Diagnosing an ulcerated gouty tophus

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ABSTRACT

We present the case of a 44-year-old man with a complicated past medical history who presented with presumed sepsis secondary to pneumonia and severe joint pain secondary to gout. Despite an entirely negative infectious workup during his lengthy hospitalization, he developed ulcerated, draining wounds on his hands and feet that were also initially presumed to be infectious. The chalky substance draining from the wounds was eventually evaluated with potassium hydroxide under polarized microscopy and found to have the characteristic negative birefringence of sodium urate crystals. He was treated with steroids after an infectious etiology had been ruled out, and he improved clinically once his uric acid levels began to fall.

KEYWORDS Bedside diagnostics; crystals; gout; negative birefringence; sepsis; uric acid

Gout, caused by hyperuricemia, can lead to inflammatory arthritis, cutaneous disease, or a more systemic, inflammatory response—any of which might mimic an infectious etiology. This was the case in our patient, and although many complex diagnostic tests are available and often critical for making a correct diagnosis, our case demonstrates the role that a simple, cost-effective test can still have in confirming a diagnosis.

CASE REPORT

A 44-year-old man from Guam with obesity and a past medical history of congestive heart failure, chronic kidney disease, recurrent pneumonias, and gouty arthritis was hospitalized for presumed sepsis secondary to pneumonia. He presented with fevers, tachypnea, leukocytosis up to 35,400/ μ L, and C-reactive protein of 377 mg/L with no defined infectious source. He was treated with broad-spectrum antibiotics and itraconazole for antifungal coverage. An extensive infectious workup to include blood, sputum, urine, synovial fluid, and cerebrospinal fluid cultures as well as hepatitis panel, human immunodeficiency virus, tuberculosis, and antigen testing for various bacterial, viral, and fungal etiologies was negative. Upon admission, he also reported severe pain in all joints with a uric acid level of 13.6 mg/dL (normal range

2.4–7.9 mg/dL). X-rays of his hands and feet showed severe erosive arthropathy consistent with gouty arthritis, and knee joint aspiration revealed both intra- and extracellular crystals with negative birefringence consistent with monosodium urate crystals. Colchicine and morphine were started on admission, but steroids were held until an infectious etiology was explored further.

On day 5 of admission, he developed a lesion on the dorsal right hand that began draining serosanguinous fluid with a white, chalky material and a similar, smaller lesion on the left fifth proximal interphalangeal joint (*Figure 1*). Bacterial and fungal cultures of the wounds as well as acid-fast bacilli staining were negative. Bedside scrapings of the dried, white material from the wound were evaluated with potassium hydroxide preparation under a polarizing microscope (*Figure 2*). The presence of negatively birefringent crystals confirmed the lesions as ulcerated gouty tophi. After an extensive infectious workup was negative, he began systemic steroids, and his clinical course improved significantly. He had a prolonged, complicated hospital stay but no infectious etiology was ever definitively identified.

DISCUSSION

Gout is an inflammatory arthritis caused by the deposition of monosodium urate crystals in synovial fluid and

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Figure 1. Lesions on the (a) right dorsal hand and (b) interphalangeal joint of the fifth digit of the left hand.

Figure 2. Negatively birefringent crystals seen when examining bedside scrapings of the wound material in a potassium hydroxide preparation under a polarizing microscope.

other tissues and is most frequently associated with serum uric acid levels >6.8 mg/dL.¹ Most patients with gout experience isolated episodes of acute gouty attacks but, with inadequately treated hyperuricemia, transition to the second phase of gout can occur.¹ This is manifested as chronic tophaceous gout, often with polyarticular attacks, symptoms between attacks, and crystal deposition (tophi) in soft tissues or joints.¹

Skin involvement with the development of gouty tophi is common, but there are reported cases of less common dermatologic conditions including gouty panniculitis, hyperpigmented skin nodules, pustules, intradermal bullae, and gouty tophi with deep skin ulcerations.² Our patient's findings most likely represent ulceration of a preexisting gouty tophus. He had a painful and complicated hospital stay, but the striking improvement in his clinical condition occurred when intravenous corticosteroids were initiated for the treatment of his severe hyperuricemia accompanying radiographically, arthroscopically, and, with the use of a relatively simple bedside test, dermatologically proven gout.

The development of ulcers over gouty tophi is a rare complication of poorly controlled gout, with only six recent case reports representing nine patients in the literature.^{3–8} These areas of ulceration are infrequent, but they have a propensity to develop over sites of potential trauma in patients with existing tophi and occur most frequently on the lower

extremities.^{3,6} Despite the unusual location and rare evolution in our patient, a bedside test confirmed the lesions as a complication of his gout by scraping the dried, white exudate from his hand and evaluating it under polarized light microscopy. Initially, the crystals were difficult to visualize due to the presence of many epithelial cells. However, because uric acid crystals are insoluble in alcohols, we used a potassium hydroxide preparation to better visualize the negative birefringence of the crystals.⁹

Although his presentation of severe, disabling gout and extreme hyperuricemia is rare with the widespread use of uric acid-lowering medications, our patient demonstrates a unique finding that highlights the need to consider gout as a possible mimicker of systemic and cutaneous manifestations of an infectious process. A similar reported case with a sepsis-like picture had a leukocyte count of $18,700/\mu\text{L}$, and this patient also did not improve until steroids were added to his treatment regimen for the underlying gout.⁸ This patient also had purulent drainage from an open lower-extremity wound that was initially thought to be infectious until polarized microscopy examination revealed monosodium urate crystals.⁸ We would like to highlight the role that a bedside diagnostic test played in the diagnosis of our patient's wounds; these relatively simple tests are often much less expensive than many other aspects of a patient's hospitalization and can be invaluable to confirming the correct diagnosis and treatment plan.

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