

# Giant Cell Tumor Of First Metacarpal

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## Abstract

Giant Cell Tumor (GCT) or Osteoclastoma is a benign locally aggressive tumor with a tendency for local recurrence. 85-90% of cases occur in the long bones. Only 2% of cases occur in the hand, and hereto metacarpal involvement is a very rare occurrence with only a few cases reported in the literature so far. We report a case of GCT of 1st metacarpal in a 22-year-old female. We discuss the clinical features, pathological and radiological hallmarks, and the various treatment modalities of such a lesion with emphasis on the reconstructive possibilities using cortical strut grafts.

## INTRODUCTION

A variety of tumors or tumorous conditions occur in the hand, but they are usually benign. However because the hand has limited free space and exquisite sensitivity, even small histologically innocent masses can cause pain, impairment of function or significant swelling. Although the malignant neoplasms in the hand that arise from tissues other than skin are rare, the hand may be the site of distant breast, lung or kidney adenocarcinoma metastasis most of which occur in distal phalanges.

Giant cell tumor [GCT] or Osteoclastoma is a benign tumor which however is locally aggressive and has a tendency for local recurrence. Giant cell tumors form about 4-5% of all primary bone tumors. 80% of the patients are above the age of 18 years and there is a distinct female predominance, the ratio ranging from 1.3 to 1.5.

85-90% of the cases occur in the long bones, the sites most commonly affected being the lower end of the femur, upper end of the tibia, the lower end of the radius and sacrum. Only 2% of giant cell tumors occur in the hand and metacarpal involvement is much less common than a phalangeal one. We are presenting a case of a giant cell tumor of the first metacarpal bone of the right hand which is a very rare site for such a tumor.

## CASE REPORT

A 22-year-old female presented to us with the complaints of pain and swelling of her right thumb for duration of two months. The swelling had gradually increased in size and there was a gross restriction of movements of the affected

thumb. There was no history of trauma or any constitutional symptoms. On physical examination, there was a localized swelling over the right first metacarpal with variable consistency. The overlying skin was free and the movements of the metacarpophalangeal and trapeziometacarpal joints were painful and restricted.

Radiographs revealed an expansile osteolytic lesion of the first metacarpal involving the articular surface of the trapeziometacarpal joint. These features were suggestive of a giant cell tumor and therefore fine needle aspiration cytology was done and the diagnosis confirmed.

Due to the low demands of the patient and the available infrastructure, a reconstructive surgery with fusion of the trapeziometacarpal and metacarpophalangeal joint was planned. Grossly the tumor consisted of brown cheesy material and had involved all the soft tissues around. The tumor was carefully removed with a cuff of normal tissue and the proximal and distal joints inspected. There was no articular cartilage of the trapeziometacarpal joint. A tricortical iliac crest graft was taken and was inserted into the troughs created in trapezium and proximal phalanx and fixed with K-wire, both proximally and distally. Histopathological examination showed a well vascularized, highly cellular tissue consisting of stromal mononuclear cells and multinucleated giant cells present in close association with each other. Stromal cells were numerous, predominantly round to oval with foci of spindling, mild degrees of atypia and occasional mitosis. Reactive bone formation with osteoblastic rimming was seen in some areas.

The patient was given a thumb spica for three months post

operatively and then mobilized. At 9 months follow-up, the graft was well taken up and there were no signs of recurrence both clinically and radiologically.

### Figure 1

Figure 1: X-Ray of the right hand showing an expansile osteolytic lesion of the first metacarpal with involvement of trapeziometacarpal joint suggestive of Giant cell tumor



### Figure 2

Figure 2: X-Ray of the right hand [anteroposterior oblique views] after removal of the tumor and reconstruction using tricortical iliac crest bone graft fixed with K-wires



## DISCUSSION

Giant cell tumor of the bone is a benign, but locally aggressive lesion. It is a relatively rare tumor composed of connective tissue stromal cells having the capacity to recruit and interact with multinucleated giant cells that exhibit the phenotypic features of osteoclasts<sub>1</sub>. The precise histogenesis of the tumor is not known.

Giant cell tumor predominates in the long bones [75-90% of cases] especially the femur [approximately 30% cases], tibia [25% cases], radius [10% cases] and humerus [6% cases]. The spine and innominate bone are involved occasionally<sub>1</sub>. Giant cell tumors of the bones of the hand are rare accounting for only 2% of cases and here too phalangeal location of the tumor is more common than metacarpals<sub>1</sub>. GCT of the hand seems to represent a different lesion than conventional GCT in the rest of the skeleton. There is an 18% incidence of multicentric foci indicating that a bone scan should be a part of routine workup of these tumors<sub>2</sub>. Overall they appear in a younger age group and recur more rapidly in the hand than they do in other locations. They also

have a shorter duration of symptoms averaging six months or less before a diagnosis is made.<sup>2</sup>

Despite the fact the GCT is not a sarcoma, the extent of tumor at the time of diagnosis and the high recurrence rate following limited resection often dictate the need of an enbloc resection through normal tissues to prevent local recurrence of the lesion. Such a treatment creates a significant skeletal defect and a challenging reconstructive problem. Reconstruction of the hand after enbloc excision is particularly difficult because of the need to restore the joint surface as well as bone and because of the dysfunction associated with post operative scarring.<sup>3</sup>

The various treatment modalities described in literature are curettage, curettage and bone grafting, irradiation, amputation, and resection with reconstruction,<sup>1, 2</sup>

Local resection of the involved metacarpal with autograft or allograft replacement is the preferred surgical treatment for several reasons. First, no correlation has been found between the grade of giant cell tumor and the rate of recurrence. Therefore all giant tumors of the hand should be considered locally aggressive. In addition curettage with or without bone grafts has resulted in recurrence rates of about 90%. Thus curettage is an unacceptable form of treatment. Second, although amputation may prevent recurrence, it is cosmetically deforming and decreases the function of the hand,<sup>1, 2</sup>. Third, it is feared that multiple surgical procedures may increase the chances of converting a benign tumor into a more malignant one, thus a definite procedure should be

done initially.<sup>4</sup>

The metacarpophalangeal joint reconstruction can be achieved by metatarsal substitution, a combined iliac crest and metatarsal head graft<sup>5</sup> and prosthetic replacement.<sup>6</sup> However, in our case, because of the low functional demands of the patient and the fact that the shortest metatarsal was longer than the involved metacarpal, we performed a local resection followed by reconstruction using a tricortical iliac crest graft fusing both the proximal and distal joints.

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