

STATEMENT OF PURPOSE

Gout is a common inflammatory arthritis resulting from monosodium urate crystal deposition in the joints and soft tissues.¹ Gout has a wide disease spectrum, but due to the extensive array of drugs available for treatment, ulcerative tophaceous gout in a young patient is not commonly seen. Even less common, is infection secondary to gout. Only one case in literature is found of osteomyelitis and concomitant gout in the lower extremity.² We present a case study, wherein a 37 year old nondiabetic male with a nearly 20-year history of gout presented with 1st ray osteomyelitis due to the ulcerative tophaceous gout. Treatment involved both medical therapies and three staged procedures, resulting in a successful outcome with no recurrence and >14 month total follow up.

Both surgical and conservative, multi-team approaches much be considered in the treatment of tophaceous gout. The purpose of this case study is to present a rare case of extensive joint destruction due to osteomyelitis and tophaceous gout in a relatively healthy younger patient and provide a definitive treatment plan which resulted in a functional foot and satisfied patient.

LITERATURE REVIEW

Gout is one of the most prevalent inflammatory arthritides among adults.¹ The prevalence increases with age and has a predilection for males. The youngest patient in literature described with a significant degree of tophus formation was 42 years old.³ Gout is a disorder of uric acid metabolism, which causes elevation of serum uric acid levels,¹ leading to deposition of monosodium urate crystals into soft tissues and joints.⁴ The 1st metatarsophalangeal joint is the most common site affected.³ The second most common site for gout in the lower extremity is the fifth metatarsophalangeal joint and the ankle is the third most common.²

The gold standard for diagnosis of gout is demonstration of negatively birefringent needle-shaped monosodium urate crystals in joint arthrocentesis.⁵ Obtaining a histological diagnosis is not always manageable and imaging modalities can have clinical relevance.⁶ Conventional radiographs (XR), CT, ultrasound, and MRI all play an important role in the diagnosis of gout.⁶ Typical XR findings in chronic tophaceous gout include well-defined "punched-out" lesions with overhanging edges, soft tissue nodules, and often asymmetric involvement.⁵ These XR changes have a diagnostic specificity of 93% and sensitivity of 31%.⁵ Radiographic changes of gout can sometimes mimic those of osteomyelitis, but rarely is a patient actually found to be positive for both. Radiologic and rheumatologic journals have devoted many pages to differentiating between osteomyelitis and tophaceous gout. However, during a literature search, only one case was found of concomitant gout and osteomyelitis in the lower extremity. The only other case of lower extremity osteomyelitis and gout in literature was described as focal and was able to be simply debrided.²

The management of gout should be multifactorial and include prophylaxis to prevent chronic tophaceous gout.⁷ There are many medications available for treatment of gout, including those that lower serum urate levels.¹ Small tophi may resolve with aggressive treatment but giant tophi are often resistant to diet change and medications.⁸ When the giant tophus is accompanied with massive limitation of joint motion, compression of neurovascular structures, or skin infection, surgical bulking and debridement of the tophus is always considered as the management option.³

Although gout is perhaps the most understood disease in terms of cause and treatment, delays in establishing a diagnosis and commencing treatment, in addition to poor compliance from the patients, contribute to poor management and outcomes associated with gout.⁷ Despite extensive research available, studies that focus on the relationship between osteomyelitis and chronic tophaceous gout are minimal in literature. We present a case of a patient with osteomyelitis in the presence of chronic ulcerative tophaceous gout who underwent partial 1st ray amputation with fifth metatarsophalangeal joint debulking.

CASE STUDY

Presentation

This 37 year old male with PMH significant for gout (diagnosed at the age of 18) and hypertension presented to the outpatient podiatry clinic as a referral from his rheumatologist due to concern for cellulitis and infection in the left foot (fig 2). The patient had an extensive history of chronic tophaceous gout in both the lower and upper extremities (fig 1), having failed Allopurinol, Uloric, and Colchicine. Approximately one year prior to presentation, he had dropped a piece of boating equipment onto the left foot, causing an exacerbation of gout in this area. He admitted to a 5-pack-per-year smoking history. The patient related to frustration that he had not been able to fit into a normal shoe in approximately 5 years and presented to the clinic wearing flip flops.

Exam revealed normal neurovascular status, three full-thickness ulcerations about the 1st ray with purulent and chalky drainage, erythema and calor about the medial left foot, and pain with palpation of the medial left foot (fig 2). He presented afebrile with no leukocytosis and an ESR of 48.

CASE STUDY

Figure 1. Clinical appearance of bilateral hands, contralateral foot, and left elbow upon presentation, displaying the systemic nature of the patient's disease.



Figure 2. Clinical appearance of left foot upon presentation to podiatry clinic, revealing purulent and tophaceous drainage, erythema, and deformity of the 1st metatarsophalangeal joint.



Wound cultures eventually grew methicillin-resistant Staph. aureus and Prevotella bivia. Radiographs were taken (fig 3) and the patient was admitted to the hospital where empiric IV antibiotics were started.



Figure 3. Left foot radiographs taken upon initial presentation: Destructive bone and soft tissue lesions affecting the entire foot, most notably the 1st MPJ.

SURGICAL TREATMENT

Surgery #1:

The patient underwent surgical incision and drainage of the left 1st MTPJ. Approximately 5cm³ of tophaceous material was removed and bone biopsies were taken. Surgical pathology of the 1st metatarsal revealed acute osteomyelitis of the 1st metatarsal and gout tophi. The incision was packed open.

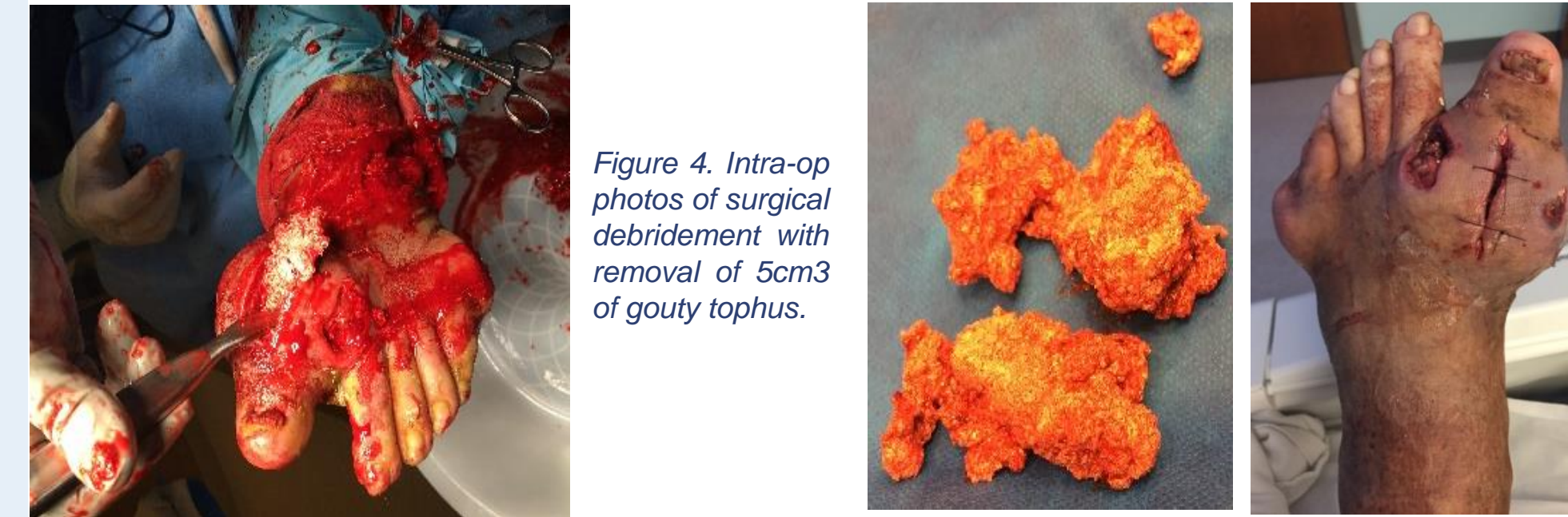


Figure 4. Intra-op photos of surgical debridement with removal of 5cm³ of gouty tophus.

Surgery #2:

Due to presence of acute osteomyelitis and significant bone destruction, the patient was taken back to the OR approximately 72 hours later for a partial 1st ray amputation. The patient was discharged from the hospital and sent for a 14-day stay in a rehab unit 2/2 difficulty using crutches with his hand deformities. He continued to follow up in the outpatient clinic where he healed the surgical site well, but was still complaining of discomfort and difficulty fitting into shoes in the lateral aspect of the 5th metatarsal head (fig 5).



Figure 5. 5-months post-operative clinical appearance and radiographs. Patient still had complaints of 5th metatarsal head discomfort. New tophi formation on x-ray but unchanged for 4 months.

Surgery #3:

Treatment options for lateral forefoot discomfort and shoe fit issues were discussed with the patient and he elected to return to the operating room. The patient was taken to the OR approximately 7 months after initial presentation for an incision and drainage of the left lateral forefoot (fig 6).

Figure 6. Intraoperative photos and immediate post-op clinical/radiographic appearance, displaying removal of approximately 2cm³ of tophaceous material. Bone biopsies were taken of the 5th metatarsal head and were negative. The incision was primarily closed.



FOLLOW UP

The patient follow up weekly in the outpatient clinic with complete healing at 4 weeks post-procedure. The patient was able to transition into a normal shoe for the first time in 6 years and resume all activities, including his occupation as a DJ, requiring him to stand for over eight hours at a time, without difficulty. The patient followed up for a total of 14 months and at his last visit expressed satisfaction with the outcome. He will continue to see his rheumatologist, where his gout will be systemically treated and be seen annually in the podiatry clinic.

ANALYSIS AND DISCUSSION

Unique Age for Degree of Destruction

This patient was 37 years old and was diagnosed with gout approximately 19 years prior to presentation. Although gout can be seen in the third and fourth decades, this degree of tophi formation and deformity in such a young patient is rare. Zhou et al described a 42 year old male who presented with a giant tophus of his left foot that impeded shoe wear and normal weight bearing, who never underwent systemic treatment, whereas the patient in our study failed many years of treatment.³ The younger age, in addition to dramatically severe presentation is fairly unique to literature.

Trauma-induced Exacerbations

The patient presented in this case study related to dropping a piece of boating equipment onto his left hallux one year prior to presentation. Trauma to weight-bearing joints causes effusions to collect during the daytime into the joints.⁹ However, as water is reabsorbed from the joint spaces overnight, a supersaturated concentration of monosodium urate is left behind in the joint.⁸ Although trauma may have exacerbated the problem, it is not likely the sole etiology given the patient's extensive history of severe tophi formation in other joints.

Rarity of Osteomyelitis and Gout to Co-Exist

There are many scenarios in literature of gout masquerading as osteomyelitis, with extensive literature presenting criteria to differentiate the two.⁵ Only one other case of lower extremity osteomyelitis secondary to chronic tophaceous gout was described by Stapleton et al, who reported a very focal lesion which was able to be surgically debrided and the joint salvaged.² In our case study, the patient had extensive osteomyelitis of the entire 1st ray in addition to severe deformity. Because of this, joint salvage was not achievable. Additionally, the patient presented by Stapleton et al, grew *Pseudomonas*, a common bacteria to lower extremity infections.² However, the patient in our case study, grew MRSA and *Prevotella bivia*, a gram-negative bacteria common in oral flora and respiratory tract infections, but less common in soft tissue and bone infections.

Surgical Intervention and Gout

Surgical intervention is rarely indicated for the treatment of gout and is typically reserved for cases where severe deformity or infection is present.⁴ Previous podiatric literature describes a case of septic 1st MPJ tophaceous gout that was surgically treated with joint salvage via bone block joint distraction arthrodesis and external fixation.² Additional podiatric literature has also described partial 1st ray amputation as a treatment option for chronic tophaceous gout.³ In our case patient, many surgical options were explored, but ultimately, given the presence of infection, and most notably, osteomyelitis in both the 1st metatarsal and proximal phalanx, the definitive option chosen was amputation. In this case, surgical amputation and debridement maximized the function of the foot and reduced pain, which over improved the patient's quality of life.

There were several limitations to our current study. The systemic treatment prior to presentation was not clear, nor was the patient's exact level of compliance on his medications. Cases of osteomyelitis associated with chronic tophaceous gout are lacking in literature, and therefore no definitive approach is available. Clinical decisions need to weigh the gains and losses carefully.

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FINANCIAL DISCLOSURES

No financial disclosures.