Case report

Geode development and multiple fractures in rheumatoid arthritis

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SUMMARY The radiological development from normal bone of geodes and subsequent fractures in phalanges of two adjacent fingers is described in a patient with classical rheumatoid arthritis. Presentation was as a septic, discharging focus, but infection was excluded; the pathology is described.

Key words: bone cyst, infection, synovitis.

A 75-year-old housewife with seropositive erosive rheumatoid arthritis of 12 years' duration presented with a four-week history of pain, swelling, and redness of the proximal interphalangeal (PIP) joint of the right index finger. Previous therapy had consisted of D-penicillamine (1980–2) and multiple non-steroidal anti-inflammatory drugs, and she was currently taking Methrazone (feprazone), Distalgesic (dextropropoxyphene and paracetamol), and sodium aurothiomalate (total dose 1050 mg). In 1981 she had received injections of triamcinolone hexacetonide into multiple small finger joints, including the second and third PIP joints bilaterally.

On examination there was redness, swelling, and a discharging area overlying the PIP joint of the right index finger. There were multiple swollen hand joints, but no focus of infection. Investigations showed: haemoglobin 9.9 g/dl, white cell count $5.5 \times 10^9/l$, plasma viscosity 2.10 cP, alkaline phosphatase 113 IU/l, negative syphilis serology, protein electrophoresis of a chronic inflammatory pattern, and normal serum lipids. Radiographs in March 1983 confirmed widespread erosive disease in numerous joints of the hands, and revealed cystic changes in the bases of the middle phalanges of the right index and middle fingers and fracture of the base of the index finger middle phalanx (Fig. 1).

Fig. 1 Radiograph: right index and middle fingers 18 March 1983.

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Review of radiographs taken in June 1980 and March 1982 showed development of the cystic changes (Figs. 2, 3).

Cloudy fluid was aspirated from the swelling, and cultures for routine micro-organisms, fungi and *Mycobacterium tuberculosis* were negative. There was no response to a course of flucloxacillin. Four weeks later there were three sinuses overlying the middle phalanx of the index finger, and surgical exploration revealed necrotic tissue, but all cultures were negative. The finger healed, with resultant instability.

Seven months later the patient presented with a four-week history of pain, swelling, and loss of function in the right middle finger. Examination revealed swelling of the proximal interphalangeal joint and middle phalanx. Hand radiographs showed that the cystic changes in the middle phalanx of the middle finger had progressed, leading to fracture of the base of the phalanx (Figs. 4, 5). Bone scan revealed increased tracer uptake in multiple hand

Fig. 2 Radiograph: right index and middle fingers 13 June 1980.

Fig. 3 Radiograph: right index and middle fingers 25 March 1982.

joints corresponding with the erosive changes in the hand radiographs.

Surgical exploration of the middle phalanx of the middle finger revealed soft intramedullary tissue eroding through a defect in the cortex. The tissue was cleared. Cultures were again negative for bacteria, fungi, and *M. tuberculosis*. Microscopical examination showed necrotic tissue containing some osseous fragments, and small areas of viable tissue with the appearance of chronic rheumatoid tissue. There was no evidence of tumour or tuberculosis. The finger healed, with instability. A diagnosis of fractures through multiple rheumatoid geodes was made.

Discussion

Rheumatoid geodes are subchondral pseudocysts, probably due to extensions of pannus¹⁻³ either through defects in cartilage or by penetration at the chondro-osseous junction.³⁻⁵ It has been suggested

Fig. 4 Radiograph: right index and middle fingers 22 December 1983.

that they are related to physical activity⁶ and represent a means of joint decompression.⁷ It has been shown that increased intra-articular pressure can be transmitted to the geode.⁸ Some authors, using radiological techniques, have described subchondral pseudocysts which apparently do not communicate with joints in RA, and have suggested metabolic⁹ and intraosseous rheumatoid nodules¹⁰ as the aetiological factors.

Fractures through geodes are not uncommon at the hip¹¹ and knee,⁵ and there are two reports of fractures at the elbow.^{12 13} To our knowledge we report the first fracture of phalanges associated with rheumatoid geodes.

The site, progression, and result of geodes in this case are unusual. We have shown the progressive radiological development of geodes and then fractures in middle phalanges of two adjacent fingers in a patient with rheumatoid arthritis. The presentation with 'pus' and the destructive nature led us in an unsuccessful search for infection. The role of the previous intra-articular steroid injections in pathogenesis is open to conjecture. However, each

Fig. 5 Radiograph: lateral view right hand 22 December 1983.

joint had only been injected once, and it is unlikely they were causally related.

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