

Sequential radiographic changes of metacarpal osteonecrosis

A case report

Hiroshi Hagino, Kichizo Yamamoto, Ryota Teshima and Hideaki Kishimoto

A 6-year-old boy with nephrotic syndrome visited our department in March 1982 for the evaluation of his bone mineral status. He had received glucocorticoid therapy for 8 months. No abnormal findings were found in the third metacarpal head in November 1982 (Figure 1). In February 1985, increased density of the entire epiphysis of the head was observed, but he had no symptoms; there was no tenderness or swelling, and there was no restriction of motion in the third metacarpophalangeal joint. Fourteen months later, there was deformity with increased density and partially small lucent areas. In April 1987, the epiphysis had become markedly smaller, although the epiphyseal plate was not widened and the epiphyseal height had decreased only slightly. Three months later, the radiograph showed new bone over the necrotic lesion. In December 1987, almost complete regeneration of the head was noted, and the dead bone was surrounded by new bone formation and a "head-within-a-head" appearance. In October 1988, the regeneration of the head had been completed with slight residual expansion of the epiphysis.

No narrowed joint space or marked deformity of the epiphysis was noted after the healing. No osteonecrosis was observed in the other epiphysis. Moreover, the patient felt no pain or discomfort in the third metacarpal head, and he retained full mobility of the third metacarpophalangeal joint during the entire observation period. No therapy was required throughout his clinical course.

Discussion

The condition of aseptic necrosis of the metacarpal head was first described by Dietrich (1932). Others have reported aseptic necrosis in the epiphyses of digital phalanges and metacarpal bones (Bopp 1938, Franck 1942, Carstam and Danielsson 1966, Gurin 1985). In patients with systemic lupus erythematosus, multiple areas of osteonecrosis including metacarpal heads are occasionally seen (Lightfoot 1972). However, there have been no reports of radiographic changes or detailed analysis of this lesion during its clinical course.

The presented case showed the progressive radiographic changes of this condition. The necrotic change occurred at once at the entire epiphysis, and the head of the metacarpal bone collapsed approximately 2 years after the onset. Nevertheless, the epiphyseal height was recovered with no resultant dysfunction. Thus, the radiographic changes in this respect are like those in Perthes' disease. However, fragmentation of the epiphysis was not observed, and metaphyseal change was not observed. Although some authors (Franck 1942, Carstam and Danielsson 1966) reported deformity as the final result of this lesion, our patient had no complaints throughout the clinical course, and he showed complete regeneration.

Our findings suggest the presence of more patients with asymptomatic necrosis of the metacarpal head than suspected, and the possibility of complete regeneration in many of them without treatment.



Figure 1. Serial changes of aseptic necrosis of the third metacarpal head. Increased density of the entire epiphysis (A, B) was followed by deformity (C) and regeneration (D-F).

References

- Bopp J. Aseptische Epiphysennekrose am Os metacarpale. II und III. Röntgenpraxis 1938; 10: 764-65.
- Carstam N, Danielsson L G. Aseptic necrosis of the head of the fifth metacarpal. Acta Orthop Scand 1966; 37(3): 297-300.
- Dietrich H. Die subchondrale Herderkrankung am Metacarpale III. Langenbecks Arch Klin Chir 1932; 171: 555-67.
- Franck S. Aseptic necrosis in the epiphyses of digital phalanges and metacarpal bones. (Thiemann's disease, Dietrich's disease). Acta Radiol (Diagn) 1942; 23: 449-54.
- Gurin J. Joint occurrence of aseptic necrosis of the head of the third metacarpal and Freiberg's disease. Acta Chir Hung 1985; 26(1): 27-30.
- Lightfoot R W Jr, Lotke P A. Osteonecrosis of metacarpal heads in systemic lupus erythematosus. Value of radiostrontium scintimetry in differential diagnosis. Arthritis Rheum 1972; 15(5): 486-92.