Pathologic Quiz Case

An 18-Year-Old Man With Pain and Swelling of the Left Hand

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An 18-year-old man presented with pain and swelling of the left hand. He noted that his left second digit had been slowly enlarging for 6 months and did not seek medical attention until he developed significant tenderness. His previous medical history was otherwise unremarkable.

Physical examination of the left hand revealed a tender symmetrical mass at the base of second index ray. There was swelling noted on both the dorsal and palmar aspects of the hand. There were no neurovascular or skin abnormalities. The patient had pain in the clenched fist position but had free range of motion. No joint effusion was present. The laboratory workup was unremarkable.

Radiographs of the left hand revealed a 2 × 3-cm expansile and lytic lesion involving the proximal index digit and the articular surface (Figures 1 and 2). The margin of the lesion was well defined with a thin sclerotic rim noted. There was no cortical destruction and matrix calcification was not seen.

The patient underwent an open biopsy, which revealed a gritty, hemorrhagic, and friable mass. Microscopic review revealed giant cells, which were scattered throughout the biopsy (Figure 3). Also, large and irregularly clefted cells with focal mature hyaline cartilage matrix were seen (Figure 4). Calcification and remodeled bone were noted adjacent to the lesion.

Approximately 1 month later, the patient underwent a total curettage of the lesion with cancellous bone graft from the iliac crest and had an uneventful recovery.

What is your diagnosis?

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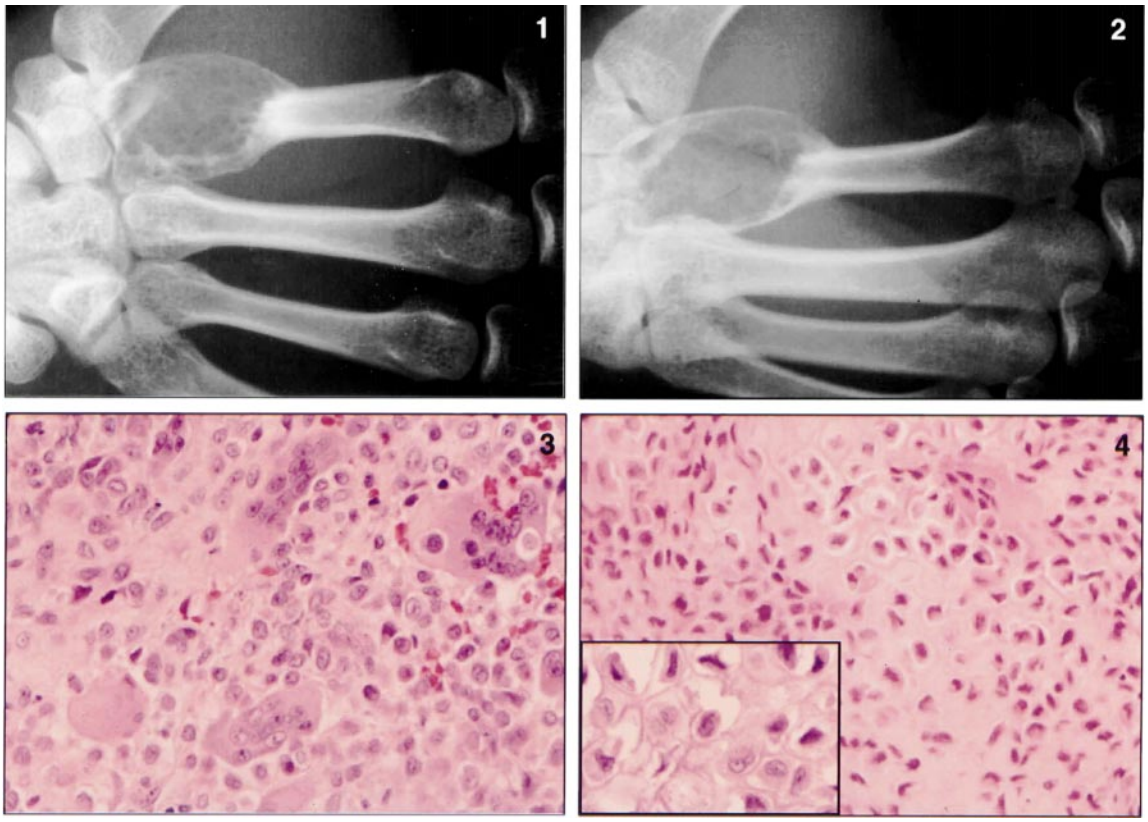

Pathologic Diagnosis: Chondroblastoma

Chondroblastoma, most frequently seen in the age range of children to young adults, is a rare benign cartilagenous tumor, accounting for less than 1% of all primary bone neoplasms.[1] Because of its histological similarities and occurrence in locations similar to giant cell tumor, chondroblastoma was initially considered a variant of giant cell tumor by Codman[2] and Ewing.[3] However, by 1942, Jaffe and Lichenstein[4] recognized this neoplasm as a distinct primary bone neoplasm and developed the histologic criteria for its recognition. The majority of chondroblastomas are seen in males between 10 and 25 years of age and are most commonly found in long bones including the humerus, femur, and tibia.[5,6] Most lesions occur in an epiphysis or an epiphyseal equivalent like an apophysis and can extend to the metaphysis.[7] Its predilection for occurring in the epiphysis is a hallmark of this lesion.

There have been a limited number of case reports of metacarpal chondroblastoma cited in the literature,[8,9] and 2 of these cases occurred in children.[9] Initially reported in 1972, 2 children, ages 9 and 12, presented with radiolucent lesions arising in the metacarpal. One patient experienced recurrence 3 years after initial curettage and iliac crest grafting and was treated with repeat curettage and grafting from the iliac crest. She was reported to be disease free at 5 months, but was lost to follow-up examination. The other patient was disease free 2 years after initial surgery.[9]

Chondroblastomas are typically radiolucent and are frequently well demarcated as was demonstrated in this case (Figures 1 and 2). Radiological differential diagnosis in lesions affecting small bones of the hands and feet in children include enchondromas, giant cell reparative granulomas, and giant cell tumor of bone.[1] However, giant cell tumor of bone should only be considered in the differential diagnosis if there is fusion of the epiphyseal plates. Of these 3, both giant cell reparative granuloma and giant cell tumor can show histopathological similarities to chondroblastoma due to the presence of numerous giant cells in these lesions. In giant cell reparative granuloma, the stromal component is made up of spindle cells with unevenly distributed giant cells. In giant cell tumor of the bone the giant cells are abundant, uniformly distributed, and share nuclear similarity with the mononuclear stromal cells.

Apart from the presence of giant cells (Figure 3), it is characteristic of chondroblastomas to have individual cells that are often surrounded by small amounts of chondroid-type matrix (Figure 4). This pericellular calcification is called a ''chicken wire'' appearance (Figure 4, inset).

Another important and defining feature of chondroblastoma is the positive staining of the tumor cells for S100 protein, a marker consistent with a neoplasm of chondrocytic origin.[1] Due to the histologic similarities of chrondroblastoma and the other lesions herein described, frozen section interpretation can be difficult. Chondroblastomas can occasionally act in an aggressive fashion and recur following conservative treatment.[10] In expendible bones such as the fibula and scapula, excision can be performed. However, when possible, curettage and bone grafting is the treatment of choice.[10] By contrast, giant cell tumor of small bones of the hands and feet are considered aggressive neoplasms that may require extensive surgery and may result in a higher risk of recurrence and ray resection.

In summary, due to the extreme rarity of chondroblastoma in the metacarpal bones and its benign clinical behavior, it is essential to distinguish this entity from more aggressive neoplasms, particularly giant cell tumor of bone, which would require more extensive surgery. Appropriate radiological correlation and attention to the nature of the mononuclear cells along with the presence of chondroid-type matrix will aid in an accurate diagnosis of chondroblastoma.

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