Tophaceous gout as a squamous cell carcinoma mimicker

Kelly A. Mueller, MD,[a] Molly R. Marous, MD,[a] Kathleen A. Mannava, MD,[a,b] and Franki Lambert Smith, MD[a]
Rochester, New York

Key words: deposition disorder; Mohs micrographic surgery; pseudoepitheliomatous hyperplasia; squamous cell carcinoma; squamous cell carcinoma mimicker; tophaceous gout.

Gout is a common inflammatory arthritis caused by deposition of monosodium urate. Tophaceous gout results from chronic accumulation of monosodium urate and most commonly presents clinically as an asymptomatic, smooth, yellow, subcutaneous nodule. Rarely, the overlying skin can ulcerate or become hyperkeratotic due to the associated pseudoepitheliomatous hyperplasia and thus mimic a squamous cell carcinoma (SCC) clinically and histopathologically. We present a case of a gouty tophus on a finger pad mimicking an SCC clinically and histopathologically and subsequent treatment with Mohs micrographic surgery (MMS) prior to accurate diagnosis and management.

Abbreviations used:

MMS: Mohs micrographic surgery
SCC: squamous cell carcinoma

CASE DESCRIPTION

A 92-year-old female presented to the dermatology clinic for a 1-year history of a painful, growth on her thumb. Exam was notable for a hyperkeratotic papule with no appreciable underlying nodule on the finger pad of her right thumb (Fig 1, *A*). Initial differential diagnosis included verruca vulgaris and SCC. After home wart treatment and in-office cryotherapy were unsuccessful, a shave biopsy was performed. The pathology result was interpreted as a well-differentiated SCC. Due to the patient's age and comorbidities, electrodesiccation and curettage was first attempted. Following the procedure, the lesion quickly regrew; thus, definitive treatment with MMS was recommended. The patient underwent MMS 8 months following initial presentation. While obtaining the first stage, a chalky white substance was noted at the base of the defect (Fig 1, *B*). Histopathological analysis of the frozen sections demonstrated dermal infiltration by irregular lobules of squamous epithelial cells with abundant eosinophilic cytoplasm and enlarged nuclei (Fig 2). The same sections also showed extensive dermal deposition of a seemingly foreign brown feathery material (Fig 3).

The slides were reviewed by a dermatopathologist (KAM) who noted doubly refractile, brown needle-shaped crystals (Fig 3), consistent with monosodium urate crystals of a gouty tophus associated with the atypical squamous proliferation. MMS was continued until clearance of atypical keratinocytes, as they were presumed to be malignant, taking 3 stages to a depth of the periosteum with adjacent crystals noted in all 3 stages.

Closer inspection of the patient's hands revealed numerous smooth yellow subcutaneous nodules overlying joints as well as on the finger pad of her first digit on the opposite hand. None of these lesions had overlying epidermal change. A review of the original shave biopsy revealed extensive epithelial hyperplasia and keratinocyte atypia initially interpreted as SCC, with a few small deposits of feathery pink amorphous material in the underlying dermis, consistent with gout. Further chart review revealed that she had been diagnosed with tophaceous gout

From the Department of Dermatology[a] and Department of Pathology and Laboratory Medicine, University of Rochester Medical Center.[b]
Funding sources: None.
IRB approval status: Not applicable.
Correspondence to: Kelly A. Mueller, MD, Department of Dermatology, University of Rochester Medical Center, 40 Celebration Drive, Rochester, NY 14642. E-mail: Kelly_Mueller@UMRC.Rochester.edu.

JAAD Case Reports 2021;10:11-3.
2352-5126
© 2021 by the American Academy of Dermatology, Inc. Published by Elsevier, Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
https://doi.org/10.1016/j.jdcr.2021.01.021

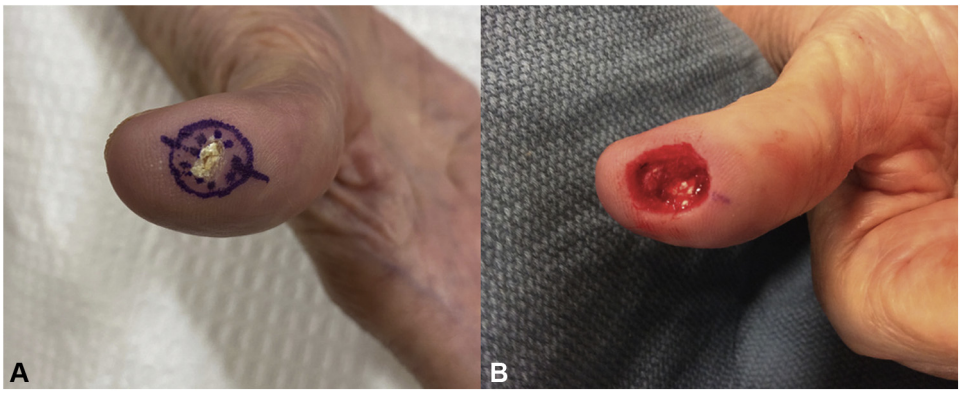

Fig 1. A, Clinical appearance of the hyperkeratotic papule. **B**, Chalky substance noted after first stage of Mohs micrographic surgery.

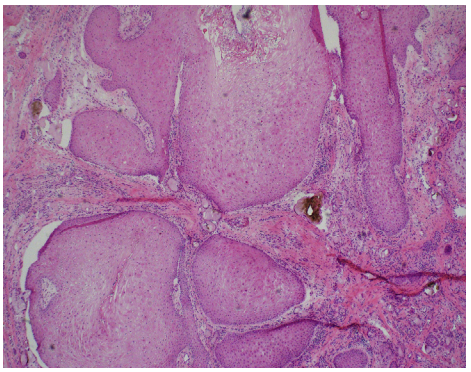

Fig 2. Mohs micrographic surgery sections with irregular lobules of squamous epithelial cells with abundant eosinophilic cytoplasm and enlarged nuclei (Hematoxylin-eosin stain; original magnification: ×40.)

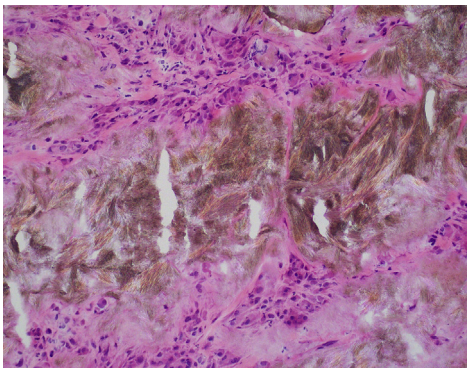

Fig 3. Mohs micrographic surgery sections showing brown needle-shaped crystals (Hematoxylin-eosin stain; original magnification: ×200.)

involving her right great toe, although she was not on any uric acid lowering agents. Following MMS, treatment with allopurinol was initiated.

DISCUSSION

Gout is a very common inflammatory arthritis with a prevalence in the United States estimated to be upwards of 3% of the population.[1] It is caused by deposition of monosodium urate, which can occur when the serum level of uric acid exceeds its solubility of 6.8 mg/dL. Tophaceous gout is characterized by chronic monosodium urate accumulation and a resultant inflammatory response, which leads to destruction of the surrounding tissue. Treatment consists of uric acid lowering medications, such as allopurinol, and anti-inflammatory agents.

An English language literature search of gouty tophi and SCC revealed 3 case reports detailing a total of 5 cases in which gouty tophi mimicked SCCs, both clinically and histologically, due to the associated significant pseudoepitheliomatous hyperplasia. Four of 5 cases involved lesions on the ear,[2,3] a relatively common site for gout deposition, and only one reported a lesion in an atypical location, the proximal nail fold of a digit.[4] Four of the 5 patients had a known history of gout, although this was not always realized until after identification of gout in the skin specimen, as in our patient's case.

This case illustrates several learning points. First, it is important for dermatologists to be aware that tophaceous gout can rarely present as an ulcerative or hyperkeratotic lesion, especially on sites such as the ear and digits. Gouty tophi most commonly develop at articular sites, tendons, or ears but can occur at any site containing connective tissue, including sites such as the finger pads, penis, breast, or tongue. Interestingly, tophaceous gout in the finger pads may occur more frequently than generally thought: a study identified finger pad tophaceous deposits in 30.5% (11/36) of patients with a history of chronic gout.[5] Clinically, tophaceous gout most commonly presents as an asymptomatic, smooth,

yellow-to-cream–colored, subcutaneous nodule; however, the overlying skin can ulcerate or become hyperkeratotic, both of which can mimic SCC.

Second, gouty tophi can lead to prominent pseudoepitheliomatous hyperplasia and thus mimic SCC histopathologically as well as clinically. Monosodium urate deposition can be very focal or not present in a superficial shave biopsy as it is often deposited in the dermis. In the absence of clinical suspicion of gout, these tiny foci of formalin-fixed crystals may go unnoticed. Although gout and SCC may occur concomitantly, especially on sites such as the hand and ear, it is important to carefully consider the possibility of pseudoepitheliomatous hyperplasia mimicking SCC, when gouty tophi are observed in a biopsy or during MMS, which was not considered in our patient's case. If considered, initiation of a uric acid lowering medication can be trialed prior to surgical removal and thus potentially avoid unnecessary procedures.

Finally, the histopathological features of tophaceous gout differ on fresh frozen sections compared with routine histologic sections, which can further complicate the diagnosis. In routine formalin-fixed specimens, the formalin dissolves the monosodium urate crystals, leaving a pink, feather-like material with clefts. In fresh frozen sections, however, the monosodium urate crystals are preserved and appear brown under the microscope. The ability to recognize the histopathological features of tophaceous gout in both fresh frozen and formalin-fixed specimens is imperative for correctly diagnosing gout during MMS.

Conflicts of interest

None disclosed.

REFERENCES

1. Zhu Y, Pandya BJ, Choi HK. Prevalence of gout and hyperuricemia in the US general population: the National Health and Nutrition Examination Survey 2007-2008. *Arthritis Rheum*. 2011;63(10):3136-3141.
2. Sutton L, Parekh P. Perforating gout of the ear. *Dermatol Online J*. 2016;22(10):13030/qt1vn208xw.
3. Morrissey KA, Garcia-Albea V, Goldberg LJ. Pseudocarcinomatous hyperplasia involving the ear from gout: a diagnostic pitfall. *J Cutan Pathol*. 2014;41(1):42-44.
4. Dacko A, Hardick K, McCormack P, Szaniawski W, Davis I. Gouty tophi: a squamous cell carcinoma mimicker? *Dermatol Surg*. 2002;28(7):636-638.
5. Holland NW, Jost D, Beutler A, Schumacher HR, Agudelo CA. Finger pad tophi in gout. *J Rheumatol*. 1996;23(4):690-692.