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CASE REPORT

Solitary Subungual Neurofibroma of the Right Great Toe: A Case Report

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Abstract

Background: Solitary subungual neurofibroma is an exceptionally rare benign tumor of the nerve sheath that most commonly presents as a slow-growing, painless subungual nodule. Owing to its uncommon location and nonspecific presentation, it is frequently misdiagnosed as a fungal or inflammatory nail disorder. Fifteen cases have been reported worldwide, highlighting the importance of awareness and accurate diagnosis.

Case presentation: The patient, a 47-year-old Bangladeshi male, presented with a three-year history of a painless, progressively enlarging nodule beneath the nail of his right great toe. Clinical evaluation revealed nail deformity (onychodystrophy), lifting of the nail plate, and a firm mass beneath the nail, with no evidence of neurofibromatosis or any underlying systemic illness. Imaging and ultrasonography revealed a hypoechoic mass, and surgical excision under local anesthesia was performed. Histopathological analysis revealed a benign, unencapsulated spindle cell neoplasm with a shredded carrot collagenous appearance containing mast cells. Postoperative recovery was uneventful, with no recurrence after one year.

Conclusion: This case highlights the diagnostic challenges posed by solitary subungual neurofibromas because of their rarity and nonspecific presentation. Early recognition, histopathological confirmation, and complete surgical excision are key to favorable outcomes. Clinicians should keep neurofibroma in mind as a possible diagnosis for nail bed tumors, particularly when imaging results are unclear.

Keywords: Solitary subungual neurofibroma, nail neoplasm, hypoechoic mass, rare case, Bangladesh

Background

Neurofibroma is a non-cancerous growth that originates from the sheath surrounding peripheral nerves. It is composed of fibrous and neural components. While solitary neurofibromas are relatively common in the general population, solitary subungual myxoid neurofibroma is a rare, benign, white/ pink nodular tumor of perineural cell origin, that is usually non-tender. Histologically, it is characterized by bland spindle-shaped cells with wavy nuclei, embedded in an abundant myxoid matrix.[1] These tumors typically exhibit poorly defined, infiltrative borders that blend with the surrounding dermis or soft tissue. Immunohistochemical staining is usually positive for the S-100 protein, confirming its neural origin.[2] Clinically, solitary subungual myxoid neurofibromas may present as asymptomatic, slow-growing nodules beneath the nail and are often misdiagnosed because of their uncommon location. Nail tumors are a common cause of nail plate deformity, and they are often misdiagnosed as inflammatory or fungal diseases. Since subungual tumors are typically nonspecific, an appropriate diagnosis can be made only following exploratory surgery of the nail apparatus.[3] Neurofibromas, which arise from Schwann cells and are classified as benign nerve sheath tumors, account for approximately 5% of all benign soft tissue tumors. They can occur as solitary tumors or as part the neurofibromatosis syndrome. Certain tumors, such as squamous cell carcinoma, fibrokeratoma, glomus tumors, and koenen tumors, can clinically resemble neurofibromas.[4] Neurofibromas can develop as solitary tumors or as components of neurofibromatosis. Solitary subungual neurofibroma is an exceptionally rare entity.[5] Subungual neurofibromas are extremely uncommon, with 15 examples recorded worldwide so

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far.[6] The clinical features are often vague, and a diagnosis is usually made intraoperatively or postoperatively. Here we present a case of solitary subungual neurofibroma of the nail bed in the right great toe, contributing to the limited global literature and emphasizing the need for clinical suspicion and accurate histopathological diagnosis with similar presentations.

Case presentation

The patient, a 47-year-old Bangladeshi male of South Asian ethnicity, presented without any comorbidities, had a round tumor on the medial side of his right great toe's nail bed. At the time of diagnosis, the tumor was approximately three years old, had a history of thickening and nail plate elevation, and was gradually growing in size (Fig. 1). The nail plate was securely affixed to the subungual tissue. The medial aspect had a noticeable longitudinal curvature. The solid tumor was white and gray in color, smooth, and nodule-shaped. It was approximately 3.5 cm long and 2.8 cm wide, painless, and had substantial onychodystrophy. There was occasional bleeding. There was no accompanying inflammation, and the distal phalanx's sensory evaluation was normal. The patient had no history of trauma. There were no signs or symptoms of type I neurofibromatosis. Mycological and laboratory tests revealed no abnormalities, and physical examination revealed no additional abnormalities. The X-ray of the area, done a few weeks prior to report, revealed normal finings. A hypoechogenic nodular tumor measuring 3.5 × 2.8 cm with a poor Doppler signal was discovered via ultrasonography. The patient and his family members showed no signs of generalized von Recklinghausen's illness.

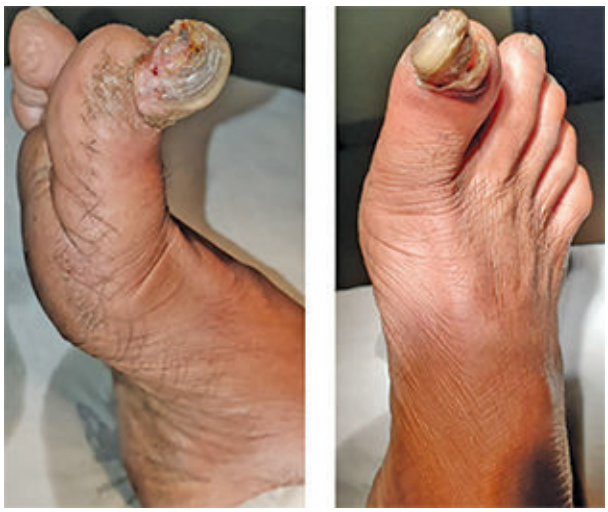

Figure 1: Features of 3-year-old swelling in the great toe right nail bed at the 1st visit

Under local anesthesia, surgery was carried out. After the nail was surgically removed, a swelling was observed on the medial side of the tissue beneath the nail. The tumor was white in color, well-defined, smooth, solid, and encapsulated, and it grew toward the pulp. The underlying skin was used to patch it, and the nail bed exhibited pedunculated growth (Fig. 2). The area was discovered to be pressure necrosed with a hard consistency upon transverse excision. The tumor was removed from this region and beneath the nail bed, and the specimen measured 3.5 x 2.8 cm. The nail bed was repositioned in conjunction with direct suture. Post operatively oral antibiotics cefixime 400 mg twice daily for 7 days and oral analgesics paracetamol 500 mg every 8 hours as needed for pain were prescribed.

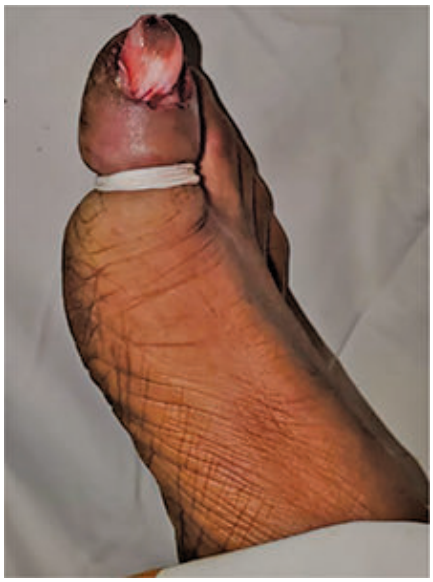

Figure 2: Nodular swelling arising from the right great toe nail bed after nail removal with an area of ischemic necrosis

Histologically, it is generally a benign peripheral nerve sheath tumor, unencapsulated, uniform spindle cell neoplasm with low cellularity and composed of neural and fibrous components. The stroma had a shredded-carrot-like collagenous appearance (Figure 4 & 5) and contained interspersed mast cells, especially in diffuse-type neurofibromas. It also revealed uniform spindle cells embedded in a collagenous stroma. The lesion consists predominantly of Schwann cells, which

display bland, spindle-shaped morphology with thin, wavy nuclei (Fig. 6). The diagnosis was confirmed by histopathology.

The patient returned for a follow-up to have the stitches removed after two weeks (Fig. 3). The follow-up was uneventful and revealed no local recurrence after one year of surgery.

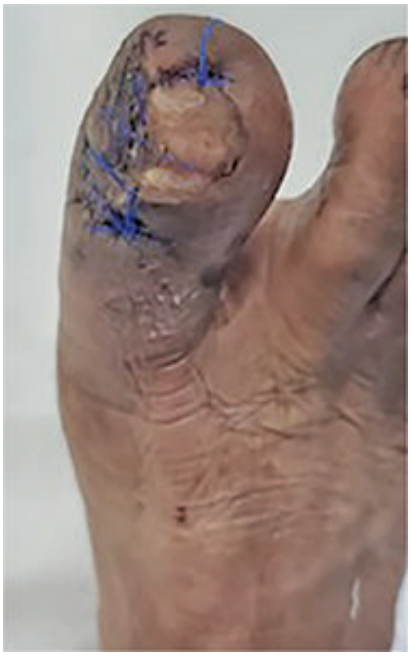

Figure 3: 14th POD of after the excision of the neurofibroma

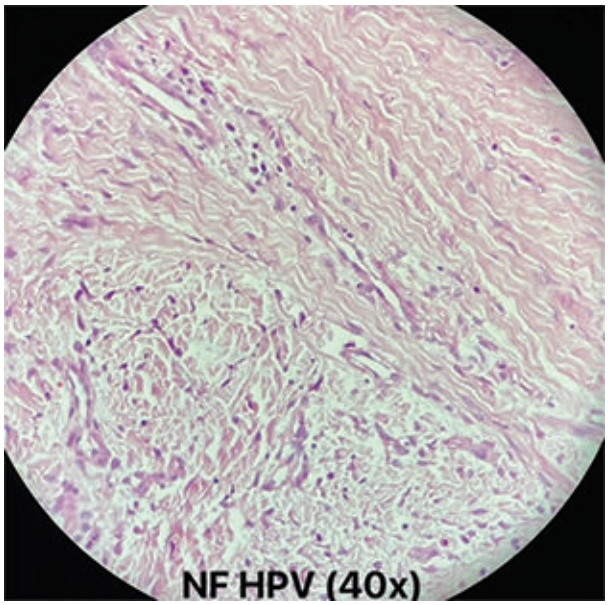

Figure 4: Stromal collagen showing a typical shredded carrot appearance

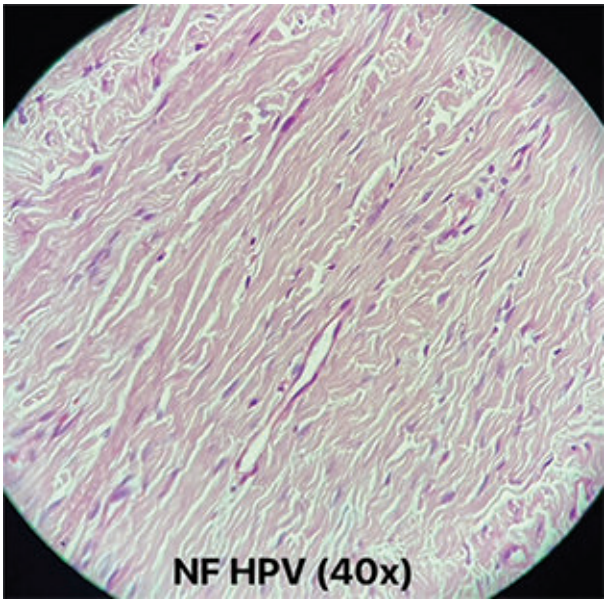

Figure 5: Stromal collagen showing a typical shredded carrot appearance

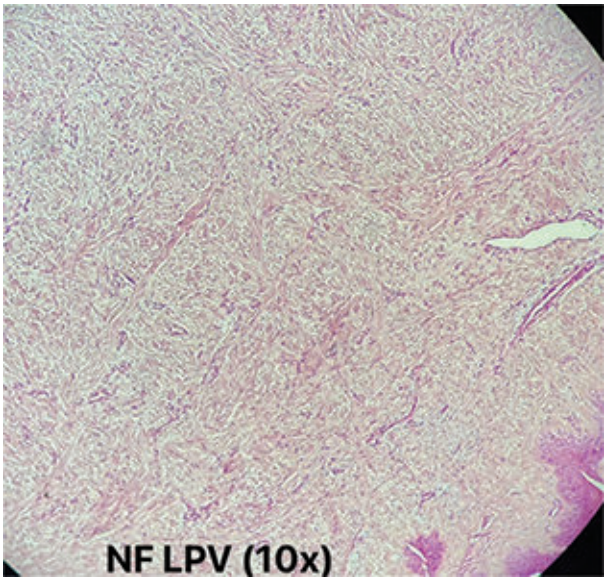

Figure 6: Uniform spindle cells with a collagenous stroma and Schwann cells with bland spindle shaped cells containing thin, wavy nuclei

Discussion

In a case report of Nail bed solitary neurofibroma published in 2019 mentioned till then 9 cases of 9 case of nail bed solitary neurofibroma were reported.[4] Out of those cases two subungual neurofibroma reported did not mention about the presence or absence of Recklinghausen disease. Including that reported cases of nail bed solitary neurofibroma 7 were

in the upper limb and rest 3 were in lower limb. Indicating that lower limb is relatively rare area of affection. Recent literature published in 2025 indicates that subungual neurofibromas is exceedingly rare, with 15 cases reported worldwide till the date of study.[6] The fingers are affected primarily in infrequently reported cases. At the subungual site, there are fewer toe tumors.[7] The lesions tend to be small tumors ranging from 0.5 cm to 1.8 cm in size. Patients don't have specific clinical features.[3,7-10] In this case it was found the tumor in the lower limb over the right great toe. These tumors grow very slowly and most commonly do not cause any pain. In 1981, Runne and Orfanos first described such mass. Recent studies in the literature have focused mostly on females between the ages of 13 and 60, even though solitary neurofibromas can occur between the third and fourth decades without sexual predominance. The masses begin as painless nodules, develop gradually, and emerge from tiny nerves.[8] These tumors appear more frequently in middle-aged women, affect the fingers and toes, and are either painful or asymptomatic, however, in our case, we found a male patient with a neurofibroma.[3]

The longest patient history observed was 6 years (average 2.4 years) present in left thumb in a 60-year-old woman[7], whereas reported patient had 3 years of history. Three cases, which are comparable to reported case, described thickening and elevation of the nail plate. In all published cases of solitary neurofibroma of the nail bed, there was only one instance where no nail plate deformity was observed following surgical removal.[10] No cases of recurrence were recorded with a maximum follow-up of 1.5 years.[11] The literature revealed that there was also no risk of recurrence, and follow-up was uneventful in this reported patient. The most effective diagnostic and treatment method appears to be nail surgery.[3] Surgery is crucial for making a diagnosis because of the vague clinical presentation and radiological characteristics. As a diagnostic and therapeutic tool, total surgical excision must be taken into consideration in every situation.[4] We also performed surgical excision under local anesthesia.

In five out of nine cases, radiography was normal, hence, imaging instruments were not particularly helpful in determining the diagnosis. The reported patient's bone prints showed no bony invasion. Because, neurofibromas and schwannomas have similar appearances on MRI. MRI is rarely used due to its small size, peripheral location, and nonspecific imaging features of the nail bed during preoperative diagnosis of solitary neurofibroma.[4] In our study, we were not able to perform a Magnetic Resonance Imaging (MRI).

According to histology, neurofibromas are hamartomatous proliferations of several neuro-mesenchymal constituents, such as mast cells, Schwann cells, endoneuria fibroblasts, and perineurial cells.[3] In this study, well-defined tumor proliferation with stroma and a shredded-carrot-like collagenous appearance were observed. It is a benign, unencapsulated spindle cell neoplasm with low cellularity. In another study, histopathology analysis revealed a well-defined, nonencapsulated tumor composed of bundles of loosely spindle cells with elongated nuclei, interlacing neural filaments, and a myxoid stroma with pale cytoplasm. Immunohistochemistry (IHC) test could be useful for demonstrating S-100 protein staining.[4] Another study reported a case of subungual neurofibroma with similar clinical characteristics and presented with a glomus tumor-like appearance.[12] Subungual neurofibromas should be taken into consideration for the diagnosis of nail bed tumors because of their uncommon occurrence and unclear presentation. For diagnosis and therapy, total surgical excision is still the most reliable method.

We were not able to perform MRI, immuno-histochemistry (IHC), or other advanced diagnostic tests due to limited local availability, financial constraints, and low disease awareness among patient, underscoring the significant diagnostic challenges in low-resource settings. In such contexts, nail surgery has emerged as the most effective diagnostic and therapeutic option, enabling both clinical assessment and definitive diagnosis through surgical excision and histopathological evaluation.

Conclusion

Subungual neurofibromas are unique in presentation. Even though this type of tumor is uncommon and owing to its nonspecific clinical and radiological features, solitary neurofibroma of the nail bed can resemble typical nail disorders and should therefore be considered in the differential diagnosis of nail bed tumors.

Consent for publication: Written informed consent was obtained from the patient to publish this case report in accordance with the journal's patient consent policy. A copy of the written consent is available for review by the editor-in-chief of this journal upon request.

Conflict of Interest: There are no conflicts of interest.

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