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Chondroblastoma in a Distal Phalanx of the Great Toe
- A Case Report -

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족부 제 1 원위지골에 발생한 연골모세포종
-증례 보고-

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A chondroblastoma is a relatively rare benign bone tumor that is typically encountered in the epiphysis. The authors describe a case of a chondroblastoma arising in the great toe. An 82-year-old woman presented with pain over her left great toe with a 1 year duration. The radiographs showed an expansile osteolytic lesion with cortical thinning and coarse trabeculation that replaced the distal phalanx of the left great toe. An incisional biopsy and curettage were performed. Histologically, the tumor consisted of uniform, round to polygonal cells with clear to slightly eosinophilic cytoplasm and round to ovoid nuclei, mimicking chondroblasts, intermingled with osteoclast-like giant cells.

Key Words: ***Chondroblastoma, Distal phalanx, Great toe***

Chondroblastoma (CB) is a rare uncommon benign bone lesion accounting for <1% of all bone tumors[7]. It is defined as a benign, cartilage-producing neoplasm and a lytic bone lesion with a predilection for the epiphyseal region of the long bones in skeletally immature individuals[7]. Although almost 50% of the chondroblasoma cases involve the metaphysis, CB arising in the distal phalanx is extremely rare[3]. The authors report a case of CB arising from the distal phalanx of the great toe.

CASE REPORT

An 82-year-old woman presented with pain over her left great toe with a 1-year duration. She denied a history of prior trauma. An examination revealed pain upon pressure over the left great toe and a skin ulcer measuring 0.5 cm in diameter. The patient had no fever or other clinical symptoms. The radiographic findings showed an expansile osteolytic lesion with cortical thinning out and coarse trabeculation replacing the distal phalanx of the left great toe (Fig. 1), suggesting a benign bone tumor, such as a giant cell tumor, a giant cell proliferative granuloma, chondromyxoid fibroma, osteoblastoma, and aneurysmal bone cyst. An incisional biopsy and curettage were performed. The biopsy specimen contained uniform, round to polygonal cells with clear to slightly eosinophilic cytoplasm and round to ovoid nuclei (indicative of chondroblasts), intermingled with randomly distributed osteoclast-type giant cells (Fig. 2). The nu-

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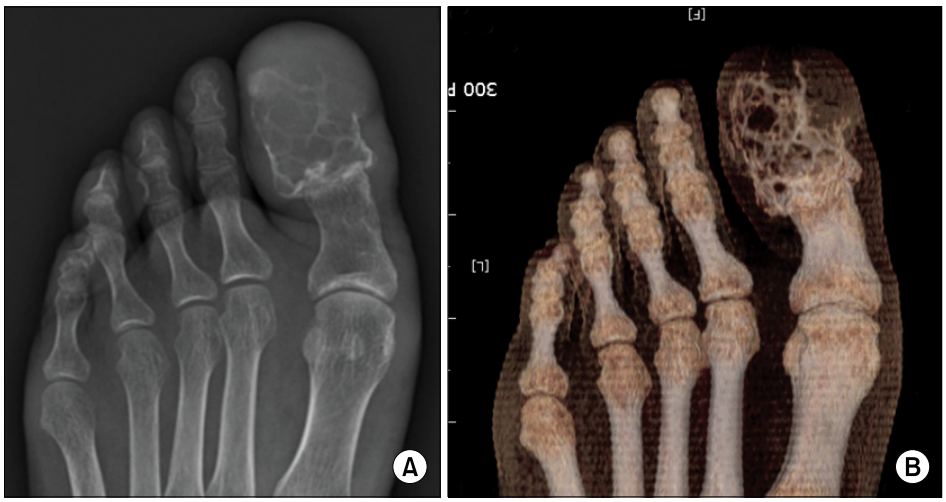

Fig. 1. Radiographs and 3-dimensional computed tomography images. (A) Radiographs show an ostelytic lesion and course trabeculation in the distal pharynx of the left great toe. (B) 3 dimensional computed tomography shows an expansile osteolytic lesion with cortical thinning out and coarse trabeculation replacing the distal phalanx of the left great toe.

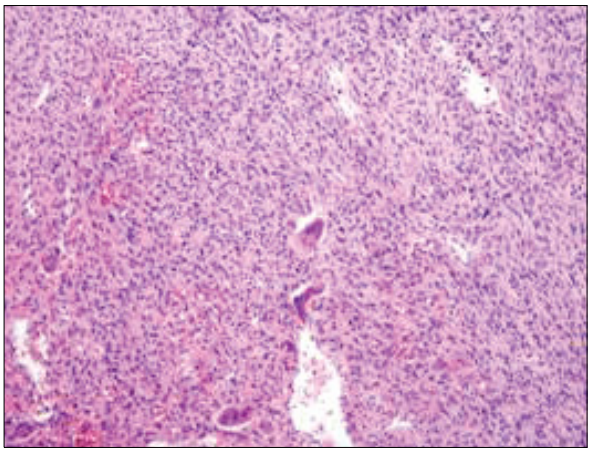

Fig. 2. Curettage specimen shows a uniform to polygonal mononuclear cells with well-defined cytoplasmic borders and slightly eosinophilic cytoplasm intermingled with scattered osteoclast-like giant cells (hematoxylin and eosin, ×200).

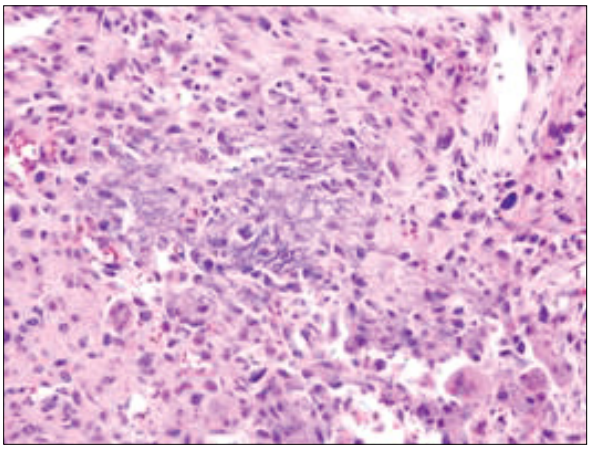

Fig. 3. High-power photomicrograph of the biopsy specimen shows fine calcification around the chondroblasts also known as "chicken-wire calcification" (hematoxylin and eosin, ×400).

clei often showed longitudinal grooves and contained one small to inconspicuous nucleolus. In some areas, a fine network of pericellular calcification, which is known as "chicken wire calcification", was observed (Fig. 3). Mitoses were observed but the atypical forms were not observed. The specimen showed the typical features of a chondroblastoma. Some mononuclear cells were immunoreactive for the S-100 protein (Fig. 4).

After the biopsy, curettage and bone cement insertion were performed. There was no sign a

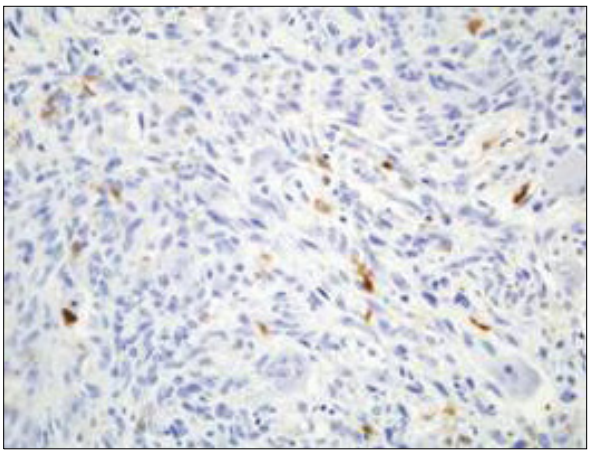

Fig. 4. Some tumor cells tested positive for the S-100 protein.

recurrence or a mass observed by a radiological examination performed 2 years after surgery.

DISCUSSION

Codman[2] first described chondroblastoma (CB) as an epiphyseal chondromatous giant cell tumor. Jaffe and Lichtenstein later renamed the condition as benign chondroblastoma[4]. CB is defined as a benign, cartilage-producing neoplasm that usually arises in the epiphyses of skeletally immature patients[7], and accounts for <1% of all bone tumors.

CBs are reported to be eccentric, oval or round well-defined lesions mainly involving the epiphyseal region of the long bones, such as in the proximal portion of the femur, tibia or humerus. Equivalent sites within the flat bones such as the acetabulum of the pelvis, and ilium are relatively rare. Other unusual sites of involvement include the scapula, spine, ribs, patella, and occasionally the craniofacial bones[6]. Davila et al.[3] reviewed CB of the hand and feet and reported CB arising in the phalanx in only 1 out of 25 cases. Moreover, CB arising from the distal phalanx of the toe is extremely rare[5]. Histologically, CB is a hypercellular tumor that consists of uniform, round to polygonal cells with well-defined cytoplasmic borders, slightly eosinophilic cytoplasm, and a round nucleus. These cells are packed in a pseudolobulated pattern in a chondroid matrix. In addition, a fine network of pericellular calcification, known as "chicken wire calcification", is also evident. Randomly distributed osteoclast-type giant cells are almost always present[7]. The contiguous involvement of the metaphyseal region occurs frequently[6].

Several studies have concluded that CB is derived from epiphyseal cartilage cells[8,10]. A recent study on cartilage growth-plate-signaling molecules[9] reported that CB is a neoplasm originating from mesenchymal cells committed toward chondrogenesis via the active growth plate signaling pathways. This can explain the close relationship between the growth plate cartilage and the epimetaphyseal location in CB. However, in the present case, CB arose in the great toe of an elderly woman. Brien et al. provided a reasonable explanation for this unusual location[1]. They suggested that CB is derived from multipotential mesenchymal cells of the tendon sheath, which have a tendency toward chondroid formation. The finding in this case supports this suggestion.

The authors reported a CB in the distal phalanx of the great toe. This case might provide a clue for the origin of CB.

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= 국문초록 =

연골모세포종은 연골 형성 양성 종양으로 10세와 20세 사이 골성장기에 호발하며 전형적인 발생 부위는 상완골, 경골, 대퇴골과 같은 장골의 골단으로 족부에 발생하는 경우는 드물다. 족부에 발생한 경우는 대부분이 거골의 후방부위나 종골로 후족부에서 발생하며 지골에서 발생하는 예는 극히 드물다. 저자들은 82세 여자의 좌족부 제 1 원위지골에서 발생한 연골모세포종 1예를 보고하고자 한다. 단순 방사선 및 컴퓨터 촬영상 제 1 원위지골에서 피질골이 얇아지면서 팽창된 골용해성 병변이 보였고 내부는 거친 잔기둥형성 소견이 관찰되었다. 조직학적 검사에서 연골모세포종의 단핵세포는 S-100 단백에 양성반응을 보이고 레티쿨린 염색에서 종양세포를 둘러싼 레티쿨린 섬유를 보였다.

색인 단어: 연골모세포종, 무지 원위지골