Gouty tophi without hyperuricemia, an interesting case diagnosed by fine-needle aspiration cytology

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Received 7 October 2016
Accepted 15 January 2017

Egyptian Rheumatology & Rehabilitation
2017, 44:139–141

Gout is a disorder of uric acid metabolism characterized by deposition of monosodium urate crystals in joint spaces or soft tissues. Gouty tophi can be the presenting feature of gout and can occur despite normal serum uric acid levels. Periarticular nodules can be a diagnostic dilemma for both clinicians and radiologists. A 39-year-old man presented with a nontender, firm swelling in right medial malleolus. His serum uric acid level was normal. Computed tomography scan report gave a differential diagnosis of synovial sarcoma and pigmented villonodular synovitis. Fine-needle aspiration cytology from the swelling revealed abundant granular amorphous deposits with needle-shaped crystals in a background of chronic inflammatory infiltrate. Biopsy from the swelling demonstrated the presence of needle-shaped crystals in a radial arrangement along with foreign-body giant cells and histiocytes. On the basis of cytological and histopathological findings, a diagnosis of gouty tophi was rendered.

Keywords:
cytology, gouty tophi, monosodium urate crystals

Egypt Rheumatol Rehabil 44:139–141

1110-161X

Introduction

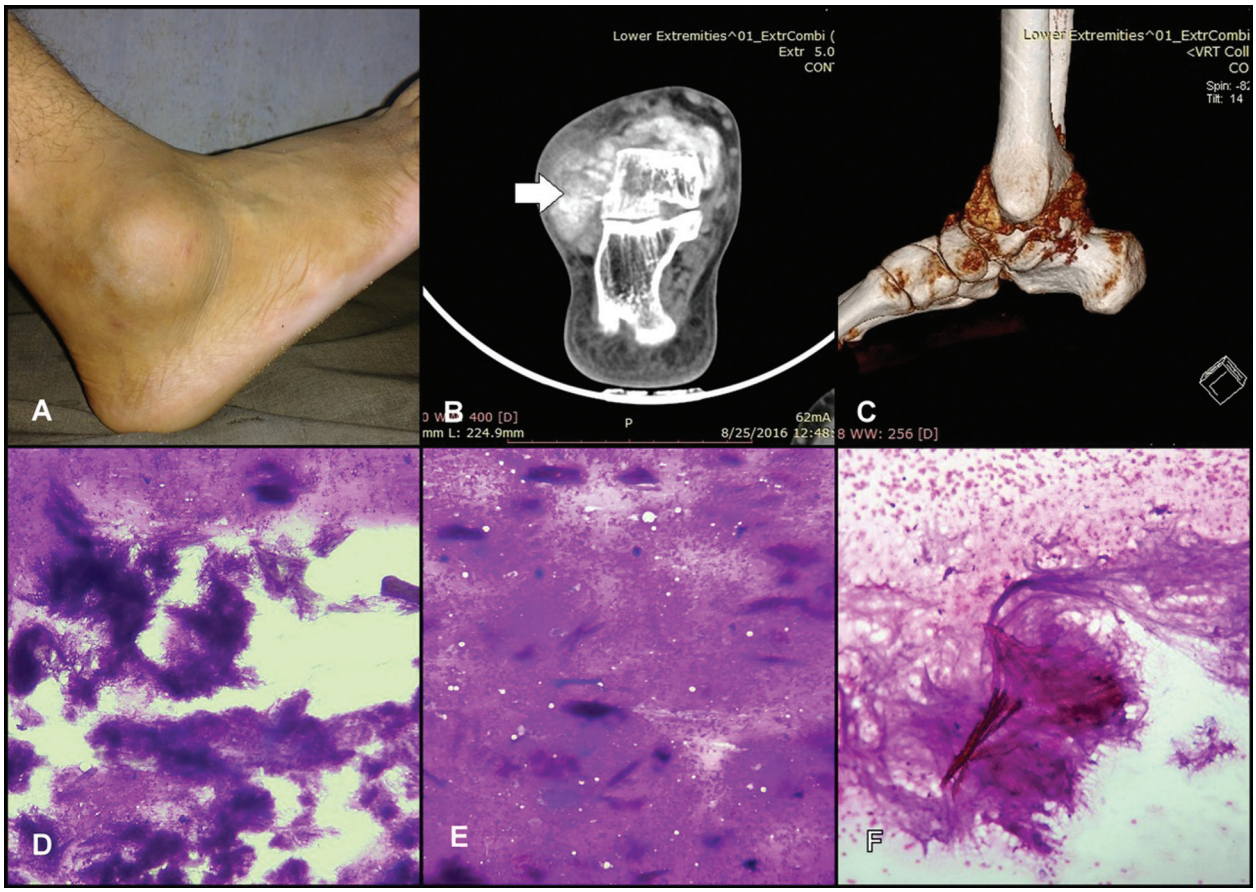
Gout is a metabolic disorder characterized by uric-acid-crystal-induced arthropathy. Locations of gouty tophi include synovial membrane, periarticular ligaments, soft tissues, and subcutaneous tissues [1]. Gouty tophi presenting as periarticular nodules can be a diagnostic dilemma. Rheumatoid nodules, pigmented villo-synovitis, and synovial sarcoma can mimic gouty tophi clinically [2]. Demonstration of monosodium urate crystals in periarticular swellings by fine-needle aspiration cytology (FNAC) can establish the diagnosis of gout. We report a case of gouty tophi as the initial manifestation in a patient with normal serum uric acid level.

Case report

A 39-year-old diabetic male reported to the rheumatology outdoor with a painless swelling over the right ankle joint (Fig. 1a). The swelling was present since 3 months and was rapidly increasing in size. There was no significant past and family history. On examination, a 3×2.8 cm swelling was found above the right medial malleolus. The swelling was erythematous, firm in consistency, nontender, and had restricted mobility. Radiographs of the right ankle (anterior–posterior and lateral view) showed extensive soft-tissue swelling over the right ankle. No calcification was seen in the swelling. Underlying bone and articular surfaces were within normal limits. Serum uric acid level was found to be 6.1 mg/dl (normal range: 3–7 mg/dl). Computed tomography scan of the swelling showed extra-articular soft-tissue swelling, with no bony erosion (Fig. 1b and c). Differential diagnoses of pigmented villonodular synovitis and synovial sarcoma were given in the computed tomography scan report. FNAC was performed from the swelling, which yielded a chalky white particulate material. Cytological examination revealed abundant granular amorphous deposits and scattered stacks, and sheaves of slender needle-shaped crystals in a chronic inflammatory background (Figs 1d–f and 2a). A provisional diagnosis of gouty tophi was given. Histopathological examination of the swelling was advised for confirmation of diagnosis. Histopathological examination of the biopsy specimen demonstrated the presence of a pale granular material in which there were needle-shaped crystals in radial arrangement (Fig. 2b and c). Heavy lymphocytic infiltrate, histiocytes, and foreign-body giant cells surrounded the crystals (Fig. 2d). On the basis of cytological and histopathological findings, a confirmatory diagnosis of gouty tophi was given. The patient is currently on antiuricosuric drugs, dietary management, and lifestyle modification. The 2-month follow-up of the patient was uneventful.

 DOI: 10.4103/1110-161X.212041

Figure 1

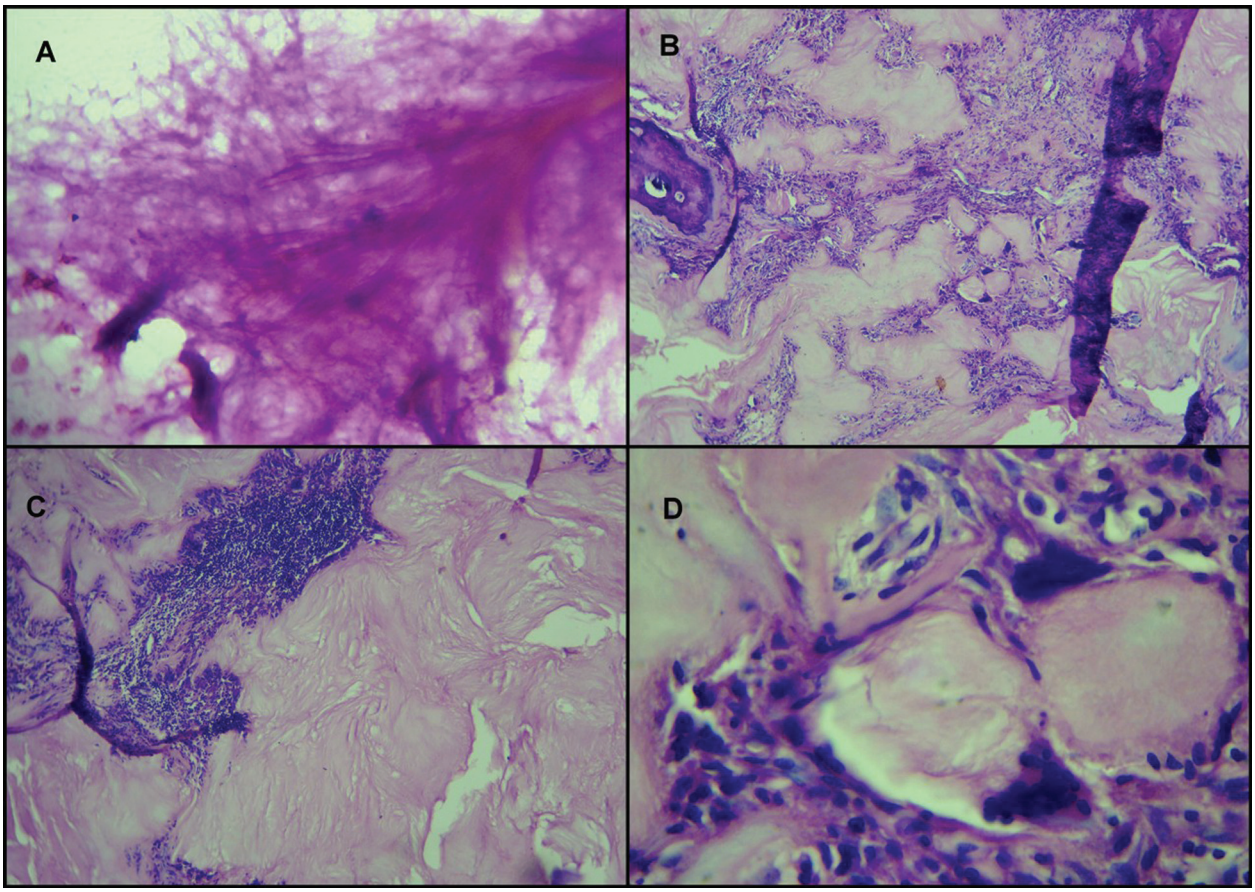


(a) Clinical picture of swelling. (b) Computed tomography (CT) scan (contrast): arrow showing soft-tissue mass. (c) CT scan three-dimensional reconstruction showing mass. (d) Needle-shaped crystals (Leishman and Giemsa, ×100). (e) High-power view of crystals (Leishman and Giemsa, ×400). (f) Cytology of crystals (hematoxylin and eosin, ×100)

Discussion

Gout is a metabolic disorder characterized by chronic hyperuricemia, which can be of primary or secondary etiology. Primary gout results from inborn errors of purine metabolism or deficient kidney function. Secondary gout stems from conditions of extensive cell turnover or acquired renal disease. Presentation of gout varies from acute arthritis, asymptomatic arthritis, gouty tophi, or nephrolithiasis [2,3]. The clinical presentation of gout only as painless periarticular nodule is not very common [4]. Gouty tophi presenting as ankle joint swelling is also relatively uncommon as it mainly occurs in knee joint, olecranon process, helix of ear, and volar aspect of the forearm [5]. Hyperuricemia is considered a major risk factor for the development of gouty tophi. However, clinicians should be aware that tophi can occur even with normal serum uric acid levels, especially in alcoholic and diabetic patients [5–7]. Similar findings were noted in our patient, where the diagnosis of gouty tophi was ruled out by both the clinician and the radiologist because of normal uric acid level. Clinically and radiologically, gouty tophi have various mimickers such as synovial sarcoma and pigmented villonodular synovitis [2], as in our case. FNAC has become the choice of investigation as it is simple, cheap, and can be done in resource-poor settings. Morphology of monosodium urate crystals is preserved in cytology and can be diagnosed with confidence by the pathologist. On cytology, tumoral calcinosis and tophaceous pseudogout formation are differential diagnosis of gouty tophi [8,9]. However, examining the cytology smears under light microscopy can make a confident diagnosis in most cases, without the need for polarized microscopy. Tumor calcinosis cytology shows intensely basophilic, calcified material, whereas gouty tophi reveals needle-shaped crystals. Crystals of pseudogout are much smaller and rhomboid in comparison with monosodium urate crystals [10]. Acute attacks of gout can preferably be treated with nonsteroidal anti-inflammatory drugs, colchicines, and corticosteroids. Prevention of recurrent attacks and control of hyperuricemia can be achieved through uricosuric drugs.

Figure 2



(a) Cytology of crystals (hematoxylin and eosin, ×400). (b and c) Histopathology images of the biopsy specimen (hematoxylin and eosin, ×100). (d) Histopathology image showing crystals surrounded by foreign-body giant cells, histiocytes, and lymphocytes (hematoxylin and eosin, ×400)

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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