Abstract  Chondroblastoma is typically located in the epiphysis. Predominant metadiaphyseal location is very rare, as is involvement of the digits. We describe a case of chondroblastoma involving the metadiaphysis of the thumb. The patient was a 13-year-old boy who presented with pain and swelling of his left thumb. Radiographs showed an expanded lytic lesion involving the whole metaphysis and diaphysis of the proximal phalanx, which subsequently progressed to involve the epiphysis. Curettage and bone grafting were done.

Key words  Chondroblastoma · Diaphysis · Metaphysis · Thumb · Phalanx · Radiograph

Introduction

Chondroblastoma (CB) is an uncommon lesion of bone, comprising less than 1% of all primary bone tumors [1]. Its typical location in the epiphysis of a long bone is an important diagnostic radiological feature. Most cases occur in the hip, knee and shoulder regions. On radiographs, more than 90% are oval-shaped lesions with well-defined margins. The majority of cases have a thin sclerotic rim, are homogeneously lucent without visible calcification, and show cortical expansion [2]. Although secondary involvement of the metaphysis is recognized [3, 4], a predominantly metaphyseal or diaphyseal location is exceedingly rare. Occurrence of CB in a digit is also very uncommon, with only a few cases reported to date [5–13]. We describe a CB arising from the metadiaphysis of the proximal phalanx of the thumb, which subsequently grew into the epiphysis.

Case report

A 13-year-old Chinese boy presented with pain and progressive swelling of his left thumb over a 1-year period. On examination, the left thumb was swollen and tender. The overlying skin was normal and sensation was intact. Radiographs (Fig. 1) showed an expanded lytic lesion involving the whole metaphysis and diaphysis of the proximal phalanx of the left thumb. The lesion contained multiple internal septa, there was no cortical break, periosteal reaction or matrix calcification. The physeal plate appeared unaffected.

An initial diagnosis of a simple bone cyst was made, and the patient was given an intralesional steroid injection. However, the thumb swelling and tenderness persisted. Repeat...
radiographs 5 months later (Fig. 2) showed increased expansion of the lesion. There was focal breaching of the proximal physeal plate, with epiphyseal extension. A pathologic fracture of the radial cortex of the phalanx was also detected. The working diagnosis was simple bone cyst or enchondroma.

At operation, a soft fleshy intraosseous tumor was found. The lesion was diagnosed as CB on frozen-section biopsy. Curettage and bone grafting were done. Histologic examination of the resected tissue showed scattered multinucleated giant cells in a background of mononuclear eosinophilic chondroblasts in which islands of chondroid material were present (Fig. 3). The mononuclear cells possessed a central or slightly eccentric vesicular nucleus with a fair amount of eosinophilic cytoplasm. They were immunoreactive for S100, further supporting their chondroblastic nature (Fig. 4). Typical chicken-wire calcification was not seen, possibly related to the prior decalcification process. The patient made a good post-operative recovery. Repeat radiographs showed good healing and he is currently well at follow-up 30 months after presentation.

**Discussion**

The term “benign chondroblastoma” was introduced in 1942 by Jaffe and Lichtenstein [14]. These authors defined the distinctive clinicopathologic features of the lesion. The basic proliferating cells of this tumor resembled giant cell tumor and it had previously been thought to be a variant of giant cell tumor, until identification of the chondroid matrix was made [14]. CB typically occurs in the second decade of life and most commonly affects the ends of the long bones, especially the distal femur, proximal tibia and proximal humerus. However, any bone that displays enchondral ossification may be involved [1, 3, 12].

A world literature review of the six major series of CB [3, 4, 9, 12, 13, 15] revealed that their occurrence in the short tubular bones of the hands is exceedingly rare. Among 69 cases reported by Schajowicz and Gallardo [4], only one CB in the metacarpal was identified, with none affecting the phalanx. Huvos and Marcove [9] reviewed 458 combined cases from both the Mayo Clinic [3] and Memorial Hospital [9], in which there were eight CBs affecting the metacarpals and phalanges of the hand. In the series of Bloem and Mulder [12], three cases involved the digits of the hand (one metacarpal and two phalanges) out of a total of 104 CBs. In a review of 70 cases of CB from the Rizzoli Institute, none involved the hand [15]. Kurt et al. [13] analysed 495 CBs at the Mayo Clinic, only nine of