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Radiological study

Fig. 1. There is an expanding, destructive lesion of the base of the first proximal phalanx with an associated dense soft tissue mass which contains calcium. There also is early cortical destruction of the head of the first metacarpal. Notice the unfused epiphyseal plates in this 17-year-old.

Clinical information

This 17-year-old white male presented with a 5-year history of an enlarging mass of his right great toe. The mass was intermittently swollen and painful, and the patient had been unable to walk for two weeks prior to admission. The patient had a 12-year history of renal insufficiency and hypertension due to membranoproliferative glomerulonephritis. Medications at the time of admission included prednisone, atenolol, furosamide, and calcium carbonate. On physical examination, a 2 cm by 3 cm mass of the right great toe was palpated. The mass was hard, tender, and erythematous. Pertinent laboratory values included a blood urea nitrogen of 97 mg per deciliter, and a creatinine of 2.9 mg per deciliter. Other laboratory studies obtained were within normal limits. A radiograph of the right foot is shown in Fig. 1.
Diagnosis:
Chronic tophaceous gout in a 17-year-old male

The differential diagnosis in a 17-year-old should include enchondroma, fibrous dysplasia, giant cell tumor, giant cell reparative granuloma and brown tumor. Rheumatoid arthritis and Reiter's syndrome should also be considered, but the clinical history was not typical and the erosions were not associated with wispy, proliferate changes. Although enchondromas and fibrous dysplasia may affect the small bones of the hand and foot, they frequently are diaphyseal and they do not extend to the subchondral surface. Also, in this case early cortical destruction of the first metatarsal head is present. Giant cell tumors and reparative granulomas do not have internal calcification. Hyperparathyroid cyst or brown tumor should be a consideration in a patient with chronic renal disease, but our patient was not hyperparathyroid.

Open biopsy of the lesion was performed, and the pathological findings are typical of gout in that they show inflammatory reaction associated with tissue deposition of urate crystals. These feature a foreign body giant cell reaction with many epithelioid histiocytes and foreign body type multinucleated giant cells. In routine sections, the urate crystals may be lost in processing and formalin fixation, necessitating special handling and stains such as the Da Galantha stain. If crystals are present, they usually are arranged as aggregates of thin, needle-like structures.

Discussion

The pathological findings were diagnostic of gout, as were the radiographic findings in retrospect. There had been no measurement of serum uric acid before biopsy, as gout had not been considered, but a later measurement revealed a serum uric acid of 13 mg per deciliter.

In about 90% of patients with hyperuricemia, decreased renal excretion of uric acid is present.

Pathological studies

![Fig. 2. A Low power (250 x) photomicrograph of the surgical specimen. There are numerous histiocytes and multinucleated giant cells surrounding clumps of crystals. The crystals are still present as the material has not yet been fixed in formalin. B The Da Galantha stain demonstrate the urate crystals as solid black. Their needle-like nature is well appreciated.](image-url)