

A Case of Distal Femur Giant Cell Tumour Treated with Excision Curettage and Sandwich Technique

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Abstract

Giant cell tumors (GCTs) are primary bone tumors that occur most commonly in long bones, with half such tumors occurring in the distal femur, proximal tibia, and fibula. Around 12% of patients present with a pathological fracture indicating more aggressive disease. Arthrodesis after tumor resection is a popular choice due to its affordability and early postoperative mobilization, as well as low risks of implant loosening, infections, malignant lesions, or mortality. In developing countries, the cost of the mega prosthesis, around lakhs means many patients cannot afford the treatment. We describe a case of a GCT of the distal femur treated by excision of the tumor with sandwich technique and reconstruction using iliac crest bone graft. The result was satisfactory, knee movements were initiated at 4th week and partial weight-bearing was allowed two months after the surgery. At the one-year follow-up, there was no recurrence, and the patient had the full weight-bearing ability with complete range of movements.

Keywords: Giant Cell Tumor, Curettage, Phenolic Acid, Chemical Cauterization, Physical Cauterization, Sandwich Technique.

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Background

A giant cell tumor (GCT) is defined as the presence of large multinucleated osteoclast-like giant cells, along with mononuclear spindle-like stromal cells and other monocytes [1]. The most common site of a GCT is the knee joint. Giant cells in GCTs lead to bone resorption [2]. Most cases of GCTs are associated with an *H3F3A* mutation, mainly *pG34W* [2]. GCTs account for 5% of all primary neoplasms and 20% of all benign bone tumors [3]. GCTs are most common among those aged 20-45 years [3]. They are slightly more common in females (ratio of 1.5:1) and relatively uncommon

in young patients with an open physis [4]. The most usual presentation of a GCT is pain due to mechanical instability from bone resorption. A localized bony swelling may be observed due to destruction of the bone and tumor progression. GCTs are often found close to joints and hence cause a limited range of motion, joint effusion, and sometimes synovitis [4]. Around 12% of patients present with a pathological fracture, which indicates more aggressive disease, with the possibility of local recurrence post-treatment and metastasis in rare cases [5]. We describe a case of a GCT of the distal femur treated by

excision of the tumor with sandwich technique and reconstruction using iliac crest bone graft. The goal of the treatment was to reduce the possibility of GCT recurrence with preservation of functional knee joint and rarely metastasis post-surgery.

Case

A 20-year-old Male came to the hospital with progressive swelling of the right lateral aspect of distal femur associated with pain and swelling of the right knee for 9 months. There was no history of trauma, fever, weight loss, or any other abnormal swellings in the body. On examination, a single oval 7×6 cm swelling was seen over the lateral aspect of the right distal thigh (Figure). The skin overlying the swelling was normal in appearance, with no sinuses and no dilated or engorged veins.

Pre Operative

All routine blood investigations and serum biochemistry studies were within normal limits.

XRAY of the right distal femur anteroposterior and lateral view showed a subarticular, eccentric, lytic lesion, with thinning of the cortex and no peripheral sclerosis in lateral femoral condyle

MRI shows lytic expansile lesion of multiple cystic areas and adjacent marrow edema involving distal meta and epiphysis of lateral aspect of femur. There are multiple areas of cortical breach predominantly along the posterior aspect. The lesion measures about 7.1 x 5.9 cm (CC x AP). Findings suggestive of giant cell tumor.

There was no evidence of lung metastasis on a chest x-ray and high-resolution computed tomography

A core needle incisional biopsy was performed and showed tumor cells comprised of stromal cells containing diffuse giant osteoclast cells.

Operative Procedure

The tumor was approached by midline skin incision and median parapatellar approach with exposure of lateral condyle of distal femur. Tumor margins were identified and marked. Excision and curettage of the tumor was done, which was followed by physical burring of tumor margins using 5MM diamond tough burr which was then followed by chemical cauterization of tumor margins using phenol and hydrogen peroxid

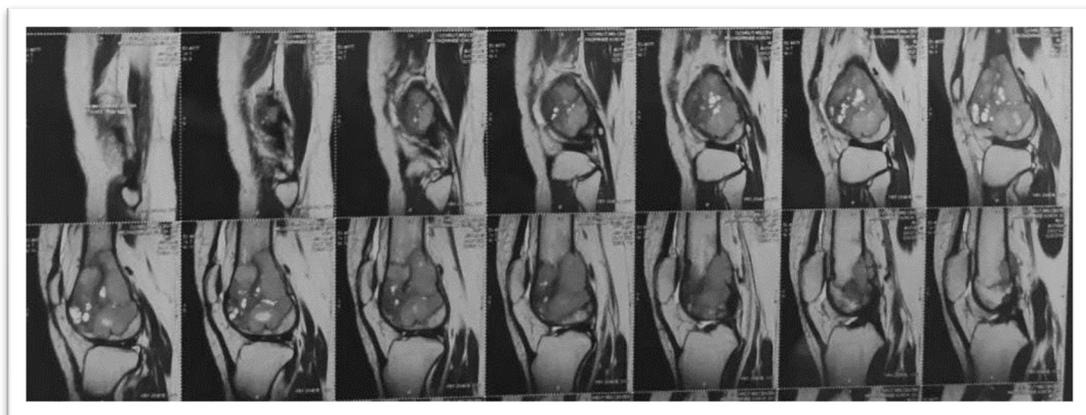


PRE-OPERATIVE XRAY

XRAY SHOWING-subarticular, eccentric, lytic lesion, with thinning of the cortex and no peripheral sclerosis in lateral femoral condyle



MRI shows lytic expansile lesion of multiple cystic areas and adjacent marrow edema involving distal meta and epiphysis of lateral aspect of femur. There are multiple areas of cortical breach predominantly along the posterior aspect. The lesion measures about 7.1 x 5.9 cm (CC x AP). Findings suggestive of giant cell tumor.



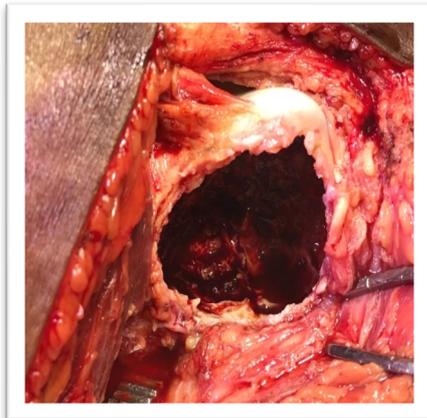
A lytic expansile lesion with multiple cystic areas and adjacent marrow edema involving the distal meta and epiphysis of the lateral aspect of femur. There are multiple areas of cortical breach, predominantly along the posterior aspect. The lesion measures about 7.1 x 5.9 cm (CC x AP).

The lesion appears iso to slightly hyperintense on T2 images and hyperintense on T1 images. Mild joint effusion.

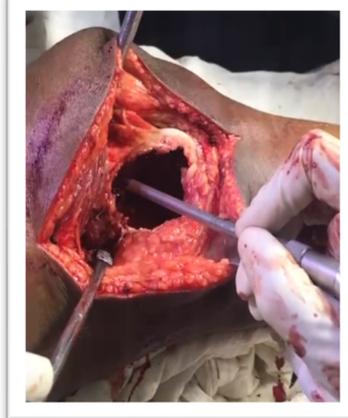
Both medial and lateral meniscii appears normal. No e/o tear.
 Lateral meniscus appears normal.
 The anterior and posterior cruciate ligaments appear normal.
 Both collateral ligaments appear normal.
 Postero-lateral corner structures appear normal.
 The quadriceps and patellar tendon, rest of periarticular structures appear normal.
 Patellofemoral joint appear normal.

IMPRESSION :

- A lytic expansile lesion with multiple cystic areas, areas of cortical breach and adjacent marrow edema involving the distal meta and epiphysis of the lateral aspect of femur. Findings are likely of giant cell tumor (GCT).



Excision and Curettage of Tumor



Physical Burring Of Tumour



Phenolic Acid Cauterization



Bone Graft Impaction





Final Skin Closure

5 centimeter in length and 1.5-centimeter breadth iliac crest bone graft was harvested which was carefully placed in subarticular region.

Absorbable gel form was carefully placed proximal to the bone graft covering it entirely

Bond cement simplex was used (40 grams) to filled the void created

The excised tumor was sent for histopathological analysis

Post operatively patient was stable with mild pain at operative side which gradually subsided over few days. suture removal was done after a period of three weeks, which were healthy and with no signs of infection

Patient was kept nil weight bearing for a duration of two months with knee range of movements initiated after 4 weeks



Post Operative Xray

Clinical Photograph

Result

Patient follow up and observed for a duration of 1 year with no signs of metastasis and recurrence .No signs of infection healthy sutures.No signs of joint

effusion and inflammation.Good range of motion was achieved and weight bearing was tolerated after a period of month

Discussion

Clinical or radiographic diagnosis of the giant cell tumor difficult. Typically, giant cell tumor appears as a lytic lesion with well-defined and non-sclerotic margins on conventional radiographs [3]. However, most lytic lesions in the epiphyseal or metaphyseal regions of long bones with open physes are found to be chondroblastoma, and the possibility of other malignant tumors (i.e., osteosarcoma) should be considered. Internal calcification of lytic lesions is the characteristic sign of chondroblastoma, but this sign is not seen in almost half the cases. CT and MRI findings are usually not specific. Definitive diagnosis therefore requires open biopsy or core needle biopsy. The main concern in the treatment of giant cell tumor is its high potential for recurrence. Radical treatment for giant cell tumor usually requires excision curettage or en bloc resection combined with various adjuvant therapies (e.g., cryosurgery, electrocautery, cementation, or Argon laser coagulation). [6]

Summary and Conclusion

Use of physical and chemical methods to prevent local recurrence of giant cell tumor in form of physical and chemical cauterization using phenolic acid and hydrogen peroxide [7]

Use of sandwich technique to reserve the articular congruity of the knee joint is helpful in long term functional outcomes [8,9]

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