International Journal of Orthopaedics and Physiotherapy
Online ISSN: 2664-8997, Print ISSN: 2664-8989
Received: 10-07-2019; Accepted: 25-07-2019; Published: 11-08-2019
www.orthopedicsjournals.com
Volume 1; Issue 1; 2019; Page No. 23-26

Giant cell tumours of the hand managed by curettage and bone grafting: A short case series

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Abstract
Giant cell tumours are rare entity and the one's involving the small bones of the hand are rarer still having an incidence rate of just 2% of all giant cell tumours. These lesions are often locally aggressive and have a tendency to recur. In this short case series we present five cases of giant cell tumours of the phalanx that initially presented as slow growing swelling of small bones of the hand and later on showed signs of increased growth and mild to moderate pain. All the patients were initially investigated by fine needle aspiration cytology which gave us the diagnosis of GCT and they were then investigated by an MRI to determine the soft tissue involvement. All the cases were managed by extended curettage and bone grafting and at one year of follow up have shown more or less full functional recovery without any signs of recurrence like pain or recurrence of swelling.

Keywords: giant cell tumours, curettage, bone grafting

Introduction
Giant cell tumours are rare benign neoplasms and tend to occur in middle aged people from 20 to 40 years of age group. They constitute about 5 to 6 percent of all primary bone neoplasms and out of all GCT the ones involving small bones of hand are only two percent [1].
These tumours quite often are locally aggressive and infiltrate surrounding soft tissues when they present with increase in swelling and pain [2, 3].
The diagnosis is made by clinico-radiological examination and histopathological evaluation confirms it. The treatment is done by extended curettage and bone grafting.
In this short case series we came across five cases of giant cell tumours involving the phalanx of hands that were adequately managed surgically and are symptom free at one year post-op.

Material and methods
This short study was conducted at the Department of orthopaedics SGRRIMHS Dehradun from February 2017 to August 2019. In this time period we came across five patients that had complaints of pain and swelling in the fingers. Out of the five patients two were males and three were females. Two patients were in the third decade of life and two were in their early thirties and one was a 18 year old female. All the five patients had a history of swelling in the digits of hand out of which four patients had involvement of the right hand while one had the swelling in the left hand. The involvement of index finger was there in three patients and two had involvement of ring fingers. The duration of symptoms was only since two months in two patients while three patients had a history of four months, six months and a year. The patient with history of one year was a 32 year old female who gave history of trauma initially that was followed by pain and gradually increasing swelling in the middle finger. Rest of the patients had similar history of a insidiously and progressively increasing swelling of the finger without any trauma or constitutional symptoms.
On examination all patients had a fusiform swelling of the involved digit. On palpation deep tenderness was present in three patients. The skin overlying the swellings were completely free in four patients and in one female it was mostly mobile except for one or two points on the dorsal aspect where the mobility was slightly restricted. The movements at the interphalangeal and metacarpophalangeal joints were with in normal range in four patients while in one patient the distal interphalangeal joint showed slight terminal restriction of flexion with pain.
All the patients were investigated by plain X-rays all of which showed an expansile lytic lesion involving the phalanx. The cortical margins were thinned out in all patients. In three patients there was no sign of any cortical erosion or periosteal reaction and the articular margins were intact. However in one twenty five years old female there was some erosion of the cortical margin on one side and a little breach of the articular surface of distal phalanx and another 18 year old female showed marked cortical thinning on one side of proximal phalanx with some increased density in surrounding soft tissue.
MRI was done for two patients and in both patients there was a expansile multiloculated heterogenous lesion involving the entire bone with eccentricity to one side. The 25 year old female patient showed some cortical breach of the mid phalanx with minimal soft tissue component and another patient showed a little cortical destruction of the proximal phalanx without any infiltration in the soft tissues.
The radiological grading of the tumours was done according

to Campanacci and Ennecking classification and was as follows.

Table 1.

Campanacci grade	No. of patients
Grade 1	3
Grade 2	2
Grade 3	0

Table 2.

Enneking stage	No. of patients
Stage 1	2
Stage 2	3
Stage 3	0

Rest of the three patients had well defined margins and intact sclerotic cortical rims without any soft tissue extension. Chest X-rays were done for all patients and they had no signs of pulmonary metastasis.

Treatment

All the patients were managed by extended curettage of the lesion by high speed burr. It was later followed by cancellous bone grafting. Three patients had well circumscribed lesions that were approached via a small cortical window and the tumour was removed from the cavity with the help of a small curette. The walls of the cavity were further curetted with the help of a high speed burr. In two patients the cortical margin was slightly breached so a cortical window as not required to be made. All the tumourous tissue was curetted with the curette and high speed burr and any soft tissue that showed signs of involvement was excised. After the extended curettage the cavity was filled with cancellous bone graft that was harvested from iliac crest in two patients and from the distal radial metaphysics in three patients.

The immediate post-op period was uneventful and the stitches were removed at tenth post-op day. Range of motion exercises were started on the third post-op day.

Follow up of patients was done by michigan hand outcome questionnaire at 4 weeks, 8 weeks, 24 weeks and at end of one year. At each follow up evaluation was done by the six scale scoring system of michigan hand outcome questionnaire. The raw score was calculated for each scale and then was converted to a score range from 0 to 100 and monitoring of functional evaluation was done.

All patients recovered well and there has been no complication or any signs of recurrence till now.

Discussion

Giant cell tumours are benign tumours of bone but sometimes can be locally aggressive. They are most commonly found around the knee joint and are usually seen in the third and fourth decade of life [4]. GCT involving the fingers are quite rare as compared to their occurrence in other parts of the body[5] as supported by Goldenberg and Yasuda *et al*. in their work on GCT which have shown very few incidence of GCT in the phalanx and metacarpals in their case series [6, 7]. In our study also we came across just five cases of GCT of small bones of hand in a span of two and half years.

GCT can cause confusion in the diagnosis due to their resemblance in clinical and radiological features to other benign lytic lesions like enchondromas or bone cysts. However certain features of GCT as locally aggressive tumours like increase in size of swelling, pain or soft tissue involvement can help us in differentiating them from other benign lytic lesions [3].

GCT of small bones of hand are a bit more aggressive than GCT at other sites. Clinically GCT of phalanx or metacarpals presents as insidiously progressive swelling of the hand that increases in size gradually over a period of months or a year. It is often associated with some pain which usually catches the attention of the patient. However sometimes the patient may experience rapid increase in size of swelling and significant pain [8]. Two patients in our study had a history of more than six months and they exhibited increased intensity of symptoms in the form of increase in size of swelling as well as pain in the last one month.

Once we suspect the cause of symptoms to be a bony neoplastic lesion of the bones of hand the next most easy and informative investigation is a plain X-ray of the affected part which narrows down our diagnosis to a few conditions. A GCT of the phalanx shows an eccentric expansile lytic swelling of the bone with a sclerotic rim [9]. Similar findings were present in the skiagram of all our patients without any periosteal reaction with two patients showing signs of slight cortical breach.

To get a better idea of the extent of the lesion and the soft tissue extension the investigation of choice is the MRI, sometimes CT scan can also be done to get an idea of the structure and morphology of the lesion.

We got a MRI scan done in all of our patients and three out of five showed intact cortical margins with no soft tissue extension however two patients showed some destruction of the cortex with the lesion reaching upto the distal interphalangeal joint and some soft tissue component [9].

Giant cell tumours have been staged according to Ennecking or Campanacci classifications. We classified our patients according to Campanacci staging which is basically a radiological staging and two of our patients were of borderline grade three as they had some cortical erosion while the rest three were of grade two [8, 10].

On radiological investigations the tumour can mimic a host of lytic lesions like aneurysmal bone cyst, brown tumours, metastatic disease etc so the definite diagnosis is made by histopatholical examination.

The main modality of treatment in GCT of phalanx is by surgery [11]. The Giant cell tumours of hand tend to present a bit late when some amount of soft tissue involvement has occurred so we have to do proper evaluation and staging of the lesion before we resort to any means of surgical treatment.

Various treatments that have been done for GCT of the phalanx include simple curettage, curettage with bone grafting, amputation or resection with reconstruction. Simple curettage with bone grafting or curettage supplemented with cryotherapy or chemical cauterisation by phenol are very commonly used but they are also sometimes associated with recurrences [12].

All the patients in our series were managed by curettage of the lesion with a high speed burr followed by bone grafting in the cavity of the lesion. The material removed after curettage was slightly brownish in colour and three patients had areas of some haemorrhage in the matrix. The sample from curettage was sent for histopathological examination which confirmed giant cell tumour in all cases. One case

also had changes like that of an aneurysmal bone cyst on histopathology.

Recurrences after curettage and bone grafting in GCT of the phalanx have been reported many times in literature. The highest rate of recurrence is seen in the ist year after surgery ranging from 4% to 30% of the cases[12]. In cases of recurrence if it is detected early it can be managed by a second local curettage with any of the adjuvant therapy, however if the recurrence is aggressive with soft tissue involvement many a times we have to resort to ray resection. Amputation is a good means to prevent recurrence but many a times is cosmetically unacceptable and causes functional loss.

Denosumab once a month and intravenous bisphosphonates have shown some protective effect against metastasis in a few studies [13, 14].

All our patients were kept on once a month oral ibandronate for a period of six months after surgery and one year post surgery have not shown any signs or symptoms of recurrence.

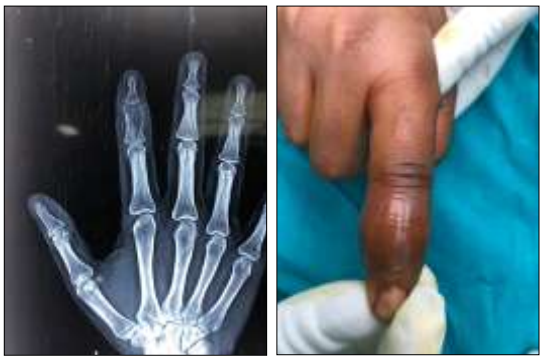
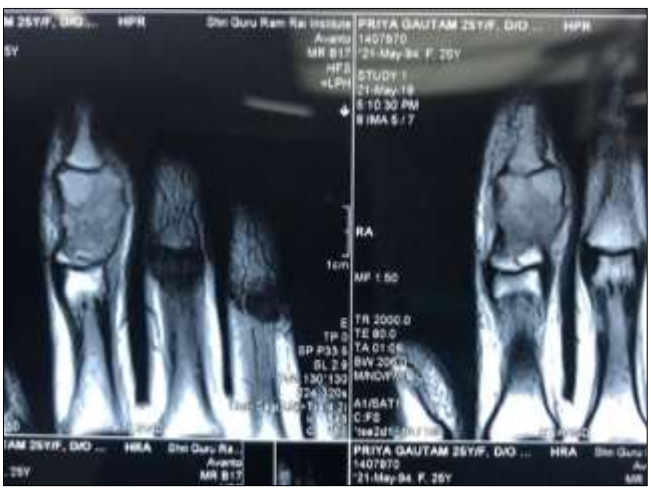


Fig 1: A 25 years old female with lytic lesion in middle phalanx of index finger showing slight cortical erosion.

Fig 2: MRI showing expansile lytic lesion with areas of haemorrhage and fluid levels



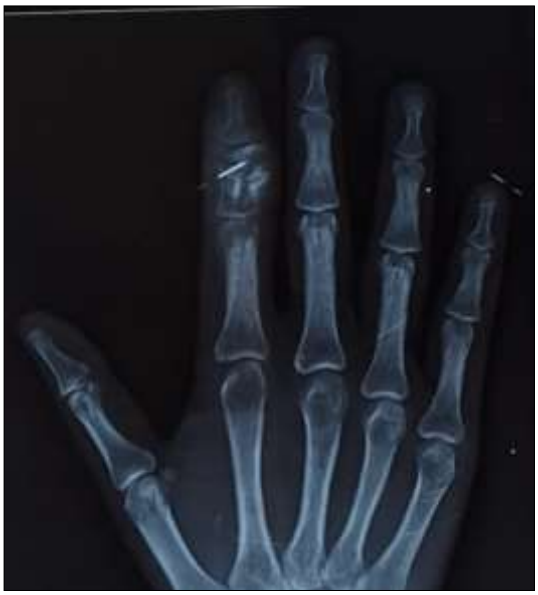


Fig 3: Intra operative photograph showing exposure of the lesion by lateral incision and curettage being done.

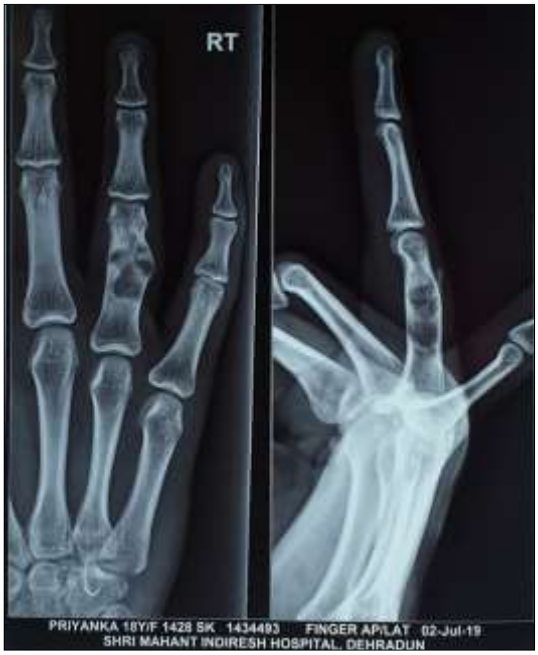


Fig 4: Immediate post op photograph showing cortico cancellous bone graft in the lesion

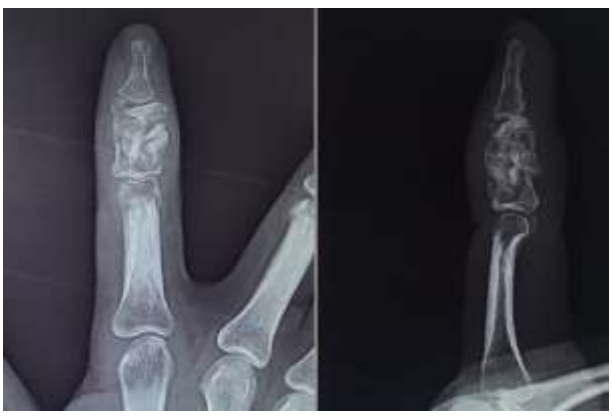


Fig 5: 3 month follow up X-ray showing consolidation of bone graft and no signs of recurrence

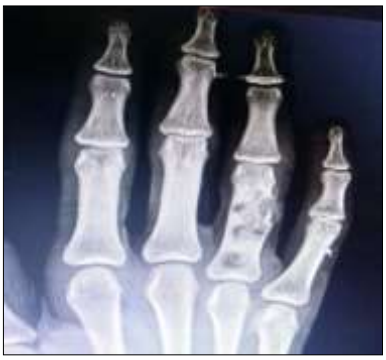


Fig 6: Another case of a 18 year old female with a well circumscribed lytic lesion in proximal phalanx of ring finger.

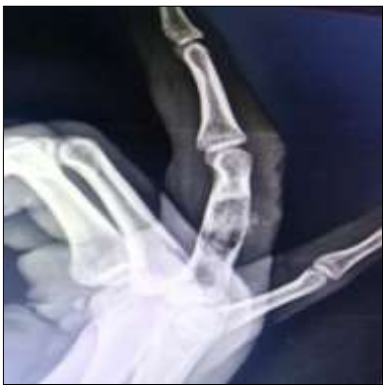


Fig 7: Immediate post op X-ray after curettage and bone grafting of the lesion

2 months follow up X-ray

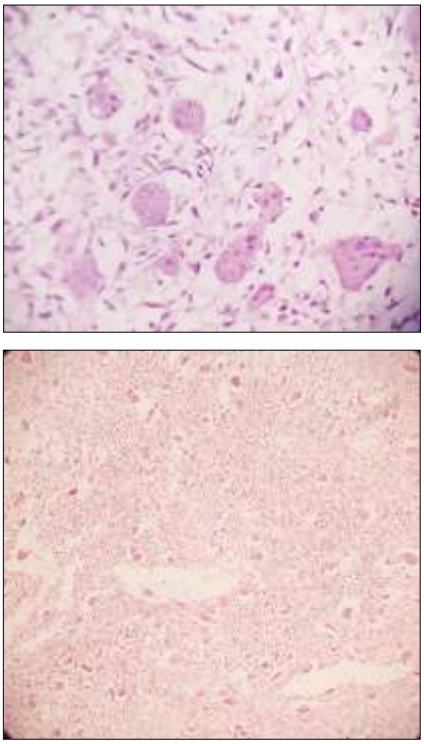


Fig 8: Histopathological picture of the curetted sample showing mononuclear stromal cells and classical multinucleated giant cells

Conclusion

Giant cell tumours in the hand are rare but when they occur they then to be more aggressive with slightly higher recurrence rate. Clinically they present early but the diagnosis can be confused with other benign lesions like enchondroma. X-rays and MRI can give us a good idea about the extent of the lesion and can guide us with the management. Most of the GCT of hand of campanacci grade 1 and 2 can be managed adequately by curettage with bone grafting. A close post operative follow up is to be done to detect any recurrences.

With this short case series we have tried to prove the above points and shown that curettage with bone grafting is a good modality for treatment of GCT of hand.

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