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***Case Report***

# GIANT CELL TUMOR OF LOWER END OF FEMUR IN A SKELETALLY IMMATURE-A RARE CASE

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## ABSTRACT
Giant cell tumor (GCT) is a benign locally aggressive tumor with a tendency for local recurrence. GCT of lower end of femur in a skeletally immature patient is of rare occurrence with very few cases reported so far. GCT in this location in skeletally immature patient is rare and should be considered in the differential diagnosis of a destructive bony lesion in both skeletally immature and mature patients. We report the rare case of GCT of lower end of right femur in a 10-year-old female and discuss the difficult aspects of diagnosis.

***Key Words:*** *Giant Cell Tumor, Destructive Bony Lesion, Skeletally Immature*

## INTRODUCTION
Giant cell tumor (GCT) is a benign tumor which, however, is locally aggressive and has a tendency for local recurrence. It usually occurs in young adult of 20-40 years in the epiphyseometaphyseal region, with a male preponderance. Nearly 85%-90% is found in long bones, of which 50% occurs around the knee joint (Schajowicz *et al.*, 1995).benign malignant tumour area frequently seen in third decade of life and pain is often felt over the lesion, (Hsu *et al.*, 2007)usual sites are distal radius proximal humerus and fibula.unni2has reported an incidence of 2% in the hand and 1.5% in foot.GCT of the hand and foot seems to represent a different lesion than conventional GCT in rest of the skeleton (Mohan *et al.*, 1980). It has higher incidence of multicentricity, appears in younger age, and has a shorter duration of symptoms, averaging 6 months or less before a diagnosis is made.

Radio graphically an expanding eccentric zone of lucency is seen in long bones, extending into articular cartilage, producing a geographic lytic lesion. Sclerosis is unusal, and periosteal new bone formation is rarely seen. Some giant cell tumours produce a large area of destruction. Metaphyseal location has been reported in rare cases, mostly in children .Radiographic feature of GCT other than long bones are nonspecific and are not like other osteolytic lesion

The diagnosis of GCT is frequently delayed as symptoms may primarily be attributed to vague clinical symptoms. MRI provides a more sensitive tool for evaluation of the nature and extent of tumour and may help in differentiating GCT from other tumour. Furthermore, histological examination is necessary for diagnosis, as clinical presentation and radiological image are not conclusive.

Histological finding consist of giant cells scattered uniformly throughout the lesion. They may contain 40-60 nuclei and show irregular border. Areas of infract like necrosis are common and there may be spindle cell reaction around the zone. The spindles cell may have storiform pattern .sometime only few foci with giant cell will be present. The nuclei of proliferating tumour cells are round to oval or spindle shaped. Mitoses are seen frequently in this lesion (Hsu *et al.*, 2007).

We present cases of a GCT of lower end of RT femur in a 10 years old girl and discussed the difficult aspect of diagnosing GCT in this unusual age group

## CASES
A 10year-old female presented with swelling over the front of the rt knee for12 months and pain for 5 months. The swelling was insidious in onset and had progressively increased in size. The pain was mild to

moderate in intensity, dull continuous, and relieved by taking medication and rest and aggravated by activity. There was no history of any constitutional symptoms and trauma. Based on the benign course of her clinical feature and x ray finding she was being treated as chronic osteomyelitis at another hospital but her pain fail to resolve; furthermore the swelling and pain kept on increasing gradually. She visited our institution after taking 3 month of antitubercular drugs.

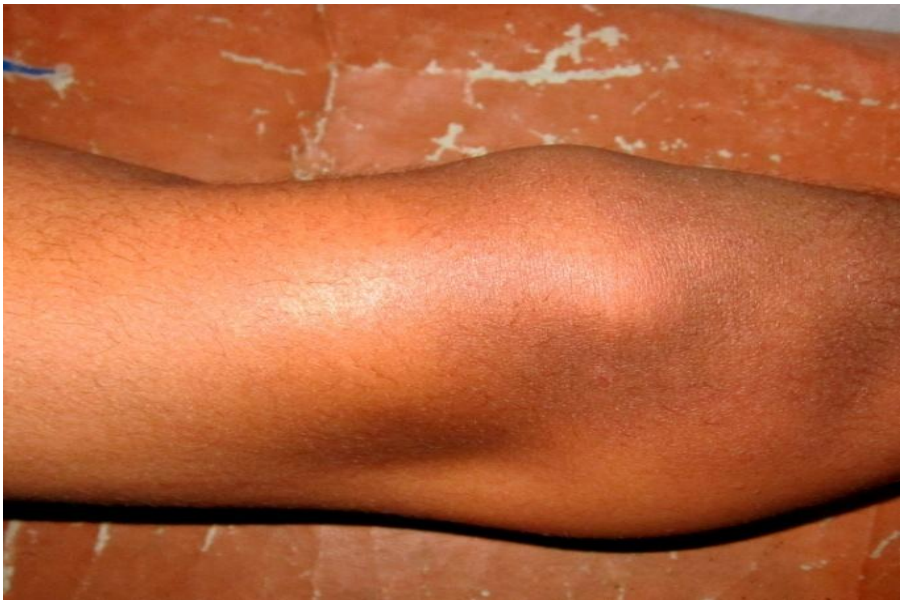

**Figure 1: Shows ovoid swelling on anterior aspect of rt femur with well defined margin, stretched overlying skin and without any sign of inflammation**

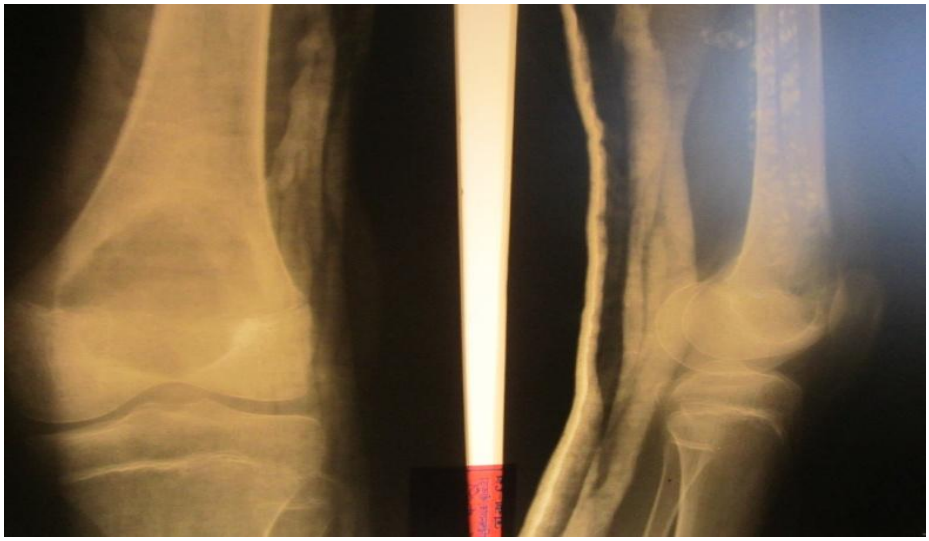

**Figure 2: Showing radiograph of knee revealed an expansile osteolytic lesion of lower end of rt femur. The classical soap bubble appearance was also clearly evident. The tumor had replaced the lower end of rt femur**

Examination revealed ovoid swelling on anterior aspect of rt femur with well defined margin, stretched overlying skin and without any sign of inflammation (fig. 1) the swelling was tender an d firm in consistency, and overlying skin was not tethered. X-ray revealed an expansile osteolytic lesion of the rt

lower end femur with trabeculation in the wall of the lesion (fig. 2) x-ray chest did not revealed any metastatic deposit. Laboratory investigation including complete blood count, blood urea nitrogen serum calcium and phosphate were within normal; limit. The fine needle aspiration cytology was consistent with diagnosis of giant cell tumour. Radiograph of the knee joint revealed an eccentric lytic lesion with a narrow zone of transition in the epiphysis of distal femur abutting articular surface without any surrounding sclerosis. The epiphyseal plate was open (fig. 2) the differentials considered were condroblastoma and aneurismal bone cyst. MRI revealed a well defined area of cortical destruction involving the epiphysis of distal end of femur associated with adjacent marrow oedema (fig. 3) for confirmation of diagnosis CT guided FNAC was performed using a 13 G cook biopsy gun. During biopsy haemorrhagic fluid was aspirated along with bits of tissue.

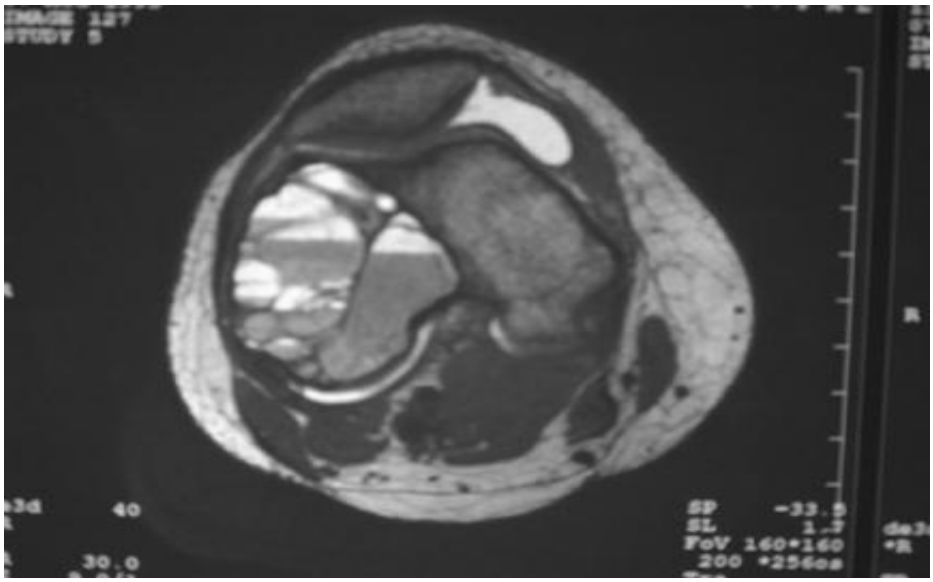

**Figure 3: Showing MRI revealed a well defined area of cortical destruction involving the epiphysis of distal end of femur associated with adjacent marrow oedema**

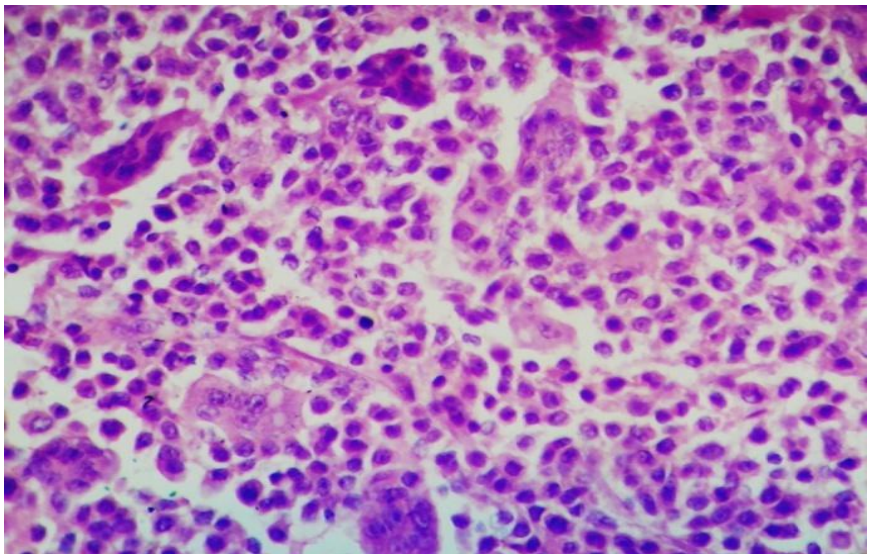

**Figure 4: Monomorphic distribution of osteoclastic giant cells in a background of blunt spindle to oval stromal cells. (H & E X 100)**

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Histopathology revealed scattered osteoclastic giant cell with a group of plump spindle cell containing oval vesicular nuclei in a background of basophilic material with a small area of haemorrhage. The histopathological finding was consistent with diagnosis of giant cell tumour (fig. 4) The nuclei of stromal cell are indistinguishable from those of the multinucleated giant cell a feature that can be helpful in distinguishing the GCT from other lesion in the pathological differential diagnosis.

**DISCUSSION**

The history of GCTs of the bone has been one of confusion. Clinical symptoms are non-specific and may include pain, local swelling and mild restriction of knee joint (50-65% of cases) the most common site is the distal femur (23-30%), followed by proximal tibia, distal radius sacrum and proximal humerus. Other less frequent site of involvement include the proximal femur, innominate bone, vertebral bodies, and the sesamoid bones particularly patella and apophysis (eg; greater trochanter) (Schajowicz *et al.*, 1995). In skeletally immature patient the tibia is the most commonly affected site [5]the distal femur are affected less frequently Radiologically, it appears as a solitary, eccentric, geographic lesion extending into the subchondral bone. In about half of the patients, there is a multiloculated appearance of the lesion secondarily to a prominent trabeculation (in fact, pseudotrabeculation due to a osseous sulcus created by endosteal erosion) (Hsu *et al.*, 2007). A GCT needs to be differentiated from other lytic lesions, such as tuberculosis, giant-cell reparative granuloma, aneurysmal bone cyst, Brown tumor of hyperparathyroidism and metastatic deposits. In the present case, the patient was misdiagnosed as a case of tuberculosis, based on benign course of her clinical features and X-ray findings. It is not uncommon to diagnose such lesion as infection, but the potential for misdiagnosis is more likely in atypical age groups (Baker *et al.*, 2009). However, absence of fever, anorexia, loss of weight and response to antitubercular treatment should raise a query on the diagnosis of tuberculosis. Aneurysmal bone cyst (ABC) is mostly seen in the second decade of life and may mimic GCT. Clinically, ABC presents as a firm, slowly enlarging mass in young patients, most commonly in adolescents (Ratner and Dorfman, 2007). The lesion is rarely present in patients above 30 years of age. The natural course of ABC involves continued local growth and destruction, although the tumor is not considered to be a premalignant lesion. Giant cell reparative granuloma is an uncommon, benign, intraosseous reactive lesion for which the radiological and histological features may overlap with GCT (Rosenberg and Nielsen, 2001). Giant cell reparative granuloma is most commonly seen in patients in their second decade of life and the metatarsus is the prime location for this lesion. Radiographically, giant cell reparative granuloma appears as an expansile lytic lesion with thinned out cortices. Cortical margins in a majority of cases remain intact, unless a pathological fracture occurs. Brown tumor typically involves the diaphysis of long bones. The radiographic and histological features of Brown tumor, GCT, ABC and giant cell reparative granuloma are often indistinguishable. However, Brown tumours were recently reported to have a much more lobulated architectural growth pattern in comparison to GCT and giant cell reparative granuloma. Hyperparathyroidism can be ruled out on the basis of normal serum calcium, phosphorus, and parathyroid hormone levels Treatment modalities for GCT of the foot comprise curettage, curettage and bone grafting, irradiation, amputation, and resection with reconstruction. Local resection of the affected metatarsal with auto graft or allograft replacement is the preferred surgical treatment. In conclusion, this case is presented to emphasize the fact that although the foot is an infrequent site for GCT, the possibility should be kept in mind. Early diagnosis is difficult because of the rarity of the lesion in this location and overlap in clinical presentation. All expansile lytic lesions on radiographs should be supplemented essentially with FNAC or needle biopsy for establishing the diagnosis, as improper diagnosis and treatment may delay and minimize the chances of a salvage procedur.

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