Urgent hemodialysis induced an acute gout attack in a patient with multiple tophi: report of a rare case

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Gout is a disorder of uric acid metabolism potentially associated with deposition of urate crystals in soft tissues and joint inflammation. With recent advances in the diagnosis/treatment of gout, gouty tophi are rarely encountered, except those caused by poor treatment. Patients with tophi should be treated carefully, because uric acid lowering in these patients can precipitate gout attacks.

Here, we report a patient with giant gouty tophi in whom a fierce gouty attack was precipitated after urgent hemodialysis.

An 80-year-old man was admitted to our hospital with gastrointestinal hemorrhage. He had a long history of renal failure and gout and had routinely taken nonsteroidal anti-inflammatory drugs (NSAIDs) for gout attacks by preference. Therefore, because of insufficient treatment, he developed numerous gouty tophi in multiple joints (Fig. 1a). On admission, he had anemia (hemoglobin 5.7 g/dl), renal failure (serum creatinine 4.2 mg/dl, blood urea nitrogen 85.7 mg/dl), and hyperkalemia (serum potassium 6.3 mmol/l). In view of the renal failure and upper gastrointestinal endoscopy revealing a bleeding duodenal ulcer, we performed urgent hemodialysis.

After dialysis initiation, the patient complained of fierce pain in multiple joints, which had become red and swollen (Fig. 1c). Body temperature increased to 39.5 °C and serum C-reactive protein level to 22.5 mg/dl. Since knee

joint aspiration revealed urate crystals, we concluded that the gout attack was triggered by acute mobilization of uric acid by dialysis. However, despite the inflammation, the persistent renal failure necessitated continuation of the hemodialysis. Furthermore, despite the severe pain, NSAID use was contraindicated because of the duodenal ulcer. Therefore, oral steroid therapy (prednisolone 30 mg daily, then gradually reduced) was initiated, which reduced the inflammatory reaction and joint swellings (Fig. 1d). Finally, dialysis was discontinued after 8 sessions as renal function improved.

After the acute phase, allopurinol (100 mg daily) was started to lower uric acid production; however, it led to liver dysfunction (total bilirubin 12.1 mg/dl). After recovery of liver function, therefore, treatment with febuxostat was initiated (10 mg daily for 2 weeks, then 20 mg daily for a further 4 weeks), which safely decreased the serum uric acid, without any side-effects; eventually, the treatment resulted in marked resolution of the tophaceous gout (Fig. 1b).

Urate crystals are normally coated with serum proteins (apolipoprotein E or B) which inhibit urate crystal-induced inflammatory responses [1]. Serum urate reduction causes partial dissolution of microtophi with release of uncoated urate crystals. Macrophages recognize uncoated urate crystals by specific Toll-like receptors, and activate the innate immune system; then, production of interleukin-1 triggers a cascade of pro-inflammatory cytokines [2].

Febuxostat, a potent xanthine oxidase inhibitor, is metabolized mainly by glucuronide formation and oxidation in the liver, and can therefore be safely used in patients with renal failure [3].

We achieved successful control of the inflammation with the steroid and resolution of the gouty tophi with febuxostat. Our findings emphasize the need to bear the

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Fig. 1 Representative photographs of gouty tophi on the first metatarsophalangeal joint **a** on admission. **b** Marked resolution is seen after therapy. **c** Swelling of the metacarpophalangeal joint after dialysis. **d** Resolution of the swelling after steroid therapy

following in mind when treating patients with gouty tophi: (1) possible precipitation of a gout attack by urgent dialysis in patients with renal failure, and (2) possible appearance of side-effects of xanthine oxidase inhibitors, especially allopurinol.

References

1. Terkeltaub RA, Dyer CA, Martin J, Curtiss LK. Apolipoprotein (apo) E inhibits the capacity of monosodium urate crystals to stimulate neutrophils. Characterization of intraarticular apo E and demonstration of apo E binding to urate crystals in vivo. *J Clin Invest.* 1991;87:20–6.
2. Liu-Bryan R, Scott P, Sydlaske A, Rose DM, Terkeltaub R. Innate immunity conferred by Toll-like receptors 2 and 4 and myeloid differentiation factor 88 expression is pivotal to monosodium urate monohydrate crystal-induced inflammation. *Arthritis Rheum.* 2005;52:2936–46.
3. Tatsuo H, Iwao O. A repeated oral administration study of febuxostat (TMX-67), a non-purine-selective inhibitor of xanthine oxidase, in patients with impaired renal function in Japan: pharmacokinetic and pharmacodynamic study. *J Clin Rheumatol.* 2011;17:S27–34.