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Case report of giant cell tumor of proximal tibia-managed in a rural tertiary care hospital

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Abstract
Giant cell tumour is seen in 4% of all bone tumours and it constitutes approximately 10% of all malignant bone tumours. Preponderance is greatest between the age groups of 20 to 55 years. It is more common in females than in males [1, 2]. Tumour is known to have high post excision recurrence rate & its activity ranges from borderline to malignant lesion. It is a locally aggressive destructive lesion. Since tumour has high recurrence rates after it is treated by combination of various modalities available to reduce the recurrence rates. Tumours treated with multiple modalities have proven to have a lower recurrence rate than those tumours treated with single modalities [3, 4]. Tumour arises from the epiphyses of long bones. Most common sites are proximal tibia, distal femur, and distal radius. Radiographically, these tumours are often seen as an expansile exophytic mass. Following the multiple treatment modality in the management of Giant cell tumours, this is one case scenario.

Keywords: giant cell, bone tumour, knee

Introduction
19 years old female presented with history of pain and swelling in left knee for 1 year. Patient had an incident of self- fall following which she incidentally noticed a swelling near the right knee. She went to the local doctor who requested for radiological investigations and was referred to our institute for further management. There was no history of trauma or fever. On examination there was a firm, tender well defined swelling arising from proximal tibia. There was no crepitus and knee range of movement was normal.
On X-ray eccentric epiphyseal expansile mass was seen in proximal aspect of left tibia (figure 1). There was no joint invasion seen on x ray. Chest X- ray of the patient was normal.
A CT scan was done, which revealed 4.4 x 6.8 x 5.2cm solitary, well-defined, expansile, osteolytic lesion, which was eccentrically noted in the epimetaphyseal region on lateral aspect of right proximal tibia with few thin internal bony septa with no periosteal reaction and adjacent soft tissue reaction. MRI revealed similar results with no breach in the cortex or involvement of the adjacent tissues. FNAC was done showed presence of giant cells. With clinical knowledge and radiological confirmation, a diagnosis of Giant Cell Tumour of the Right Proximal Tibia was made and treatment was planned accordingly. Routine pre-anaesthetic evaluation was uneventful patient was planned for treatment by excisional biopsy. Wide local excision, breakage of septations with a high speed burr followed by cortical and cancellous bone grafting and bone cement placement (figure 2, 3).
A 5 cm fibular graft was harvested from the ipsilateral fibula. Tumour was treated by excisional biopsy and curettage of the lesion.
Resulting cavity that was formed was filled by placement of the fibular graft superiorly along with cancellous graft from the iliac crest, the remainder of the cavity was packed with abgel and bone cement (poly methyl methacrylate) (figure 4, 5). The tumour sample was sent for histopathological examination. It was macroscopically found to consist of multiple grey-white to grey-brown friable soft tissue amounting to 30 cc.
Microscopy was consistent with the diagnosis of giant cell tumour. Mixture of mononuclear round to spindle shaped mononuclear cells and multinucleate osteoclast like giant cells were seen and were found to be consistent with Giant Cell Tumour. There was no evidence of wound infection in postoperative period. Patient was continued with a short knee brace and started on in bed mobilization. Patient was discharged after suture removal. Patient could comfortably bear weight postoperatively (figure 6).

Discussion
Giant cell tumour represents 4% of all bone tumours of bone. Tumour is primarily benign but has tendency to turn malignant and is notorious for recurrences [1]. This tumour arises from the epiphysis of bone, and grows as a expansile exophytic mass. On gross appearance, it is grey to reddish brown in colour and is composed of soft vascular friable tissue. Microscopically, it consists of multinucleated giant cells scattered in vascularized network of proliferating round, oval or spindle shaped cells surrounding by indistinct cytoplasm [2]. For this reason, there are various modalities of treatment available for tumour to prevent the recurrences. Various modalities available for treatment are excision of tumour followed by curettage, wide local excision, burr drilling, and other adjuvant therapies like phenol, cauterization, cryotherapy, and intra-lesional chemotherapeutic agents like Adriamycin or methotrexate [3]. Resultant defect that is formed is treated based on location and size of tumour. In case distal ulna, proximal radius, proximal fibula, coccyx, sacrum resection of involved bone is performed. For distal femur, proximal tibia, distal radius bone cement or bone graft or combination is used. For larger tumours around knee joint reconstruction with technique like turn-o-plasty or arthroplasty is used. Some aggressive and recurrent tumours may require

amputation. Chemotherapy and radiotherapy is used for unresectable malignant tumours. Adjuvant therapies used to reduce recurrences. Phenol cautery and cryotherapy kills malignant cells at the margin of tumour. Bone cement by exothermic reaction exerts a cytotoxic effect on tumour cells. Cavity can be filled by bone cement or bone graft; Both methods have their own advantages and drawbacks [4]. Advantages of bone cement is that cement exerts thermal effect which kills cells, makes detection of recurrence easier and gives structural support and allows early weight bearing. Drawbacks are damage to articular cartilage when used in subchondral lesions and cement though strong in compression is weak when subjected to shear. Advantages of bone graft are that it undergoes remodeling along stress lines and once incorporated reconstruction is permanent. Drawbacks are autograft quantity is limited, donor site morbidity, allograft is expensive and recurrence is difficult to identify [5].

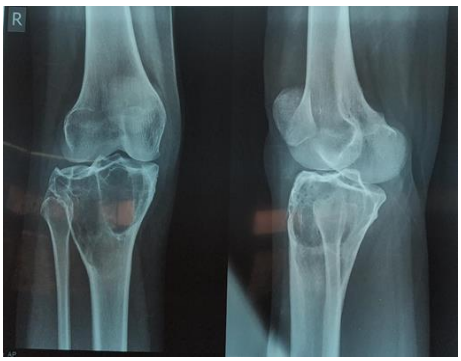

Fig 1: X- ray of the left knee showing an expansile growth

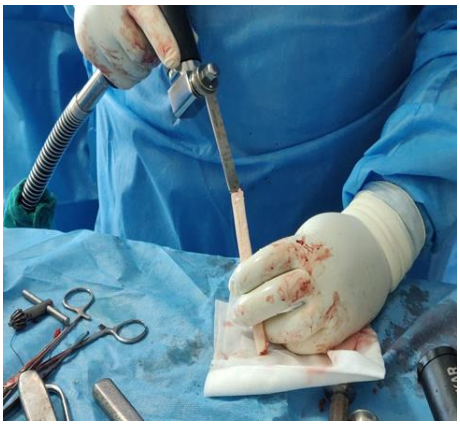

Fig 2: cm fibular bone graft that was harvested from the ipsilateral side

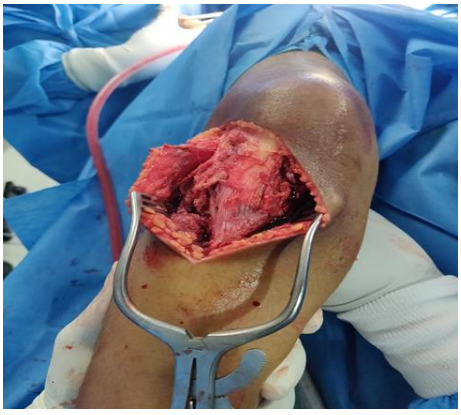

Fig 3: intra-operative view of the tumour

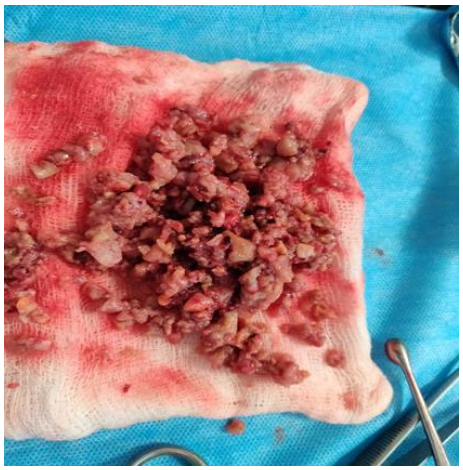

Fig 4: tumour tissue extracted piecemeal

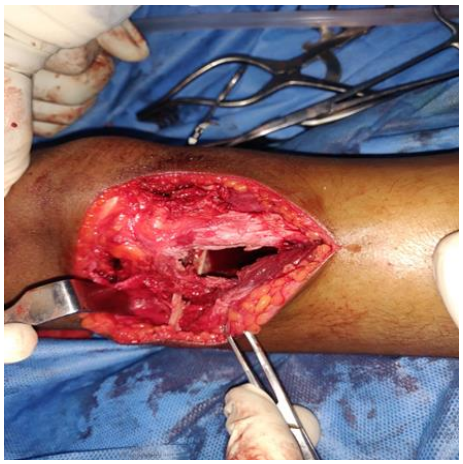

Fig 5: post tumour excision

Conclusion

The main primary treatment of GCT is surgery, the type of which depends on preoperative evaluation which includes clinical evaluation that involves the site and size of the tumour in relation to surrounding structures, together with plain X-ray, CT scan and/or MRI as indicated and tissue biopsy to define tumour grade. Curettage alone results in high rate of local recurrence. On the other hand, curettage and adjuvant procedure like burr drilling, phenol cauterization, cryosurgery, argon beam etc. using bone cement or bone grafts as filler gives low rate of local recurrence. Resection is recommended for stages IB and IIB, extremely large lesions, and in cases where resection results in no significant morbidity as proximal fibula and flat bones. Amputation is preserved for massive recurrences and malignant transformation.

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