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Periosteal chondroma of the fifth toe – A case report

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ABSTRACT

A case of a periosteal chondroma arising in the fifth toe is reported. A 19-year-old man presented a palpable mass of his left fifth toe with pain for 2 years. Plain radiographs showed mild irregularity of the cortical bone of the fifth proximal phalanx. Magnetic resonance imaging revealed a tumour attached to the fifth proximal phalanx with low signal intensity on T1-weighted images and high signal intensity on T2-weighted images without intramedullary extension. The tumour was enhanced heterogeneously after intravenous injection of gadolinium diethylene triamine penta-acetic (GD-DTPA). The tumour was removed, together with the covering periosteum. It was diagnosed as periosteal chondroma histologically.

INTRODUCTION

Periosteal chondroma is an unusual, slow-growing benign cartilaginous tumour of bone in the periosteal region. Lichtenstein and Hall [9] first described it as arising between periosteum and cortex in 1952. Jaffe [6] coined the term juxtacortical chondroma in 1956. The most common sites are the proximal ends of long bones, especially the humerus, femur and phalanges of hand [1, 2, 8, 12]. Focal swelling and pain are the most common clinical symptoms [1, 2, 8]. Periosteal chondroma of the lesser toes is very rare [11, 16] but our group has already described such a tumour in the great toe with the findings of computed tomography (CT) and magnetic resonance imaging (MRI) [5]. This time, we report a case of a periosteal chondroma arising in the fifth toe and describe its radiological features.

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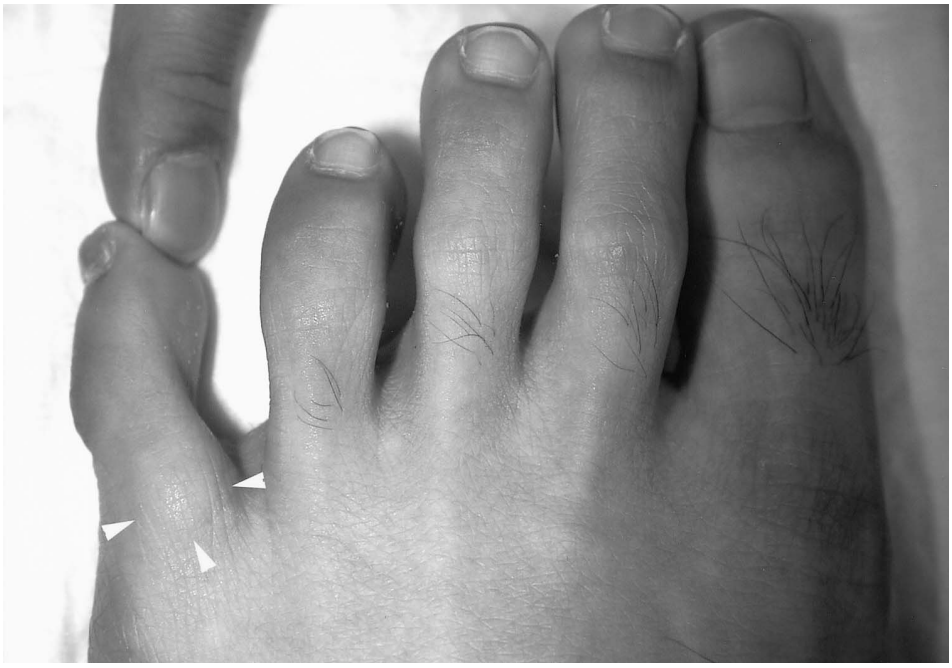


Fig. 1. The affected left fifth toe. The arrow heads indicate subcutaneous mass.

CASE REPORT

A 19-year old man visited a doctor because of pain on the left fifth toe for one year. A bone-like protrusion of the base of the fifth proximal phalanx was found. After one-year follow-up, he was referred to our hospital because of continuous pain. Physical examination revealed a palpable mass of the left proximal fifth toe on the medial side (Fig. 1). The skin color and temperature overlying the tumour was normal and skin adhesion to the tumour was absent. Tenderness was felt by firm pressure on it. There was no abnormality in a preoperative blood test. A plain radiograph showed soft tissue swelling and saucerization of the medial cortex of the fifth proximal phalanx. No osteolytic changes, periosteal reaction nor marginal sclerosis were detected (Fig. 2). MRI of the fifth toe showed a well-circumscribed mass measuring 1.5 cm in diameter with no invasion into the medullary cavity. Low heterogeneous signal intensity on T1-weighted images and high signal intensity on T2-weighted images were observed (Fig. 3-a, b). After intravenous injection of gadolinium diethylene triamine penta-acetic (GD-DTPA), the mass was enhanced heterogeneously (Fig. 3-c). Longitudinal skin incision and subcutaneous dissection exposed the periosteum covering the tumour. The firm cartilaginous lobulated mass was excised with the overlying periosteum. The remaining tumourous tissues attached to the cortex were thoroughly curetted. The cortex, to which the tumour was attached, was macroscopically confirmed to have saucer-shaped depression but no intramedullary

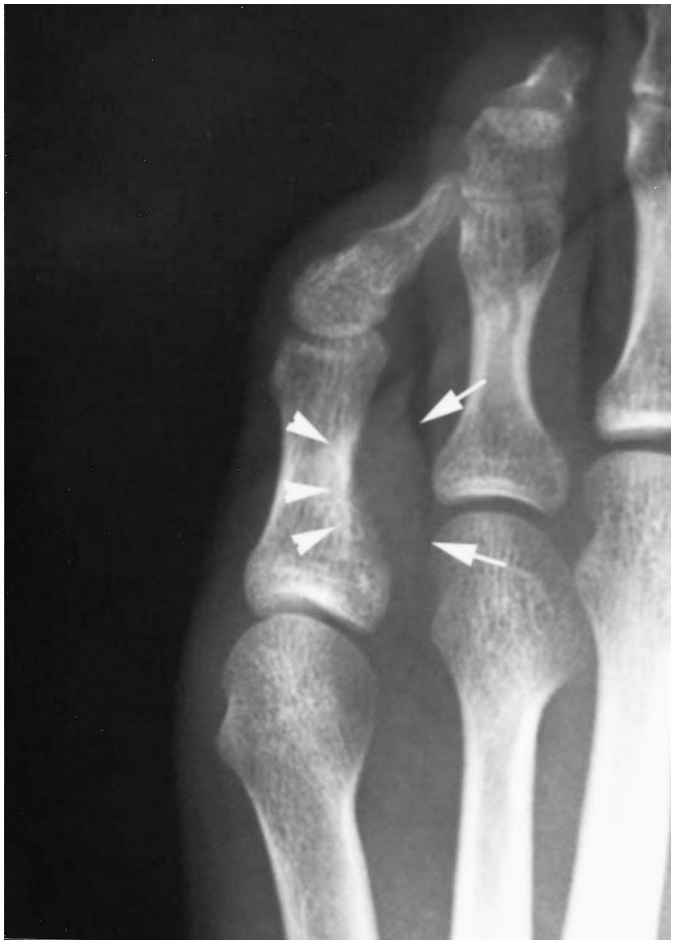
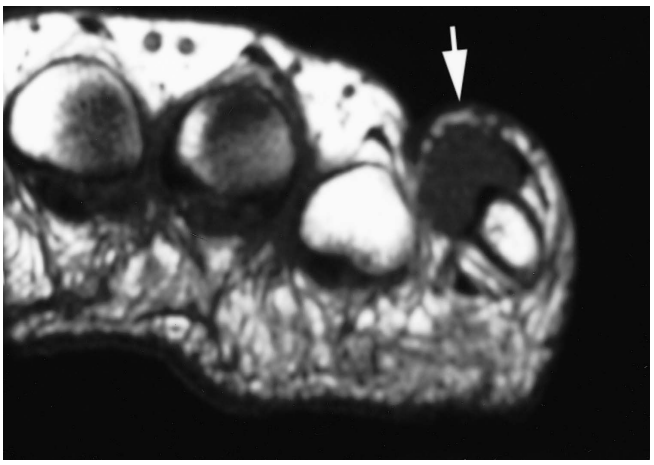


Fig. 2. Oblique radiograph of the left fifth toe. A soft tissue swelling without calcification (arrows) was observed around the proximal phalanx. Faint erosion (arrow heads) was identified in the medial side cortex of the proximal phalanx.

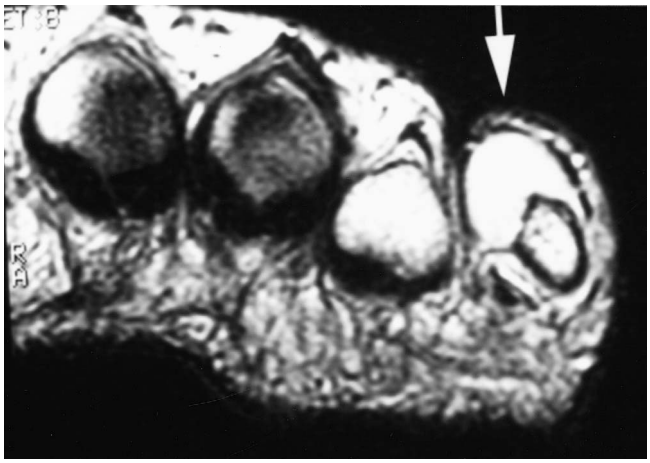
invasion was found. Histological examination revealed a lobulated mass which was composed of moderate hypercellurality with mild cellular atypia and myxoid matrix and hyaline cartilage with slight calcification (Fig. 4).

DISCUSSION

The radiographic features of periosteal chondroma are scalloping of the cortex with a well defined inner margin and overhanging edges, a variable amount of ring- or arc-shaped calcification and a soft tissue mass [1, 5, 8, 12]. Calcification of the chondroid matrix and a soft tissue-dense mass can be detected on plain radiographs in approximately half of the cases [3]. An oblique plain radiograph of the fifth toe



a



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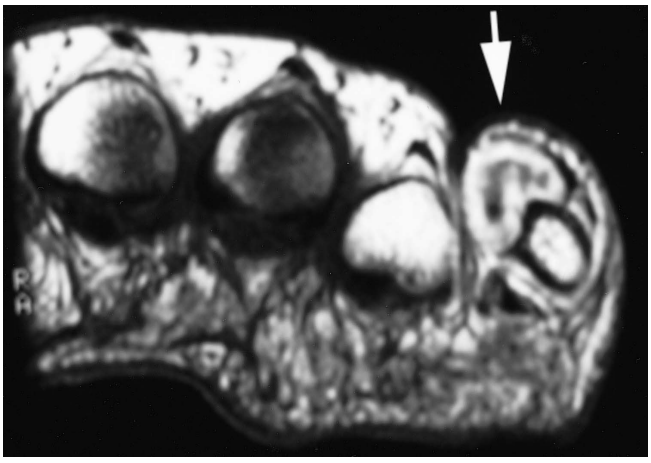

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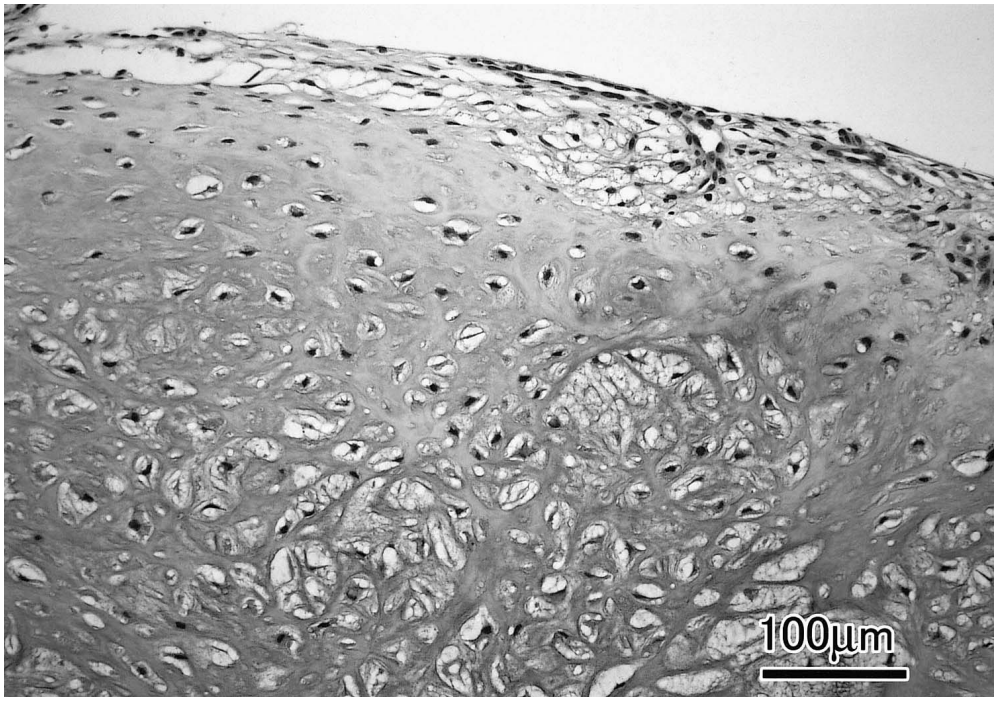

Fig. 4. Microscopic findings of the specimen showed periosteum covering the tumour and groups of star-like chondrocytes with hyperchromatism (haematoxylin and eosin stain).

showed slight scalloping of the cortex but no calcification was found. CT and MRI provided the best means of diagnosing periosteal chondroma because of their accuracy in distinguishing the soft tissues [10, 15]. Varma et al [14] reported that periosteal chondromas show low signal intensity on T1-weighted images and marked high signal intensity on T2-weighted images and suggested the usefulness of MRI imaging in atypical cases of periosteal chondroma with a non-specific juxtacortical mass or calcifications without any bony scalloping. Hatori et al [5] also reported a case of periosteal chondroma in the great toe with no calcification on plain radiographs. However, the tumour was highly intensified on T2-weighted images and diffusely enhanced after injection of GD-DTPA. These features corresponded well to those of the present case.

Fig. 3. MRI images of the proximal phalanx of the left fifth toe.

a. Coronal T1-weighted image (spin echo, TR/TE=440/14). Heterogeneous low signal intensity mass (arrow), which was attached to medial aspect of the fifth toe, was identified.

b. Coronal T2-weighted image (spin echo, TR/TE=3300/80). High signal intensity of the mass (arrow), which was well defined, was seen and no invasion into intramedullary cavity.

c. Coronal T1-weighted image after intravenous injection of GD-DTPA (spin echo, TR/TE=440/14). The margin and the inside of the tumor (arrow), were highly and diffusely enhanced respectively.

Preoperative differential diagnoses of the present case were a giant cell tumour of the tendon sheath (GCT-TS) and ganglion. The latter was ruled out because of diffuse enhancement of the tumour after injection of GD-DTPA. GCT-TS was mostly found in the fingers and less in the foot [7, 13]. Gibbsons et al [4] described the MRI features of GCT-TS: low signal intensity corresponding to the fine haemosiderin granules and the abundant matrix collagen in the lesions, particularly in T2-weighted images, and characteristic enhancement after administration of GD-DTPA. Compared with these features, GCT-TS was less likely in the present case.

In conclusion, preoperative MRI is thought to be useful for diagnosing periosteal chondroma in combination of plain and CT findings.

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