



Case Report

# **Diagnostic utility of FNAC in gouty tophi with review of literature**

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## **Abstract**

Periarticular nodules have the variety of differential diagnosis including inflammatory to neoplastic conditions. Amongst these, gouty tophus is an important differential diagnosis. Fine needle aspiration cytology (FNAC) is a valuable diagnostic tool for the diagnosis of periarticular nodules. We presented here a case of 48 years old male with multiple soft tissue nodules in extremities. Case was evaluated clinically and FNAC was advised. Fine needle aspiration revealed chalky white aspirate. The case was studied and data was collected in month of October 2013. After staining the smear with Hematoxylin and Eosin (H&E), needle shaped crystals were seen in amorphous granular debris. Diagnosis of gouty tophi was made. On further workup, serum uric acid levels were found to be high and a diagnosis of gout was established. FNAC is an easy, minimally invasive and cost effective procedure for diagnosing gouty tophus and is replacing biopsy for the diagnosis of gouty tophus.

## **Key words**

FNAC, Gout, Tophus, Nodules, Crystal.

## **Introduction**

Periarticular nodules have the variety of differential diagnosis including inflammatory to neoplastic conditions, ranging from rheumatoid nodule, gout, giant cell tumor of tendon sheath, and synovial osteochondromatosis to synovial sarcoma [1, 2]. Amongst these, gouty tophus is

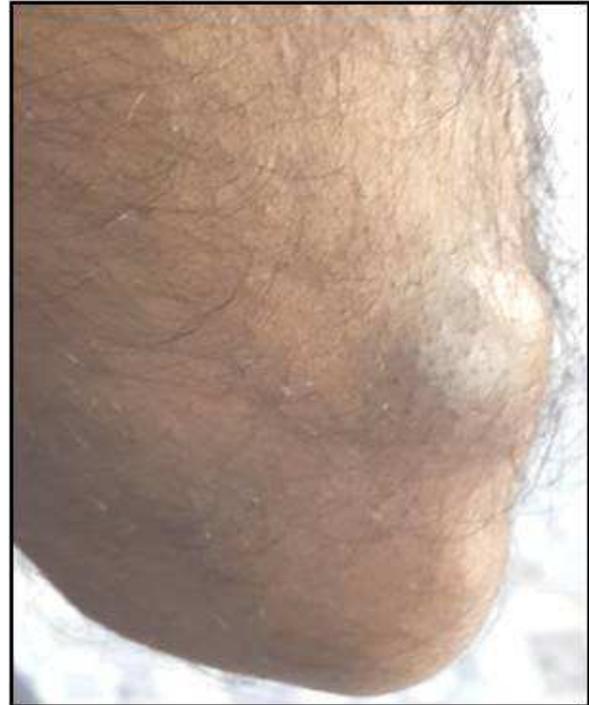
an important differential diagnosis. Fine needle aspiration cytology (FNAC) is becoming popular in diagnosis of soft tissue nodules; hence it is important for the pathologists to be aware of its varied microscopic features. Gout is a common disease associated with monosodium urate (MSU) crystal deposition in articular or

Periarticular tissues and in the renal tract. Generally it progresses through four clinical stages if left untreated: asymptomatic hyperuricemia, acute gout, inter critical or interval gout and chronic tophaceous gout [3]. Here, we presented the clinical and cytological profile of a case of gouty tophus along with review of literature. The case was studied and data was collected in month of October 2013.

### Case report

A 48 years old male presented with history of multiple periarticular swellings since 2 years. The periarticular swellings were initially small in size and gradually increasing in size and involved the left elbow (**Photo – 1**), left knee (**Photo – 2**), left ankle (**Photo – 3**) and tarso-metatarsal joint of left great toe (**Photo – 4**). Patient had history of multiple joint pains and he was on treatment for the same. On investigations, his hemogram, liver function tests, and rheumatoid factor were within the normal limits and serum uric acid level was 7.8 mg/dl. Radiograph of the lesions showed a soft-tissue swelling without involvement of underlying bone with evidence of calcification at left tarso-metatarsal joint of great toe. (**Photo – 5**) FNAC was performed from all periarticular swellings and thick chalky white material was aspirated. (**Photo – 6**) The smears were stained with Hematoxylin and Eosin. Smears revealed amorphous crystalline material intermingled with which were few polymorphs, macrophages. (**Photo – 7** and **Photo – 8**) The crystalline material on the higher magnification revealed elongated needle shaped crystals with pointed ends. (**Photo – 9** and **Photo – 10**) The diagnosis of gouty tophus was made on the cytology, which was further supported by elevated levels of serum uric acid.

**Photo – 1:** Nodular swelling of size 1.5x1.5 cm, hard, non mobile, present below the left elbow joint.



**Photo – 2:** Nodular swelling of size 1.5x1.5 cm, hard, non mobile present below the left knee joint.



**Photo – 3:** Nodular swelling of size 1x1 cm, hard, non mobile at left ankle joint.



**Photo – 5:** X-ray of left foot showing increased calcification without destruction of underlying bone.



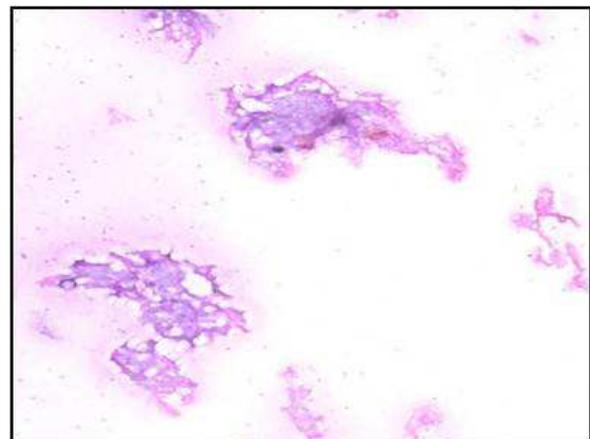
**Photo – 6:** Chalky white aspirate from the lesion.



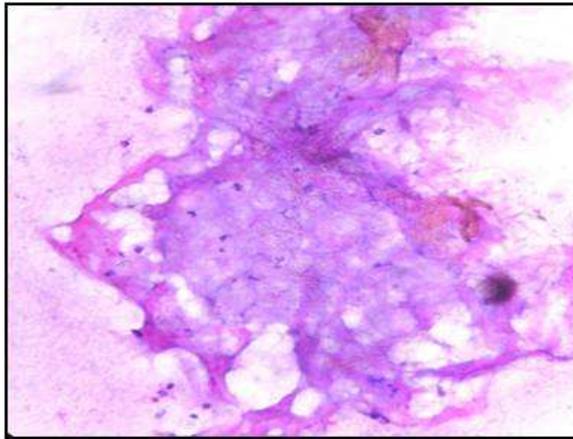
**Photo – 4:** Nodular swelling of size 2x1.5 cm, hard, non mobile at left great toe.



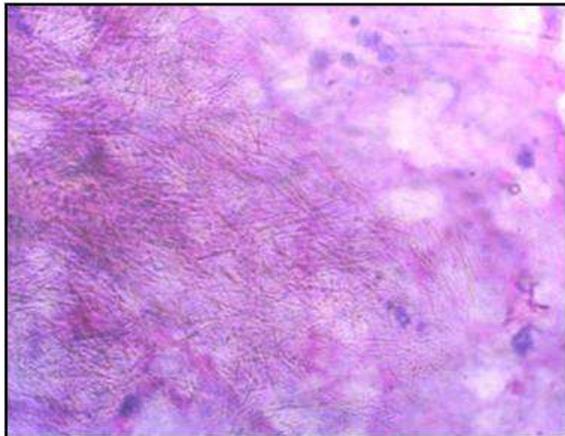
**Photo – 7:** Amorphous eosinophilic material with inflammatory cells. (H&E, 10X)



**Photo – 8:** Amorphous eosinophilic material with inflammatory cells and plenty of needle shaped crystals. (H&E, 40X)



**Photo – 9:** Amorphous eosinophilic material with inflammatory cells and plenty of needle shaped crystals with pointed end. (H&E, 100X)



**Photo – 10:** Wet mount smear of aspirate shows plenty of needle shaped crystals with pointed end. (Unstained, 100X)



## Discussion

Gout is caused by persistent chronic hyper uricemia which can be either primary as a result of inborn errors of purine metabolism or diminished renal excretion of uric acid or can be secondary due to conditions with extensive cell turnover or acquired renal disease. Gout usually manifests as acute arthritis but can also present in the form of asymptomatic hyper uricemia, chronic tophaceous gout or nephrolithiasis [4].

The diagnosis of gout can be problematic when the presentation is atypical and serum uric acid is borderline value. Occasionally, gout may present as a soft tissue tophus without antecedent painful arthritis or hyper uricemia. Differential diagnosis of articular nodules includes giant cell tumor of tendon sheath, giant cell tumor of bone and metastatic tumor [2]. Demonstration of monosodium urate crystals in FNAC smears from nodular masses establishes the diagnosis of gout unequivocally [5].

Agarwal, et al. (2007) [1] reviewed the literature and found six published reports of gouty tophi diagnosed by FNAC. These included 17 cases with the clinical diagnosis of: gouty arthritis (5 cases), giant cell tumor (5 cases), metastatic tumor (2 cases), sarcoma (2 cases) arthritis (1 case) and in 2 cases the diagnosis was not given. The uric acid level was high in 5 cases, normal in 7 and low in 2 cases [4, 5, 6, 11, 12, 14]. Since then another few cases were reported, [3, 7, 8, 9, 10, 13] arriving at a total of 23 cases as per **Table - 1.**

The advantages of FNAC over open biopsy and other surgical procedures have made FNAC an increasingly popular procedure. Advantage of FNAC over excision biopsy is that urate crystals are often lost during histological processing because they dissolve in formalin, but they are preserved in FNAC smears that are alcohol fixed.



FNAC is currently replacing other investigations due to its quick, less invasive, simpler and cost effective technique. The crystal demonstration in FNAC smears is superior to histopathology sections where crystals are more commonly lost during processing. In joint fluid analysis coincident crystals like hydroxyapatite, steroid etc in the joint fluid may cause confusion [6].

### Conclusion

FNAC is an easy, minimally invasive and cost effective procedure for diagnosing gouty tophus. It is accurate and replacing biopsy for the diagnosis of gouty tophus.

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**Table – 1:** Summary of published reports of gout diagnosed by FNAC.

Author	Year	No. of cases	Site of lesion	Clinical diagnosis
Marisa H, et al. [7]	2012	1	5 <sup>th</sup> digit, left hand	Metastasis? Gout?
Koley, et al. [3]	2010	1	Bilateral feet and toes, left palm, right elbow, helix of left ear	Arthritis
Gupta, et al. [8]	2009	1	Left elbow joint and near the lateral malleolus of the left foot	Not given
Angeles, et al. [9]	2008	1	No data	No data
Purohit, et al. [10]	2006	1	Nodules over extremities	Benign neoplastic lesion
Bhadani, et al. [5]	2006	7	Dorsum foot and arm	Gout
			Hand and foot	Gout
			2 <sup>nd</sup> toe, right foot	Gout
			Hands and feet	Metastatic tumor
			Little finger (Left)	GCT
			Olecranon (Right)	GCT
			1 <sup>st</sup> toe (Right)	GCT
Sah, et al. [11]	2002	2	Forearms, hands, dorsum feet, lateral malleoli	Metastatic tumors
			Palmar aspect over base of little finger	<b>GCT</b>
Paik, et al. [12]	2002	1	Hands, feet, ear helix	Rheumatoid arthritis
Rege, et al. [6]	2000	2	Nodules on bilateral malleoli	Arthritis
			Nodules on dorsum foot, sole, lateral malleolus	Gout?
Nicol, et al. [4]	1997	3	Dorsal ulnar, right distal forearm	Sarcoma
			I and III metacarpal joints	Gout
			Right foot and ankle	Sarcoma
Liu, et al. [13]	1996	1	Right distal ulnar mass	GCT
Nasser, et al. [14]	1994	2	Vertebral level C3, L4	Not given
			Forearm nodule	Not given

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