significant morbidity. Bisphosphonates are effective in SM for osteoporosis and have a role in the associated refractory bone pain.

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Frostbite arthritis

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A 46 year old black woman, born in Haiti, was admitted in 1999 owing to bilateral and symmetric arthritis of the hands. Her past history was unremarkable. She had lived in New York in the 1970s, where she sustained an episode of severe frostbite in 1977 while staying outside for 1 hour at a temperature of −20°C without protection. Frostbite affected all fingers but not the thumbs, requiring admission to hospital for 11 days (amputation of some fingers was discussed at this time).

She had complained about arthritis affecting the interphalangeal (IP) joints since 1994, without extra-articular involvement or fever. Progressive joint deformations appeared at this time. Clinical examination was normal except for proximal IP joint deformation.

Routine laboratory tests, immunological tests (antinuclear antibodies, rheumatoid factor, antineutrophil cytoplasmic antibodies, complement), seric tests (HIV, HTLV-1, TPHA-VDRL), proteins, and haemoglobin electrophoresis were normal or negative.

Plain radiographs of the hands showed an erosive arthritis with subchondral osteosclerosis and large punched-out cystic defects affecting all proximal and some of the distal IP joints and metacarpophalangeal joints (fig 1). A technetium-99m scintigraphy showed early and massive increased uptake of the radiologically affected joints. A radiographic survey of the skeleton and pulmonary *x* ray findings were normal. A synovial biopsy and a bone biopsy of a lytic lesion of the second phalange of the third left finger were non-conclusive.

Treatment with non-steroidal anti-inflammatory (NSAIDs) drugs was unsuccessful. Significant clinical improvement was obtained with clodronic acid, 800 mg twice a day. In 2004, radiographs of hands showed a moderate extension of punched-out cystic defects, without progression of joint deformations. Immunological tests remain negative.

Figure 1 Erosive arthritis with subchondral osteosclerosis and large punched-out cystic defects affecting all proximal and some of the distal IP joints.

DISCUSSION

Initially described in the military population, frostbite is also common in people with psychiatric disturbance, intoxication, or unplanned circumstances leading to cold exposure (as in our case).

Clinical and radiological changes mimic those of osteoarthritis.[1–3] A clinical and radiological idiosyncrasy is the preservation of both thumbs and metacarpophalangeal joints.[1 4] Sparing of the thumb is characteristic, although not invariable, and can be attributed to clenching of the fist with the thumb clasped in the palm during cold exposure. The presence of large subchondral cysts in our patient, probably consecutive to bone infarcts, helps in differentiating frostbite arthritis from osteoarthritis. Early diagnosis can be suspected by ^{99m}Tc scintigraphy in the first days after exposure to cold, but hyperfixation could persist several years after, as reported in this observation.

The time intervals between frost injury and clinical symptoms are variable—from 3 to 10 years (17 years in our case). Frostbite results from exposure to cold air usually at a temperature below −13°C (8°F). The development and progression of frostbite injuries are directly related to abnormality in circulation (thrombosis, vasoconstriction).

A pathophysiological study has shown marked similarities in inflammatory processes between thermal burns and ischaemia/reperfusion injury due to cold exposure. Evidence of the role of thromboxanes and prostaglandins has resulted in more active approaches to the medical treatment of frostbite wounds.[5] Initial treatments are debatable: vasodilators, hyperbaric oxygen, thrombolysis, or surgery, when necessary. At a chronic stage, treatment of frostbite arthritis with NSAIDs or steroids at low dosage has been suggested. Clodronic acid was proposed because of the known anodyne effect of bisphosphonates in some cases of rheumatism, but, to our knowledge, there is no report of use of bisphosphonates in frostbite arthritis.

In conclusion, patients with distal arthritis should be carefully questioned for a history of exposure to cold, and frostbite arthritis should be considered in the differential diagnosis of unexplained, seronegative arthritis of hands. Clinical and radiological changes mimicked those of osteoarthritis, but the presence of giant subchondral cysts, unusual in osteoarthritis, may suggest the diagnosis.

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