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# Ulcerated tophaceous gout

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## Abstract

Gout is a common inflammatory arthropathy with a high prevalence worldwide. Increased levels of uric acid in the blood lead to deposition of monosodium urate crystals in the joints, inflammation, and pain. Acute gout attacks are often sudden, monoarticular, and typically resolve within a week, whereas chronic gout is often polyarticular with baseline pain between attacks. In chronic gout, depositions of uric acid known as tophi can form throughout the body. Despite the high prevalence of gout and the frequency with which tophi occur, ulceration over tophi is surprisingly rare. We report the case of a 38-year-old man, undiagnosed with gout, who presented to clinic for evaluation of ulcers with chalky white granules. The wounds were determined to be ulcerated tophaceous gout. Risk factors for ulceration over tophi and reported treatments are discussed.

*Keywords: ulcer, tophi, gout, dermatology,, wound, arthropathy, skin, tophaceous gout*

## Introduction

Gout is the most common inflammatory arthropathy and has a high prevalence both worldwide and in the United States, where it affects up to 4% of adults [1]. High levels of uric acid in the blood lead to deposition of monosodium urate crystals in the tissues and synovial fluid. These crystals trigger a complex immune cascade that results in significant inflammation and pain. Hyperuricemia is generally defined as uric acid levels above 6mg/dL for

premenopausal women and 7mg/dL for men and postmenopausal women [2]. There are two broad mechanisms that cause hyperuricemia. The first is underexcretion of uric acid by the kidneys, which is responsible for about 90% of cases. The second is overproduction of uric acid, which accounts for the other 10% of cases [3]. Acute gout attacks are typically rapid in onset and monoarticular, presenting as a hot, swollen, erythematous joint. These will often resolve spontaneously within days to a week and patients will be asymptomatic between attacks. Chronic gout typically has destructive polyarticular involvement and a baseline level of joint pain may persist between episodes [3]. In chronic gout, accumulations of uric acid, known as tophi, can deposit throughout the body.

## Case Synopsis

A 38-year-old man with a history of hypertension, anxiety, obesity, and chronic left lower extremity edema presented to the wound clinic for evaluation and treatment of ulcers on his left lower extremity (**Figure 1**). The wounds first appeared two years prior to presentation and subsequently resolved spontaneously, only to reopen 6 months later. Two months before presentation, the patient had been hospitalized for cellulitis of the skin surrounding the ulcers that required intravenous antibiotics. There was a negative work-up for deep vein thrombosis at that time. The patient reported that the ulcers were incredibly painful. Pain was out of proportion to physical examination findings. The patient also complained of polyarthralgias. Physical examination



**Figure 1.** Left medial leg with shallow ulcers containing small yellow-to-white chalky material embedded in the base.

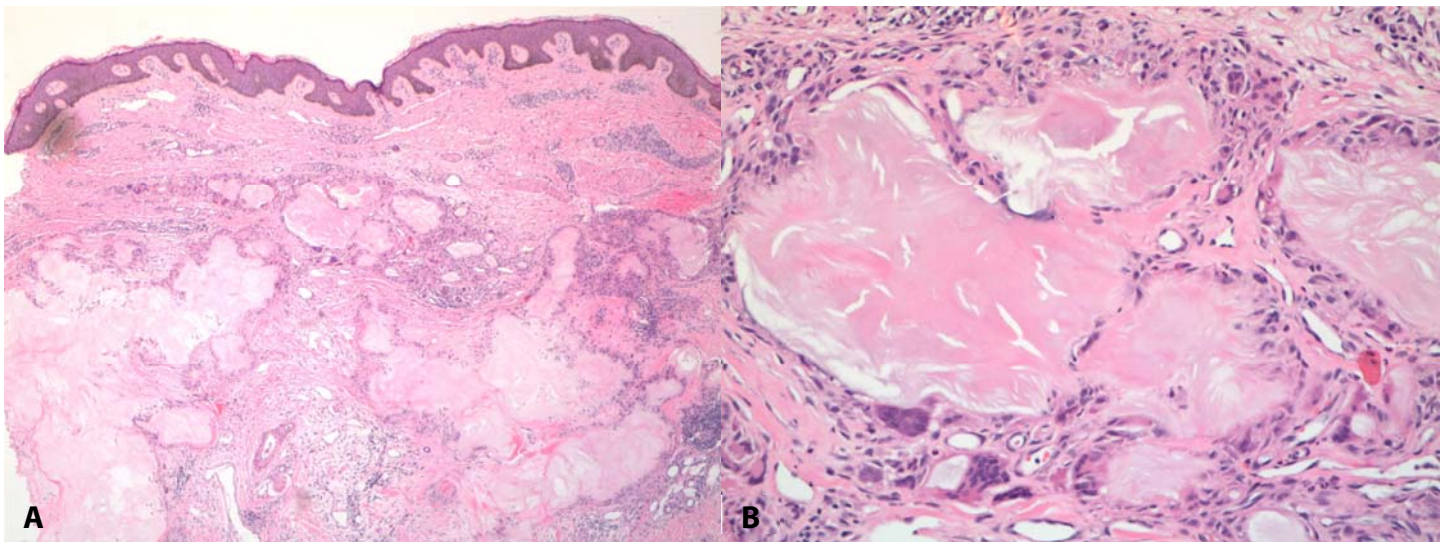
revealed indurated plaques surrounding multiple ulcers containing small yellow-to-white chalky granular deposits. There were also multiple hyperpigmented indurated nodules and plaques present on the bilateral arms, back, and right thigh.

A punch biopsy was obtained that showed dermal deposition of eosinophilic material with chronic granulomatous inflammation (**Figure 2**). Inspection under polarized light revealed needle shaped crystals with negative birefringence (**Figure 3**). These findings were consistent with tophaceous

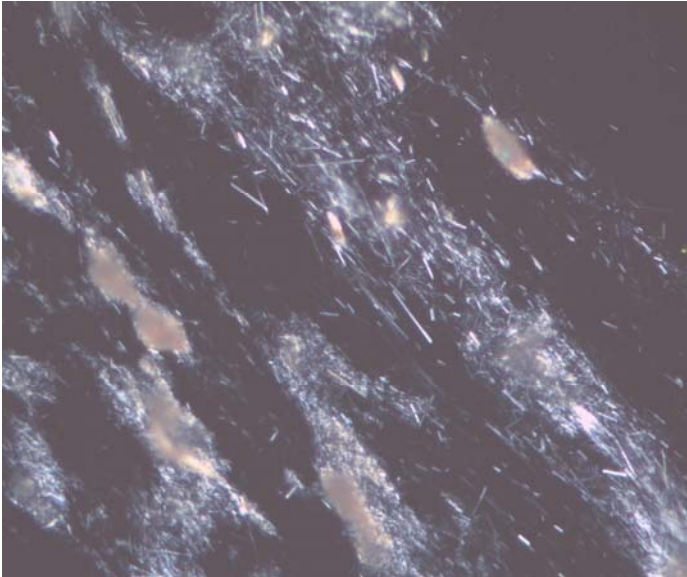
gout. The patient had not previously been diagnosed with gout, but retrospective chart review revealed a uric acid level of 12.2mg/dL during his previous hospitalization. The patient was diagnosed with ulcerated tophaceous gout and was started on treatment with colchicine and allopurinol. Absorbent dressings and Unna boots were used for wound care.

### Case Discussion

Despite the high frequency of tophaceous gout, ulceration is surprisingly uncommon and is the exception rather than the rule [4]. A recent literature review examined cases of ulcerated tophaceous gout and found nine articles comprising 22 individual patient cases. Ulcers were found in patients aged 36 to 95 and were most commonly seen in men (82%). Comorbidities such as diabetes and hypertension were present in 86% of cases and 19 out of the 22 patients had been diagnosed with gout prior to ulcer formation. Most ulcers were found on the feet, but cases were also noted on the heel, thumb, and second finger [4]. Treatment options for ulcerated tophi are not well established, but a variety of approaches have been tried. These include topical use of 3% citric acid in petroleum jelly, single debridement with or without topical treatments,



**Figure 2.** **A)** Low power view of punch biopsy with dermal deposition of amorphous eosinophilic material with surrounding granulomatous inflammation. H&E, 20 $\times$ . **B)** High power view of amorphous material in the dermis with dermal fibrosis and marked granulomatous response with giant cell formation. Formalin fixation has destroyed the uric acid crystals. H&E, 200 $\times$ .



**Figure 3.** Needle-shaped uric acid crystals from a fresh smear of gouty tophi showing negative birefringence under polarized light.

gentle monthly debridement after using a hydrogel to soften the tophus, and free flap surgery to cover the wound. All methods yielded good results and when reported, the time to healing ranged from 7 to 40 days [4]. Another study prospectively recruited

and analyzed patients with gout who had tophi severe enough to warrant surgery. They found that 13.7% of the patients in this population had clinically apparent ulceration over the tophus, 78% of which were located on the feet. The study also found that ulceration of tophi was independently correlated with older age, increased size of tophi, and a lack of protective sensation [5].

## Conclusion

The patient from this case had an unusual presentation in that he was relatively young, presented undiagnosed with gout, had ulcers in an unusual location for gout, and lacked risk factors for ulceration. Although ulcerated tophaceous gout is uncommon it should be considered in the differential diagnosis for dermatologists when evaluating ulcers that contain yellow or white chalky granules.

## Potential conflicts of interest

The authors declare no conflicts of interests.

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