

Gouty Tophi: FNAC Diagnosis and Review of Literature

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ABSTRACT

Periarticular and articular nodules can pose a diagnostic challenge to clinicians as well as pathologist and radiologist. It has many differentials from non-neoplastic to neoplastic disorders like rheumatoid nodules, ganglion cysts, pigmented villonodular synovitis, synovial chondromatosis and synovial sarcoma. Gouty tophi are considered as one of differential of these conditions. Fine needle aspiration cytology (FNAC) of these periarticular nodules is one of the diagnosing tools for gouty tophi on the basis of its characteristic cytomorphological features. Here we are presenting cytomorphological evaluation of gouty tophi in a case of 44-year-old male who presented with multiple joint swelling.

Keywords: Cytomorphology, Gout, Tophi, FNAC

INTRODUCTION

Gout accounts for 2 to 5% of chronic joint diseases. It is chronic hyperuricemic crystal induced arthropathy caused by disturbance in purine metabolism and deposition of monosodium urate crystals in articular or periarticular tissues. It may be found in synovial membrane, periarticular ligaments, tendons, soft tissues, subcutaneous tissue, achilles tendon. Gout can affect any part of the body and tophi can be the first clinical sign. The definitive diagnosis of gout is best established by demonstration of monosodium urate crystals.^[1] The most common site is first metatarsophalangeal joint space. Fine needle aspiration cytology (FNAC) is simple, cost effective, safe procedure in diagnosing periarticular nodules. In gouty tophi, the diagnosis of which can be difficult in cases of unusual presentations i.e. in the absence of arthritis or hyperuricemia.^[2] Fine needle aspiration cytology plays important role in the diagnosis and thus highlighting its

substantial role in diagnosis of periarticular nodules.

CASE REPORT

44 year male presented with multiple joint swellings associated with pain since 4-5 years. Multiple joint swellings included right elbow joint, bilateral lateral malleoli and bilateral first metatarsophalangeal joint. He was chronic alcoholic and tobacco chewer since 20 years. Local examination revealed bilateral foot swelling which was firm, tender, non-mobile and measured 3×3 cm in size. The overlying skin was unremarkable. No abnormality was detected on systemic examination. X-ray left foot showed a soft tissue swelling at 1st metatarsophalangeal joint, with no evidence of arthritis in the adjacent bones. Patient was investigated for serum uric acid which was normal. Fine needle aspiration cytology was done using a 23 gauge needle. The aspirate was chalky white amorphous material. Two smears were made from the aspirate. One smear was fixed and stained

with Papanicolaou stain and the other aspirate was air dried and stained with May Grunwald Giemsa stain. Microscopy revealed many intact and degenerated polymorphs, histiocytes and multinucleate giant cells in the background of abundant amorphous granular material [Figure- 5]. We found slender needle-shaped crystals in stacks as well as singly. Polarizing microscopy of the stained smear revealed needle shaped birefringent crystals consistent with monosodium urate crystals of gout [Figure 1-4]. At places there was formation of tophus with a central core surrounded by radiating needle-shaped birefringent crystals. These tophi are predominately seen around joints, subcutaneous tissues, knee joint, olecranon process, Achilles tendon, helix of the ear and volar aspect of the forearm and can be mistaken as malignancy. Chronic tophaceous gout is known as Harrison Syndrome.^[3]

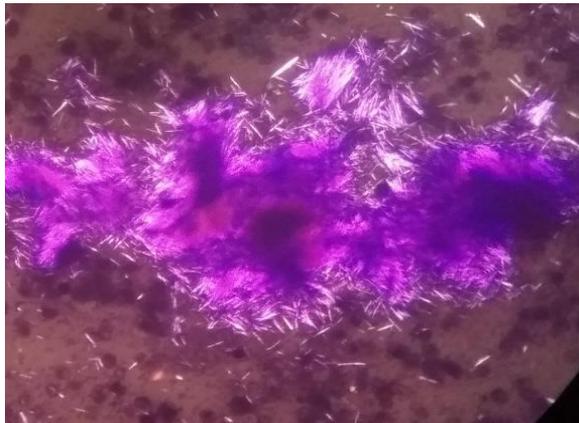


Figure 1 - Polarizing microscopy revealed needle shaped birefringent crystals (MGG stain – 40X)

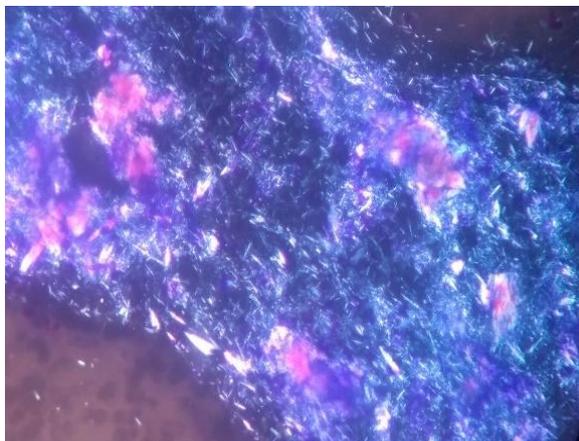


Figure 2 - Polarizing microscopy revealed needle shaped birefringent crystals (MGG stain – 40X)

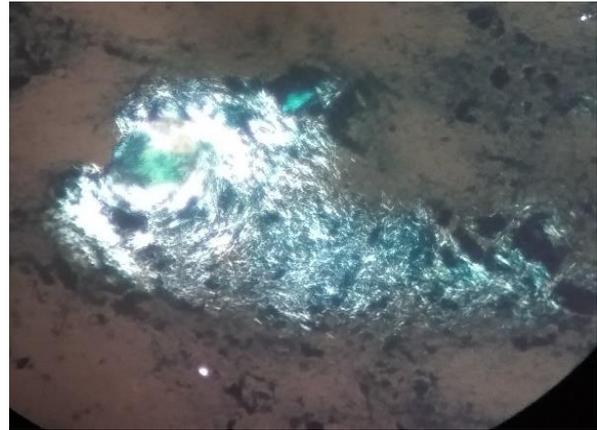


Figure 3 - Polarizing microscopy revealed needle shaped birefringent crystals (PAP stain – 40X)

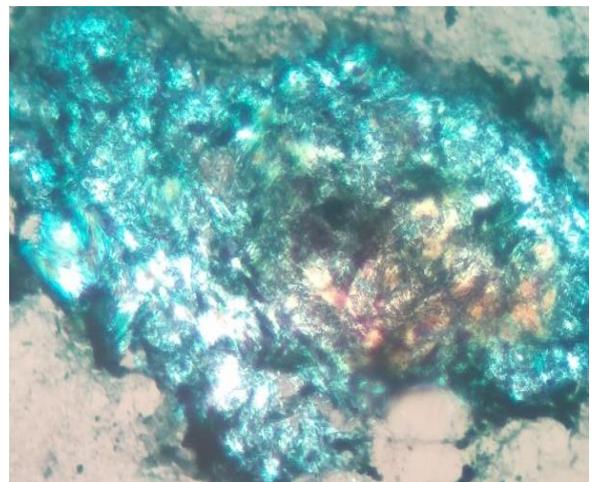


Figure 4 - Polarizing microscopy revealed needle shaped birefringent crystals (PAP stain- 40X)

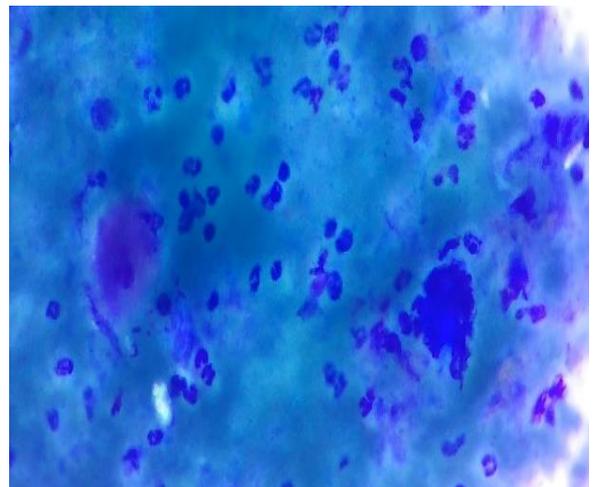


Figure – 5 Microscopy shows intact and degenerated polymorphs, histiocytes and multinucleate giant cells (MGG stain – 40X)

DISCUSSION

Gout is a chronic metabolic disorder characterized by hyperuricemia and deposition of Mono Sodium Urate (MSU) crystals in joints and within peri-articular

soft tissues. Heavy alcohol intake, overuse of diuretics, and analgesics like acetylsalicylic acid, purine rich diet, obesity, hypertension and renal compromise are the predisposing factors. Hyperuricemia in gout may be primary or secondary. Primary hyperuricemia is due to the result of either inborn errors of purine metabolism or related to reduction in the renal excretion of uric acid. The secondary causes of hyperuricemia include systemic diseases like malignancies and renal disease. Its prevalence is highest in industrialized countries. The major risk factors include alcohol, diuretic therapy, hypertension, diabetes, renal dysfunction and obesity, psoriasis, myeloproliferative diseases, post-operative state and hyperparathyroidism. [4] In this case patient was chronic alcoholic which was one major risk factor.

Gout has four clinical stages: asymptomatic hyperuricemia, acute gout, intercritical gout and chronic tophaceous gout. Although gouty tophi are seen in chronic disease, tophi may be the first sign. Tophi are soft tissue masses present in periarticular region which develops after a long standing gouty arthritis. [5]

The term "gout" was first used by Randolph of Bocking, around 1200 AD. Historically, it was referred to as "the king of diseases and the disease of kings" or "rich man's disease". The first documentation of the disease is from Egypt in 2,600 BC in a description of arthritis of the big toe. In 1679, the microscopic appearance of urate crystals was first described by Dutch scientist Antonie van Leeuwenhoek. In 1848, English physician Alfred Garrod identified excess uric acid in the blood as the cause of gout. [6]

Iglesias et al coined the term "gout nodulosis" and is used to describe the subcutaneous deposits of monosodium urate crystals without gouty arthritis as first manifestation. [7] It can also develop in patients with normal serum uric acid levels, particularly in diabetic patients and alcoholics. In literature, Rao et al reported a case of gouty tophus with normal serum uric

acid level. Measurement of serum uric acid is of limited use in the diagnosis of chronic tophaceous gout. The uric acid level may be low or normal due to the uricosuric action of increased blood glucose levels. [8]

In literature, most of FNAC aspirates were chalky white as with the present case. Microscopy showed in most of the cases, amorphous or granular material with needle like MSU crystals and multinucleated giant cell along with chronic inflammatory infiltrate which also correlated with the microscopic findings of the present case. The other advantage of crystal demonstration in FNAC smears is that it is superior to histopathology sections where crystals are more commonly lost during processing. In joint fluid analysis, other crystals like hydroxyapatite, steroid in the joint fluid may cause confusion. [9]

Sometimes the crystal identification can be obscured by haemorrhagic background and inflammatory infiltrate with paucity of crystalline material. Sah et al has suggested that presence of amorphous or granular material should alert the pathologist to examine the smear under a polarizing microscope. Crystals can be very clearly seen on unstained smears. [10] The differential diagnosis of crystalline tophus on cytology includes tumoral calcinosis (calcinosis cutis) and tophaceous pseudogout. Pseudogout is a rare entity which consists of deposition of calcium pyrophosphate dehydrate crystals in sites such as temporo-mandibular joint, fingers, toes, cervical spine, wrist, hip. The crystals are shorter, rhomboid shaped with blunt ends with weak birefringence on polarization and calcification on radiography. Tumoral calcinosis is an idiopathic condition presenting as swelling around the large joints such as hip, elbow, ankle and scapula. The calcified material in tumoral calcinosis is hydroxyapatite in nature and shows amorphous intensely basophilic granular appearance, but absence of crystals on cytology. Radiological calcification is commonly seen in pseudogout and tumor calcinosis is

relatively rare in gout. [11] Other differentials of periarticular swellings include rheumatoid nodules, ganglion cysts, pigmented villonodular synovitis, giant cell tumor, metastases, synovial chondromatosis and synovial sarcoma. [12] The wet mount is prepared by needle washings by flushing the aspirating needle with absolute alcohol for demonstration of crystals. [2]

CONCLUSION

Gouty tophi presenting as periarticular masses are uncommon. It can cause diagnostic dilemma as in most of the cases it remains clinically unrecognized. A high index of suspicion for gouty tophi should be kept in mind whenever chalky white aspirate and amorphous granular material is obtained on FNAC. FNAC is a simple, rapid, reliable, cost-effective OPD procedure acting as an alternative to synovial biopsy and joint fluid analysis for diagnosing the cause of these periarticular nodules. It not only helps in diagnosing the cause or the nature of periarticular nodules, but also excellently preserves the morphology of the crystals. FNAC is less invasive as compared to synovial biopsy which causes more tissue trauma. Crystal demonstration has been superior in cytology smears rather than histopathology sections in which crystals are lost during processing. [2]

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