Subungual Osteochondroma

A Diagnostic Dilemma

Tolga Tuzuner, MD*
Ayse Kavak, MD†
Ali Haydar Parlak, MD†
Nil Ustundag, MD, PhD‡

Osteochondroma is the most common skeletal neoplasm of all benign bone tumors. However, it rarely occurs subungually. This tumor is more common in the toes than in the fingers.1,3 The first toe is the most commonly involved.3 Previous studies2, 4 have shown that subungual osteochondroma is more common in male patients. However, Apfelberg et al2 and Vazquez-Flores et al3 found a female predominance. Subungual osteochondroma usually presents as a slow-growing mass on the dorsal aspect of the distal phalanx and juxtaepiphyseal region. As it progresses, it may cause nail deformity, and it is often misdiagnosed by the clinician. The age of the lesion at the time of presentation has varied from 3 to 36 months.1, 2, 5, 6 Osteochondromas undergo sarcomatous transformation in 1% of cases.6

The numerous conditions resembling subungual osteochondroma and the close similarities among these entities lead to confusion among the subungual tumors. Particularly difficult is differentiating subungual osteochondroma from subungual exostosis. Although it has been suggested that these two tumors may be the same entity, some researchers have excluded the possibility of any relationship between the two conditions.2, 4, 5, 7, 9 The main differences between subungual exostosis and subungual osteochondroma are given in Table 1.1, 5, 7, 10, 11

We present two cases of subungual osteochondroma leading to nail deformity. These cases were treated successfully with total excision. We discuss the characteristic clinical, radiologic, and histopathologic features of this entity and briefly describe the differences between subungual osteochondroma and subungual exostosis.

Case Reports

Case 1

A 30-year-old man presented to Duzce Medical School, Abant Izzet Baysal University, Duzce, Turkey, with a nail deformity on his right great toe of 3 months’ duration. The area was slightly painful. Paronychia and ingrowing nail were the initial diagnoses, and the patient had been treated with local and systemic antibiotics without relief. He denied any trauma to the affected site.
Physical examination revealed a firm, immobile, white nodule that caused nail elevation (Fig. 1). The nail plate was normal. Radiologic examination revealed a pedunculated osseous growth projecting from the dorsomedial aspect of the distal phalanx of the right great toe with an ill-defined upper margin. An excisional biopsy was performed after achieving adequate anesthesia with a 1% bupivacaine hydrochloride digital block. After partial nail excision, total resection of the tumor was performed. The base of the tumor was adherent to the bony phalanx.

On histopathologic examination of the lesion, a characteristic trabecular bone pattern covered with a hyaline cartilage cap was seen (Fig. 2). The patient healed uneventfully and had no tumor recurrence after 1 year of follow-up.

**Case 2**

A 15-year-old otherwise healthy boy presented with a subungual tumor and recurrent swelling on the distal aspect of the left great toenail of 6 months’ duration. There were no previous episodes of trauma. Physical examination revealed swelling and hyperemia in addition to a nonpainful and bluish nodule under the distorted nail. The radiographic appearance was similar to that of Case 1 (Fig. 3). After treating the local infection, complete resection of the osteocartilaginous tumor from the dorsal aspect of the distal phalanx was performed. Histopathologic examination of the biopsy sample revealed a hyperkeratotic acanthotic epithelium overlying loose fibrous connective tissue, which in turn covered a core of hyaline cartilage. There was no bone at the base, but the cartilaginous nodule was consistent with the cap of an osteochondroma. No recurrence was observed during 11 months of follow-up.

**Discussion**

Osteochondroma is the most common skeletal neoplasm (20%–50%) among the benign bone tumors, and it is rarely seen subungually. Osteochondromas are thought to be congenital in origin. They commence growth at or before puberty and are frequently found in patients aged 10 to 25 years. Differences in the sex ratio have been found in subungual osteochon-

<table>
<thead>
<tr>
<th>Subungual Osteochondroma</th>
<th>Subungual Exostosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Etiology</td>
<td>Congenital</td>
</tr>
<tr>
<td>Sex ratio (M:F)</td>
<td>2:1</td>
</tr>
<tr>
<td>Age range at onset (years)</td>
<td>10–25</td>
</tr>
<tr>
<td>Origin</td>
<td>Bone is formed from enchondral ossification</td>
</tr>
<tr>
<td>Osseous base of implantation</td>
<td>Proximal (metaphyseal zone)</td>
</tr>
<tr>
<td>Histopathology</td>
<td>Hyaline cartilage cap</td>
</tr>
<tr>
<td>Risk of malignancy</td>
<td>Low</td>
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</tbody>
</table>

Figure 1. Smooth-surfaced, bony nodular lesion projecting from the dorsum of the distal phalanx (Case 1).

Figure 2. Photomicrograph showing trabecular bone and hyaline cartilage (H&E, original magnification ×400) (Case 1).
chondroma. Both of our patients were male. More recently, however, Vazquez-Flores et al\(^3\) reported 20 females in their group of 27 patients with subungual osteochondroma. Thus it seems that there is no strict sex ratio for subungual osteochondroma.

The etiology of this benign tumor is unknown; however, a history of trauma is commonly reported by the patients. There was no history of trauma to the affected digits in our patients. Considering that most cases occur in a young age group, it may be suggested that a neglected trauma to an immature bone may result in subungual osteochondroma. The most common symptoms include pain or the sensation of pressure. Time to the appearance of pain varies. In an interesting case reported by Eliezri and Taylor,\(^5\) a 10-year-old child had no symptoms even with a 3-year history of subungual osteochondroma. Although lesion size was not mentioned for their case, the lesion growth rate probably was not rapid enough to cause nerve pressure. The duration of the lesions was shorter and symptoms had begun earlier in our patients compared with this child. In addition to pain, nail deformity appears with the growth of the tumor. This finding, seen in most subungual tumors, is not specific.

A notable feature in Case 1 as well as in some previously described patients in the literature was unnecessary antibiotic treatment, up to 6 months in duration, in patients with subungual osteochondroma owing to misdiagnosis as an infectious process.\(^3\) This highlights the importance of radiologic examination in the evaluation of subungual tumors. Pedunculated osseous growths in the distal phalanges were consistent with classic radiologic findings of subungual osteochondroma in both of the presented cases. However, some subungual osteochondroma lesions may be sessile.\(^2\)

A classic histopathologic finding of osteochondroma is a well-defined trabecular bone covered with a hyaline cartilaginous cap. The superficial portions of the cartilage cap contain chondrocytes in clusters and in lacunae. Toward the base of the lesion, where enchondral ossification occurs, the lacunae tend to line up in columns, simulating a normal epiphyseal plate.\(^1, 2, 6, 10, 14\) Our patients showed similar features. Fibroblasts found in subungual exostosis were not seen.

Osteochondromas are commonly misdiagnosed by the clinician. Clinically, the lesion appears as a firm, shiny, smooth-surfaced, white-yellow nodule.\(^5, 15\) The differential diagnosis includes bony, cartilaginous, and soft-tissue tumors as well as cystic lesions. When they occur subungually, osteochondromas can easily be misdiagnosed as verruca vulgaris, subungual fibroma (garlic glove tumor), lipoma, pyogenic granuloma, or subungual digital mucous cyst.\(^1, 2, 5\) Our patients’ lesions had durations of 3 and 6 months. These growth rates could suggest a malignant entity. However, both nodules had regular borders and surfaces. Thus we clinically excluded some malignancies, such as malignant melanoma and epidermoid

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**Figure 3.** Anteroposterior (A) and oblique (B) radiographs showing a well-circumscribed, pedunculated osseous lesion (arrows) (Case 2).
carcinoma. Although a glomus tumor located mostly in the subungual region was considered in the differential diagnosis in Case 2 because of its bluish color, radiologic examination revealed a bone growth. At this stage, we considered enchondroma and subungual exostosis in addition to subungual osteochondroma. Enchondroma was easily excluded given the absence of well-defined radiolucent defects, which are highly characteristic of this most common tumor of the phalanx.  

Some differences between subungual exostosis and subungual osteochondroma are summarized in Table 1. Some clues may help in the evaluation of malignant transformation. Malignant degeneration should be strongly suspected if a subungual osteochondroma continues to grow after skeletal maturity. Other suspicious findings, irregular calcification and binuclear chondrocytes, also were not seen in our patients during follow-up.

Total excision of the lesion together with ablation of the bony base is the main goal in the management of subungual osteochondroma. However, in some cases, recurrence has been observed. Eliezri and Taylor reported two cases of subungual osteochondroma in which one lesion recurred a few weeks after total excision. The lesion was excised again, and this time the bony base was also ablated. No recurrence was seen after 4 years of observation. Apfelberg et al also reported five patients with subungual osteochondromas successfully treated with total excision and curettage of the underlying bony surface. Our patients’ lesions were completely excised together with curettage of the bony base. The nail bed was left to heal secondarily. No residual deformity of the nail bed or recurrence was observed within 12 months.

**Conclusion**

Subungual osteochondroma can be a diagnostic dilemma for the clinician. Awareness of this unusual tumor and radiographic studies of the digit in suspected cases will provide some clues. In the presence of radiologic features with consistent histopathologic findings, subungual osteochondroma can be differentiated from other subungual entities.

**References**