



GLOBAL JOURNAL OF MEDICAL RESEARCH: H
ORTHOPEDIC AND MUSCULOSKELETAL SYSTEM
Volume 18 Issue 1 Version 1.0 Year 2018
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Giant-Cell Tumor of the Patella: Case Report

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Abstract- Giant cell tumor (GCT) is a tumor found most often in the ends of long bones and is essentially located in the epiphyseal or metaphyseal or epiphyseal equivalent portions of bone. It is a locally aggressive neoplasm, generally arising in adults between the ages of 20 and 40 years, clinically possessing metastatic potential. The classic location is around the knee joint and it starts in the epiphysis spreading to the metaphysis and may erode the cortex in 25% of the cases. Approximately 10% of these tumors have a malignant course. The patella is a rare site with a reported incidence of less than one percent. Rare multicentric forms have been reported.

A 14-year-old female from Malang, East Java, presented with a one year history of a progressively growing mass in the left patella associated with slight pain that has been aggravated with activity for 6 months.

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GJMR-H Classification: *NLMC Code: WE 850*



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Giant-Cell Tumor of the Patella: Case Report

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A 14-year-old female from Malang, East Java, presented with a one year history of a progressively growing mass in the left patella associated with slight pain that has been aggravated with activity for 6 months.

Plain X-ray left knee AP and lateral views reveal expansile lytic lesion in left patella with marked thinning of cortex in anteroinferior aspect with few sclerotic septa within. MRI of left knee shows approximately 3x2x2 cm heterogeneous lobulated expansile soft tissue mass in left patella extending up to the articular surface with fluid appearance. No evidence of extension into the joint space. From fine needle aspiration cytology, resulting giant-cell tumor with deferential diagnosis of aneurysmal bone cyst.

Operation was already performed. Curettage, bone graft and biopsy were taken. Immunocytochemical smear was performed and confirmed as giant-cell tumor of the patella. At present, 6 months after the operation, the patient has no arthralgia and full range of motion for the knee.

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I. INTRODUCTION

Giant cell tumor (GCT) is a tumor found most often in the ends of long bones and is essentially located in the epiphyseal or metaphyseal or epiphyseal equivalent portions of bone. It is a locally aggressive neoplasm, generally arising in adults between the ages of 20 and 40 years, clinically possessing metastatic potential.² The classic location is around the knee joint and it starts in the epiphysis spreading to the metaphysis and may erode the cortex in 25% of the cases. Approximately 10% of these tumors have a malignant course.³ The patella is a rare site with a reported incidence of less than one percent. Rare multicentric forms have been reported.⁴

In this article, we report a case of GCT originating from the left patella which was diagnosed on fine needle aspiration cytology, magnetic resonance imaging and already performed excision, curettage, and bone cement.

II. CASE REPORT

A 14-year-old female from Malang, East Java, presented with a one year history of a progressively growing mass in the left patella associated with slight pain that has aggravated with activity for 6 months. It measured 42 cm in its largest diameters. The overlying skin was normal. She had no pulmonary and other systemic symptoms. All hematological and biochemical investigations were within normal limits.

Patient underwent plain X-ray left knee AP and lateral views. Radiograph reveal expansile lytic lesion in left patella with marked thinning of cortex in anteroinferior aspect with few sclerotic septa within. (FIG.1)

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Fig. 1: Antero-posterior and lateral radiograph showing expansile lytic lesion in left patella

Patient underwent MRI of left knee. T1 and T2 weighted images were obtained in axial and sagittal planes (FIG: 2&3). MRI of left knee shows approximately 3x2x2 cm heterogeneous lobulated expansile soft tissue mass in right patella extending up to the articular

surface, and a fluid-fluid level was observed. The possible differential diagnosis from MRI include giant cell tumor or aneurysmal bone cyst. Luckily the articular cartilage at posterosuperior part is still intact.

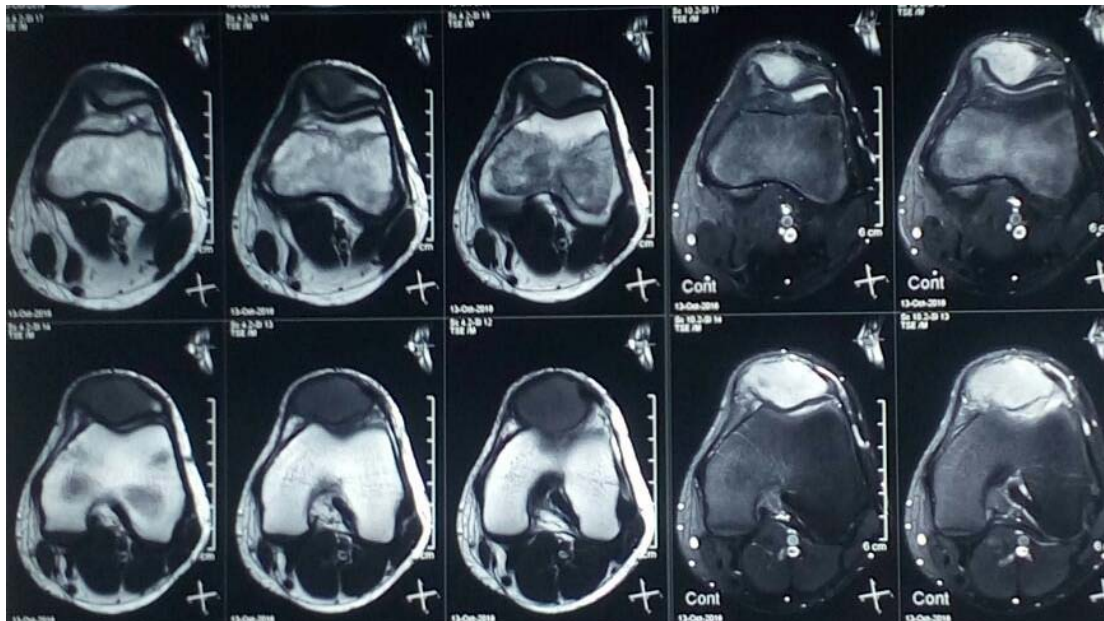


Fig. 2: Axial T1 and T2 MRI show defect in anteroinferior aspect of patella

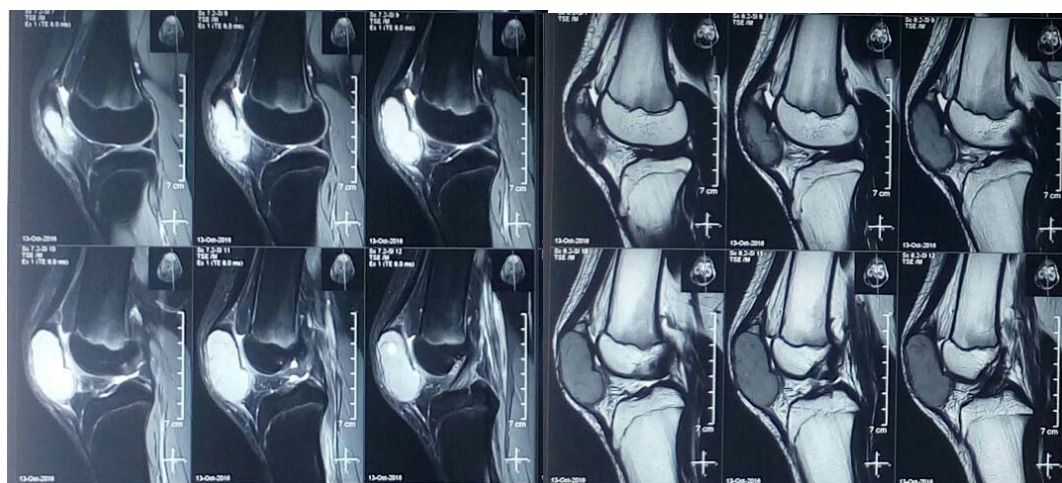


Fig. 3: Sagittal T1 and T2 MRI show fluid-fluid level

To confirm the diagnosis, fine needle aspiration was performed at the anteroinferior aspect of patella. Hystopathological finding still cannot differentiate whether

this is giant-cell tumor or aneurysmal bone cyst although multi-nucleated giant cell was already found (FIG.4)

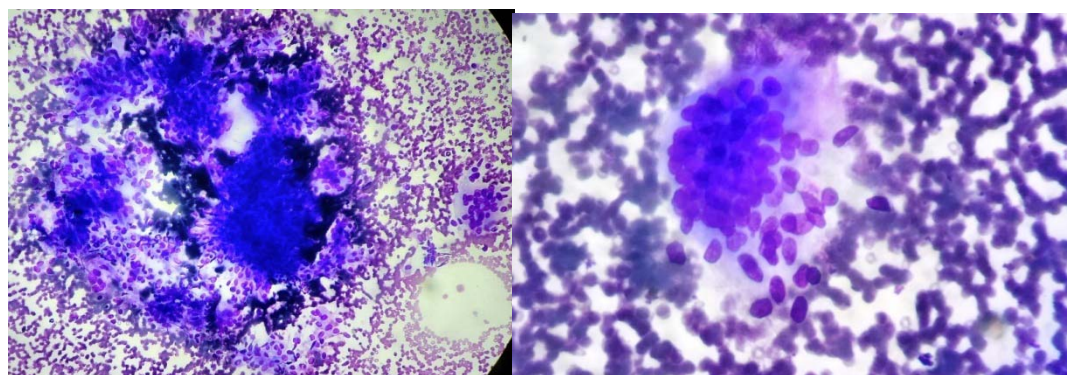


Fig. 4: Multi-nucleated giant cell from fine needle aspiration

At the end of November, curettage of the lesion and bone substitution were performed with general anesthesia. These procedures were performed through an approximately 10 cm longitudinal incision directly above the area. The periosteum was detached from the surface of the patella with a raspator to make an oval incision. The main part of the tumor was solid and yellow-brown with partial retention of blood (Fig.5). Macroscopically, it appeared to be a giant cell tumor. We carefully removed the contents with a curette, filled the defect with approximately 5g of calcium hydroxyapatite ceramic and fixed it with two screws and closed the incision in a routine manner. X-ray left knee AP and lateral views post surgery were taken to confirm whether the defect was filled with bone substitution component (FIG.6).

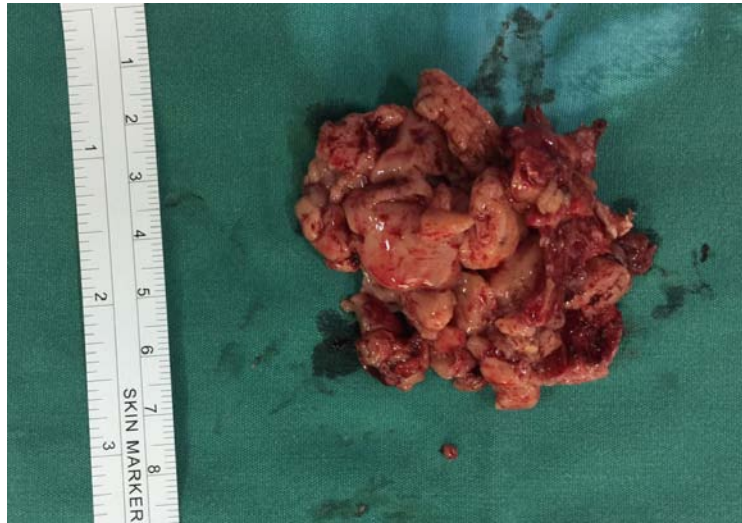


Fig. 5: Macroscopically of the tumours, solid and yellow-brown with partial retention of blood



Fig. 6: Post surgery X-ray AP and lateral of left knee

Histopathological examination was performed after the surgery, and showed multi-nucleated giant cell with more than 20 nucleus, short spindle shaped cells, bone tissues, and calcification. No cellular atypia and few mitotic figures were observed. On the basis of these findings, the lesion was diagnosed AS a giant-cell tumor rather than as an aneurysmal bone cyst (FIG.7). Immunohistochemical WAS performed to confirm the diagnosis and found positive result in CD68 staining (FIG.8). The diagnosis was confirmed to be giant-cell tumor of left patella.

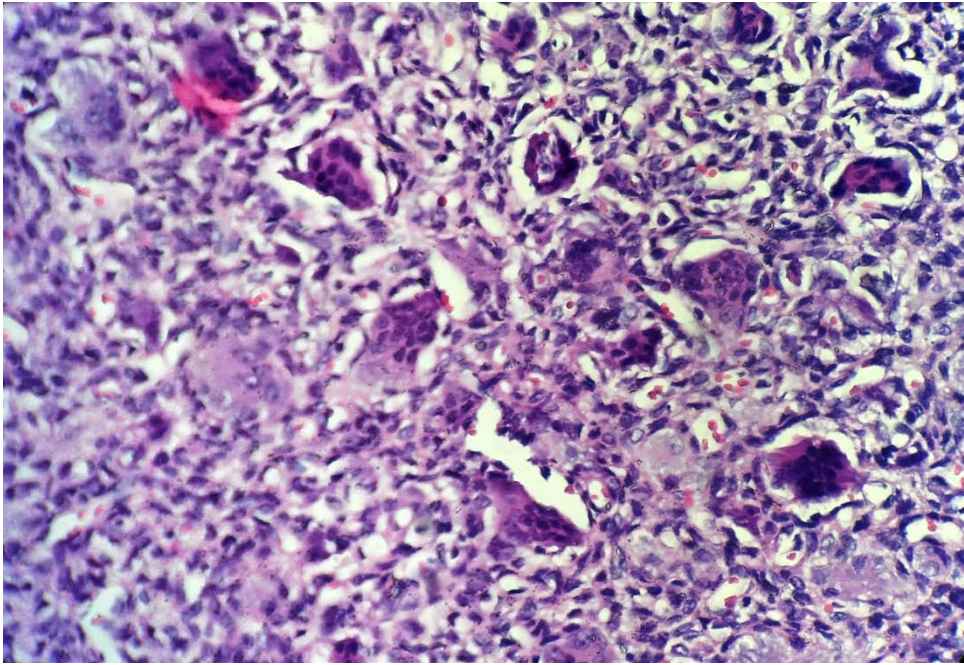


Fig. 7: Hystopathological examination shows multi-nucleated giant cell with more than 20 nucleus, short spindle shaped cells, bone tissues, and calcification

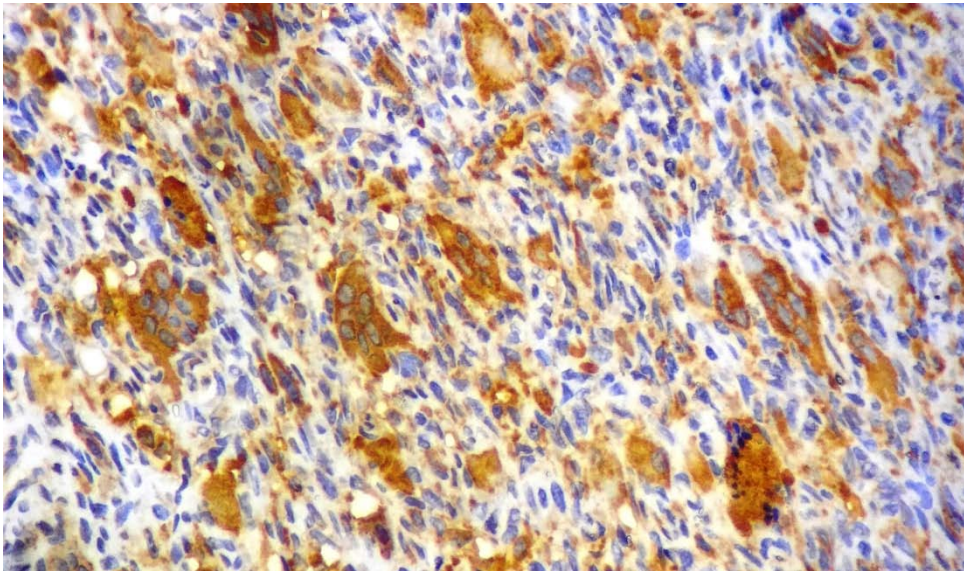


Fig. 8: Immunohystochemical show positif result of CD68 staining

The affected part was immobilized with a splint for approximately 2 weeks after the operation. Weight bearing and range of motion exercises were initiated after the suture was removed. Full weight bearing was allowed by approximately 4 weeks. At present, 6 months after the operation, the patient has no arthralgia and full range of motion for the knee.

III. DISCUSSION

Bone tumors arising in the patella are comparatively rare. According to a survey by the Bone and Soft Tissue Tumor Committee of the Japanese

Orthopedic Association, of the 27, 403 primary bone tumor cases were reported for 32 years from 1972 to 2003 in which tumors involved the lower extremities in 70.5% or 13,860 of these cases.¹ However, tumors arising in the patella were encountered in only 75 cases, accounting for 0.5% of all cases. Of these 75, 4 were osteosarcomas, i.e., malignant bone tumors, and 71 were benign bone tumors. The benign tumors included chondroblastoma (n=24), giant cell tumor (n=22), and solitary exostosis (n=14). Less than 50 cases of giant cell tumor of the patella have been reported in the international literature in the developed world.²

Clinically, the patients with the patellar GCTs usually complained about knee pains and/or swelling.³⁻⁷ Physical examination may show redness, local heat, swelling, effusion, tenderness, lump, crepitus, and the decrease of motional range.³⁻⁷ The laboratory findings on some severe patients showed an increase of serum alkaline phosphatase (AP) and erythrocyte sediment rate (ESR).⁸

Radiographs revealed an osteolytic lesion of the patella with destruction of the bone, and sometimes, soap bubble appearance.³ Magnetic resonance imaging (MRI) showed abnormal extension and lesion of the patella, and there may be some evidence of adjacent tissues and sclerotic.⁸ Additionally, chest radiography and bone scintigraphy are necessary for GCT patients to determinate the possible metastasis on the lung and other bones.

A needle biopsy or incisional biopsy of the patella is recommended for the diagnosis. The histopathological features of the patellar GCT, which mainly include numerous giant cells, short spindle-shaped cells, bone tissue calcification, and a few mitotic should be distinguished from aneurysmal bone cyst or chondroblastoma. The histological examination of the aggressive GCT showed a compact stroma with nuclear atypia, frequent mitotic figures, hyperchromatism, and the unevenly distributed giant cells.⁷

Curettage with a combination of cryosurgery may be attempted in early stage of the disease but it still carries the risk of recurrence about 25 to 40%.¹⁰ For small, benign GCT (Enneking stage 2), intralesional curettage or partial patellectomy with filling of the bone void and reconstruction of the extensor mechanism is the first choice in treating GCT of the patella. But if the patellar GCT is extensive or malignant (Enneking stage 2 to 3), patellectomy combined with adjuvant treatment and resection of metastasis is recommended.⁸ Resection may be the only form of treatment left in advanced cases which offers good to excellent functional results.²

Follow up in such cases have shown a long term good function and no recurrence with patellar resection, thus emphasizing the role of patellectomy in such advanced case.²

Future reconstruction procedures using osteo-articular grafts after resection in such advanced cases may be a feasible option.¹⁰

bone substitution and cryosurgery may be attempted in early stage and patellectomy for advance stage. For future reconstruction procedure osteo-articular grafts can be used after resection that may be feasible option for advance cases.

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IV. CONCLUSION

This case illustrates the fact that giant cell tumors of patella can be mistaken for ABC and other malignant tumors of bone and soft tissues. Fine needle or biopsy would be diagnostic if adequate specimen is obtained and can also confirmed with immunohistochemical staining. Surgery is the primary mode of treatment for this case. Curettage accompanied with