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## Endoprosthetic replacement in benign giant cell tumor of the distal femur: A case report

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### Abstract

Giant cell tumors (GCT) of the bone are benign but locally aggressive tumors that most commonly affect the metaphyseal region of long bones, particularly the distal femur. Despite being non-malignant, GCT can lead to significant morbidity due to their potential for local recurrence and, in rare cases, pulmonary metastasis. Surgical management of GCT typically involves options ranging from curettage to wide resection, depending on the tumor's aggressiveness and recurrence. This case report details the management of a 58-year-old male patient with a GCT of the distal femur, who presented with progressive knee pain and swelling. Imaging revealed a stage 2 tumor according to the Enneking system, with cortical destruction and joint space involvement. The patient underwent en bloc resection of the tumor followed by reconstruction using a hinge massive prosthesis. Postoperative recovery was favorable, with no evidence of infection, aseptic loosening, or recurrence at the 36-month follow-up. This case highlights the efficacy of endoprosthetic replacement in managing aggressive GCTs of the distal femur, offering a balance between oncologic control and functional limb preservation.

**Keywords:** Septic arthritis, hip joint, children, functional limb preservation

### Introduction

Giant Cell Tumor (GCT) occur mainly in young adults and account for 5% of all primary tumors of bone. It generally affect the metaphyseal region of long bones, as well as less often flat bones. It most frequently occur in the distal femur and the proximal tibia [1]. Its histogenesis is still uncertain. Though not a malignant neoplasm, it often exhibits locally aggressive behavior and can metastasize to the lungs in 2% to 9% of cases [2].

The available surgical options range from curettage to wide resection with suitable reconstruction. Wide resection is reserved for aggressive, recurrent, and extensive tumors. Among the many reconstruction methods, prosthetic replacement after tumor resection has been widely used because it has the advantages of complete resection, low postoperative recurrence rate and high rate of excellent short-term postoperative limb function [3]. In this presentation, we aimed to report the case of a patient with distal femoral giant cell tumor treated by en bloc resection and reconstruction by a hinge massive prosthesis illustrated by a review of the recent literature.

### Case History

A 58-year-old man presented in our out-patient department of Orthopaedics, Dr. PMR Institute of Medical Sciences, Chevella. Telangana, with a complaint of progressive left knee pain followed by swelling, since 6 months. There was no history of trauma to the affected knee or leg. He did not give history of fever, Joint was normal, Clinically. Physical examination revealed exquisite pain in lower extremity of femur, a diffuse swelling about 6cm/8cm and limited mobility of the knee, with terminal pain full, Knee joint Extension was normal. Anteroposterior and lateral radiographs of the left knee demonstrated an osteolytic lesion in the epiphysis involving the metaphysis and extending in the subchondral bone of the distal femur, Initial Curettage and Filled with cement and cancellous bone Graf. (Figure 1).



**Fig 1:** Radiograph showing osteolytic lesion in the distal femur with cortical destruction



**Fig 4:** Magnetic resonance imaging (MRI) of the left knee showing tumor extension and joint space involvement



**Fig 2:** Intraoperative image illustrating tumor resection and femoral cut during endoprosthesis placement



**Fig 5:** Intraoperative image demonstrating the placement of a hinge massive prosthesis after tumor resection



**Fig 3:** Postoperative radiograph depicting the alignment of the endoprosthesis in the distal femur



**Fig 6:** Follow-up radiograph at 36 months showing good knee mobility and prosthesis alignment



**Fig 7:** Follow-up radiograph at 12 months showing maintained prosthesis alignment and good joint space preservation

Magnetic Resonance Imaging (MRI) of left knee showed cortical destruction and extra osseous extend of the tumor with involvement of joint space without involvement of neurovascular structures around the knee. The tumor was in stage 2 according to Enneking system for benign tumors. In the context of the tumor extension report, Thoraco-Abdomino-Pelvic CT scan and bone scintigraphy showed no metastasis. The size of the tumor resection was estimated from radiographic and MRI measurements.

### Procedure

An anterior-external approach carrying the path of the initial biopsy was performed. The detachment of the quadriceps muscle from the vastus lateral is enabled us to resect the tumor and to perform the femoral cut, while placing a counter-bend along the internal margin of the femur. During the placement of the Endo-Prosthesis of knee. We controlled limb length, patellar stroke as well as knee mobility (Figure 2-5). Immediate post-operative Radiograph shows, Endoprosthesis in alignment. (Figure 6, 7). On follow-up after 3, 6 and 12 months, patient had a good knee mobility (0° of extension, 100° of flexion) and no inequality of the lower limbs length. There was no evidence of secondary infection, aseptic loosening or peri-prosthetic fracture.

### Discussion

The World Health Organization has classified GCT as an aggressive, potentially malignant lesion [4]. The surgical treatment of this tumor has always been controversial, with the desired treatment being a balance between adequate removal and retention of function [5].

A variety of treatment modalities are available for GCT, they range from intralesional curettage to wide resection with suitable reconstruction.

Intralesional excision leaves microscopic disease in the bone and the recurrence rate was reported as 60%. Use of modern instruments such as high power burr, pulsatile jet lavage system, headlamp and dental mirror combined with multiple angled curates to identify and access small pockets of residual disease didn't provide 100% results. Therefore, many investigators apply chemical (such as zinc chloride, carbolic acid and liquid nitrogen) and physical (such as high-speed burr) methods for

destruction of any bone tumor in the cavity wall in order to reduce the local recurrence rate. Despite this, recurrence has been reported with the use of adjuvants [6, 7]. However, when there is pathologic fracture, tumor recurrence, extensive destruction of the bone cortex, or insufficient solidity to meet the physical load after tumor excision, en bloc resection of tumor and reconstructive surgery of the bone defect need to be performed [8]. In our case, en bloc resection has been indicated for the two main reasons which are cortical destruction and extra osseous extend of the tumor with involvement of joint space.

There are various approaches to reconstruct the defects resulting from tumor resection. They include autograft, allograft and prosthetic replacement. Autograft can be used to fill the defect, but its quantity is limited and harvesting autograft causes donor site morbidity. Allograft is expensive and requires a bone bank. Allograft itself can lead to infection, fracture, non-union and joint instability [9].

Endo-Prosthetic replacement has become the method of choice after bone tumor resection. It provides immediate restoration of bone stability, allowing the patients to start using the limb earlier, in addition to least rates of recurrence and complications [10]. The possible complications include secondary infection, aseptic loosening and breakage [11]. In our presentation we used a hinge massive prosthesis with good functional outcome.

### Conclusion

Resection and knee arthroplasty is technically feasible and easy, it allows both to regulate the carcinological problem and to preserve articular function. However, it should be reserved for certain situations such as pathological fracture, tumor with extensive destruction of the bone structure or difficulty in reconstruction after intralesional curettage. In the other cases, conservative treatment is the preferred method.

### References

1. Beldini N, Campanacci M, Picci P, Sudanese A, Boriani S. Giant cell tumor of bone. *J Bone Joint Surg Am.* 1987;69(1):106-114.
2. Bertoni F, Present D, Enneking WF. Giant-cell tumor of bone with pulmonary metastases: Six case reports and a review of the literature. *Clin Orthop Relat Res.* 1988;(237):275-285.
3. Myers GJ, Abudu A, Carter SR, Tillman RM, Grimer RJ. Endoprosthesis replacement of the distal femur for bone tumours: Long-term results. *J Bone Joint Surg Br.* 2007;89(4):521-526.
4. Szendroi M. Giant-cell tumour of bone. *J Bone Joint Surg Br.* 2004;86(1):5-12.
5. Wang HC, Song TY, Luo X, Cai ZD. Management of grade III giant cell tumors of bones. *J Surg Oncol.* 2005;92(1):46-51.
6. McGrath PJ. Giant-cell tumour of bone: An analysis of fifty-two cases. *J Bone Joint Surg Br.* 1972;54(2):216-229.
7. Kawai A, Lin PP, Boland PJ, Corda B, Healey JH. Relationship between magnitude of resection, complication, and prosthetic survival after prosthetic knee reconstructions for distal femoral tumors. *J Surg Oncol.* 1999;70(2):109-115.
8. Yang ZM, Guo W, Sun X, *et al.* The choice strategy of surgical treatment for giant cell tumor close to the knee (Chin). *Zhonghua Wai Ke Za Zhi.* 2006;44(24):1693-1698.
9. Gitelis S, Mallin BA, Piasecki P, Turner F. Intralesional excision compared with en bloc resection for giant-cell tumors of bone. *J Bone Joint Surg Am.* 1993;75(11):1648-

1655.

10. Myers GJ, Abudu A, Carter SR, Tillman RM, Grimer RJ. Endoprosthetic replacement of the distal femur for bone tumours: Long-term results. *J Bone Joint Surg Br.* 2007;89(4):521-526.
11. Maruthainar K, Mahendra A, Masterson E, Reddy K, Carter SR, Grimer RJ. Massive endoprostheses for giant cell tumours of the distal femur: A 12-year follow-up. *Knee.* 2006;13(5):378-381.

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