

Giant Cell Tumor of Distal Femur with Pathological Fracture: A Case Report

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Abstract

Giant Cell Tumor is an aggressive benign neoplasm arising from osteoclasts, demonstrated as subarticular eccentric lytic lesion occurring in fused skeleton accounting for 5 % to 10% of all primary bone tumors and approximately 20 % of all benign cancers and complicated with pathological fracture 1 in 5 patients with giant cell tumor of bone. We are highlighting a 39-year-old male complaining of painful swelling and difficulty walking who underwent conventional radiography that raised the suspicion of GCT with cystic changes and hemorrhagic foci along with a pathological fracture. Only a single case report was found in the past on the following topic done by Dr. Neetan P Mahajan in 2021 [8]. The uniqueness of our case was the atypical nature of the GCT on imaging and histopathology, as further discussed in the article presenting with fracture.

Keywords: Giant Cell Tumor, pathological fracture

Introduction

World Health Organization has classified Giant Cell Tumor GCT as an aggressive and potentially malignant lesion with 80% benign and 10 % malignant potential .1 to 4 % present with pulmonary metastasis [1]. It is usually situated in the epiphysis and grows eccentrically. A case with an open growth plate may start from the metaphysis.[2] The giant cell tumors are multifocal in 0.5 % of cases, and solitary lesion shows a predilection for long bones like the distal femur or proximal

tibia 55 %, distal radius 10 %, proximal humerus 6 %, sacrum 7 % this is the most standard site in the spine. Pathological fracture is the first sign in approximately 15 % of cases.[3]. the initial presentation is localized pain and swelling; some present following trauma or as an incidental finding in 9 % to 30 % of cases.[4] Diagnosis requires diverse methodologies, from clinical history, physical examination, diagnostic imaging, and histological findings.

Case Presentation

A 39-year-old male landed at our patients' department of orthopedics with the chief complaints of progressively increasing swelling of the right knee with a preceding history of minor trauma; he denied any history of fever, weight loss, chest pain or swelling of any other joint. he had taken first aid from primary care unit and referred to tertiary care. On examination of the right knee, there was diffuse swelling of the right knee joint in the region of the lateral femoral condyle. The range of motion of the right knee joint was restricted.

There was reduced bone density on the plain radiograph, and the ill-defined, expansile lytic lesion was seen in the lateral femoral condyle extending up to the articular margins showing a narrow zone of transition, cortical thinning, and periosteal reaction with the blurring of adjacent fat and soft tissue. The displaced comminuted fracture was also seen in the lateral femoral condyle reaching the articular margin.

(Figure 1 & 2)

On MRI done after a few days, a lobulated expansile eccentric heterogeneous mass lesion was seen in the lateral femoral condyle reaching up to its anterolateral region, causing significant endosteal thinning along the lateral aspect. A comminuted pathological fracture was seen in the lateral femoral condyle getting up to its anterior and inferior lateral articular surface. A mild bulging of tumor material was noted on the posterolateral aspect of the lateral femoral condyle. A few small cystic spaces and hemorrhagic foci were also emphasized within this lesion. Mild heterogeneous enhancement was noted following intravenous contrast administration. Heterogeneous enhancement was also present in the plantar lateral head of the gastrocnemius and a few of the fibers of vastus lateralis. Edema and blurring of myofascial planes were noted, with edema and fat stranding in overlying subcutaneous soft tissue representing reactionary changes. Imaging appearances are suggestive of an atypical giant cell tumor with pathological fracture. (Figure 3)



Figure 1: X-ray Knee joint AP projection shows ill-defined expansile mass lesion along the lateral femoral condyle with adjacent periosteal reaction and pathological fracture.



Figure 2: X-ray knee joint Lateral projection shows pathological fracture along the posterior aspect of lateral femoral condyle with ill-defined lucent mass.

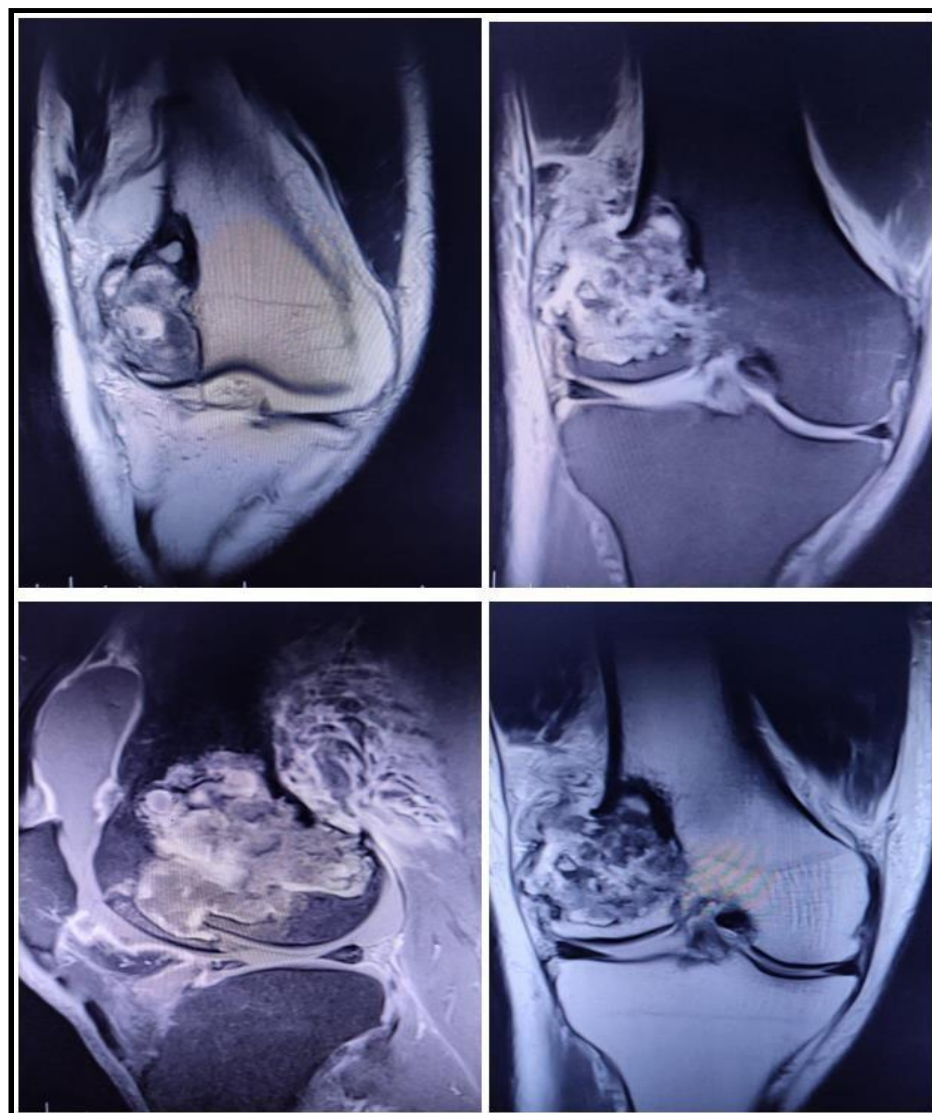


Figure 3: MRI Knee Joint shows an ill-defined heterogeneous mass lesion along the lateral femoral condyle with adjacent endosteal thinning and periosteal reaction associated with pathological fracture.

Microscopic examination reveals bony fragments showing a lesion composed of osteoclast-like giant cells, between which mono-nuclear neoplastic cells were seen. These cells exhibit round to oval cells with occasional spindled cells showing pale eosinophilic cytoplasm and nuclei with dispersed chromatin and small nucleoli. Focally cystic

Discussion

Giant cell tumor has been discussed as benign, locally aggressive tumor by various studies in the past decade [7,8], accounting for only 5 % incidence in the west and about 20 % in the east, with peak incidence reported in the east Asia is about 16 % only in Japan. Only 3 % of cases developed in the immature skeleton. [6] Fluid levels can only differentiate it from an aneurysmal bone cyst on MRI. Many differentials are made with a lytic bone lesion, including chondroblastoma, aneurysmal bone cyst, non-ossifying fibroma, brown tumors, and monostotic fibrous dysplasia, which can only be excluded with proper clinical history, physical examination, relevant imaging, and histopathological report. Curettage and bone grafting, irradiation, amputation, and resection with reconstruction are the

Conclusion

Diagnosing a giant cell tumor requires several factors, including history, clinical examination, imaging techniques, and, finally, the confirmatory biopsy of the lesion. This also helps in grading and staging the tumor, which helps in determining the prognosis and deciding the further treatment options.

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spaces filled with hemorrhage and foci of histiocytic collections were also seen. Directions of fibrosarcomatous stromal cells were also appreciated. Impression of atypical giant cell tumor was made, orthopedic surgeons did wide curettage, and early follow-up visits with follow-up scans were advised for the prognosis of the disease.

various treatment options for management. [8] In our case, the patient presented with a typical picture of a giant cell tumor complicated with pathological fracture based on clinical history, physical examination, and conventional radiograph but on further investigation, with MRI knee with contrast, the suspicion of atypical giant cell tumor was raised due to the presence of few small cystic spaces and hemorrhagic foci noted within this lesion, these findings were confirmed via microscopic examination that showed focally, cystic spaces filled with hemorrhage and principles of histiocytic collection and presence of fibrosarcomatous stromal cells within it. No similar case has previously been reported adding to the distinctness of our case report.

Author contributions

Mahum Zaidi: Writing of Manuscript (Introduction and Discussion)

Bisma Ali: Writing of Case Presentation and Abstract

Rida E Zainab: Assembling the Case Summary and Imaging

Rabiya Siraj: Supervision and Review

Javed Iqbal: Supervision and Review

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