Case Report

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Localised Tenosynovial Giant Cell Tumour of the Great Toe: A Case Report

Orthopaedics Section

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ABSTRACT

Tenosynovial Giant Cell Tumour (TGCT) is a benign proliferative lesion arising from the synovium of tendon sheaths, bursae, or joints. Although localised TGCT is usually described in the digits of the hand, involvement of the foot and isolated great toe lesions remain uncommon. We report a 20-year-old female with no known medical comorbidities who presented with a four-year history of gradually progressive swelling over the plantar aspect of the left great toe, associated with intermittent dull aching pain. Clinical examination revealed a firm, well-circumscribed soft-tissue mass with preserved first metatarsophalangeal joint motion and intact distal neurovascular status. Magnetic Resonance Imaging (MRI) demonstrated a well-defined lesion along the plantar aspect of the first metatarsal and proximal phalanx, encasing the flexor hallucis longus tendon, while Fine-Needle Aspiration Cytology (FNAC) suggested a benign tenosynovial lesion. The tumour was excised en bloc with preservation of the flexor hallucis longus tendon, and histopathological examination confirmed localised TGCT. The lesion was classified as Al-Qattan type I because it was a solitary encapsulated nodule without satellite lesions. The postoperative course was uneventful, and no clinical recurrence was noted at four weeks. This case emphasises the importance of considering TGCT in the differential diagnosis of persistent toe swellings and highlights the role of meticulous complete excision in reducing recurrence risk.

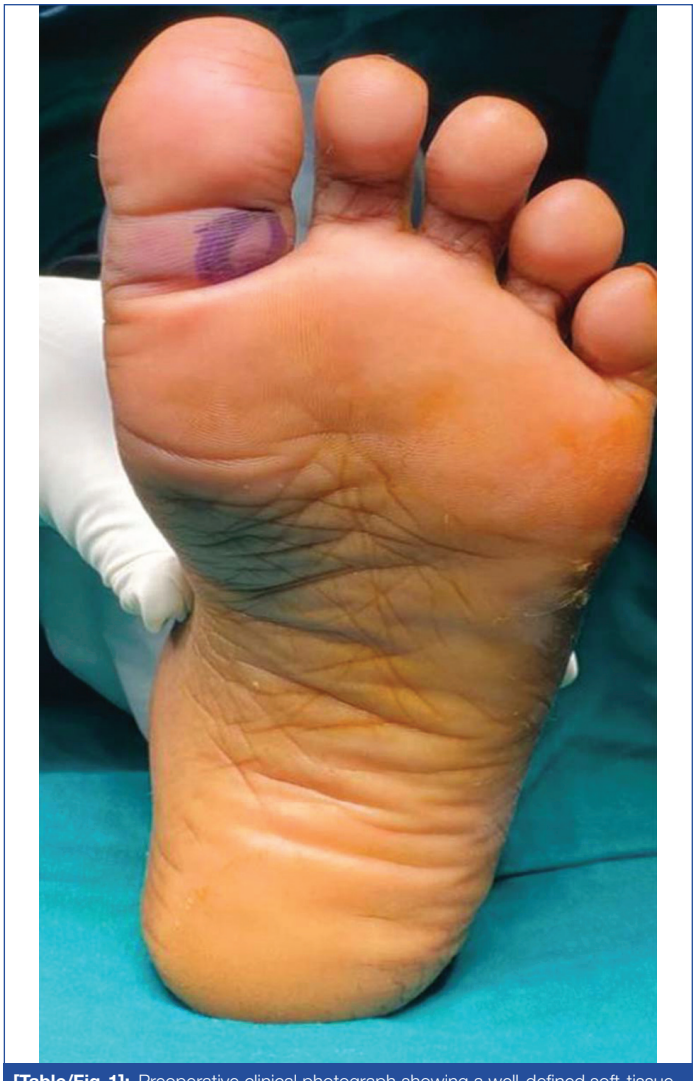
Keywords: Biopsy, Fine-needle, Local, Magnetic resonance imaging, Neoplasm recurrence

CASE REPORT

A 20-year-old female presented to the orthopaedics outpatient department with a four-year history of gradually progressive swelling over the plantar aspect of the left great toe, associated with intermittent dull aching pain that increased on prolonged standing and walking. There was no history of preceding trauma, fever, weight loss, tuberculosis, gout, inflammatory arthritis, diabetes mellitus, hypertension, bleeding disorder, immunosuppression, or any other known medical comorbidity. She was not on long-term medication and had no previous surgery at the involved site. Baseline blood investigations, including complete blood count, erythrocyte sedimentation rate, and C-reactive protein, were not suggestive of an infective or inflammatory lesion.

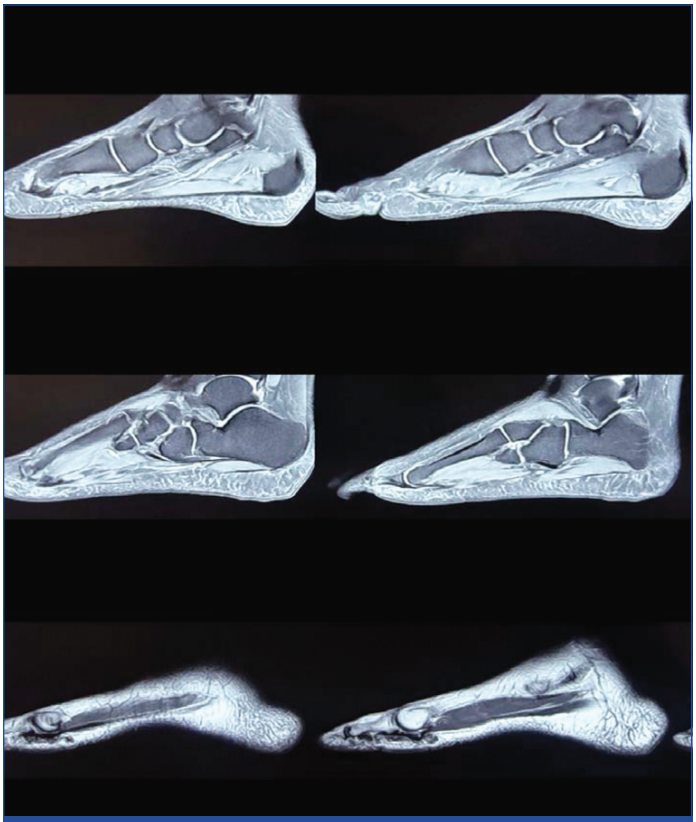
On physical examination, a firm, well-circumscribed swelling was noted at the base of the left great toe along the plantar aspect [Table/Fig-1]. The lesion was minimally tender on deep palpation, non-pulsatile, and mobile relative to the overlying skin, but its movement was limited in relation to the flexor hallucis longus tendon sheath, suggesting tendon-sheath attachment rather than bony origin. There were no signs of local inflammation, discharge, skin discoloration, or ulceration. Range of motion at the first metatarsophalangeal joint was preserved and painless, and distal neurovascular status was intact.

The MRI of the left foot demonstrated a well-defined soft-tissue lesion measuring approximately 1.5×1.5×1.5 cm along the plantar aspect of the first metatarsal head and proximal phalanx, as shown on multi-sequence MRI evaluation [Table/Fig-2]. The lesion was predominantly iso- to hypointense on T1-weighted sequences and hetero- to isointense on T2-weighted sequences, with blooming compatible with haemosiderin deposition. It encased the flexor hallucis longus tendon and showed restricted diffusion with low apparent diffusion coefficient values, without any convincing cortical erosion or marrow involvement. Based on the MRI appearance, the radiological differentials included giant cell tumour of tendon sheath, fibroma of tendon sheath, and other benign soft-tissue lesions; however, the signal pattern and tendon-sheath relationship strongly



[Table/Fig-1]: Preoperative clinical photograph showing a well-defined soft-tissue swelling over the plantar aspect of the left great toe.

favoured TGCT. FNAC revealed scattered multinucleated giant cells, foamy histiocytes, and haemosiderin-laden macrophages in a haemorrhagic background, favouring a benign tenosynovial lesion consistent with TGCT and helping to exclude purely cystic or lipomatous lesions.

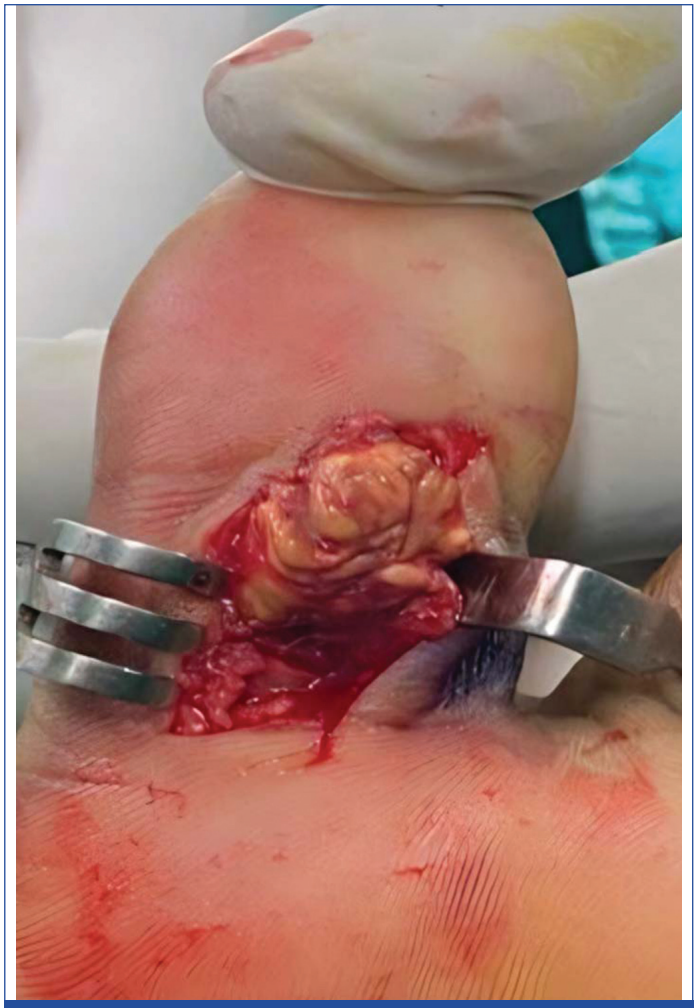


[Table/Fig-2]: Magnetic Resonance Imaging (MRI) of the left foot: (a,b) T1-weighted images showing an iso- to hypointense plantar soft-tissue lesion; (c,d) T2-weighted images showing hetero- to isointense signal; and (e,f) gradient-echo/blooming images suggestive of haemosiderin deposition. The lesion is seen in relation to the flexor hallucis longus tendon, consistent with Tenosynovial Giant Cell Tumour (TGCT).

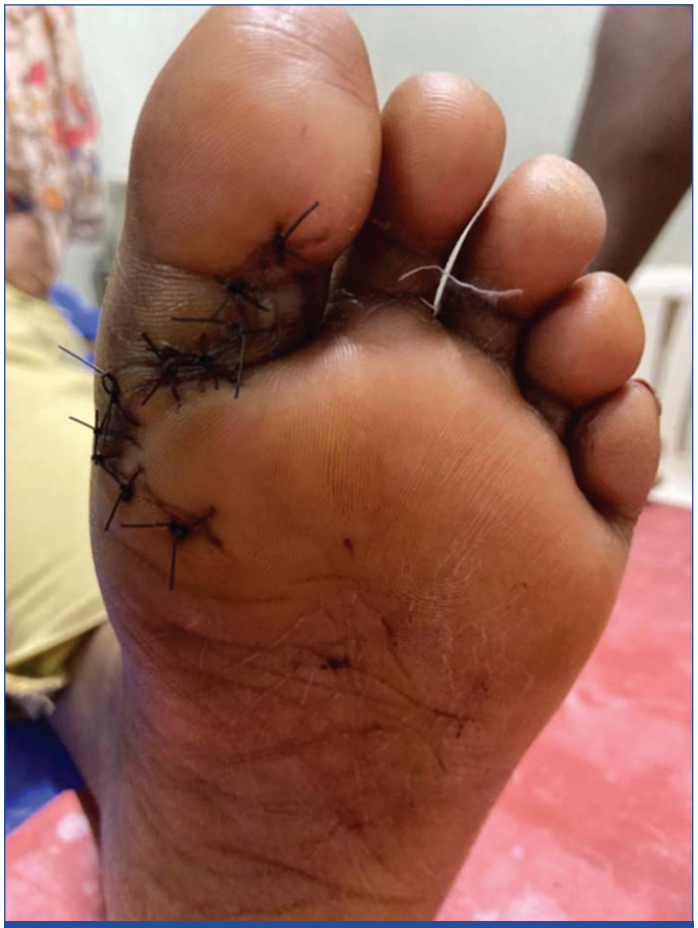
After clinicoradiological correlation, excision biopsy was planned. Under spinal anaesthesia and strict aseptic precautions, a longitudinal plantar incision was made along the medial aspect of the great toe extending towards the head of the first metatarsal. A well-defined encapsulated tumour was identified in relation to the flexor hallucis longus tendon sheath [Table/Fig-3]. The mass was dissected carefully from the surrounding soft-tissue and excised en bloc with preservation of the tendon. Particular care was taken to remove the lesion in toto without breaching the capsule, and the operative field was inspected for any residual tumour tissue or satellite nodules in order to minimise the risk of recurrence. The excised specimen measured approximately 1.5×1.5×1.5 cm and was sent for histopathological examination.

Histopathological examination confirmed TGCT of the tendon sheath. Microscopy showed a cellular lesion composed of mononuclear stromal cells, osteoclast-like multinucleated giant cells, foamy macrophages, and foci of haemosiderin deposition. Based on Al-Qattan's classification, which separates giant cell tumours of tendon sheath into type I solitary encapsulated lesions and type II lesions with separate nodules or satellite lesions, the present tumour was categorised as type I because it was a solitary encapsulated nodular lesion without satellite nodules.

At the first postoperative review at one week, the wound was healthy and there were no signs of infection. By the four-week follow-up, the patient reported complete resolution of pain and was able to ambulate normally. There was no residual swelling, stiffness, scar tenderness, tendon adhesion, or neurovascular compromise, and no clinical evidence of recurrence was noted during the available follow-up period [Table/Fig-4].



[Table/Fig-3]: Intraoperative photograph showing the encapsulated tumour arising from the flexor hallucis longus tendon sheath during excision.



[Table/Fig-4]: Postoperative clinical photograph showing a well-healed plantar incision at follow-up without residual swelling.

DISCUSSION

Localised TGCT is the localised form of the TGCT spectrum and corresponds to the entity historically termed giant cell tumour of tendon sheath. Population-based data indicate that localised TGCT is more frequent than diffuse-type disease, with reported incidence rates of approximately 30.3 per million person-years for localised TGCT and 8.4 per million person-years for diffuse TGCT [1]. It most often occurs in relation to tendon sheaths of the hand and fingers; involvement of the foot and ankle is distinctly less common, and isolated great toe involvement is rare [2,3]. The present case is therefore noteworthy because the lesion arose from the flexor hallucis longus tendon sheath at the plantar base of the great toe, a location where TGCT may clinically resemble ganglion cyst, fibroma of tendon sheath, foreign-body granuloma, gouty tophus, lipoma, or other benign soft-tissue swellings.

The clinical course in this patient was indolent, with a four-year history of slowly progressive swelling and only intermittent dull pain. This pattern is consistent with earlier reports of localised TGCT, which commonly describe a firm, slow-growing mass with preserved or only mildly restricted joint function [2,4,5]. Zendeoui A et al., reported a neglected big-toe lesion in a 32-year-old woman, while Al Aswad MK et al., described a painful firm big-toe mass initially suspected clinically to be gout [4,5]. Similar to those cases, the present lesion was ultimately confirmed only after correlation of clinical findings, imaging, cytology, operative findings, and histopathology.

The MRI was particularly useful in the present case because it demonstrated a well-defined tendon-sheath-related lesion with iso- to hypointense T1 signal, hetero- to isointense T2 signal, and blooming compatible with haemosiderin deposition. These findings are typical of TGCT and help distinguish it from purely cystic, lipomatous, or inflammatory lesions [6,7]. FNAC further supported the diagnosis by showing multinucleated giant cells, foamy histiocytes, and haemosiderin-laden macrophages in a haemorrhagic background, findings consistent with published cytopathological descriptions of giant cell tumour of tendon sheath [8]. Histopathology remains confirmatory because the characteristic combination of mononuclear stromal cells, osteoclast-like giant cells, foamy macrophages, and haemosiderin deposition establishes the diagnosis.

The operative objective in localised TGCT is complete excision with preservation of function while minimising recurrence. In the present case, the lesion was removed en bloc, the flexor hallucis longus tendon was preserved, the capsule was not breached, and the surgical bed was inspected for residual tumour tissue or satellite nodules. These steps are important because recurrence is associated with incomplete excision, satellite nodules, bone or joint involvement, diffuse-type disease, and poorly defined margins [9-11]. Al-Qattan MM reported no recurrence in type I lesions in his series, whereas recurrence occurred in type II lesions, supporting the prognostic relevance of identifying satellite nodules during surgery [9].

Available literature on toe and foot TGCT supports complete local excision as the treatment of choice for small localised lesions. Zhang Y et al., reviewed foot and ankle cases and emphasised the importance of complete excision, while Scheele C et al., recently reported foot and ankle TGCT outcomes and highlighted differences between localised and diffuse disease behaviour [2,3]. Diffuse-type TGCT has a higher tendency for repeated recurrence and functional morbidity, and selected unresectable or recurrent diffuse cases may require adjuvant or systemic treatment directed at colony-stimulating factor 1 receptor pathways. However, such treatment is not indicated for a small, solitary, completely excised localised great-toe lesion such as the present case.

[Table/Fig-5] summarises selected published studies and case reports relevant to localised TGCT of the foot, toe, or tendon sheath. Compared with previous reports, the present case adds a young female patient with long symptom duration, plantar great-toe location, flexor hallucis longus tendon-sheath encasement, no bone involvement, Al-Qattan type I morphology, and uncomplicated early functional recovery [2-5,8]. Although the available follow-up is short, the absence of early recurrence, pain, stiffness, tendon adhesion, or neurovascular compromise supports the adequacy of excision. Longer clinical surveillance

Study	Study type	Site/case profile	Diagnostic modality	Treatment	Follow-up	Recurrence	Outcome/relevance
Zhang Y et al., 2013 [3]	Case series and literature review	Giant cell tumour of tendon sheath involving the foot and ankle	Clinical examination, imaging and histopathology	Surgical excision	Follow-up reported in the study	Recurrence discussed as an important concern	Supported complete excision and careful follow-up for foot and ankle lesions.
Jain S et al., 2022 [8]	Retrospective cytology-based study	Twelve diagnosed cases of giant cell tumour of tendon sheath, predominantly involving digits	Fine-Needle Aspiration Cytology (FNAC); histopathological confirmation available in selected cases	FNAC used for preoperative diagnosis; excision/ histopathology in selected cases	Not specifically applicable as a cytology-focused study	Recurrence prediction discussed in relation to margin, satellite nodules and mitotic activity	Demonstrated that FNAC can support preoperative diagnosis by showing stromal cells, multinucleated giant cells, foamy cells and haemosiderin-laden macrophages.
Zendeoui A et al., 2022 [4]	Case report	32-year-old woman with giant cell tumour of tendon sheath of the big toe	Clinical examination, imaging and histopathology	Excision of the toe lesion	Not stated	No recurrence reported in available follow-up	Reported an unusual big-toe localisation and emphasised differential diagnosis of chronic toe swelling.
Scheele C et al., 2025 [2]	Retrospective cohort study	Foot and ankle TGCT cohort including localised and diffuse forms	Clinical evaluation, imaging and histopathology	Surgery based on subtype and extent	Follow-up reported in the study	Recurrence analysed according to TGCT subtype	Highlighted subtype-based differences in recurrence risk and clinical outcome between localised and diffuse TGCT.
Al Aswad MK et al., 2025 [5]	Case report	41-year-old male with painful firm big-toe mass initially suspected as gout	Clinical examination, imaging and histopathology	Surgical excision	Not stated	No recurrence reported in available follow-up	Reinforced that big-toe TGCT can mimic common benign or inflammatory lesions such as gout.
Present case	Case report	20-year-old female with plantar great-toe lesion encasing the flexor hallucis longus tendon	Clinical examination, Magnetic Resonance Imaging (MRI), FNAC and histopathology	En bloc excision with preservation of the flexor hallucis longus tendon	Four weeks	No clinical recurrence at four weeks	Al-Qattan type I lesion; pain resolved with good early functional recovery and no early recurrence.

[Table/Fig-5]: Summary of selected literature relevant to localised Tenosynovial Giant Cell Tumour (TGCT) of the toe/foot and comparison with the present case [2-5,8].

remains advisable because TGCT recurrence, when it occurs, may be delayed.

CONCLUSION(S)

Localised TGCT of the great toe is rare and may clinically mimic other benign or inflammatory soft-tissue lesions. Persistent toe swelling, particularly when firm, slow-growing, and related to a tendon sheath, should prompt MRI, cytological or histological confirmation, and planned complete excision. In the present Al-Qattan type I lesion, en bloc excision with preservation of the flexor hallucis longus tendon resulted in pain relief and good early functional recovery without clinical recurrence. Continued follow-up is advisable because recurrence risk is mainly related to incomplete excision, diffuse disease, and missed satellite nodules.

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