Chondroblastoma of the Distal Phalanx

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abstract

Chondroblastoma is a rare, benign primary bone tumor that usually occurs at the epiphysis of long bones. The authors present an example of the diagnosis and successful treatment of this neoplasm in an exceedingly rare location in the distal phalanx. Clinical and radiographic outcomes after 68 months of follow-up are presented. A 15-year-old, right hand–dominant, boy developed painful swelling of the right ring finger. Radiographs revealed a radiolucent lesion of the distal phalanx with expansive remodeling of the bone. An excisional biopsy was performed with curettage and bone grafting of the lesion. The diagnosis of chondroblastoma was made based on pathologic evaluation of the biopsy specimen. Sixty-six months after surgical treatment, the patient was free of recurrence and metastatic disease with excellent clinical and functional outcomes. To the authors’ knowledge, this represents only the second reported case of chondroblastoma of the distal phalanx. The diagnosis of chondroblastoma in this rare location was made by pathologic review of the resection specimen. It is imperative to confirm the diagnosis of any resected bone specimen even when the concern for an aggressive or malignant lesion is low. A tumor presenting in an unusual location may require a change in treatment or surveillance.

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Figure: Lateral radiograph of the right ring finger showing consolidation of the defect at final follow-up.
Chondroblastomas are rare tumors that typically occur in the epiphyses of long bones, especially the proximal humerus, proximal and distal femur, and proximal tibia. Few published studies have investigated the clinical entity and all are retrospective in nature. To the authors’ knowledge, only 1 published report of chondroblastoma in a phalanx of the hand exists in the English literature. Predictors of local recurrence, metastasis, and patient survival are still being defined.

This tumor is an unusual finding in the distal phalanx. A typical differential for a lesion with this presentation includes epidermal inclusion cyst, enchondroma, giant cell reparative granuloma, aneurysmal bone cyst, unicameral bone cyst, and infection. This case reinforces why the proper diagnosis must always be made not only for immediate treatment, but also for long-term monitoring.

The authors report a case of chondroblastoma in the ring finger distal phalanx in a 15-year-old boy that was successfully treated with curettage and bone grafting. At 68-month follow-up, the patient was disease-free and had an excellent clinical and functional outcome. This diagnosis was made by pathology and emphasizes the necessity of getting a biopsy specimen for confirmation of diagnosis.

**Case Report**

A 15-year-old, right hand–dominant boy presented with increasing pain and swelling of his right ring finger for 3 months after a minor injury. His medical history was significant for lymphoma, which was in remission. The right ring finger was enlarged around the distal phalanx, consistent with pseudoclubbing. No erythema or fluctuance were observed. The finger was tender on palpation. Range of motion was normal except for 0° to 75° at the distal interphalangeal joint. Two-point discrimination and light touch sensation were normal. Radiographs showed a radiolucent lesion with expansile re-modeling of the bone (Figure 1). Laboratory evaluation revealed no evidence of infection.

Curettage of the specimen revealed yellowish-brown gelatinous material that was sent for pathology and culture. The void was filled with autogenous distal radius bone graft.

Pathology showed a moderately cellular chondroid neoplasm with round to polygonal tumor cells, scattered “chicken-wire” type calcifications, and scattered osteoclast type giant cells (Figure 2). On immunohistochemistry, the giant cells were positive for CD68 and the tumor cells were inconclusive for S100. Cultures were negative. A diagnosis of chondroblastoma was made based on the histologic findings. Chest computed tomography was obtained and negative for metastasis.
He was able to obtain employment with full use of his right hand. He noticed a minor cosmetic difference. At 68-months follow-up, the diameter of the right finger distal to the distal interphalangeal joint was greater than the other digits. Radiographs showed a small well-circumscribed lucency at the tip but no clear evidence of recurrence (Figure 3). He had normal sensation. Distal interphalangeal joint range of motion was 0° to 85° (Figure 4). Grip and pinch strength were equivalent with the contralateral side.

**DISCUSSION**

Chondroblastoma is a benign tumor of bone that accounts for 1% of primary bone tumors. However, it is the most common epiphyseal tumor seen in children. It typically occurs at the epiphysis of long bones. The current case represents only the second report of this rare occurrence in a phalanx. Based on his age and medical history and the location of the lesion, etiologies including an epidermal inclusion cyst, giant cell reparative granuloma, aneurysmal bone cyst, unicameral bone cyst, enchondroma, lymphoma recurrence, and chronic infection were believed to be more likely. Treatment for these diagnoses is similar, but long-term follow-up is necessary to verify the absence of recurrence in chondroblastoma. It is also imperative to perform chest imaging to look for the presence of metastases when a diagnosis of chondroblastoma is made.

Few reports of chondroblastoma of the hand exist. In 2008, Garin and Wang reported a series of 10 tumors, only 1 of which was distal to the carpus. Interestingly, the tumor was found in the ring finger distal phalanx, which is identical to this case. The patient reported by Garin and Wang was a 17-year-old boy who was treated with curettage and bone grafting. The lesion recurred at 5 months. Repeat curettage, burring, and bone grafting were performed, and they reported the patient was disease-free at 5.5 years follow-up.

To the current authors’ knowledge, this is the only other reported case of a chondroblastoma of phalanx in the hand. The current case is similar in presentation and treatment, except no recurrence occurred and no repeat surgical intervention was necessary. Garin and Wang did not provide any clinical or functional outcome information.

Chondroblastoma was first identified in the proximal humerus by Codman in 1931 as a chondromatous variant of giant cell tumors. A decade later, Jaffe and Lichtenstein renamed it a benign chondroblastoma. This was done to emphasize the chondroblastic nature of the lesion and to distinguish it from the classic giant cell tumor of bone. Patients often present with pain, but this is not a universal finding. The male to female prevalence is approximately 2 to 1. It occurs most often during the second decade of life. Curettage can be curative, but a local recurrence rate of...
10% to 35% is reported. No clear genetic marker has been identified, but studies have shown links to chromosomes 5 and 8, as well as p53 mutations. Male gender is the only known risk factor for the development of a chondroblastoma. Malignant chondroblastomas are rare and are associated with a dismal prognosis. The lungs are the most common site of metastatic disease, which occurs in less than 1% of cases. For this reason, a chest computed tomography scan is recommended as part of the diagnostic work-up for metastatic disease.

CD68 is a glycoprotein found in the cytoplasmic granules in a range of different cells. It is particularly useful as a marker for the various cells of the macrophage lineage, including histiocytes, giant cells, and osteoclasts. S-100 is a protein found in the cells of neural crest origin, including chondrocytes. Despite the inconclusive S-100 in the current case, the rest of the histological evidence was sufficient to make the diagnosis of a chondroblastoma.

Most chondroblastomas occur in the long bones. As recently as 2009, Sailhan et al reported a series of 87 tumors; of which 24 were located in the proximal tibia, 23 in the proximal femur, 19 in the proximal humerus, and 8 in the distal femur. In 2000, Ramappa et al reported 47 tumors; of which 11 were in the proximal tibia, 10 in the proximal humerus, and 8 in the proximal femur, and 4 in the distal femur. Neither study identified a single lesion distal to the radius. The pooled data from multiple reports suggests a prevalence of 23.7% in the proximal tibia, 20.4% in the proximal femur, 19.7% in the proximal humerus, and 13.2% in the distal femur, with it rarely occurring distal to the radius in the upper extremity.

REFERENCES