



## Case Report

Journal Homepage: <http://crp.tums.ac.ir>

## Tophaceous Gout: An Educational Case

Anahita Sadeghi<sup>1</sup> , Mona Talaschian<sup>2</sup> , Sudabeh Alatab<sup>1\*</sup>

1. Digestive Disease Research Center, Digestive Disease Research Institute, Tehran University of Medical Sciences, Tehran, Iran.

2. Department of Internal Medicine, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran.

**Citation:** Sadeghi A, Talaschian M, Alatab S. Tophaceous Gout: An Educational Case. Case Reports in Clinical Practice .2019; 4(3):69-72.**Running Title:** Tophaceous Gout: An Educational Case**Article info:****Received:** 03 July 2019**Revised:** 26 July 2019**Accepted:** 20 September 2019**Keywords:**Uric acid; Tophaceous gout;  
Colchicine**ABSTRACT**

Gout is a type of inflammatory arthritis that results from the deposition of monosodium urate crystals in the articular or periarticular tissues. In this educational case, we report a middle-aged man who presented with multiple nodules distributed bilaterally over the dorsum of his hands, feet, and elbow joints. Based on clinical and histological findings, the nodules were found to be gouty tophi, and the patient was diagnosed with tophaceous gout characterized by collections of solid urates in connective tissues.

**Introduction**

**G**out is a type of inflammatory arthritis that results from the deposition of monosodium urate crystals in the articular, periarticular tissues, and other tissues like renal tract [1]. If left untreated, the disease follows a typical clinical course. First, there are several years of asymptomatic hyperuricemia, followed by acute intermittent arthritis attacks, inter-critical stage, and eventually chronic tophaceous gout presented with the formation of tophi, or collections of MSU crys-

tals that serve as the nidus of a granulomatous reaction [1]. Chronic tophaceous gout classically occurs after 10 years or more of recurrent polyarticular gout attacks. However, it can be the first manifestation of the disease in the absence of arthritis [2].

One-fifth of the patients who suffer from acute gout eventually develop tophaceous deposits if not treated with hypouricemic drugs [3]. In particular, transplant recipients and older adults are more prone to tophaceous gout. Here we present a middle-aged man with tophaceous gout.

**Sudabeh Alatab, PhD.****Address:** Digestive Disease Research Center, Digestive Disease Research Institute, Tehran University of Medical Sciences, Tehran, Iran.**E-mail:** [sudabehalatab@yahoo.com](mailto:sudabehalatab@yahoo.com)



**Figure 1.** Bilateral nodules on olecranon bones



### Case Presentation

A 56-year-old man with a history of chronic uncontrolled gout for 20 years presented to the clinic with multiple bilateral nodules. The patient consumed his medication (allopurinol and colchicine) irregularly, mostly because he did not feel improvement in his condition. The nodules were presented for several years. The patient presented to our clinic because of enlargement and expansion of the nodules. His past medical and surgical history, including drug history was unremarkable. The nodules were not painful or tender. The patient did not have fever or any other constitutional

symptoms. His physical examination revealed no organomegaly or lymphadenopathy.

On cutaneous examination, he had multiple firm, skin-colored nodules. They were non-tender and distributed bilaterally over the olecranon bones (Figure 1), proximal interphalangeal joints of both hands (Figure 2), metacarpophalangeal joints of the left hand, and the first and third metatarsophalangeal joints of the left foot (Figure 3). His Erythrocyte Sedimentation Rate (ESR), hemoglobin count, total leukocyte count, differential blood count, platelets, blood sugar, serum calcium, phosphate, albumin, electrolytes, urea, creatinine, parathyroid hormone, thyroid-stimulating hormone, rheumatoid factor,



**Figure 2.** Multiple skin colored nodules on proximal interphalangeal joints of both hands





**Figure 3.** Multiple skin-colored nodules on metatarsophalangeal joints (MTP) of the left foot



and anti-nuclear antibody titers were within the normal range. However, his serum uric acid was high (12mg/dL). Abdominal ultrasonography revealed stones in both kidneys. Fine needle biopsy of the nodules and their histologic examination demonstrated birefringent urate crystals consistent with the diagnosis of chronic tophaceous gout. He was treated with allopurinol and colchicine with no significant improvement. Surgery was also suggested for the patient, but he refused to undergo operation.

## Discussion

Gout is one of the oldest known forms of arthritis. It is a chronic metabolic disorder characterized by chronic hyperuricemia (above 7mg/dL in men and above 6mg/dL in women) and MSU crystals deposition in joints and within the periarticular soft tissues [4]. The hyperuricemia could be primary, due to inborn errors of purine metabolism or decreased renal excretion of uric acid or secondary due to systemic diseases with extensive cell turnover like malignancies and renal disease (extensive cell turnover or renal disease) [5]. Gout usually passes through four sequential stages of asymptomatic hyperuricemia, acute intermittent arthritis attacks, inter-critical stage, and chronic tophaceous gout. Involvement of the metatarsal-phalangeal joint of the great toe is often the earliest manifestation.

Tophi generally occur in 12% of patients after 5 years, and 55% after 20 years of untreated disease [6]. The interval between the diagnosis of gout and the presence of tophi is higher in men compared to women due to the uricosuric effect of estrogens [7]. The development of tophi in the absence of prior episodes of gouty arthritis is unusual, but it could happen [1, 5]. The tophus represents a complex chronic inflammatory tissue response to monosodium urate crystals deposition [8]. In patients with a diagnosis of chronic tophaceous gout, tendons are commonly affected by the deposition of urate crystals. In pathological assessment, there are a central proteinaceous core, foreign body giant cells, and macrophages [8].

These tophi are mostly found in the helix of the ear, over olecranon processes, volar aspect of the forearm, and interphalangeal joints. It is proposed that the occurrence of tophi at these sites is due to precipitation of uric acid crystals in parts of the body with lower temperature [9]. However, the tophi involvement can extend beyond these sites and involve any part of the body like vocal cords, arytenoids cartilage, myocardium, mitral and aortic valves, eyes, and spinal cord [10].

The differential diagnosis of such crystalline tophus includes periarticular nodules like rheumatoid nodules, ganglion cysts, pigmented villonodular synovitis, synovial chondromatosis, synovial sarcoma, tumoral

calcinosis, and tophaceous pseudogout [1, 11]. In acute setting of presentation, septic arthritis should also be included in differential diagnosis list.

The gold standard for diagnosis is the demonstration of urate crystals in synovial fluid or a tophus by polarized light microscopy. The crystals are needle-shaped and exhibit negative birefringence on polarized microscopy. In alcohol fixed sample, urate crystals appear as well, in the form of closely arranged, brown, needle-shaped crystals. In formalin-fixed material, the crystals usually dissolve during routine processing and leave large pale pink acellular areas [12].

Fine needle aspiration cytology is another useful method of diagnosing gouty tophi which is preferred over histopathology because of rapidity, cost-effectiveness, being less invasive and more straightforward and highly sensitive. The first line of treatment for tophaceous gout is medical therapy with urate-lowering agents. Surgery may be an appropriate approach for severe, complicated patients or those who do not respond to medical treatment [13].

## Ethical Considerations

### Compliance with ethical guidelines

All ethical principles were considered in this article.

### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### Conflict of interest

There is no conflict of interest to declare.

## References

- [1] Forbess LJ, Fields TR. The broad spectrum of urate crystal deposition: Unusual presentations of gouty tophi. *Semin Arthritis Rheum.* 2012; 42(2):146-54. [DOI:10.1016/j.semarthrit.2012.03.007] [PMID]
- [2] Kumar P, Das A, Savant SS, Mandal RK, Hassan S. Gout nodulosis: Report of a rare case and brief review. *Dermatology Online Journal.* 2015; 21(1)pii.13030/qt7x98t2jt. [PMID]
- [3] Hollingworth P, Scott JT, Burry HC. Nonarticular gout: Hyperuricemia and tophus formation without gouty arthritis. *Arthritis & Rheumatology.* 1983; 26(1):98-101. [DOI:10.1002/art.1780260117] [PMID]
- [4] Chen JH, Yeh WT, Chuang SY, Wu YY, Pan WH. Gender-specific risk factors for incident gout: A prospective cohort study. *Journal of Clinical Rheumatology.* 2012; 31(2):239-45. [DOI:10.1007/s10067-011-1802-6] [PMID]
- [5] Higgins PA. Gout and pseudogout. *Journal of the American Academy of Physician Assistants.* 2016; 29(3):50-2. [DOI:10.1097/01.JAA.0000475472.40251.58] [PMID]
- [6] Wallace SL, Singer JZ. Therapy in gout. *Rheumatic Disease Clinics of North America.* 1988; 14(2):441-57. [PMID]
- [7] Bolzetta F, Veronese N, Manzano E, Sergi G. Tophaceous gout in the elderly: A clinical case review. *Clinical Rheumatology.* 2012; 31(7):1127-321. [DOI:10.1007/s10067-012-1956-x] [PMID]
- [8] Purohit MB, Purohit TM, Tandon RK. FNAC of gouty tophi—a case report. *Indian Journal of Pathology & Microbiology.* 2006; 49(1):42-3. [PMID]
- [9] Dalbeth N, Kalluru R, Aati O, Horne A, Doyle AJ, McQueen FM. Tendon involvement in the feet of patients with gout: A dual-energy CT study. *Annals of the Rheumatic Diseases.* 2013; 72(9):1545-8. [DOI:10.1136/annrheumdis-2012-202786] [PMID]
- [10] Flores Martín JF, Vázquez Alonso F, Puche Sanz I, Berrio Campos R, Campaña Gutierrez MA, Cózar Olmo JM. Gouty tophi in the penis: A case report and review of the literature. *Case Reports in Urology.* 2012; 2012:594905. [DOI:10.1155/2012/594905] [PMID] [PMCID]
- [11] Falasca GF. Metabolic diseases: Gout. *Clinical Dermatology.* 2006; 24(6):498-508. [DOI:10.1016/j.clindermatol.2006.07.015] [PMID]
- [12] Koley S, Salodkar A, Choudhary S, Bhake A, Singhanian K, Choudhury M. Tophi as first manifestation of gout. *Indian Journal of Dermatology, Venereology and Leprology.* 2010; 76(4):393-6. [DOI:10.4103/0378-6323.66593] [PMID]
- [13] Kasper IR, Juriga MD, Giurini JM, Shmerling RH. Treatment of tophaceous gout: When medication is not enough. *Seminars in Arthritis and Rheumatism.* 2016; 45(6):669-74. [DOI:10.1016/j.semarthrit.2016.01.005] [PMID]