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Management of Giant Cell Tumour of Proximal Tibia with Pathological Fracture by Knee Arthrodesis Using Locking Plate: A Case Report.

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Abstract : *Giant cell tumor is a common neoplasm which may affect subchondral bone and aggressively destroy bone and surrounding soft tissues. Such tumors need to be removed without residual cells. The bone defect thus created needs to be filled up, either by reconstruction with graft or the joint be entirely replaced by arthroplasty with custom made megaprosthesis. In some cases, resection with fusion of the joint may be attempted. This prevents joint movement but is much more affordable than arthroplasty. Here we are presenting one such case of giant cell tumor of right tibia with resection arthrodesis of knee who has had reasonably satisfactory outcome.*

.Keywords :*Giant cell tumor, Knee Arthrodesis, Locking Plate,Pathological Fracture.*

I. Introduction

Giant cell tumor (GCT) is a benign but locally aggressive lesion consisting of osteoclast-like giant cells, fibroblast-like stromal cells, and blood vessels, comprising of 5% of bone neoplasms. They typically occur in patients 20 to 40 years old, more in females[1]. They occur in the epiphysis of long bones and extend into the metaphysis where they abut the subchondral surface of the adjacent joint. Common sites include the tibial plateau, femoral condyle, distal radius, and humeral head [2]. They can cause pain, swelling, and pathological fracture, and aggressive lesions cause extensive destruction of normal tissue.

II. Case Report

Our patient, a 54 year old female Hindu patient, local vegetable vendor by profession presented with pain and swelling on the right upper leg. The patient had noticed swelling in the right knee initially 10 years ago but had ignored it, mainly due to poor socioeconomic condition. However, about 2 months ago, she had approached a local doctor because of the pain and swelling which had limited her walking, so as to restrict her to walking with a stick. The doctor had given a course of analgesics, but the pain and swelling had not subsided. Then the doctor injected corticosteroid intralesionally. 1 week after this injection, the patient had an episode of sudden onset pain on the upper part of the leg while walking. The pain was moderate in intensity and increased with movement but decreased with rest and at night. The pain did not progress in intensity. However, it totally restricted her activities of daily living. She attended the Jawaharlal Nehru Institute of Medical Sciences where her routine investigations were performed along with radiological investigations and CT scan which revealed a lytic lesion at the upper tibia measuring 5.2 cm×4.8 cm×3.6 am with pathological fracture. She was then referred to RIMS, Imphal for further management.

The patient had no history of any other significant chronic or infectious disease in the past. She had undergone cholecystectomy 13 years ago and hysterectomy 7 years ago. She did not have history of contact with known case of tuberculosis or any other infectious disease. She is married with 4 children, with none of family members having any significant disease. She is non-smoker, non-alcoholic, taking mixed diet. She had regular menstrual periods until her hysterectomy due to a uterine fibroid.

The tumor was found to be Campanacci grade 3, and hence resection was deemed necessary[3]. The patient's haematological and other routine investigations revealed no abnormality. Since the osteochondral shell on the tibial plateau was too thin, reconstruction was ruled out. She was offered the option of total knee arthroplasty with custom made tumour prosthesis but refused due to financial constraints. Then decision was made to go through with knee arthrodesis.

Preoperatively, long leg films of both the lower limbs were taken and precise placements of cuts was planned on the film. The patient was counseled regarding the intraoperative risks and postoperative functional goals and with her due consent, we proceeded with the surgery.

A 30 cm long incision was placed centering the upper pole of the patella and after superficial dissection, the patella and retinacular fibers were retracted laterally to expose the knee joint and the tumour site. Tibia was cut 8 cm distal to the joint line and the proximal prtion removed with 3 cm of the fibular head, taking care to preserve the common peroneal nerve. A 11 cm long cut was made in the sagittal plane along the mid axis of the femur. Then another cut was made from the medial border of the femur to the midline, ie meeting the previous cut so as to free the medial part of the femur. Soft tissues were dissected and this fragment was transported caudally with intact soft tissues to fill up the gap created by the removed proximal part of tibia and fibula. A 16 hole, 4.5mm locking plate was used on the medial side to span the joint and fixed with 4.5 mm locking head screws.

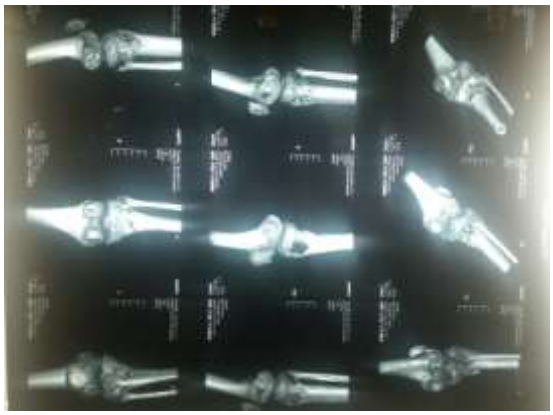
The patient did well in the post operative period with non weight bearing crutch walking being allowed on the 15th day with a knee extension brace. She did not have any soft tissue complications or distal neurovascular deficit. Currently she is pain free and has a immobile but stable knee.

III. Discussion

The modalities of treatment of GCTs include (a)aggressive, extended curettage followed by argon beam coagulation, which is easy to use, effective, and associated with few complications and using bone cement to fill the cavity because of its ease of application, immediate structural support, and ease with which local recurrence can be detected adjacent to the cement mantle; (b) primary resection ; (c) hemicondylarosteoarticular allograft reconstruction or a rotating hinge endoprosthesis round the joints, especially knee;(d) radiation or embolization and (e) resection-arthrodesis[4,5,6,7]. Resection-arthrodesis of the knee is an extensive operation requiring prolonged recovery and is best reserved for vigorous young adults. Harris et al. compared the long-term function of amputation, arthrodesis, and arthroplasty for tumors around the knee. They showed that patients who had undergone amputations had difficulty walking on steep, rough, or slippery surfaces but were active and were the least worried about damaging the affected limb. Patients with an arthrodesis performed the most demanding physical work and recreational activities, but had difficulty with sitting, especially in the back seats of cars, theaters, or sports arenas. Patients who had an arthroplasty generally led more sedentary lives and were more protective of the limb, but had little difficulty with activities of daily living. These patients also were the least self-conscious about the limb[8].

IV. Diagrams And Pictures

Pre operative X-Ray



3 Dimensional CT reconstruction.

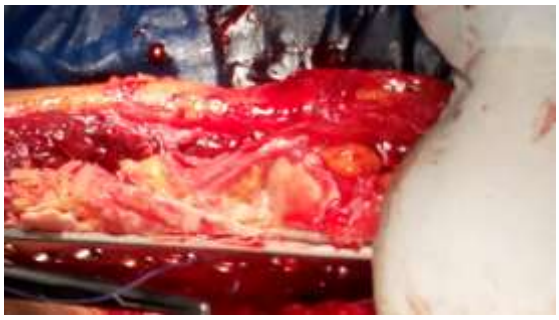
Preoperative clinical picture

Excised tumor mass.

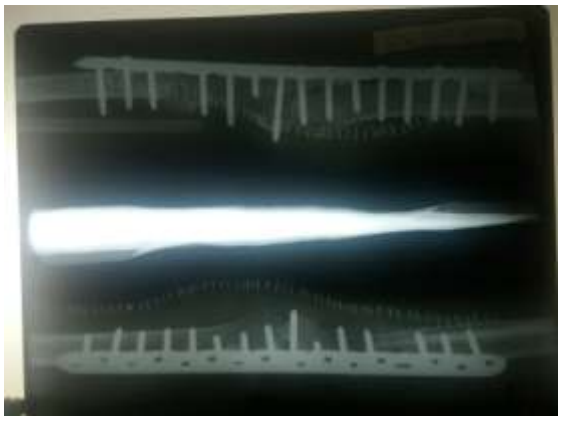
Mobilization of lower end of femur

Femur after mobilization. Tumor free margin of tibia can also be seen

Femoral condyle being prepared for bridging the gap.



LCP application



Post operative X-ray image

Post operativeclinical photograph

V. Conclusion

Resection arthrodesis inherently has several problems, including immobility of knee joint which restrict the abilities to sit and hence directly affect activities of daily living which increases DALY and also has a bearing on patient's psychology. It requires a prolonged period of immobilization for healing by bone formation unlike other procedures like total knee replacement or amputation. Also, post operative complications like infection, implant failure, aseptic loosening are common. However, the procedure is relatively more affordable and can be performed with minimal set up. The patient has a stable, painless disease free knee, though at the cost of stability. The success rate of this procedure is quite high [9, 10]. So, resection-arthrodesis is a viable option in GCTs of proximal tibia in carefully selected cases.

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