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CASE REPORT

Fujio Nakazawa · Hirokazu Ishihara · Koudai Tanaka

A case of female premenopausal tophaceous gout requiring surgical management

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Abstract We report a case of tophaceous gout in a 32-year-old woman who had suffered from anorexia nervosa since the age of 15. She had been taking a diuretic, mainly furosemide, to lose weight since she was 18. She was referred for orthopedic surgery because of a tophus at her right metatarsophalangeal joint. Because of a discharging sinus associated with the tophaceous deposits, surgery was performed. Use of the diuretic was stopped after surgery and the serum uric acid concentration returned to normal. It was thought that long-term abuse of a diuretic induced the tophaceous gout in this premenopusal woman.

Key words Anorexia nervosa · Diuretic · Gout · Premenopause · Surgery

Introduction

Gout is an uncommon disease among premenopausal women. Female gouty arthritis has been estimated to represent about 5.1% of all cases of gout[1] with an even lower percentage in the Japanese population (1%).[2] Furthermore, almost all the gout in females appears after menopause. Diuretic treatment is frequently associated with female gout especially in the presence of anorexia nervosa.[3] We describe here female premenopausal tophaceous gout after long-term abuse of diuretics, mainly furosemide (40 mg/day).

F. Nakazawa (✉)
Fujikoshi-Hospital Orthopedic Surgery, 11-65 Ishigane, Toyama 930-0964, Japan
Tel. +81-76-424-2881; Fax +81-76-424-0085
e-mail: sna08804@nifty.com

H. Ishihara
Department of Orthopedic Surgery, Toyama Medical and Pharmaceutical University, Toyama, Japan

K. Tanaka
Department of Psychology, Toyama Medical and Pharmaceutical University, Toyama, Japan

The management of gout can generally rely entirely on medical control. It is no longer necessary to resort to surgery for resolution of a large tophus. However, because of the discharging sinus associated with the tophaceous deposit in this patient, we chose surgical management. We thought that medical therapy could be effectively supported by surgical removal of the tophus.

Patient

A 32-year-old Japanese woman had suffered from anorexia nervosa since she was 15 years of age. She was admitted to the psychological unit of our hospital after referral from her psychiatrist because of her emaciation and long-term abuse of diuretics, mainly furosemide (40 mg/day), to lose weight. Her onset of menstruation was at age 10, and she had had menstrual irregularity since age 16. She had been hospitalized in a psychiatric hospital when she was 18. She had complained of edema in her legs and had been given a diuretic by her previous psychiatrist. Her right metatarsophalangeal (MTP) joint exhibited a tophus that had ruptured 2 years previously; it had never received any medical treatment, but she had never been bothered by it even up to the time of this referral. It was unknown whether she experienced a gouty attack. She was referred to the orthopedics department concerning the tophus that had been found by our hospital psychiatrist.

Her physical examination showed the following: height 166.2 cm, body weight 27.3 kg, body mass index (BMI) 9.82, blood pressure 90/50 mmHg, heart rate 55 and regular (Fig. 1). She was able to walk smoothly although with slight pain at her right MTP joint. Her 6-cm tophus appeared to have acted as a foreign body and behaved almost like a bone sequestrum that had formed during osteomyelitis. *Staphylococcus epidermidis* was cultured from the effusion (Fig. 2). Gouty tophi were also observed in two fingers (Fig. 3).

The results of the laboratory studies were as follows: Na 133 mEq/l (normal 135–147 mEq/l); K 3.1 mEq/l (3.5–5.0 mEq/l); Cl 79 mEq/l (98–108 mEq/l); albumin 3.9 g/dl

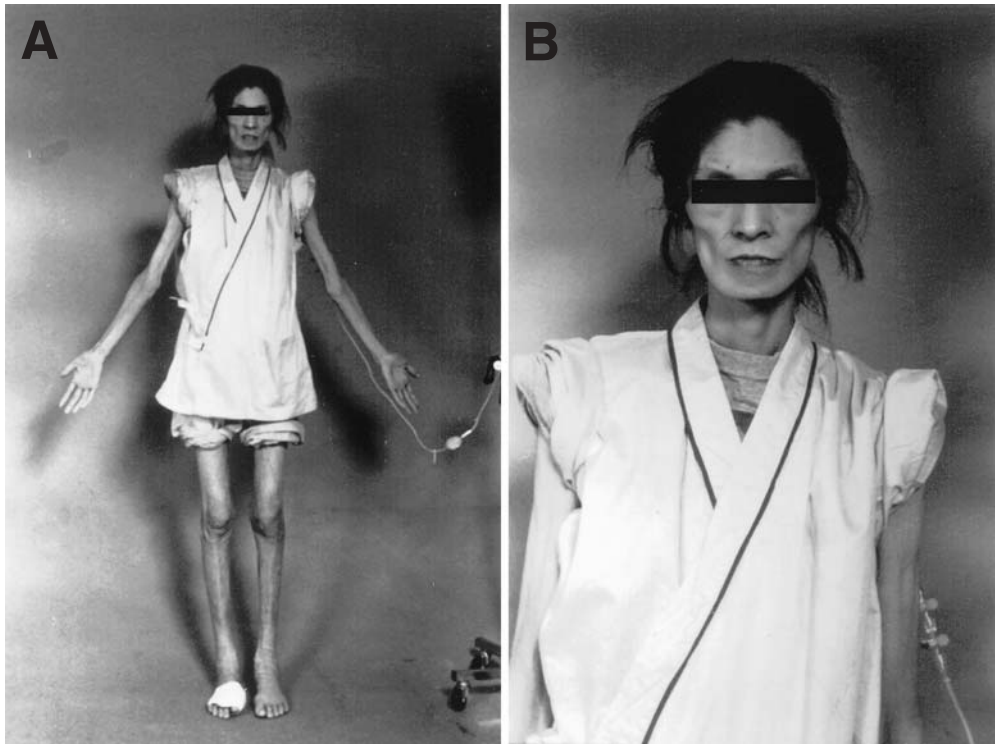

Fig. 1. **A** Full-length view of the patient. Height 166.2 cm; weight 27.3 kg; body mass index 9.82. **B** Upper half of the patient

Fig. 2. Tophus at a right metatarsophalangeal (MTP) joint

(3.8–5.3 g/dl); white blood cell count 4720/μl (3900–9700/μl); red blood cell count 447 × 10^4/μl (370–500 × 10^4/μl); platelets 17.6 × 10^4/μl (13–38 × 10^4/μl); blood urea nitrogen 35 mg/dl (8.0–20.0 mg/dl); creatinine 1.4 mg/dl (0.4–0.8 mg/dl); uric acid 11.4 mg/dl (1.5–6.0 mg/dl); erythrocyte sedimentation rate 12 mm/h (3–11 mm/h); C-reactive protein 0.2 mg/dl (0–0.3 mg/dl); creatine clearance 36.8 ml/min (70–130 ml/min); uric acid clearance (Cua) 5.2 ml/min; urinary uric acid (Uua) 0.12 g/day; Cua/Ccr, 0.14; urine protein (−); urine sugar (−); PSP test 15 min, 10%. Both creatine clearance and PSP were decreased, indicating renal failure. Cua and Uua were also decreased.

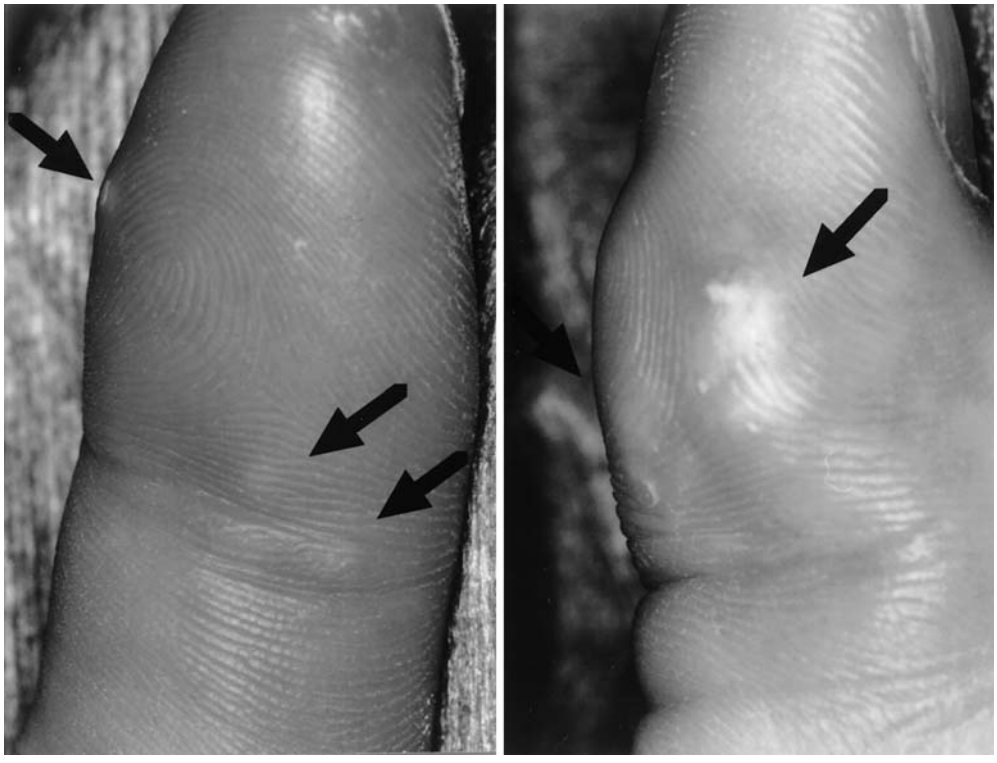

Fig. 3. Tophus of the fingers (*arrows*). Left index finger and right thumb

Fig. 4. Radiographs showing joint destruction with an extensive subchondral tophus

Radiographic examination showed complete joint destruction with an extensive subchondral tophus. The thin cortex was oppressed, and joint cartilage was buried in the tophus (Fig. 4).

Because of the discharging sinus associated with the tophaceous deposits, surgical management was undertaken. A straight skin incision was made to resect the fistula, and the tophaceous material was exposed and extracted (Fig. 5). Remains were curetted and washed away to remove the tophus completely. The wound was packed open. Her right big toe was shortened by 2 cm as a result of the surgery. Pathologically, the tophus showed needle-like urate crystals

that proved to be sodium urate (>95%) by the infrared absorption spectrometry (IR method) (Fig. 6).

A day after the surgery, the patient was able walk, as the pain was tolerable. The site of surgery responded with prompt formation of granulation tissue, and healing of the wound was observed. After surgery, anti-gout medication was administered to decrease the serum uric acid concentration. Because renal insufficiency was seen, allopurinol (100 mg/day), an inhibitor of xanthine oxidase, was given to the patient. Although regular meals were served, she did not appear to be receiving adequate nutrition, so she underwent intravenous hyperalimentation to supply additional nutrients and to increase her urine volume until the wound was healed. She was sufficiently compliant to avoid both starvation and overeating. These treatments were continued until she was discharged from the hospital. The diuretic was suspended to permit the serum uric acid concentration to normalize, and bilateral leg edema was never seen.

Fig. 5. Operative finding. Tophaceous material was exposed and extracted

Discussion

Gout is characterized by acute attacks of crystal-induced arthritis with chronic deposits of monosodium urate in and about the joints and subcutaneous tissues. Gout is provoked by various causes, such as the consumption of large quantities of food and drink or starvation, overwork, and the presence of underlying joint disease. It is also recognized that the disease is the result of an inborn error of metabolism caused by phosphoribosyl-pyrophosphate (PRPP) synthetase hyperactivity, which permits abnormally high production of uric acid.

The first manifestation of gout in women usually occurs with precipitating factors such as renal insufficiency or treatment with a diuretic.[3,4] After long-term surreptitious use of diuretics, symptoms similar to those of Bartter's syndrome may be observed, and the disease is diagnosed as pseudo-Bartter's syndrome.[5] In this case, laboratory findings revealed hypokalemia, renal failure, and generalized weakness, making her prone to develop pseudo-Bartter's syndrome, eventually causing hyperuricemia and gout.

Diuretics are some of the most frequently prescribed drugs in elderly patients, and they are a well recognized cause of secondary hyperuricemia and gout.[6] The mechanism by which diuretics induce gout is not still defined, although enhanced proximal tubular reabsorption of urate as a result of extracellular fluid depletion has been described as being of prime importance in causing urate retention in diuretic-induced hyperuricemia. It was reported that

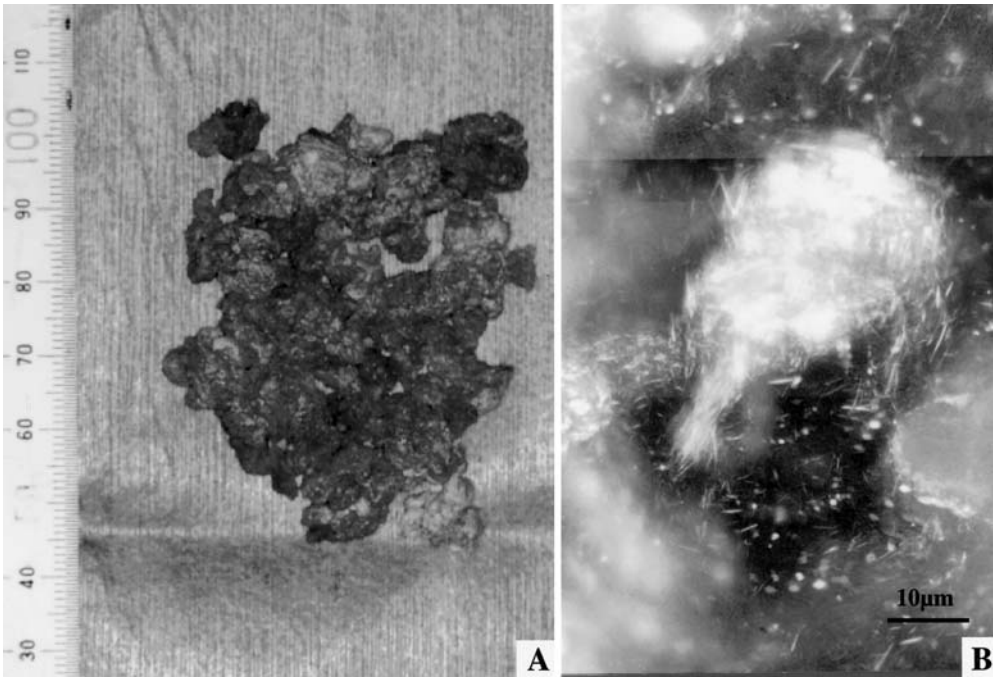

Fig. 6. Tophus material.
A Whole-body photograph.
B Photomicrograph

diuretic-induced gout occurs in patients in whom there is an additional cause of hyperuricemia, usually impaired renal function.[6,7] Menopause is also an important factor in the development of gout in women. Gouty symptoms usually develop in women after menopause.[7] Generally, the serum uric acid level is lower in the premenopausal woman than in men. The patient described herein had been suffering from anorexia nervosa since age 15, and she had noted menstrual irregularity since she was 16. This situation might conducive to developing gout.

There have been some reports of tophaceous gout in women, and it is interesting that all of these patients took diuretics.[3,4,6,7] It was reported that 26% of the female patients with gout also had a tophus.[1] Thus, because it is not rare to encounter a tophus in women with gout, it is important to understand the background and management of this condition. It is essential to evaluate the renal function and to look for use of a diuretic.

Several authors have developed indications for surgery on tophi.[8,9] We resected the tophus in this case because it was infected. After surgery the wound responded with prompt formation of granulation tissue, and it healed. Because of the avascular nature of tophi and the long interval required for resorption of an extensive lesion, however, surgical management might have been required in this case regardless of whether it was infected, although anti-gout medications and suspending the use of the diuretic might have controlled the serum uric acid concentration and perhaps cured the gout. It was easy to diagnose the gout and resect the tophus in this case. Normally, it would be difficult to control the serum urate concentration in tophaceous gout in premenopausal women after long-term abuse of a diuretic. Fortunately, our patient stopped her use of diuretics with the help of our hospital psychiatrist.

Conclusions

We reported a case of female premenopausal tophaceous gout that required surgical management. The prognosis was uneventful so long as the serum uric acid concentration remained normalized.

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