

# Giant cell tumor of patella: A case report and review of literature



Mohit Kumar Arora\*, Ela Madaan, Rajnand Kumar

Narayana Superspeciality Hospital, Gurugram, Haryana, India

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**\*Corresponding author:** Mohit Kumar Arora, Department Of Orthopedics, Narayana Superspeciality Hospital, Gurugram. Phone: +91-9013490058; Email: drmkarora@yahoo.com

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## Abstract

**Objective:** Patella is a sesamoid bone which develops in the quadriceps tendon. It is an uncommon site for neoplasms. The most common primary tumors which involve patella are benign. These include chondroblastoma, giant cell tumor (GCT) and aneurysmal bone cyst. Malignant lesions are less common in patella. These encompass metastasis, osteosarcoma and hemangioendothelioma. The most common complaint in patients of GCT patella is anterior knee pain. Early diagnosis and optimal management are necessary for improving survival rate in these patients.

**Case Presentation:** The authors present a case report of GCT of patella in a 16-year old child. Incisional biopsy was done to confirm the diagnosis. Further radiological examination showed that the tumor involved almost whole of the patella. Hence, surgical management in the form of patellectomy and extensor mechanism repair was done to improve the outcome of the disease. The patient did not have any clinical or radiological symptoms at the end of the final follow up of 22 months.

**Conclusion:** Primary tumor of patella is a rare entity. Benign tumors like GCT present only with anterior knee pain and should be included in the differential diagnosis of anterior knee pain. MRI is useful to determine the extent of involvement of tumor in the patella. Treatment may vary from curettage and bone grafting to total patellectomy with extensor mechanism repair.

**Keywords:** Giant cell tumor, Patella, Benign neoplasm

## Introduction

Primary tumors of patella are very rare with majority comprising of chondroblastoma, giant cell tumors (GCT) and aneurysmal bone cyst (ABC) (1,2,3). Malignant lesions are less common in patella. These include metastasis, osteosarcoma and hemangioendothelioma. Of all the GCTs in the skeletal system, less than 1% occur in patella (4,5). We present a case of GCT of the patella in a 16 year old female who was managed by total patellectomy and quadriceps tendon repair.

## Case Presentation

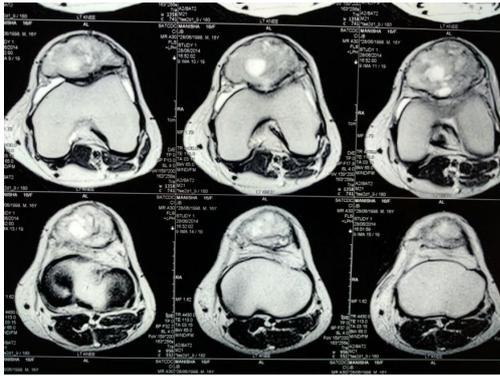
A 16 years old girl presented to the outpatient department with pain in the knee joint over anterior aspect for the past 6 months. There was an increase in the pain since the last 2 weeks. There was no history of trauma or fever prior to the onset of pain. On examination, patella was enlarged and minimally tender. The skin overlying the patella was normal. There was slight atrophy of quadriceps on the affected side. The flexion of the affected knee joint was terminally restricted. Rest of the knee joint was comparable

to the opposite side. X-rays of the affected knee (AP and Lat views) were obtained which showed expansile lytic lesion with multiple septations in the patella (Figure 1). MRI of the knee joint was done which showed lesion in the patella with fluid levels (Figures 2 and 3). Chest X-ray was



**Figure 1.** X-ray of knee joint (AP and Lat views) showing lytic, expansile lesion in patella.

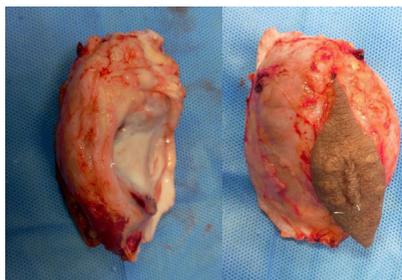




**Figure 2.** MRI (axial sections) showing involvement of whole patella.

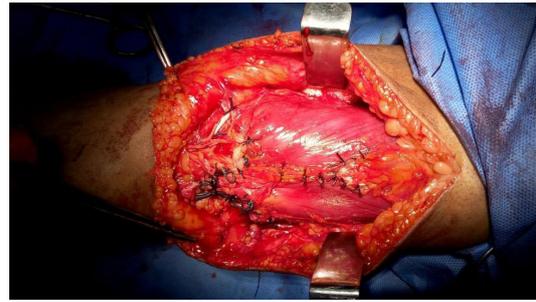


**Figure 3.** Sagittal cuts in MRI showing extent of involvement.



**Figure 4.** Completely excised patella along with overlying skin having scar from previous incisional biopsy.

also done to rule out lung metastasis. An incisional biopsy of the lesion was done which revealed GCT of the patella. As the lesion was involving almost whole of the patella, patient was planned for total patellectomy and extensor mechanism repair. Standard anterior midline incision was given over the knee joint with a little modification by including scar from previous biopsy (Figure 4). Whole patella was removed along with a margin of 2 cm of normal soft tissue sleeve around it (Figure 4). Extensor mechanism



**Figure 5.** Extensor mechanism repair with ethibond suture.



**Figure 6.** Complete extension and flexion of knee joint at the final follow up of 22 months.



**Figure 7.** X-rays (AP and Lat views) at the final follow up.

repair was done after suturing quadriceps tendon to patellar tendon (Figure 5) and patient was immobilized in cylindrical cast with knee in hyperextension for 6 weeks so that complete healing of extensor repair can take place. Gentle knee bending exercises were started after 6 weeks. At the final follow up of 22 months, patient is symptom free with full knee range of motion (Figure 6) and there is no clinical or radiological evidence (Figure 7) of local recurrence. Figure 8 shows completely healed incisional scar.

### Discussion

Patella is a sesamoid which develops in the quadriceps tendon. It gets ossified at about three years of age (3). There is a paucity of literature on patellar neoplasms. Majority of the patellar neoplasms are benign which include chondroblastoma, GCT and ABC. GCT accounts for 5%-



**Figure 8.** Incision scar healed completely.

9% of all primary bone tumors (4,5). They are typically present in the 3<sup>rd</sup> decade as compared to our case, where GCT presented in the second decade. They are usually larger in size as compared to chondroblastoma. GCT of patella usually presents with anterior knee pain and enlarged patella. Trauma in a pre-existing lesion can result in pathological fracture which gives rise to immediate pain. Benign lesions like GCT usually do not involve overlying skin like in our case. Malignant neoplasms of patella, on the other hand, are rapidly growing tumors, which present with severe pain and involvement of overlying skin. They usually metastasize specially to lungs. Radiography in GCT shows lytic expansile lesion with sclerotic margins (6). MRI is usually done to see the tumor extent and bony breach. Chest X-ray or CT scan of the chest is also required to rule out lung metastasis especially in malignant tumors. Incisional biopsy or fine needle aspiration cytology is required for diagnosing GCT. Treatment usually consists of curettage and bone grafting if the lesion is small or total patellectomy is the treatment of choice if lesion involves more than 50% of patella or there is presence of malignant

lesion. In our case as the lesion had involved almost whole of patella, hence total patellectomy with removal of 2 cm of normal soft tissue sleeve around the patella was done along with extensor mechanism repair.

### Conclusion

Primary tumor of patella is a rare entity. Benign tumors like GCT present only with anterior knee pain and should be included in the differential diagnosis of anterior knee pain. MRI is useful to determine the extent of involvement of tumor in the patella. Treatment may vary from curettage and bone grafting to total patellectomy with extensor mechanism repair.

### Authors' contributions

MKA did the surgery along with RK who was the first assistant, while EM prepared the manuscript along with MKA and RK.

### Ethical Issues

The patient's consent for the purpose of publication of his case was taken prior to the submission of this manuscript.

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