advancing age. The most frequent site, according to a study done in India, was near the knee, with 9 of the 17 lesions (or 53%) occurring in the lower end of the femur and the upper end of the tibia [5]. The average local recurrence rate is 33%, with a range of 20% to 50% [1].

They typically present as solitary lesions. The multicenter occurrence of a GCT is extremely rare, with only around 1-2% of cases described in the literature [7]. In our case, however, the patient presented with two well-defined expansile and eccentric lesions on her left medial ankle, revealed in X-ray imaging.

It frequently manifests in the long bone meta-epiphysis and typically affects the subchondral bone without impacting the articular surface. Larger tumours, however, can occasionally invade the metaphysis and, much less frequently, the diaphysis [8].

Histologically, the lesions appear cellular with a background network of mononuclear stromal cells, with multinucleated giant cells being the characteristic cell type. The cells may be spindle-shaped, oval-shaped, or plump with prominent mitotic activity, and rarely, cellular atypia [9]. Similarly, in our case, histopathological examination revealed a lesion primarily composed of scattered clusters of spindles to oval shaped, multinucleated osteoclastic giant cells with a hemorrhagic background but absent mitotic activity and cellular pleomorphism.
Imaging techniques like computed tomography (CT) scans and magnetic resonance imaging (MRI) may be essential to confirm the typical subchondral location of these lesions within the bone itself and the extent of a soft tissue mass, either beyond the bone cortex or through the nearby joint [1].

The differential diagnosis based on the radiographic findings can include; Lytic metastatic lesion (particularly a vascular metastasis from thyroid or renal cell carcinoma), Primary bone tumour, Brown tumour of hyperparathyroidism, non-ossifying fibroma, Aneurysmal bone cyst, Fibrous metaphyseal defects, Osteoblastoma, Chondroblastoma, Malignant fibrous histiocytoma, Telangiectatic osteosarcoma [1].

Despite being an uncommon, mostly benign tumour, it may act in an unexpected way regardless of the findings of radiological tests. Hence, results of the radiographic examination can assist in reaching differential diagnosis, they cannot be conclusive. The gold standard for diagnosis continues to be histological analysis [5].

According to Campanacci et al., GCTs can be classified into three grades based on their radiographic appearance: grade 1 lesions (latent) have an intact cortex and well-defined margins; grade 2 lesions (active) have a relatively well-defined margin without a radiopaque rim, with a thinned and moderately expanded cortex ; and grade 3 lesions (aggressive) have indistinct borders and cortical destruction. In a select number of patients

with Campanacci grade 3 lesions that have joint invasion, multiplanar soft tissue component, and when the tumour covers a large amount of subchondral bone, wide excision and reconstruction is the choice of treatment [10].

The main objective of the treatment and management of a GCT, in the paediatric age group, are local control, maintaining joint function and preserving the physis, although the increased likelihood of the tumour's recurrence is a primary concern as well [11].

There are several treatment modalities for giant cell tumours that have been described in the literature previously.

Amputations, wide resections, or reconstructions were once used to treat GCT. However, because GCT is a benign but regionally aggressive tumor, a local intralesional surgical approach is usually appropriate. The recommended treatments include curettage, curettage and bone grafting, curettage and polymethylmethacrylate (PMMA) insertion, and primary resection. For pelvic and sacral tumors that are inoperable, radiation therapy and feeding vessel embolization are used [1].

According to Schajowicz [12], when paired with adjuvant therapy, curettage, an inadequate oncological technique when used alone, has a more effective overall outcome than one-block excision, especially in terms of functioning. Some adjuvant therapies include, phenol, liquid nitrogen, or hydrogen peroxide and coagulation using argon beam, and each of these treatment modalities have their own advantages and disadvantages [13].

Despite the fact that they are rarely lethal, benign bone tumours may cause a significant disruption in the local bony architecture, which can be particularly problematic in peri-articular regions [13]. According to a study published by Hosseinzadeh S et al, giant cell tumours of the bone may be complicated with tumour recurrence, osteoarthritis of the knee joint, stress fracture, limited movement, pulmonary metastasis, local and deep infections, osteomyelitis, joint degeneration and hardware failure [1].

Conclusion:

Majority of the reported cases of GCT of the bone that have been documented in literature, present with solitary lesions. In our case, however, the 15-year-old presented with two lytic lesions on her distal tibia, which is a rare finding. Moreover, histopathological examination is the most crucial diagnostic tool for GCT of the bone, with prompt diagnosis and effective treatment leading to a positive result. Currently, the patient at 1-month follow-up is doing well and walking with support, comfortably without any pain. Her wound dressings are being changed at regular intervals and there are no signs of recurrences.

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