

## CASE REPORT

### Subungual exostosis of the big toe

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#### Abstract

The subungual exostosis is a benign bone tumor on the distal phalanx of a digit, beneath or adjacent to the nail, often bringing in discussion many differential diagnosis. We present a 14-year-old boy with a cutaneous nodular lesion, painful to the easy touch on the latero-internal half of the nail of right big toe with extension in the cutaneous part of this. He suffered many treatments, especially cauterization, but with recurrence. In the present, the radiological findings of the affected finger and the histopathological ones from the fragment excised confirmed the diagnosis of subungual exostosis. The local excision of the entire region with the removal of the cartilaginous cap has been followed by a silent period without recurrences of almost two years when he was revised.

**Keywords:** subungual, exostosis, lesion, osteoid.

#### □ Introduction

Subungual exostosis is a benign bone tumor. This lesion is not a true exostosis, but an outgrowth of normal bone tissue [1]. It occurs predominantly in children and young adults and often, nearly 80% affects the great toe and rarely other toes [2]. Moreover, there are little reports on this entity in the literature. This tumor presents as a firm swelling below the nail, which usually displaces the tip and is often misdiagnosed, leading to inadequate therapy or extreme treatments such as digital amputation or radiation therapy. The radiological findings, in majority of cases may establish the diagnosis with certainty [1].

We report a subungual exostosis on the big toe from the left foot with a nodular inflammatory firm aspect with eroded surface, which had serious problems of diagnosis including that of achromic malignant melanoma or osteosarcoma.

#### □ Patient and Methods

A 14-year-old boy presented in the pediatric department for a tumor, with nodular aspect, painful, bleeding on the left big toe.

The lesion debuted two years ago with the presence of a small painful nodular lesion on the latero-internal half nail bed of the big toe, with elevation and destruction on the nail at this level (in this area). Initially has been considerate a subungual verruca, then

pyogenic granuloma, the patient suffered many repeated surgical interventions after that the tumor reappears. He did not recognize a significant symptomatology before the apparition of the lesion, excepting an easy discomfort on the left big toe correlated with the trauma at this level, he being a soccer lover.

The lesion was excised and the lumpectomy was processed by histopathological technique through paraffin embedding. There have been performed thin sections for the usual Hematoxylin-Eosin stain.

Because the clinical aspect of the lesion in this case brings in discussion main diagnosis, inclusive the achromic malignant melanoma, we consider necessary a dermatological and histopathological examination, and also a radiographic examination.

#### □ Results

The general physical examination was normal. The dermatological examination discovered a nodular tumor lesion with the diameter over 1.5 cm, hard, painful, with eroded surface, on the latero-external half of the nail bed of the left big toe, result of elevation and destruction of the nail with the tendency of extension to the cutaneous region of the finger (Figure 1).

Radiographically, we observe a bone lesion that leads from the dorsal or dorso-median region of the ungual phalanx to the distal portion (Figure 2). The lesion has the structure of the mature bone,

compact, well delimited to the bone tissue through an osteocondensation zone localized in the 1/3 distal from diaphysis of the ungual phalanx of the left big toe, with the aspect of the "Y" bifurcation (Figure 2).

The patient suffers a local excision with the complete removal of the cartilaginous cap.

The histopathological examination revealed a proliferation of fibro-collagenous tissue with myxoid transformation in some areas, which included osteoid

tissue lamellas (Figure 3) and in other areas limestone micro-precipitates and nodular chronic inflammatory infiltrate (Figure 4).

The clinical, histopathological and radiographic data sustain the diagnosis the subungual exostosis that eliminated all the other supposal diagnosis.

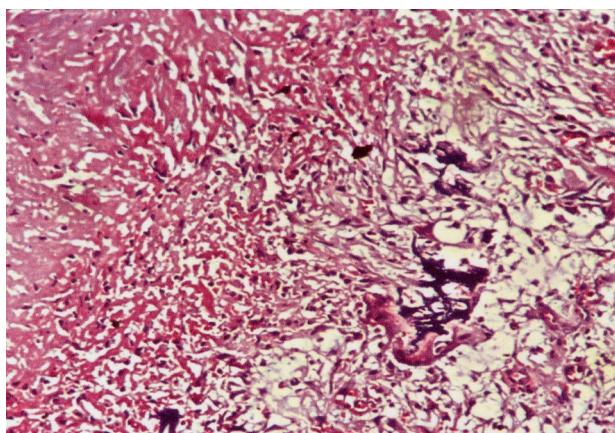
After this treatment, the evolution has been satisfactory. After two years, the patient affirms that he has no recurrences.



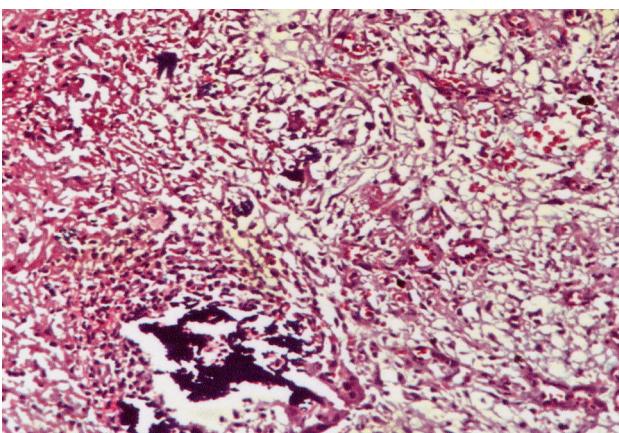
**Figure 1 – Lesion with hard consistency, painful, with eroded surface, on the latero-external half of the nail bed of the left big toe.**



**Figure 2 – Bone lesion localized in the 1/3 distal from diaphysis of the ungual phalanx of the left big toe, with the aspect of the "Y" bifurcation (a – at the left), well delimited to the bone tissue through an osteocondensation zone (2b – at the right).**



**Figure 3 – Subungual exostosis: fibro-collagenous tissue proliferation with myxoid areas and osteoid tissue formation.**



**Figure 4 – Subungual exostosis: fibro-collagenous tissue with limestone micro-precipitates and nodular chronic inflammatory infiltrate.**

## Discussion

Osteochondromas are small, benign, bone tumor of the foot [3]. They are most often found at the end of small bones, such as phalanx of the toes.

Subungual exostosis is an uncommon benign bone tumor arising in the distal phalanx of the digit, beneath or adjacent to the nail bed. It is considered a rare variant of osteochondroma [4]. The first description of this lesion has marked by Dupuytren G in 1847 [5] when he reviewed his experience with 30 patients suffering from subungual exostoses of the great toe [6]. This peculiar tumor is relatively uncommon; it has not been much remarked on the recent years [6, 7]. The great toe is involved in most of the cases, but also lesser toes and

even fingers may be affected [2, 8]. Subungual exostosis usually develops during adolescence and is more common in females than in males [7].

From clinical point of view, in typical cases, the subungual exostosis is usually a solitary lesion, which appears like a small firm lesion, usually located deep to the free edge of the nail. Pain, particularly severe on walking, develops due to the collision of the nail plate with the expanding exostosis. The overlying nail is pushed up and is finally detached; leading a mass of fibrous tissue whose surface may become eroded and infected. This mass overlies the exostosis [7].

The pathogenesis of subungual exostosis is not clearly understood, many factors have been charged: trauma, chronic infection, tumor, hereditary abnormality

or activation of the cartilaginous cyst [9]. Trauma is often a precipitating factor and subungual exostosis may represent cartilaginous metaplasia occurring in response to acute or chronic irritation [4, 6]. Chronic infection seems to be the result rather than the cause of the underlying lesion [6]. In the initial stages of development, the lesion appears as proliferating fibroblasts in direct continuity with the nail bed where cartilaginous metaplasia can be seen. The cartilage gradually undergoes calcification and ossifies. Afterwards, these areas of enchondral ossification eventually progress to woven bone and then lamellar bone. In the early stage, proliferation of cartilage contributes to the exophytic growth of the lesion while later mature bone dominates the outgrowth [2].

Roentgenographically, an exostosis is seen as a bony outgrowth projects from the dorsal or dorso-median aspects of the distal portion of a terminal phalanx, and composed of a nature trabeculated bone with attachment to the phalanx; the free end is flat, cupped and smooth, or irregular. Unlike the clinical complaints, the radiological images may be modest; there is a large radiolucent cartilaginous cap [9]. There is no cortical disruption or other abnormality of the distal phalanx [4].

Histologically, in the mature lesion, the picture is of a base of trabecular bone with a proliferating fibro-cartilaginous cap. In immature lesions, the cartilaginous cap is thick while the mature exostosis shows a thin cap of cartilage that has been largely replaced by trabecular bone [2]. Mature trabecular bone formation under the cartilage cap produces the appearance of an osteochondroma. However, the location and the spindle cell proliferation separate it from an osteochondroma [10]. The subungual exostosis has a fibro-cartilage cap whereas the osteochondroma has distinctive hyaline cartilage [3].

The differential diagnosis of subungual exostosis include subungual verruca, granuloma pyogenicum, glomus tumor, carcinoma of the nail bed, melanotic whitlow, keratoacanthoma, subungual epidermoid inclusions and enchondroma, Koenen's tumor, and ingrown toe nail [4]. Unlike of exostosis, enchondromas are cartilaginous tumors arising in the medullar cavity of tubular bones.

The case we present is interesting by the fact that bring in discussion the diagnosis of subungual exostosis, the possibility not so rare as supposed on the specialty

literature. It is important that in this prominent painful lesions, on the distal phalanx, under nail or adjacent and extremely recidivate, to take in consideration and this eventuality, using histological and radiographic examination, very utile in this diagnosis.

## Conclusions

The subungual exostosis determined repeated trauma in the nail bed could produce its removal. Without the nail protection, the nail blade is exposed to the infection and can develop at one moment an inflammatory process with pseudo-tumoral aspect. In the absence of the histopathological and radiographic examination the diagnosis can be mistaken and the treatment inadequate, even crippling.

The local excision and the removal of the cartilaginous cap is the elective treatment of the subungual exostosis.

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