Malaria and Acute Tophaceous Gout with Superimposed Infection: A Case Report

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LEARNING OBJECTIVE

To discuss the incident of acute tophaceous gout in a patient with malaria, as well as an evaluation of the role of uric acid in malarial inflammation.

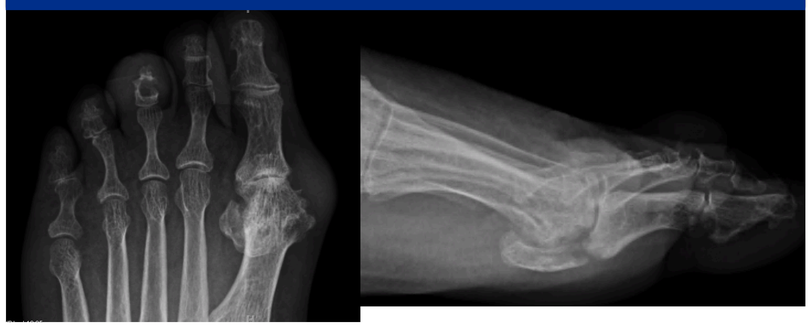
LITERATURE REVIEW

Malaria is a highly inflammatory disease with characteristic cyclical fevers caused by erythrocyte infection by the parasite *Plasmodium* spp. Patients are inoculated following the bite of an infected female *Anopheles* mosquito. The incubation period for *Plasmodium* varies from 2-4 weeks, during which patients are asymptomatic. There are relapsing species that can cause illness two to three years after initial infection (1). Uric acid has emerged as an important inflammatory mediator in the disease process of malaria (2). *Plasmodium*-infected erythrocytes accumulate uric acid and hypoxanthine, a uric acid precursor. The malarial cycle continues until erythrocyte rupture, releasing uric acid and its precursor into the extracellular space, at which point xanthine dehydrogenase can degrade the latter into additional uric acid (3). The resultant increased serum uric acid causes a strong localized inflammatory response and alerts an immune response (4, 5). Allopurinol is an anti-gout medication that functions by inhibiting xanthine dehydrogenase and thus uric acid formation, with potential to decrease inflammation in malarial patients (6).

CASE STUDY

75-year-old female with a history of gout, chronic kidney disease, and hypertension presented with a left third digit cellulitic wound with exposed bone. The wound was several weeks old, and the patient denied any prior history of ulcerations. Examination of the wound revealed positive probe to bone, gouty tophi (later confirmed by pathology), as well as warmth, erythema, and edema of the third digit. At initial presentation, she was pancytopenic (WBC 2.2K/uL and Hb 7.1gm/dL) and had elevated markers of inflammation (ESR 82mm/hr and CRP 6.99mg/dL). Her vitals were within normal limits. She was admitted to the hospital and empiric broad-spectrum IV antibiotics were initiated. Upon further evaluation, she reported a recent travel to Sierra Leone several weeks prior. HIV, hepatitis, babesia, and tuberculosis were ruled out; however a Malaria smear was positive. She was treated with atovaquone/proguanil and allopurinol, followed by a third digit amputation with primary closure. She completed her course of atovaquone/proguanil, oral antibiotics, and was discharged with allopurinol. She healed her amputation site without further incident.

Figure 1a and 1b – Initial Radiographs

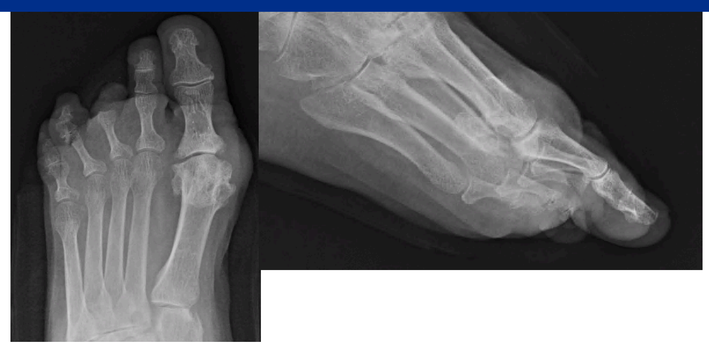


Radiographs showing degenerative changes to the third digit, localized around the middle phalanx.

ANALYSIS/DISCUSSION

Uric acid plays an active role in the pathogenesis of malarial inflammation, with elevated levels of uric acid and high concentrations of hypoxanthine (uric acid precursor) in infected erythrocytes. The malarial cycle is complete with rupture of the infected erythrocytes, releasing uric acid and hypoxanthine into the plasma. This can result in precipitation of urate and propagate acute gouty attacks. It is important to be aware of the role of uric acid in patients infected with malaria, as it predisposes the patients to elevated serum uric acid and thus acute gout. Allopurinol and its mechanism of action of inhibiting the formation of uric acid can be utilized to decrease the associated inflammation.

Figure 2a and 2b – Final Postoperative Radiopgraphs



Post operative AP and Lateral x-rays: showing amputation of the third digit at the level of the proximal interphalangeal joint.

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