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Management of giant cell tumor of fibular head with curettage: A case report

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Abstract
Giant cell tumour of bones is an unusual neoplasm that accounts for 4% of all primary tumours of bone, and it represents about 10% of malignant primary bone tumours with its different grades from borderline to high grade malignancy.
GCT generally occurs in skeletally mature individuals with its peak incidence in third decade of life. Distal femur and proximal tibia are the commonest sites followed by distal radius. Less than 4% of these tumours are known to affect the ankle joints. But, its biological behaviour at this rare location is quite unpredictable.
Case Summary: 24 years old male presented with history of nontraumatic pain of left knee since 2 years. Patient was initially evaluated from peripheral hospital with x rays and MRI. It showed a well-defined osteolytic lesion in the epiphysis involving the metaphysical bone of right fibular head without intra-articular extension.
Conclusion: In cases of GCT, the management depends upon the various factors such as site, age, involvement of the bone, extent of bone involvement and whether there is articular involvement or not. Extra-articular GCT can be managed with extended intralesional curettage. However, in the proximal fibula, total en bloc excision of the tumor is the treatment of choice.

Keywords: Giant cell tumour, fibular head

Introduction
Giant cell tumor of bone is an osseous neoplasm that is histologically benign but clinically shows local aggression and a high rate of recurrence [1, 2].
It accounts for about 5% of all primary bone tumors in adults and predominantly occurs in the third and fourth decades of life with a slight predilection for females [1, 3, 5]. GCT of bone is very rarely seen in children or in adults older than 65 years of age [4]. Usually, the tumor site is at the long bone meta-epiphysis, especially the distal radius and femur, proximal humerus and tibia [4]. Involvement of the foot and ankle is rare and comprises less than 4% of all GCT. GCT of hand and foot are more aggressive and aggressive treatment is recommended.
Clinically, patient presents as a dull aching or a vague pain around the affected joint and sometimes trauma brings notice to the existence of this lesion. Swelling and joint stiffness can also be the presenting complaints. Pathological fractures are seen in 12% of patients at the time of presentation [5].
The diagnosis of giant cell tumour of bones depends mainly on clinical and radiological examination (plain X-ray and MRI) on the site of the lesion along with bone biopsy [6].
The treatment of GCT is directed towards local control without sacrificing joint function. This can be achieved by intralesional curettage with autograft reconstruction by packing the cavity of the excised tumor with morselised iliac corticocancellous bone or using bone cement as packaging material for the defect [7].
GCT were classified by Enneking and later by Campanacci based on radiographic appearance [8]. They described three stages that correlate with tumor local aggressiveness and risk of local recurrence,
Stage I – latent,
Stage II – active,

Stage III – aggressive.

Campaanacci attempted to grade the lesions based on radiological appearance. All of the tumors, both primary and recurrent, are graded radiographically, using the designations Grade I, Grade II, Grade II with fracture, and Grade III.

Grade – I tumor has a well-marginated border of a thin rim of mature bone, and the cortex is intact or slightly thinned but not deformed.

Grade – II tumor has relatively well-defined margins but no radiopaque rim; the combined cortex and rim of reactive bone is rather thin and moderately expanded but still present. Grade-II lesions with a fracture are graded separately.

Grade – III designates a tumor with fuzzy borders, suggesting a rapid and possibly permeative growth; the tumor bulges into the soft tissues, but the soft tissue mass does not follow the contour of the bone and is not limited by an apparent shell of reactive bone [8].

Various benign and malignant tumors unfortunately may be confused with GCT. They include the brown tumor of hyperparathyroidism, aneurysmal bone cyst, telangiectatic osteosarcoma, and malignant fibrous histiocytoma [9].

Case Report

24 years old female presented to us with complaint of pain and swelling over outer aspect of left knee since last two years. Onset was insidious and gradually progressive. Clinical examination revealed diffuse swelling at the anterolateral border of the left knee with normal knee movements and intact neurovascular status with full ankle range of motion. X-ray of left knee with leg in anteroposterior and lateral views were done. It showed a well-defined osteolytic lesion in the epiphysis involving the metaphysical bone of right fibular head without intra-articular extension Magnetic resonance imaging was performed it revealed a well-defined lytic lesion measuring 5x4x4.2cms having narrow zone of transition in the right fibular head epi metaphyseal region MRI findings were confirmed with bone biopsy. Microscopically, the lesion was presented by proliferating uniform oval mono- nuclear cells scattered around the background of numerous osteoclast-type giant cells. Ossification and osteoid production were noted in small foci at the periphery of the lesions, particularly in soft tissue extensions.

Surgical Procedure

Patient underwent operations in the supine position under spinal anesthesia. The posterolateral approach was used to explore the lesions and neurovascular bundle (figure1). The incision started approximately 8 cm proximal to the fibular head and extended along the border of the biceps muscle to the fibula; it then straightened and further extended along the line of the fibular shaft approximately 5 cm below (figure2). First, the common peroneal nerve was explored and approached with the intent of mobilizing the common peroneal nerve and opening and exposing the common peroneal and deep peroneal nerve branches throughout the fibromuscular tunnel (figure 3). The most important part remained the identification of vessels after dissection of lateral head of gastrocnemius where the anterior tibial artery lies in the interosseous space and hinders mobilization, ligation of the anterior tibial artery done.

The anterior tibial and peroneal vessels ligated. Second, intralesional or en bloc resection of the proximal fibular tumor was performed.

Type 1 marginal en bloc resection included resection of the proximal fibula with 1 to 2 cm of the normal diaphysis and a thin muscle cuff in all dimensions while preserving the peroneal nerve and all motor branches [11]. Type 2 wide intracompartmental en bloc resection included resection of the proximal fibula with 3 to 5 cm of the normal diaphysis with the anterior and lateral muscle compartments, peroneal nerve, and if involved by the tumor. We have done type 1 resection (figure3, 4). With careful dissection, all the tumors were resected en bloc with no rent in the capsule and with a good cuff of normal tissues all around the malignant tumors thus achieving adequate wide resection. the muscles attached to the fibula and all around were resected en mass. Large cortical window to access the tumor was created. Extended intralesional curettage was done with the help of multiple angled curettes. A high-power burr was used to break the bony ridges which helped in extending the curettage. A pulsatile wash was given to wash out tumor cells. Phenol was used as adjuvant. To avoid instability at knee joint Reconstruction consisting of repairing the lateral collateral ligament and reinsertion of the biceps femoris tendon on the lateral condyle of the tibia done.

A knee immobilizer was used full-time for the first 4 weeks postoperatively. For the subsequent 2 weeks, patients were allowed to perform gentle knee motion exercises. After 6 weeks, the patients were allowed to gradually progress to full weight bearing.

Discussion

Microscopically GCT consists of multinucleated giant cells scattered in vascularized network of proliferating round, oval or spindle shaped cells surrounding by indistinct cytoplasm (figure5). GCT of bone is a locally aggressive tumor with a high tendency to recur after removal. The rates of recurrence after simple curettage ranged from 12-65% as compared with 12-27% after curettage and adjuvant treatment and 0-12% after resection. In cases of GCTB affecting the hand and foot the recurrence rate is higher in comparison with GCTB in more conventional sites. Hence Adequate removal of tumor seems to be a more important predictive factor for the outcome of surgery [12].

Given the sensitive anatomy in this location, we sought to assess the incidence of peroneal nerve palsies, knee stability, and local recurrence after surgical treatment.

We recommend that after the proximal part of the fibula is resected because of the presence of a tumor, the insertions of the LCL and biceps femoris tendon should be meticulously repaired. Repair of the LCL and biceps femoris tendon to the lateral aspect of the tibia is a straightforward, reliable technique. When choosing the point of attachment to bone, the knee is checked through flexion-extension range attempting to locate the most isometric point for repair. The ligament and tendon are attached using nonabsorbable sutures, metallic staples, or more recently, suture anchors.

Given the increased local recurrence rate with intralesional curettage and the malignant transformation of a relatively large portion of tumors (20%), we recommend en bloc resection for more aggressive tumors. Giant cell tumors in other anatomic locations are typically managed satisfactorily by curettage, chemical or thermal cautery of the walls of the cavity, and bone grafting [13]. However, in the proximal fibula, total en bloc excision of the tumor is the treatment of choice [14]. Others have similarly reported a higher recurrence rate after curettage and bone grafting (41%) as opposed to resection (7%) [15]. As such, we strongly recommend en bloc resection of giant cell tumors located in the proximal fibula. The current study does not allow us to comment on the role of

radiation. If intralesional excision is performed, bone grafting of the resulting defect is necessary. However, the surgeon must be cognizant that recurrence is common after incomplete removal of the lesion.

We found benign tumors of the proximal fibula are rare. While postoperative permanent peroneal nerve palsies and local recurrences are concerns, knee stability is not if the appropriate repair is completed. Giant cell tumors and aneurysmal bone cysts in the proximal fibula require wide excision with intraarticular resection of the proximal tibiofibular joint given the concern for local recurrences and malignant transformation [16].

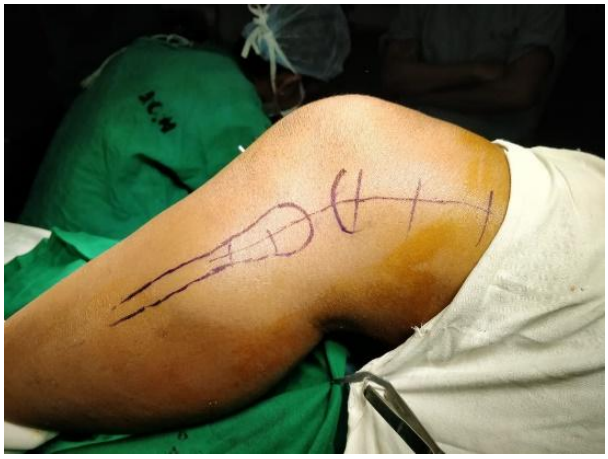

Fig 1: pre-operative clinical picture

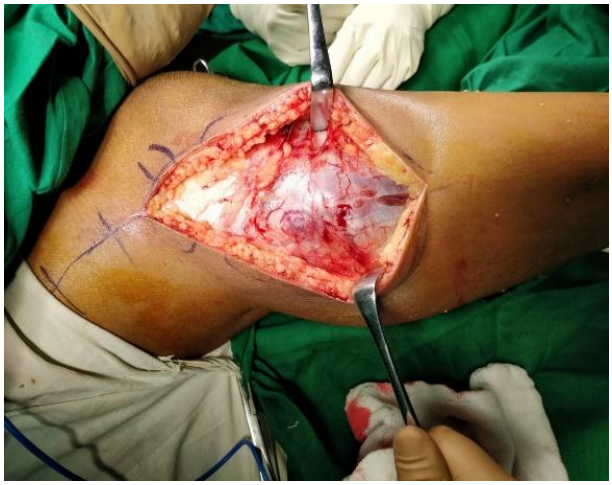

Fig 2: Intra operative clinical picture-exposure

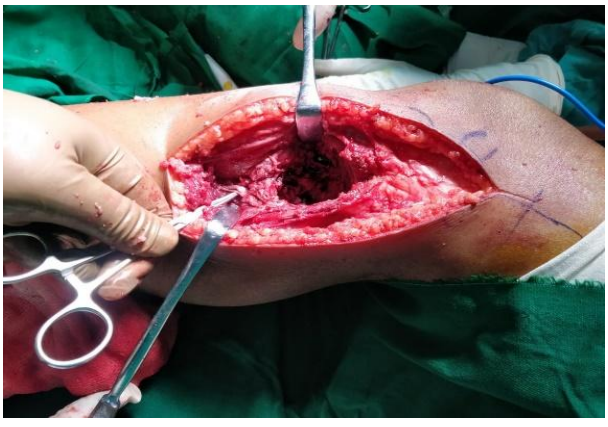

Fig 3: Intra operative clinical picture with nerve

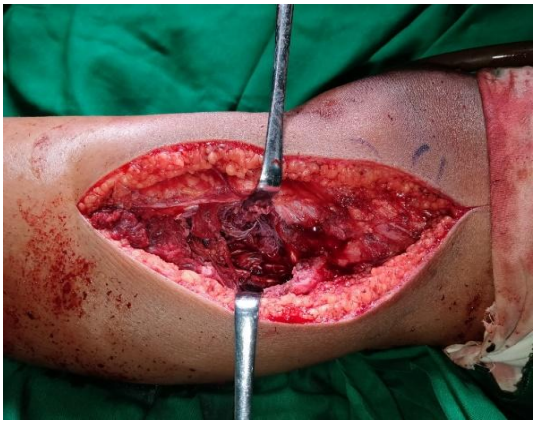

Fig 4: intra-operative clinical picture after resection

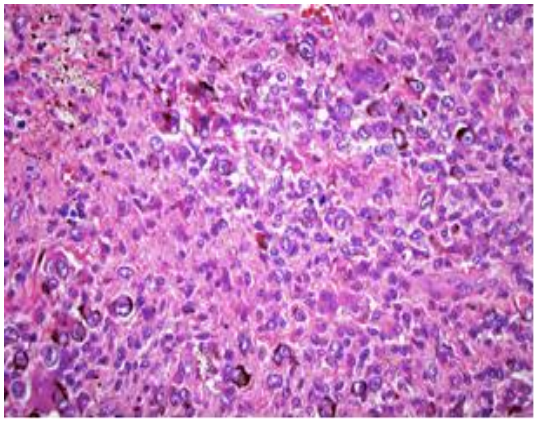

Fig 5: histology

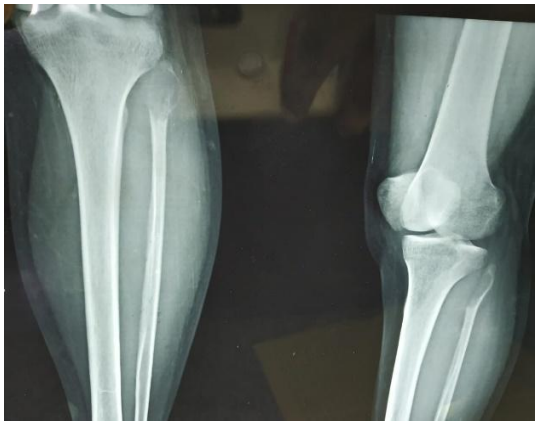

Fig 6: pre-op xray

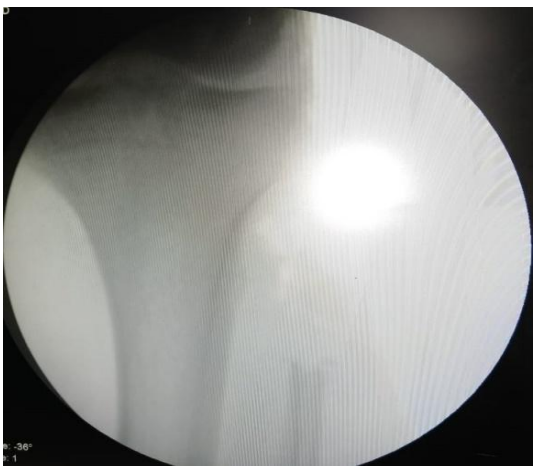

Fig 7: intra-op c arm image

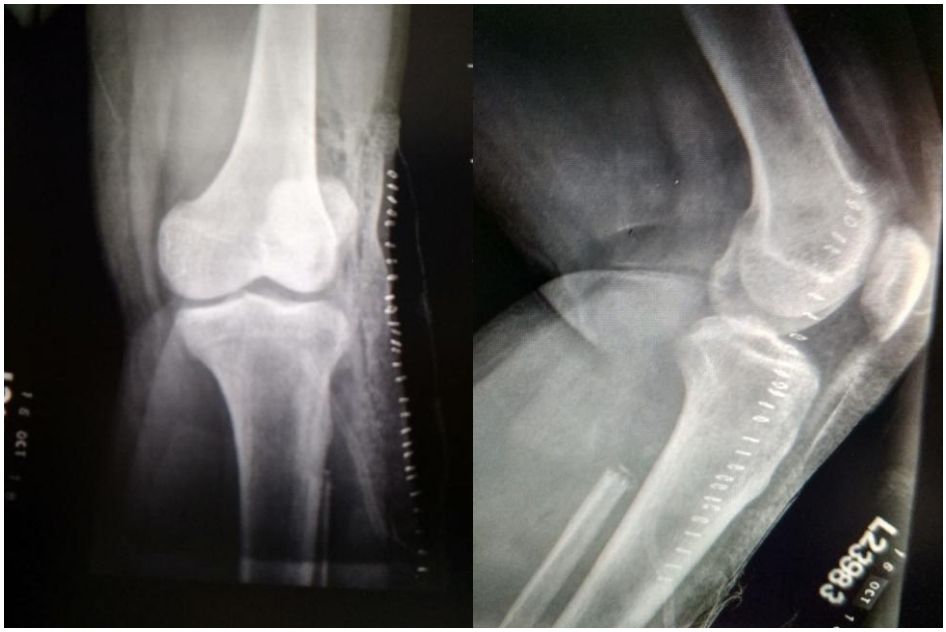

Fig 8, 9: post-op xray AP and lateral

Conclusion

GCTs affecting the fibular head are rare to encounter. Surgical management remain main treatment modality for GCT. Type of surgery depends on preoperative evaluation of patient clinically and radiologically for tumor site, size and involvement of surrounding tissue. Essential factor in the treatment of giant cell tumor is meticulous curettage of the affected bone.

Excision of the tumor neither without affecting the course of commo peroneal nerve / or causing foot drop or affecting the mobility of knee was a challenging task which was achieved by meticuluous dissection of the tumour.

Abbreviations

GCT: giant cell tumor.
GCTB: giant cell tumor of bone

Consent

For this case report to be published patient satisfactorily given informed consent for history, physical examination and publishing clinical photos and other relevant details.

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