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Case Report

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A case report of giant cell tumor of the extensor tendon sheath in index finger

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ABSTRACT

Giant cell tumor of the tendon sheath (GCTTS) is an uncommon benign soft tissue lesion of uncertain etiology. Although it predominantly involves the hand, occurrences in the ankle and foot have also been reported but remain rare. Patients typically present with a painless, palpable mass that has often been present for an extended duration. While imaging studies and fine-needle aspiration cytology (FNAC) may suggest the diagnosis, definitive confirmation relies on histopathological examination following surgical excision. This report describes a rare case of GCTTS involving the extensor tendon sheath of the right index finger. A 38-year-old male presented with a 4-year history of a gradually enlarging, painless swelling on the dorsal aspect of the right index finger. Clinical examination revealed a well- defined, firm, 4 cm × 1.5 cm mass located over the proximal phalanx. The swelling had a smooth surface, uniform consistency, and was easily mobile in the lateral plane. Radiographic imaging of the hand showed a localized soft tissue shadow without any evidence of bony involvement. Ultrasonography revealed a soft tissue mass, and FNAC was suggestive of GCTTS. The lesion was subsequently excised, and histopathological analysis confirmed the diagnosis by demonstrating characteristic features of GCTTS. Given its indolent course and subtle presentation, GCTTS should be considered in the differential diagnosis of soft tissue swellings in the hand, particularly in adults. FNAC, followed by surgical excision and histopathological evaluation, remains both diagnostic and therapeutic. Ongoing follow-up is recommended due to the potential for local recurrence.

Keywords: Giant cell tumor, Tendon sheath, Excision biopsy

INTRODUCTION

Giant cell tumor of the tendon sheath (GCTTS) is a benign, firm, and localized soft tissue lesion that arises outside the joint and typically presents as a slow-growing, painless swelling that may persist for years. It affects approximately 1 in 50,000 individuals, with the highest incidence observed in adults between 30 and 50 years of age. Women are slightly more affected than men, with a reported female-to-male ratio of 3:2.[1] Although it predominantly involves small joints of the hands and feet, it can occasionally be found near larger joints such as the ankle, knee, elbow, or hip.[2] Surgical excision remains the cornerstone of treatment, occasionally supplemented by adjuvant radiotherapy. Despite adequate removal, the tumor may recur in about 10–20% of cases.

Originally described in 1852 by Chassaignac as a "fibrous xanthoma," this lesion has since been referred to by a variety of names in medical literature, including fibrous histiocytoma of the synovium, pigmented nodular synovitis, localized nodular tenosynovitis, and giant-cell fibro hemangioma, among others.[3,4] There remains ongoing debate regarding its biological nature-whether it is a true neoplasm or a reactive proliferative process.[5] Although around 15% of patients report trauma preceding

the development of the lesion, a definitive causal link has not been established. Recent studies showing aneuploidy and clonal chromosomal abnormalities in some cases suggest a neoplastic origin.[6,7] The fingers are the most affected sites, with the index finger being involved most frequently, followed by the middle, ring, little fingers, and thumb in decreasing order of incidence. The current case demonstrates the typical clinical manifestation of GCTTS localized to the index finger.[8]

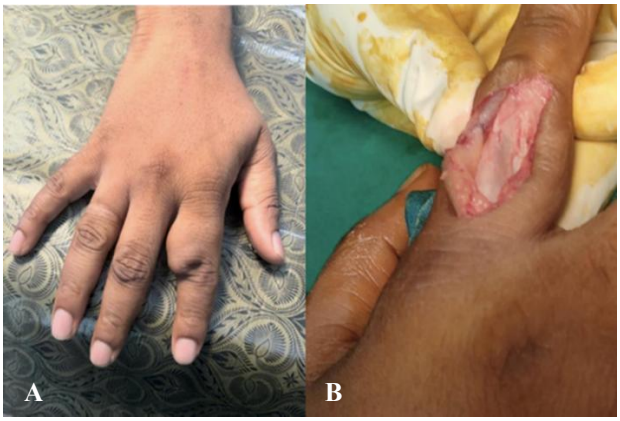

Figure 1: (A) Swelling on the dorsal aspect of the index finger, (B) intra operative excision of tumor.

CASE REPORT

A 38-year-old male presented to the orthopaedic outpatient department of a private hospital in Brahmavara, Udupi District, Karnataka, India, with complaints of a gradually enlarging swelling over the dorsal aspect of the right index finger for the past four years. The onset of the swelling was spontaneous, with no history of preceding trauma, thorn prick, or infection. The mass increased slowly in size and began to interfere mildly with daily and household activities, although pain was absent. On physical examination, a 4×1.5 cm well-defined, firm mass was noted over the dorsal surface of the proximal phalanx of the right index finger (Figure 1A). The swelling was smooth- surfaced, uniformly firm in consistency, and exhibited lateral mobility, while movement along the longitudinal (proximal-distal) axis was restricted. There were no signs of inflammation such as local temperature rise, skin changes, or clinical evidence of bony involvement. The swelling was noted to move with finger motion, suggesting its close association with the tendon. Radiographic evaluation (anteroposterior and oblique views) of the hand revealed a localized soft tissue shadow over the proximal phalanx of the index finger, without any bony erosion or cortical involvement.

Ultrasonographic evaluation revealed a well-defined soft tissue lesion localized to the dorsal aspect of the proximal phalanx. Routine blood investigations-including hemoglobin levels, total and differential leukocyte counts, random blood sugar, liver function tests, and kidney function tests-were within normal limits. The patient was scheduled for excisional biopsy (Figure 1B). Under supraclavicular block anesthesia and tourniquet control, a complete excision of the tumor was performed. The mass was located deep to the fascial layer and was adherent to the extensor tendon sheath. The tumor was removed in a single piece, followed by layered wound closure and release of the tourniquet. The excised mass measured approximately 4×1.5 cm and appeared as a reddish, encapsulated lesion (Figure 2A). Histopathological examination revealed multiple multinucleated giant cells scattered within a stroma composed of polygonal to round histiocytes, adipose, and fibrous tissue (Figure 2B), consistent with a diagnosis of giant cell tumor of the tendon sheath (GCTTS). The post-operative period was uneventful. At six-month follow-up, the patient remained asymptomatic with full range of motion at the metacarpophalangeal and proximal interphalangeal joints. Ultrasonography of the finger revealed no recurrence, abnormal soft tissue mass, or underlying bone erosion. Doppler imaging demonstrated normal vascularity.

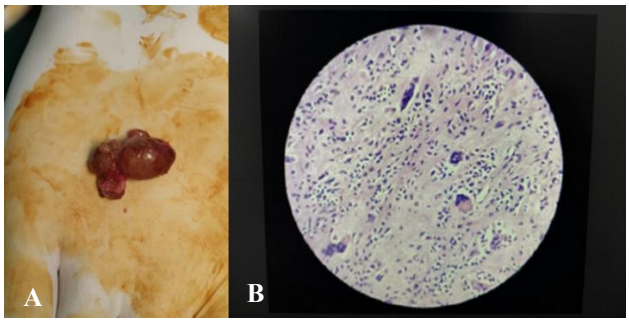

Figure 2: (A) Excised encapsulated tumor, (B) histopathological appearance showing multiple multinucleated giant cells interspersed in a stroma of histiocytes and fibrous tissue.

DISCUSSION

Giant cell tumor of the tendon sheath (GCTTS) typically arises spontaneously, though a subset of patients may associate its onset with minor trauma. The lesion is generally mobile and not adherent to overlying structures; however, in chronic or larger cases, it may produce pressure-induced bone indentation. Owing to the absence of functional limitations in many cases, patients often present at a later stage. GCTTS primarily involves the hand, which accounts for the majority of reported cases. However, involvement of the foot and ankle has also been documented, comprising approximately 3–5% of all cases. In the lower extremity, lesions are commonly located on the dorsum of the foot and lateral aspect of the ankle, frequently involving extensor tendons-making misdiagnosis more probable. In contrast, involvement in the hand typically occurs on the flexor surface.[1-5]

Kant et al analyzed 26 GCTTS cases with a minimum follow-up of two years, identifying the highest incidence in individuals aged 21–40 years and noting bone indentation in 7 patients. Clinically, GCTTS manifests in two distinct forms: the more prevalent localized nodular

type, commonly involving the hands, and the less common diffuse type, which is typically associated with joint involvement and carries a higher risk of recurrence. Rare malignant variants have also been documented. The diffuse form may necessitate repeated interventions due to its aggressive behavior. Recent therapeutic advancements include the use of pexidartinib, a drug that has shown efficacy in reducing tumor size.[8] Lautenbach et al, reviewed 84 cases and found no single imaging modality to be superior for diagnosis or surgical planning.[9] Sonographic appearance of GCTTS may vary, presenting as either hypoechoic or hyperechoic.[10] MRI remains a valuable tool for assessing lesion size and extent, typically showing low signal intensity on both T1- and T2-weighted images.[11] However, MRI lacks specificity for differentiating GCTTS from similar pathologies such as pigmented villonodular synovitis, synovial sarcoma, or synovial chondromatosis-making histological confirmation essential.

Recurrence rates for GCTTS have been reported with considerable variability, ranging between 4.7% and 45%. Recurrence rates for GCTTS have been reported with considerable variability, ranging between 4.7% and 45%. In a cohort study of 64 patients, Grazia et al reported a recurrence rate of 4.7%, with tendon involvement noted in 10.9% and bone erosion in 4.7% of cases.[12] Risk factors for recurrence include radiographic bone erosion, involvement of interphalangeal joints, osteoarthritic changes, and incomplete surgical excision. Tumors in the thumb interphalangeal (IP) and distal interphalangeal (DIP) joints show higher recurrence rates. Microsurgical techniques, including the use of magnifying loupes or an operating microscope, have been associated with improved resection accuracy and lower recurrence. Kotwal et al proposed the use of postoperative radiotherapy (20 Gy in 2 Gy daily fractions) in high-risk cases, achieving a 0% recurrence rate in their patient series.[13,14] However, the role of radiotherapy and histological subtype in predicting recurrence remains debatable. Failure to excise satellite nodules, especially in IP joints, is considered a leading cause of recurrence.[15] In contrast, giant cell tumors of bone frequently recur following intralesional curettage unless supplemented with bone grafts or cement. Wide excision followed by reconstruction offers lower recurrence but does not eliminate the risk of metastasis.[16]

Expression of receptor activator nuclear kappa-B ligand (RANKL) has emerged as a promising prognostic marker for local recurrence in bone GCT, as demonstrated by Ghani et al.[17] The current case displayed the typical benign features of GCTTS. A preoperative diagnosis was suggested by fine-needle aspiration cytology and subsequently confirmed through histopathological analysis of the excised specimen. At six months postoperatively, the patient shows no clinical or ultrasonographic evidence of recurrence. A minimum of two years of long-term follow-up is scheduled to monitor for any potential recurrence.

Follow up

The patient was monitored over a period of 6 months to 1 year, during which no recurrence was noted. Ongoing follow-up is being maintained. Range of motion was within normal limits.

CONCLUSION

GCTTS should be kept as a differential diagnosis in soft tissue tumors of hand in adults. FNAC followed by excisional biopsy is diagnostic and curative, but the patient should be followed up for detecting and managing recurrence.

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