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# A case series of GCT of tendon sheath

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**Abstract**
Tenosynovial giant cell tumor (TGCT) is a slow growing soft tissue mass, second commonest tumor of the hand. FNAC can often be inconclusive and final diagnosis can only be made after complete resection and histopathological examination. Many factors are considered for recurrence, including proximity to the distal interphalangeal joint, presence of degenerative joint disease, pressure erosions of bone in the radiographs, increased mitotic activity. This study was conducted in the Department of Orthopaedics, Medical College, Kolkata over a period of 12 months. A total of 4 cases of TGCT were operated of which two cases were confirmed preoperatively by FNAC and two had inconclusive preoperative FNAC report which were subsequently proved to be TGCT after open biopsy. Of the 4 patients one had the lesion in middle finger, two in the palm, one each along the middle finger and index finger and one lesion over the ventral aspect of index finger. Patients were investigated with routine radiographs of the involved part and ultrasound scan. One case had bony changes in form of bony indentation and calcification. Recurrence was not found in any of the cases at 6 months. The index finger TGCT developed post-operative stiffness, but regained full range of movements with physical therapy by 6 months.

**Keywords:** Tenosynovial giant cell tumor, hand, FNAC, histopathology, recurrence, surgery, stiffness

## Introduction
Tenosynovial giant cell tumor (TGCT) is a slow growing soft tissue mass that develops over a period of months to years involving the synovium, bursae and tendon sheath. It is the second commonest tumor of the hand [1] but it can be confused with other tumors of hand. FNAC can often be inconclusive and final diagnosis can only be made after complete resection and histopathological examination. Trauma, inflammation, metabolic disease and neoplasia are considered as etiological factors by some authors [2, 3]. Symptoms can include pain, swelling, tenderness, warmth at the location and stiffness of the joint. Giant cell tumors of the tendon sheath can be divided into two types: localised nodular type (most commonly found in the hands and surrounded by pseudocapsule) and diffuse type (usually located around large joints). In localized TGCT, smaller joints tend to be affected such as digits and parts of the foot. In diffuse TGCT, knees are most commonly involved. Surgery is often the initial treatment option. However, depending on the subtype, the tumor can recur particularly in diffuse TGCT which was previously known as pigmented villonodular synovitis (PVNS) [24]. Factors that are considered for recurrence include proximity to the distal interphalangeal joint, presence of degenerative joint disease, pressure erosions of bone in the radiographs, increased mitotic activity, and type 2 lesions described by Al-Qattan [1, 3-5]. But a consistent observation by various authors in preventing recurrence is complete surgical excision with removal of all satellite nodules if and when present [6-8]. Recurrence was found after 2 months post-operatively, by some authors [23]. Recurrence has been reported 10-20% commonly but may be upto 40% [22].

## Material and Methods
This study was conducted in the Department of Orthopaedics, Medical College, Kolkata over a period of 12 months. A total of 4 cases of TGCT were operated of which two cases were confirmed preoperatively by FNAC and two had inconclusive preoperative FNAC report which were subsequently proved to be TGCT after open biopsy. All 4 patients were asked to come for follow-up at 1 month, 3 months and 6 months. Age of patients ranged from 30 to

50 years (mean age 40 years) of the 4 patients one had the lesion in middle finger (Fig 1), two in the palm, one each along the middle finger and index finger (Fig 2, Fig 4) and one lesion over the ventral aspect of index finger (Fig 3). History of previous trauma was present in two cases.

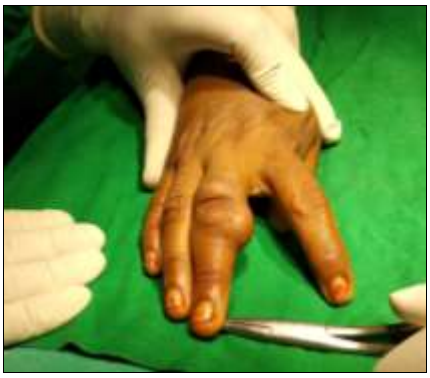

**Fig 1:** Swelling over middle finger

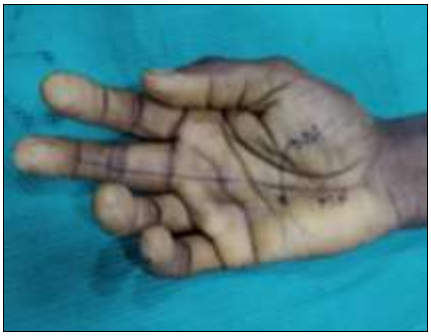

**Fig 2:** Swelling along the ventral aspect of middle finger and palm

**Fig 3:** Sweilling over ventral aspect of index finger

**Fig 4:** swelling over palm over first web space

Patients were investigated with routine radiographs of the involved part and ultrasound scan. One case had bony changes in form of bony indentation and calcification (Fig 5).

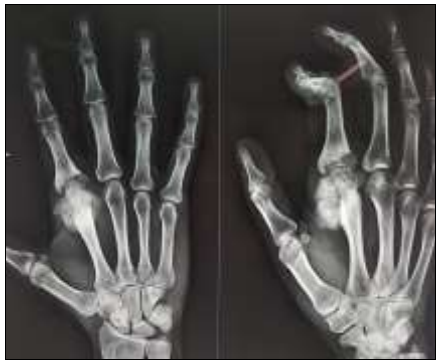

**Fig 5:** TGCT involving index finger showing bony involvement

All patients were subjected to FNAC. The slides were analyzed by histopathologist for the probability of TGCT (Fig 6) so that extra caution could be taken during dissection. All the procedures were performed by the same surgical team.

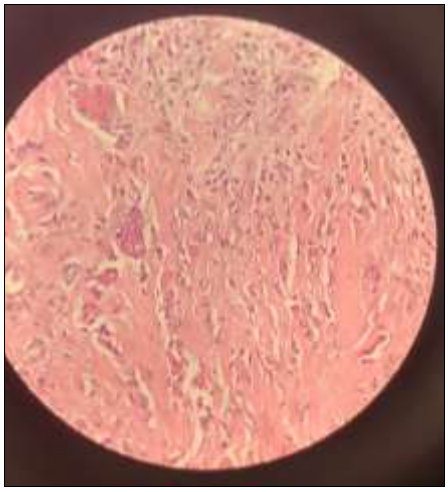

**Fig 6:** Histopathology of tendon sheath GCT

All cases were operated under tourniquet control. Special care was taken to excise the whole tumor with a margin of normal tissue. The operating field was searched for presence of satellite lesions or daughter cysts. The entire specimen was then sent for histopathological examination.

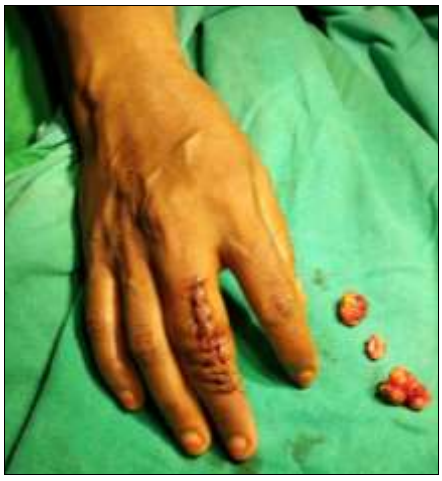

**Fig 7:** Could represent a postoperative view or imaging of a patient treated for TGCT. Suggesting the outcome after surgical intervention

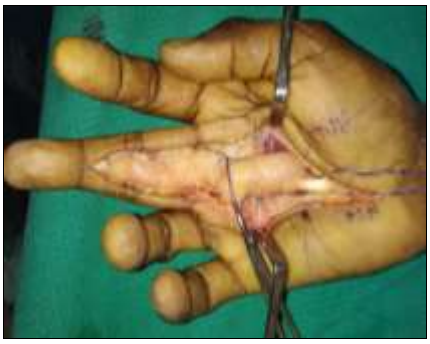

**Fig 8:** Could depict intraoperative findings, such as the tumor or affected area exposed during surgery

**Fig 9:** Might show histopathological slides or magnified images of tissue samples illustrating the cellular characteristics of TGCT

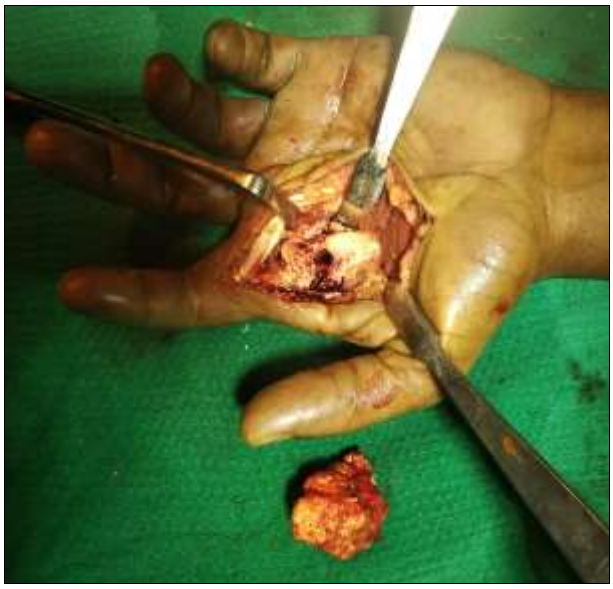

**Fig 10:** Likely relates to a diagnostic imaging scan or follow-up visual showing the treated area post-surgery

## Result

Out of 4 cases two were FNAC positive for giant cells and the other two cases were later confirmed by open biopsy. In 1 case there was skeletal changes in the form of calcification and bony indentation, due to pressure effect of the mass. Recurrence was not found in any of the cases at 6 months. The index finger TGCT developed post-operative stiffness, but regained full range of movements with physical therapy by 6 months.

**Table 1:** Patient demographics, swelling site, diagnosis, postoperative outcomes.

| No | Age | Sex | Site of swelling | Fnac | X ray changes | Postoperative stiffness | Postoperative infection | Recurrence |
|---|---|---|---|---|---|---|---|---|
| 1 | 35 | Male | Middle finger | Positive | No changes | Absent | No | No |
| 2 | 44 | Male | Palm of hand (Along middle finger) | Inconclusive | No changes | Absent | No | No |
| 3 | 49 | Male | Palm of hand (Along index finer) | Inconclusive | Bony indentation with calcification | Present | No | No |
| 4 | 31 | Female | Index finger | Positive | No changes | Absent | No | No |

## Discussion

Giant cell tumor of tendon sheath is a very rare type of tumor and only few cases has been reported. It is often confused with other tumors of hand. Differential diagnosis of hand tumors includes lipoma, hemangioma, foreign body, myxoid cyst, synovial carcinoma, tophaceous gout, glomus tumor, tuberous osteitis, epidermal cyst, fibroma, and metastasis [9, 10]. Only 20% to 30% of giant cell tumors of tendon sheath are clinically diagnosed before surgery [10]. Thus, histopathology is important since the lesion can mimic other conditions which have different types of treatment.

The etiology of giant cell tumor of the tendon sheath is not well defined. The hypothesis of a true neoplasm - resulting from sesamoid bones, from the synovial membrane, or from primitive mesenchymal cells - has been proposed. However, most authors favor the hypothesis that the condition is a reactive inflammation process [11]. Giant cell tumor of tendon sheath commonly involve the short arm of chromosome 1 (1p13) with rearrangement of the *CSF1* gene in majority of cases [12-14] indicating the neoplastic nature of this tumor.

Most giant cell tumors of tendon sheath arise on the fingers (about 85%). Less commonly affected sites include the wrists, feet, ankles, and knees. Very rarely this tumor can occur in the elbow or hip. The tumor can occur in people of any age but commonly affects young to middle-aged adults between 30 and 50 years of age. The tumors are painless, slowly growing nodules in the soft tissue, in close proximity to tendons or interphalangeal joints. Occasionally, these tumors erode nearby bone, shows calcification or involve the overlying skin [15]. Rarely patients present with multiple discrete tumors called satellite lesions usually along a single tendon sheath, but rarely involving separate digits. History of local trauma has been reported in a subset of cases [15].

Giant cell tumors of tendon sheath are usually small nodules between 0.5 and 3 cm in size which are well-circumscribed but lobulated mass, with a white fibrous cut surface. The presence of yellow and brown areas is variable and depends on the number of xanthoma cells and the extent of hemosiderin deposition. Histologically giant cell tumor of tendon sheath is surrounded by a fibrous pseudocapsule and thin bands of fibrous tissue often separate the tumor into nodules. Findings in HPE show multinucleated giant cells, polyhedral histiocytes, fibrosis and hemosiderin deposits [8, 17, 18]. Histological features of cellularity and mitosis, though previously found significant were not found to influence recurrence [1, 16]. But Rao and Vigorita[5] has found high

incidence of recurrence in tumors with increased mitotic activity.

Complete local excision is the treatment of choice for giant cell tumor of the tendon sheath [9] but recurrence rate ranges from 4%-44% [20]. The risk of recurrence is associated mainly with incomplete resection or other reasons like anatomical location (Distal interphalangeal joints or thumb interphalangeal joint), presence of bony erosion on X-rays, association with degenerative disease and diffuse subtype [20]. Age, gender, lesion size, and volar location seem to have no influence on recurrence which can occur due to the lobular nature of the tumor with hidden extension around the tendon sheath [10]. All surrounding tissues should be examined for satellite lesions and their connections must be removed. Local irradiation has been applied as an adjuvant therapy to prevent recurrence [11].

Although the condition is routinely benign, malignant degeneration has been reported in few cases [10]. The diffuse type can be locally aggressive, with reports of possible multiple recurrence and malignant transformation [19].

## Conclusion

GCT of tendon sheath is very rare tumor, commonly occurring in hand may be confused with any other tumor. Definitive diagnosis only be done after complete excision and HPE. Recurrence rate high but it can be reduced by meticulous searching of satellite nodules and complete excision.

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