Subungual Exostosis

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Subungual exostosis (SE) is a relatively uncommon benign tumor of the bone occurring in the distal phalanx of a digit. Its similarities to other dermatologic disorders involving the nail bed often can lead to misdiagnosis, which may result in inadequate or extreme treatments. We present a case of a 20-year-old man with an exquisitely tender lesion on the distal phalanx of the left fourth toe. We also review the clinical presentation, pathogenesis, histologic and radiographic findings, diagnosis, and treatment of SE.

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First described by Dupuytren[1] in 1847, subungual exostosis (SE) is a solitary benign tumor of the bone occurring on the dorsal or dorsomedial aspect of the distal phalanx of a digit with a variable relationship to the nail bed.[2,3] This hyperkeratotic bony proliferation occurs on the great toe in nearly 80% of cases and rarely on other digits.[4,5] The pathogenesis is unknown, though many causes have been proposed, including trauma, chronic infection, heredity, and activation of a cartilaginous cyst.[5] Patients most commonly are affected in the second or third decades of life; however, SE has been reported in a wide age range with an equal gender distribution.[6] Although often misdiagnosed, diagnosis is confirmed radiographically and treatment is complete excision.[7] We report SE presenting as an exquisitely tender lesion on the lateral nail plate of the distal phalanx of the left fourth toe.

Case Report

A 20-year-old man with no notable medical history presented to our dermatology clinic with an exquisitely tender lesion on his left fourth toe of 3 months' duration (Figure 1). The patient denied any history of trauma to the area. He also denied any discharge or bleeding from the lesion. He had no history of similar lesions. Physical examination revealed a 6-mm, pink, firm papule under the lateral aspect of the nail plate of his left fourth toe with overlying telangiectases. Dystrophy and thinning of the nail plate also were noted. Radiographically, a 3×4-mm SE protruding laterally from the distal phalanx of the left fourth toe was observed (Figure 2). The patient was referred to the podiatry department for surgical removal.

Comment

Subungual exostosis is an uncommon variant of osteochondroma, typically occurring as a solitary outgrowth of normal bone on the dorsal or dorsomedial aspect of the distal phalanx.[6] Subungual exostosis has a predilection for the toes (86%–90%). The majority of SEs (77%–80%) occur on the great toe. Occasionally, SE will occur on the distal phalanx of

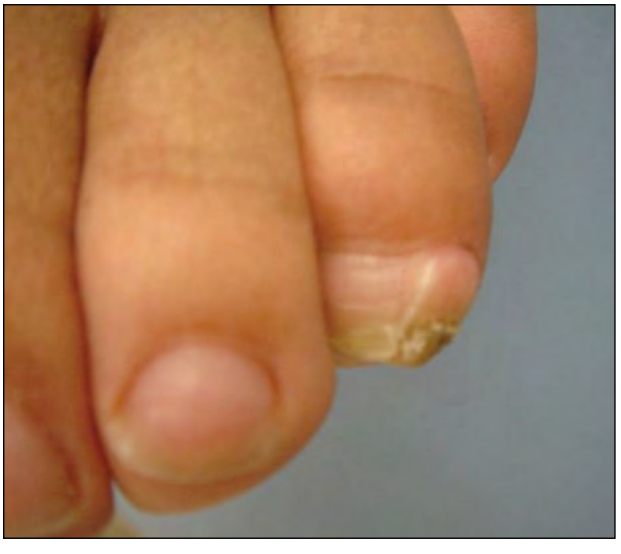

Figure 1. Tender lesion of the distal phalanx of the left fourth toe due to subungual exostosis.

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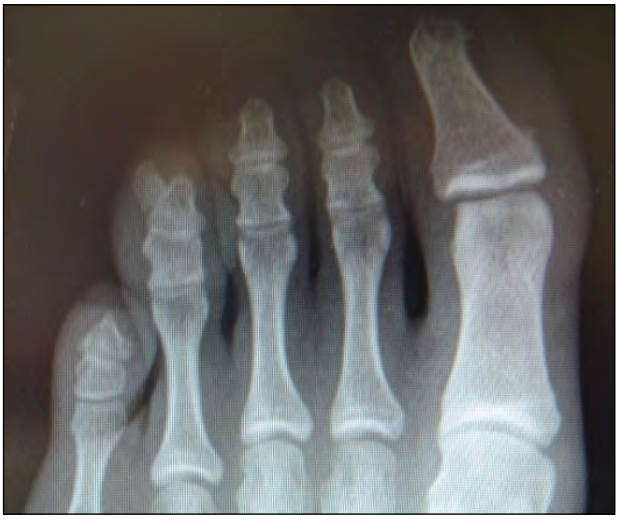

Figure 2. Radiograph of a 3×4-mm subungual exostosis protruding laterally from the distal phalanx of the left fourth toe.

the fingers (10%–14%). Epidemiologically, patients most commonly are affected in the second or third decades of life; however, SE has been reported in a wide age range (7–58 years).[6] Some authors report a female predilection; however, most of the literature reports an equal gender distribution.[6,8]

Typically, SEs present as solitary, small, firm, reddish pink nodules localized beneath or adjacent to the nail plate.[8] Pain is present due to the expanding exostosis and ulceration of the overlying skin, which often is exacerbated while walking.[2] Clinical presentations vary depending on when a patient seeks care. To explain the differences in presentation, García Carmona et al[9] proposed a clinical classification scheme based on the clinical signs and symptoms present during examination and the associated disorders of the nail plate, progressing in severity from type 1 (mild deformity) to type 4 (medial or lateral condyle). Type 1 deformities are caused by normal or minimal incurvation of the nail plate. Type 2 deformities are a progression of type 1 in which the exostosis is distal to the nail plate. A type 3 deformity is associated with exostosis that is under the nail plate. Type 4 deformities are classified as osseous proliferations of either the medial or lateral condyles of the distal phalanx.[9] Using this classification system, our patient's nail would be classified as a type 3 deformity.

Subungual exostosis is considered to be a reactive rather than neoplastic process.[9] No formal studies have investigated the exact pathogenesis. Most studies propose that SE is a deformity acquired via trauma or microtrauma, representing cartilaginous metaplasia.[2] Chronic infection also has been considered a cause of SE; however, the infection is more likely resultant of the underlying lesion and the ulceration it creates.[5] Other studies have postulated that possible etiologies include teratologic abnormalities, forme fruste of multiple hereditary exostoses, activation of a cartilaginous cyst, or defect in the perichondrial node of Ranvier.[3,5]

Histologically, the immature lesion only has a thick fibrocartilaginous cap, contributing to exophytic growth of the lesion.[2,5,6,8] The mature lesion consists of a base of trabecular bone with a proliferating fibrocartilaginous cap,[5] thereby differentiating SE from osteochondroma, which has a cartilaginous cap that consists of hyaline cartilage.[2] Subungual exostosis is hypercellular and the cartilage cells may have plump nuclei. However, the lack of anaplasia and its distinct radiographic appearance differentiate SE from chondrosarcoma. Malignant degeneration has not been reported.[5,6]

Radiographically, SE appears as a bony outgrowth composed of trabecular bone, projecting from the dorsal or dorsomedial aspect of the distal phalanx.[8] The cartilaginous cap is radiolucent, which can make the clinical concerns seem disproportionate to radiologic findings.[5] There is no cortical or medullary continuity to the underlying bone, differentiating SE from numerous dermatologic disorders affecting the nail bed.[6]

The clinical presentation leads SE to be easily misdiagnosed, which may result in inadequate or extreme treatments. The histologic and radiologic findings make SE distinct. The differential diagnosis includes subungual verruca, pyogenic granuloma, glomus tumor, epidermal inclusion cyst, carcinoma of the nail bed, keratoacanthoma, enchondroma, Koenen tumor, and ingrowing toenail.[3]

After diagnosis, a patient with SE should be referred to a podiatrist, orthopedist, or preferably a dermatologic surgeon for surgical intervention. Surgical intervention is the most appropriate treatment; when correctly performed, long-lasting results are obtained.[7] Recurrence rates vary from 11% to 53%[6]; however, if the lesion base is excised at the cortex until spongy bone is observed, recurrence rates drop to 5% to 11%.[8]

Conclusion

It is crucial to obtain histopathologic and/or radiographic evidence of SE or misdiagnosis may occur. Misdiagnosis may lead to inadequate treatment and result in recurrence, extreme treatments, and sometimes digital amputation. Proper diagnosis and subsequent referral to a podiatrist, orthopedist, or dermatologic surgeon for surgical intervention may lead to reduced recurrence rates and favorable patient outcomes.

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