

Hallux Mystery: A Rare Case of Fibro-Osseous Pseudotumor

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Learning Point of the Article:

This importance of considering FOPD in the differential diagnosis for digital masses, even in atypical locations like the foot.

Abstract

Introduction: Fibro-osseous pseudotumor of the digit (FOPD) is a rare benign growth characterised by fibroblastic proliferation and osteoid formation in subcutaneous tissue. This case report describes an uncommon presentation of a large FOPD lesion in the hallux, notably without nail bed involvement.

Case Report: A 15-year-old male presented with a firm, growing lesion over the proximal phalanx of his right big toe, causing irritation donning shoe wear and limited joint movement. There was no involvement of the nailbed. Imaging suggested a lesion consisted with an Extensor Hallucis Longus tendon sheath tumor (giant cell tumor). Surgical excision produced a 4.5g, 28 × 22 × 15mm circumscribed mass with noted scalloping of the dorsal bone. Histological analysis demonstrated bony trabeculae, osteoclasts, osteoblasts, and a cartilaginous cap. This was consistent with a FOPD. This lesion is deemed benign and carries a favorable prognosis after complete removal, with local recurrence being uncommon.

Conclusion: This unusual case highlights the importance of considering FOPD in the differential diagnosis for digital masses, including those in the foot. Complete surgical excision with clear margins is the treatment of choice, avoiding unnecessary morbidity. Early recognition through multidisciplinary evaluation involving clinical, radiologic, and histopathologic assessment is crucial for accurate diagnosis and optimal management of FOPD. Maintaining a high index of suspicion for this benign entity can prevent misdiagnosis and inappropriate treatment.

Keywords: Case report, fibro-osseous pseudotumor of the digit, benign tumour, hallux.

Introduction

Musculoskeletal tumors and tumor-like lesions in the foot and ankle region can present with a wide range of clinical and radiographic features. Common lesions in this area include giant cell tumors of the tendon sheath, which are among the most frequent soft-tissue tumors of the foot and ankle. These typically manifest as slowly growing, painless masses closely associated with the tendon sheath [1]. Soft-tissue sarcomas, which are malignant neoplasms, can arise from various soft-tissue

structures in the foot and ankle and often present as rapidly enlarging, painful masses [2]. Benign soft-tissue lesions such as fibromas, lipomas, and ganglion cysts can appear as palpable masses of varying sizes and growth rates, depending on the specific pathology [3]. Rare benign entities, such as pseudo-malignant osseous soft-tissue tumors, can mimic neoplastic processes radiographically by appearing as bony protrusions from the cortical surface [4]. Bizarre parosteal osteochondromatous proliferation, also known as Nora's lesion,

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Figure 1: Pre-operative clinical presentation of fibro-osseous pseudotumor of the digit in the right foot's hallux.

is a benign, tumor-like lesion that arises from the periosteum and presents as a bony outgrowth on imaging [4]. Another uncommon lesion to consider is the fibro-osseous pseudotumor of the digit (FOPD), which typically originates from the cortical surface of the affected phalanx or metatarsal bone [5].

FOPD is a rare benign lesion characterized by fibro-osseous proliferation in the soft tissues of the digits. It most commonly



Figure 2b: AP radiograph of foot showing soft tissue lesion with no coronal deformity or involvement of physis



Figure 2a: Lateral radiograph of foot demonstrating soft tissue lesion with calcification and dorsal scalloping of bone

affects the hands and wrists of young adult females, with the index finger being the predominant site [6, 7]. FOPD involving the feet is exceedingly uncommon, with only a few cases reported in the literature [8, 9, 10].

We present an unusual case of a 15-year-old male patient who developed FOPD in the hallux (great toe) of his right foot without antecedent trauma. This case does not involve the nailbed. The patient presented with a gradually enlarging mass over the proximal phalanx, causing local irritation and limiting joint mobility. Radiologic findings were concerning for a giant cell tumor, prompting surgical intervention [10].

Case Report

This case involves a 15-year-old male who presented to the pediatric orthopedic outpatient clinic with a rapidly growing lesion on the proximal phalanx of his right hallux, without nail bed involvement, as shown in Figure 1. The lesion had gradually increased in size over the past year. The patient reported that the swelling was aggravated by the rubbing of shoe wear and experienced pain only when the toe was flexed or extended. He denied any history of trauma to the toe. A neurovascular assessment revealed normal results, with a palpable dorsalis pedis pulse, preserved digital nerve function, and no changes to

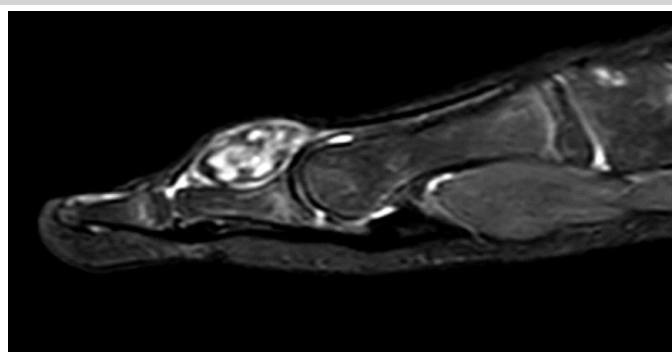


Figure 3a: Sagittal STIR sequence MRI showing a well-defined ovoid-shaped ossified body overlying the proximal phalanx of the hallux underneath the EHL tendon.

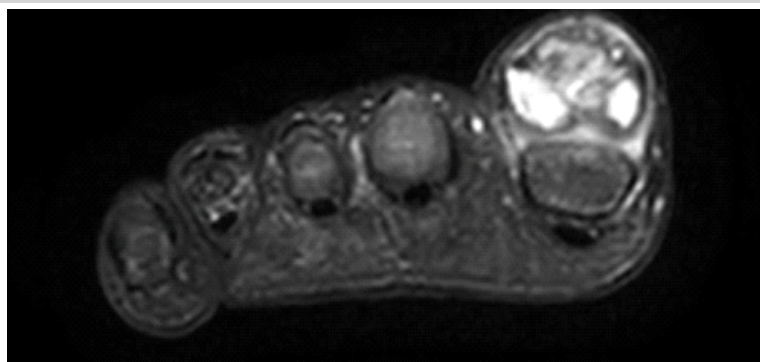


Figure 3b: Axial STIR sequence MRI showing a lesion underneath the EHL tendon of the great toe.

the nail bed.

Radiological examinations included X-rays and magnetic resonance imaging (MRI); the radiograph revealed soft-tissue shadowing and slight scalloping of the bone dorsally, as shown in Figure 2a and b. MRI findings suggested a giant cell tumor of the extensor hallucis longus (EHL) tendon sheath, as shown in Figures 3a, b, c. Radiologically, FOPD lesions appear as ill-defined, calcified soft-tissue masses, lacking the distinct zoning pattern seen in myositis ossificans, though histologically, FOPD resembles this condition.

The patient underwent surgery in which the mass was carefully dissected from the EHL tendon, to which it was attached through the tendon sheath, through a dorsal elliptical incision, as shown in Figure 4a. There was noted scalloping of the dorsal proximal phalanx due to compression, but no significant changes to the periosteum or physis were observed. The circumscribed tumor weighed 4.5 g and measured $28 \times 22 \times 15$ mm, as shown in Figure 4b. Histological analysis revealed bony trabeculae with osteoclastic and osteoblastic proliferation, as well as a cartilaginous cap. These findings were pathologically consistent

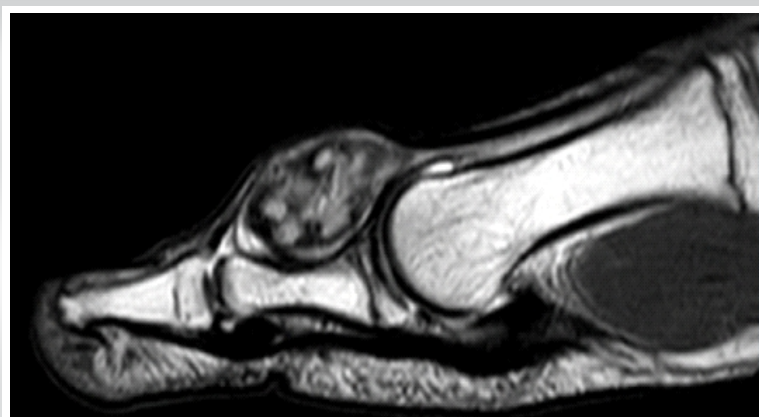


Figure 3c: Sagittal T2 MRI showing lesion with obvious scalloping of dorsal aspect proximal phalanx great toe.

with FOPD. females, with the index finger being the most frequently reported site [6, 9]. The index finger is the most frequently reported site, while only 1 out of 21 cases in the study by Dupree and Enzinger (1986) involved the feet [7]. A recent case report from 2021 described a 26-year-old female diagnosed with FOPD on the dorsal aspect of her left hallux [8], unlike our case, where there was no involvement of the nail bed. Another similar case in 2020 involved a 40-year-old man who was initially treated for pyogenic granuloma, but further investigations revealed FOPD [10].

Although several cases of FOPD have been reported since first described by Dupree and Enzinger in 1986 [7] our case is unique due to the extremely rare location of FOPD in the hallux without a history of trauma. We experienced FOPD formation in the hallux with no history of trauma to the great toe in a 15-year-old male. While the etiology of FOPD is unclear, trauma has been observed in approximately

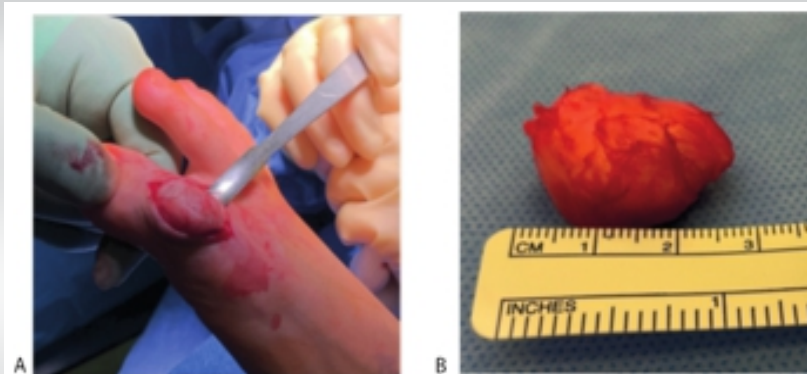


Figure 4: (A) Intraoperative fibro-osseous pseudotumor excision via dorsal elliptical incision. (B) complete excision of mass measuring 2.8cm.

Figure 4: (A) Intraoperative fibro-osseous pseudotumor excision versus dorsal elliptical incision. (B) Complete excision of a mass measuring 2.8 cm.

40% of cases [7].

Among young patients, bone tumors like osteosarcoma or Ewing's sarcoma are common, yet rarely manifest in the foot region [2]. Instead, synovial sarcoma is the most common histological diagnosis for soft-tissue tumors in this age group and anatomical location. In the context of foot tumors, it is important to note that most lesions encountered are benign or tumor-like conditions. Malignant soft tissue and skeletal tumors of the foot are exceedingly rare, and their diagnosis is often delayed, leading to referrals to specialized teams after initial inappropriate procedures or unplanned excisions. Misdiagnosis of foot tumors can have adverse consequences, including an increased risk of amputation or local recurrence. Therefore, thorough imaging studies and histopathological examinations are essential when undertaking any local treatment for foot lumps. Early recognition and careful evaluation are crucial.

Despite the rarity of FOPD occurring in the foot, it should be considered a potential diagnosis in this location. Our patient underwent complete surgical excision, which is the gold standard treatment approach for FOPD. This procedure typically yields an excellent prognosis with a low risk of recurrence when the lesion is entirely removed. Extensive resection beyond the lesion margins is generally unnecessary, as FOPD is a benign condition, and malignant transformation is exceedingly rare. However, it is crucial to rule out malignancy

and ensure clear margins during excision to prevent inappropriate amputation and preserve the function of the digit [5]. Previous reports have documented instances of unnecessary amputations resulting from misdiagnosis [5,14]. Therefore, we emphasize the importance of not ruling out the hallux for FOPD immediately; excisional biopsy and comprehensive histopathological examination to accurately diagnose FOPD, guide timely and correct management.

Conclusion

We report a rare case of FOPD in the hallux of a 15-year-old male with no history of trauma or identifiable cause. Complete surgical excision with clear margins, the recommended treatment for FOPD, was successfully performed, resulting in an excellent prognosis with a low risk of recurrence. Early recognition and accurate diagnosis through excisional biopsy and comprehensive histopathological evaluation are essential for appropriate management.

Clinical Message

This case underscores the importance of considering FOPD in the differential diagnosis for digital masses, even in atypical locations like the foot. It highlights the necessity of thorough clinical, radiologic, and histopathologic assessments to establish an accurate diagnosis and guide treatment, emphasizing that early recognition and complete surgical excision are crucial.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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