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Aspiration cytopathology of tophaceous gout: a report of 22 patients

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Introduction Gout may manifest with crystal-induced arthropathy and/or soft tissue tophi. Demonstration of monosodium urate (MSU) crystals is necessary to establish the diagnosis. Despite the fact that alcohol is an ideal fixative to preserve MSU crystals, very few fine-needle aspiration (FNA) cases of gout have been published.
Materials and Methods A retrospective review was performed for FNA cases diagnosed as tophaceous gout. Samples included unstained smears or smears stained with Diff-Quik or Papanicolaou stain, and formalin-fixed paraffin-embedded cell block stained with hematoxylin and eosin (H&E).
Results We identified 22 FNA cases involving 18 men and 4 women. Only 7 patients had a clinical history of gout and 5 were taking gout medication. At least 4 patients presented with a clinical diagnosis of rule out sarcoma. All had soft tissue masses from either upper (n = 5) or lower (n = 17) extremities. Extracellular polarizing needle-shaped crystals with negative birefringence were present and visible on unstained, Diff-Quik, or Papanicolaou-stained conventional smears as well as in H&E-stained cell blocks in all cases.
Conclusions Our study demonstrates that MSU crystals are readily detectable under polarization on direct smears with or without staining. FNA cytology can serve as an alternative to core needle biopsy or synovial biopsy in not only confirming a diagnosis of tophaceous gout, but also in eliminating a diagnosis of soft tissue sarcoma in those patients where clinical and/or radiologic features were concerning for malignancy.

Introduction

Chronic hyperuricemia causes formation of crystals of monosodium urate (MSU) in various body tissues and leads to gout, which may manifest with crystal-induced arthropathy and/or soft tissue tophi. Tophi are usually periarticular and develop after a longstanding crystal-induced arthritis. But they may manifest as an initial finding without concomitant arthritis or hyperuricemia, which is usually called "gout nodulosis", when occurring subcutaneously.[1] Gout can be easily diagnosed clinically when hyperuricemia and arthritis are present. In the absence of hyperuricemia, however, gouty arthritis can be mistaken for infectious arthritis and soft tissue tophi can be mistaken for a soft tissue neoplasm.[2]

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Table 1 Clinicopathological characteristics of 22 FNA cases with gout.

Case No.	Age (years)	Sex	History of Gout	Clinical Presentation/Impression	Location	Surgical Specimen
1	66	F	No	NA	L elbow	NA
2	39	M	No	NA	L elbow	NA
3	71	M	No	1.5 cm mass	R dorsum of foot	NA
4	69	F	No	2.7 cm mass	L 4th toe	NA
5	33	M	No	3.7 cm mass	L anterior tibia tubercle	NA
6	49	M	No	3.5 cm painful mass	R 2nd toe	NA
7	77	M	No	10 cm mass	L elbow	Gout tophi
8	40	M	Yes, allopurinol	3.7 cm mass	L patella	NA
9	71	M	Yes, allopurinol	1.5 cm mass	R 2nd toe	NA
10	50	M	No	4.5 cm mass/? sarcoma	R knee	NA
11	47	F	No	3.2 cm mass	R foot dorsum	NA
12	42	M	No	2.8 cm mass	R 5th toe dorsum	NA
13	43	M	Yes, colchicine	3.5 cm mass	L heel	NA
14	42	M	Yes, no treatment	2 cm mass	L 2nd metacarpal joint	NA
15	42	M	Yes, allopurinol	3.5 cm mass	R knee	NA
16	70	M	No	1.6 cm mass	L 3rd toe	NA
17	34	M	No	1.7 cm mass	R knee	Gout tophi
18	78	F	No	4.5 cm mass/? sarcoma	L foot	NA
19	66	M	Yes, no treatment	4 cm mass	R great toe	NA
20	60	M	No	4 cm mass/? sarcoma	L heel	NA
21	71	M	Yes, allopurinol	3 cm mass	L middle finger	NA
22	46	M	No	4.8 cm mass/? sarcoma	L foot	NA

Abbreviations: M, male; F, female; NA, not available; L, left; R, right; CLL/SLL, chronic lymphocytic leukemia/small lymphocytic lymphoma.

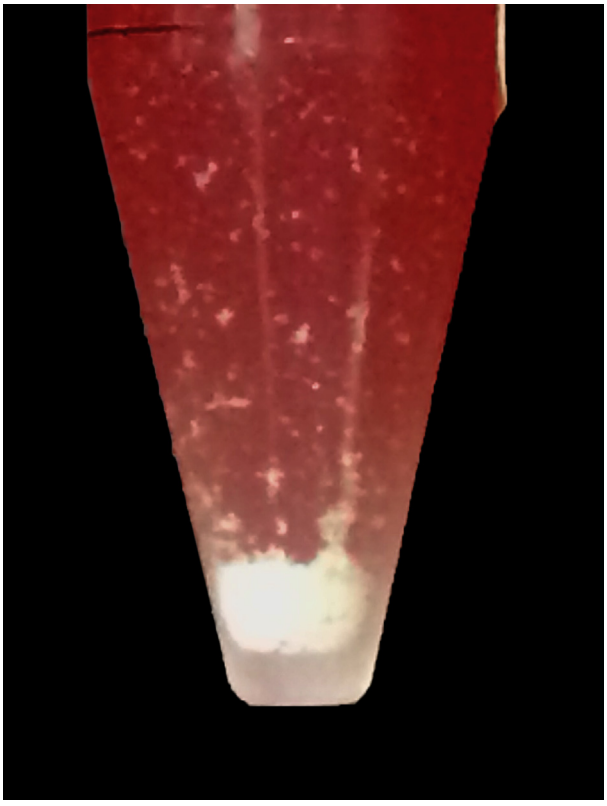

Figure 1 FNA needle rinse, RPMI tube: White paste-like precipitate is clearly visible at the bottom of the tube.

Histologically, characteristic amorphous or granular material composed of MSU crystals can be identified in tophi, together with surrounding multinucleated giant cells and chronic inflammation. It has been reported that demonstration of MSU crystals helps to establish the diagnosis of gout on both synovial fluid and fine-needle aspirates of tophi.[3] Despite the fact that alcohol is an ideal fixative to preserve MSU crystals, very few cases of gout have been published in the cytology literature. In order to investigate the value of fine-needle aspiration (FNA) cytology in the diagnosis of gout, we report our experience with the largest published cohort of cases using the FNA biopsy technique in the English literature.

Materials and methods

After obtaining institutional review board approval, we initiated a retrospective study. A computer-based search of the CoPath (Cerner Corporation, Kansas City, Missouri) laboratory information system database at Ohio State University between 1991 and 2017 was carried out to retrieve FNA cases diagnosed with gout. Case slides were reviewed and patient demographics, clinical presentation, crystal features, and associated cytologic findings were recorded.

Results

We identified 22 FNA cases involving 18 men and 4 women (age range: 33-78 years, mean: 55 years). Only 7