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Tophi as the Only Manifestation of Gout, Diagnosed on Fine Needle Aspiration Cytology: A Case Report with Review of Literature.

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Case Report

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ABSTRACT

Gout, a disorder of purine metabolism characterized by deposition of mono-sodium-urate crystals in the joints and soft-tissue commonly presents with peri-articular nodules, also referred to as tophi. Frequently the uric acid levels are near normal at presentation raising doubts about the etiology of the nodules. FNAC (Fine Needle Aspiration Cytology) of the nodules is an efficient method of making a quick diagnosis with characteristic cytological features. Presence of amorphous granular debris should alert the pathologist to search for crystals as it can be easily missed by the untrained eye. We present such a case where the patient presented with tophi as the only manifestation of gout which was confirmed by FNAC.

INTRODUCTION

Periarticular nodules pose a challenge to clinicians in terms of diagnosis and management. Various causes of periarticular nodules are ganglion cysts, synovial chondromatosis, villonodular synovitis, synovial sarcoma and rheumatoid nodules. Gouty tophus is an important differential diagnosis [1]. Gout is characterised by presence of monosodium urate (MSU) crystals in synovial fluid and deposition of these crystals in the soft tissue thus presenting as single or multiple periarticular nodules. Gout can affect any part of the body and tophi can be the first clinical sign. The tophi in gout tend to grow slowly, eventually ulcerating and forming a non-healing ulcer which can be often be mistaken for a neoplasm [2]. In such clinical scenario fine needle aspiration cytology (FNAC) helps in making a quick, safe and cost-effective clinical diagnosis and helps in initiating early treatment [3].

Case Report

A 66 year old male presented with a painless swelling over left great toe of 17 years duration. He complained of pain and ulceration over swelling since three month which was not showing any signs of healing with standard methods of wound management. On examination, the swelling was tender, firm measuring 4x3 cm with an ulcer on the surface (Fig 1a). There were two more nodules of similar consistency measuring less than 1 cm on the plantar surface. The sensation in the foot was normal and patient was not a diabetic. X-ray showed irregular areas of radio-opacity with destruction of the underlying distal phalanx, inter-phalangeal joint and the distal half of the proximal phalanx raising concerns of whether the swelling could be of a neoplastic origin (Fig 1b). MRI showed the multiple, well demarcated nodules around the inter-phalangeal joint of the great toe but did not explain the severe destruction of the bone which led the clinicians to seek an FNAC study.



Figure 1: 1a-nodular lesion on great toe, 1b-x-ray showing lesion with bone destruction

FNAC was done using 21mm gauge needle, which yielded chalky white material. Air dried smears were stained with leishmann stain and alcohol fixed smears were stained with hematoxylin and eosin stain and papanicolaou stain. Smears were scanty cellular and showed eosinophilic matrix material. Careful examination of background showed plenty of needle shaped and irregular to feather shaped golden brown crystals in H& E stain and papanicolaou stained smears. Few histiocytes and multinucleated giant cells were seen (Fig 2a). Based on above findings diagnosis of gouty tophi was rendered. Patient had a mildly elevated serum uric acid level with normal renal functions.

Due to non healing ulcer and bony destruction which would compromise any efforts to reconstruct the skeleton, patient was offered a great toe amputation at the level of the mid proximal phalanx.

Specimen measured 4.5x4x3.3 cm and nodule measured 2.5x4x1 cm. Skin showed ulceration. Cut section showed chalky white material filling the subcutaneous nodule with destruction of underlying soft tissue and bone. Histopathological microscopic examination showed extensive deposition of dissolved urate crystals in the form of amorphous eosinophilic material surrounded by intense inflammatory reaction composed of lymphocytes, foreign body giant cells, macrophages and few plasma cells (Fig 2b). Large golden brown coloured crystals noticed in smears were also seen. The findings confirmed the diagnosis. Patient had an uneventful healing of the amputation stump and was started on drugs to reduce the uric acid levels with appropriate dietary advice.

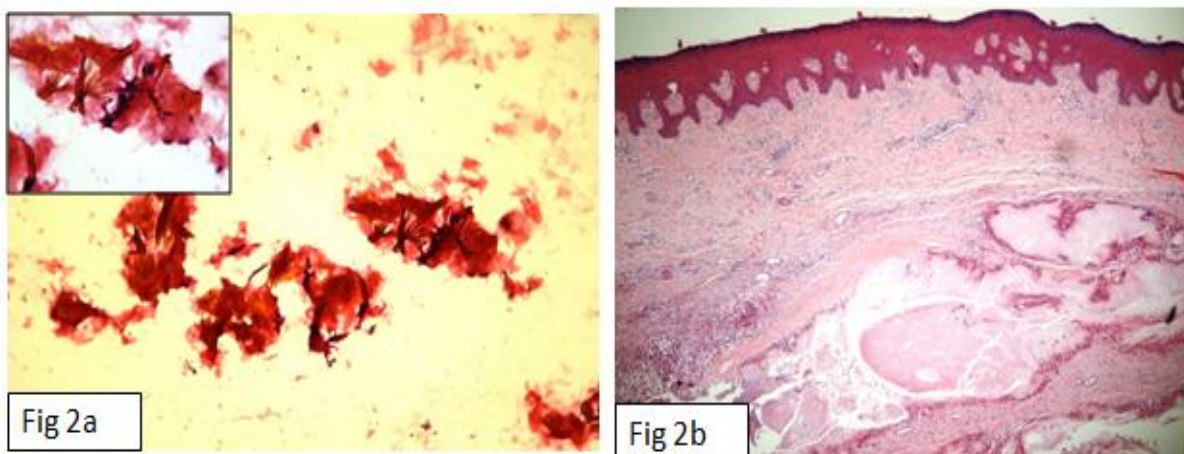


Figure 2: 2a-FNAC smears showing brown thick and thin crystals (H&E, 10x), inset shows higher power view of crystals (40x). 2b-Histopathology section showing gouty tophus in deeper dermis ((H&E, 10x).

DISCUSSION

Gout is characterised by disordered uric acid metabolism resulting in deposition in joint spaces of monosodium urate crystals [4]. Chronic hyperuricemia in gout can be primary due to inborn errors of metabolism or secondary to acquired renal disease or conditions with extensive cell turnover [5]. It often presents as painful joint effusion and is commonly diagnosed by elevated uric acid levels and cytological examination of joint fluid for characteristic crystals [1].

Tophi generally form around joints but can deposit at various locations like ear pinna, subcutaneous tissue, visceral organs and bone. Tophi can be the only and first manifestation as in our case. Gout nodulosus is rare presentation where nodular subcutaneous gout form in absence of arthritis [2]. Tophi in unusual sites can mimic tumours.

Periarticular masses pose diagnostic challenge both to clinicians and diagnosticians. Various causes of periarticular nodules include rheumatoid nodules, ganglion cysts, villonodular synovitis, tumoral calcinosis, pseudogout, neurofibroma, and synovial sarcoma [4, 6].

Gout is commonly diagnosed by either elevated uric acid levels or cytological examination of joint effusion in patients with arthritis. Measurement of uric acid levels may not help in all cases as some patients especially with diabetes mellitus may have low or normal uric acid levels due to uricosuric action of blood glucose. Low levels may also be seen in alcoholics [7].

In patients with tophi as the only manifestation, FNAC is an important newer diagnostic modality. There are few case reports describing the cytological features along with differential diagnosis of gouty tophi [5].

On review of literature, aspirate in most cases was chalky white particulate material. Smears show amorphous granular material with plenty of crystal, histiocytes, multinucleated giant cells and chronic inflammatory cells [8]. Intense inflammatory material and blood can obscure the true nature of the lesion [5]. Differential diagnoses of crystalline tophus include tophaceous pseudogout and tumoral calcinosis.

Tophaceous pseudogout is characterised by deposition of calcium pyrophosphate dihydrate (CPPD) crystals which on smears are shorter, more often rhomboid than needle shaped. On polarising microscopy MSU crystals of gout are negatively birefringent whereas CPPD crystals of pseudogout show weakly positive birefringence. Radiological calcification commonly seen in pseudogout and tumoral calcinosis is relatively uncommon in gout. Hydroxyapatite calcified material in tumoral calcinosis shows intensely basophilic granular material on smears without any crystals [3, 5].

MSU crystals may be lost during histopathologic processing. However they are preserved in cytologic smears especially alcohol fixed smears which can be subjected for polarising microscopy for definitive confirmation whenever available [3].

FNAC is emerging as an important tool in evaluating subcutaneous and periarticular nodules. FNAC smears are superior in demonstrating crystals and are replacing synovial biopsy and synovial fluid analysis. It is safe, simpler and cost effective technique [5, 8].

However it can be missed by inexperienced cytopathologists. Presence of amorphous granular debris should alert pathologist to search for crystals. In asymptomatic patients where clinical suspicion of gout does not exist, FNAC can be an important diagnostic modality as characteristic cytological features exist.

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