CLINICAL IMAGES

Painful Cutaneous Nodules

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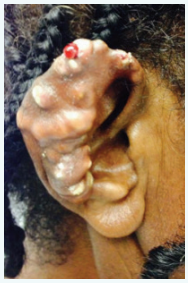
A 61 year old African American male presented to the emergency department with a chief complaint of a three week history of tender nodules on his ears and bilateral hands. He initially developed white-yellow nodules on his ears and then similar tender lesions appeared on his hands and toes. The patient noted the lesions often drained yellowish-white fluid if manipulated. Arthralgias of the hands and feet were also present for about two weeks. His joints were enlarged, warm and tender to palpation. He admitted to similar arthralgias in the past, but never to this severity. The patient denied fever, chills, vision changes, lesions in his mouth, or sick contacts at home. Dermatologic evaluation revealed skin-colored to white-yellow firm dermal and subcutaneous nodules with ulceration and bloody exudate involving the helix and antihelix of his right ear (Figure 1) and large skin-colored firm, mobile subcutaneous nodules involving his dorsal hands at the interphalangeal joints (Figure 2). There were also white-yellow papules with ulceration and erythema on the palmar surface of PIP and DIP (Figure 3). The nodules on the ear released a white chalky discharge when firm pressure was applied.

Past medical history is significant for hypertension, hyperlipidemia, and gout. He denies alcohol, tobacco or drug use. Patient reports that he takes no medications. Family history is non-contributory.

Laboratory studies in the emergency department included an elevated ESR of 67mm/hr (normal 0-30mm/hr), CRP >9.0mg/dL (normal <1.0mg/dL), WBC count of 14 (normal 3.5-10.5 billion cells/L), neutrophils 80.7% (normal 42-76%), and serum uric acid of 8.1 (normal 2-7mg/dL). His renal function and electrolyte panel were within normal limits.

FIGURE 1:



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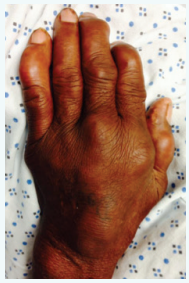

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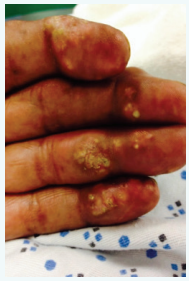

QUESTIONS:

1. The most likely diagnosis?

A. Calcinosis cutis

B. Xanthomas

C. Rheumatoid nodules

D. Chronic tophaceous gout

2. What is the best diagnostic method?

A. Serum uric acid level

B. Lipid panel

C. Microscopic examination of aspirate or tissue sample

D. Imaging studies

3. What is the recommended initial treatment?

A. NSAIDS, colchicine, purine-free diet

B. Statin therapy and low-fat diet

C. IV antibiotics

D. Surgical excision of lesion

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ANSWERS

1. What is the most likely diagnosis?

The correct answer is:

D) Chronic tophaceous gout

The differential diagnosis for gouty tophi includes xanthomas, rheumatoid nodules, and calcinosis cutis.[1] The diagnosis of chronic tophaceous gout can be made clinically with history and physical exam findings along with the presence of negatively birefringent needle-shaped crystals on microscopy. Xanthomas are dermal collections of lipids and may be a sign of underlying lipid disorder or gammopathy. They classically appear as firm yellow papules, nodules, or plaques distributed on the extensor surfaces of the hands, extremities, and/or buttocks.[1] Rheumatoid nodules appear in approximately 20% of patients with history of rheumatoid arthritis. The nodules are typically asymptomatic, firm, semi-mobile, and distributed over the extensor surface of joints spaces.[1] Calcinosis cutis or cutaneous calcification is due to a disruption in calcium pathways in the body and may occur due to medications, metastatic causes such as renal disease or sarcoidosis, infection, autoimmune disorders such as scleroderma, or idiopathic causes.[1]

2. What is the best diagnostic method?

The correct answer is:

C) Microscopic examination of aspirate or tissue sample

Identifying the presence of monosodium urate crystals under microscopy is the gold standard for diagnosis of gout. This diagnosis can be made via fine needle aspiration or skin tissue sampling.[2] The presence of intracellular needle-shaped crystals with negative birefringence on joint/lesion aspirate or tissue sample confirms the diagnosis of gout.[1] Hyperuricemia on serum uric acid laboratory studies is suggestive but not diagnostic for gout.[3] Lipid panel may be considered if evaluating for xanthomatous disease. The possibility of septic arthritis should be excluded with a gram stain and culture.[1] Imaging studies are typically not useful for diagnosing an acute gout flare.[1]

3. What is the recommended initial treatment?

The correct answer is:

A) NSAIDS, colchicine, purine-free diet

The treatment of an acute gout flare includes NSAIDs as first-line therapy as long as no contraindications such as renal failure or bleeding history are present.[1] Colchicine is used to treat both acute and chronic gout by decreasing swelling, reducing pain, and preventing future flare-ups.[1] Corticosteroids in oral, intravenous, intraarticular, or intramuscular form are an alternative pharmacologic treatment option in patients with medical contraindications to NSAIDs or colchicine such as those with renal disease.[3] Diets free of purine-rich foods including liver and fish as well as reducing alcohol consumption may also be of benefit to patients with gout. Xanthine oxidase inhibitors such as allopurinol are indicated, unless contraindications exist, for the long-term management of gout.[1,4]

CASE DISCUSSION

This patient was admitted to the hospital for further workup and management. Therapy with intravenous antibiotics and steroids was initiated as the diagnosis was unclear at time of presentation and was thought to possibly be infectious. During the course of his hospital stay, he reported improvement in symptoms. The chalky exudate (Figure 4) was sent for polarizing microscopy studies and revealed intracellular and extracellular needle-shaped negatively birefringent urate crystals and neutrophilia consistent with gout (Figure 5).

He was discharged on a regimen of allopurinol 100 mg daily, prednisone 40mg daily, colchicine 0.6mg PO daily, and cephalexin. 500 mg three times daily for seven days following discharge. Three weeks later, the patient reported improvement. His gout flare had clinically improved with tophi on the ears and extremities diminished in size (Figure 6,7,8). He did note continued arthralgias with erythema, swelling, and warmth in the affected joints, however improvement is anticipated with continued long-term control and medication compliance.

DIAGNOSIS

Chronic tophaceous gout

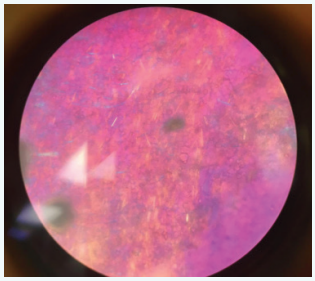
Gout is a chronic inflammatory disease that affects nearly 4% of the population in the United States.[5] In fact, it is the most common form of crystal-induced arthropathy, and the most common inflammatory arthopathy in men older than 40 years.[1] Gout is a deposition disease of metabolic origin caused by supersaturation of monosodium urate. Needle-like crystals are deposited into joints, connective tissue, and the kidneys. This deposition may lead to various clinical sequelae such as arthritis, tophi, and acute kidney injury.[1] Gout can transition through many phases including asymptomatic, acute, and chronic disease.[6] Environmental or genetic causes may contribute to development of hyperuricemia.[6] Men are more affected by gout than women, related to an estrogen-induced increase in urate clearance by the kidney.[7]

Primary forms of gout may be caused by inborn errors of purine metabolism or decreased excretion of uric acid by the kidneys. Secondary forms of gout are related to excessive cell turnover or secondary renal impairment.[2] Increased turnover may be related to diets rich in purines including proteins, fats, and sugary foods like soft drinks.[8] Under-excretion of uric acid by the kidneys accounts for up to 90% of gout cases.[2] Heavy alcohol intake and medications including diuretics, aspirin, and nicotinic acid may decrease excretion of uric acid and contribute to an acute attack.[8] Gout is also associated with hypertension, obesity, dyslipidemia, diabetes mellitus and insulin resistance.[7,9] Rare causes of hyperuricemia include tumor lysis syndrome, genetic conditions such as Lesch Nyhan syndrome, or malnutrition.[8]

Chronic untreated gout may lead to the development of tophi, a dermatologic manifestation involving collections of uric acid crystals that settle in soft tissues and joints. These skin lesions develop due to a foreign-body granulomatous reaction to the crystal deposits. Tophi are typically a clinical representation of long-standing gouty arthritis with average appearance 10 years after onset in approximately 10% of patients with gout.[1,10] The lesions often appear cream to yellow in color and are firm, mobile subcutaneous

FIGURE 4:

FIGURE 5:



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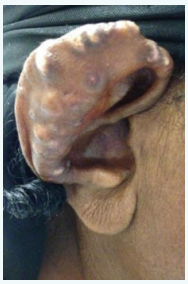

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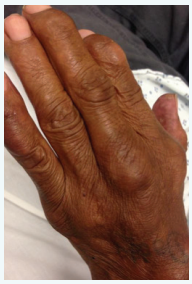
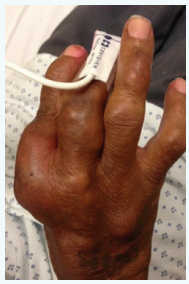


FIGURE 8:



nodules with erythematous overlying skin.[10] The drainage from lesions varies in appearance from a clear fluid to thick chalky discharge.[1] Tophi more commonly form in joints and cooler body surfaces such as the helix of the ear, fingers, toes, prepatellar bursa and olecranon.[11] Less common documented body sites of involvement include the eyelids, cornea, heart valves, and nasal cartilage.[10]

The presence of intracellular needle-shaped crystals with negative birefringence under polarized microscopy confirms the diagnosis of gout.[1] This diagnosis can be made via fine needle aspiration or skin tissue sampling such as shave or punch biospy.[2] Hyperuricemia on serum uric acid laboratory studies is suggestive but not diagnostic for gout.[3] Even with presence of urate crystals on microscopy, the diagnosis of septic arthritis should be excluded with a Gram stain and culture.[1] Imaging studies are not useful in the diagnosis of an acute gout attack, though may be useful in ruling out other diagnoses or identifying chronic changes associated with long-standing gout.[1]

Treatment of tophaceous gout involves implementation of dietary changes as well as pharmacologic and possibly surgical interventions.[12] Dietary changes such as eliminating purine rich foods and substituting for carbohydrate-rich and fatty foods may be difficult in patients with comorbidities such as diabetes and hyperlipidemia.[2] Medical treatment of chronic tophaceous gout includes long-term use of uric-acid lowering drugs such as allopurinol or probenecid.[8] Acute flares may be treated with colchicine, NSAIDs, or corticosteroids.[3] Comorbidities such as renal disease, hypertension, and diabetes must be considered before initiating medical treatment.[8] Corticosteroids in oral, intravenous, intraarticular, or intramuscular form are an alternative pharmacologic treatment option in patients with medical contraindications to colchicine such as those with renal disease.[3] Prior to the introduction of these gout medications approximately 60 years ago, chronic tophaneous gout would affect approximately half of patients with history of gout. However, this incidence has decreased significantly following the advent of allopurinol and colchicine.[7] Emphasizing the importance of long-term management of gout to patients is important. Complications of long-standing untreated gout may include secondary infection, urate nephropathy, renal stones, nerve impingement, or fractures in joints with tophi.[3]

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