GOUT & PSEUDOGOUT

HOWARD L. FEINBERG, D.O.,F.A.C.O.I., F.A.C.R.

ACOI BOARD REVIEW 2019

GOUT

- Hyperuricemia is not gout
- Gout typically follows years of asymptomatic hyperuricemia
- Serum urate increased by alcohol, height, body weight, age, blood pressure, BUN, creatnine

- 13.6/1000 in men
- 6.4/1000 in women
- estrogen causes increased uric acid excretion

CLASSIFICATION CRITERIA

- Step 1: Entry Criteria – swelling pain and redness in a peripheral joint or bursa
- Step 2: Sufficient criterion (if met does not require other criteria) – MSU crystals in a symptomatic joint or bursa
- Step 3: Apply criteria if step 2 is not met

CLASSIFICATION CRITERIA
(Requires 9 points)

- Characteristics (1-3 points)
  - Erythema over joint
  - Can't bear touch
  - Inability to walk or use joint
- Time Course (one episode 1 point, recurrent 2 points)
  - <24 hours
  - Resolves in <14 days
  - Complete resolution between episodes
- Evidence of Tophus (4 points)
- Serum Urate
  - <4 (-4 points)
  - 6-8 (2 points)
  - 8 – 10 (3 points)
  - > 10 (4 points)
- MSU negative (-2 points)
- Imaging
  - Urate deposit evidence (4 points)
  - Typical damage evidence (4 points)

ASSOCIATED CONDITIONS

- Obesity
- Ethanol
- Diabetes Mellitus
- Hypertriglyceridemia
- Hypertension
- Hypothyroidisim
- Atherosclerosis
- Metabolic Syndrome
- Pregnancy
- Acute Illness
- Dehydration
- Psoriasis

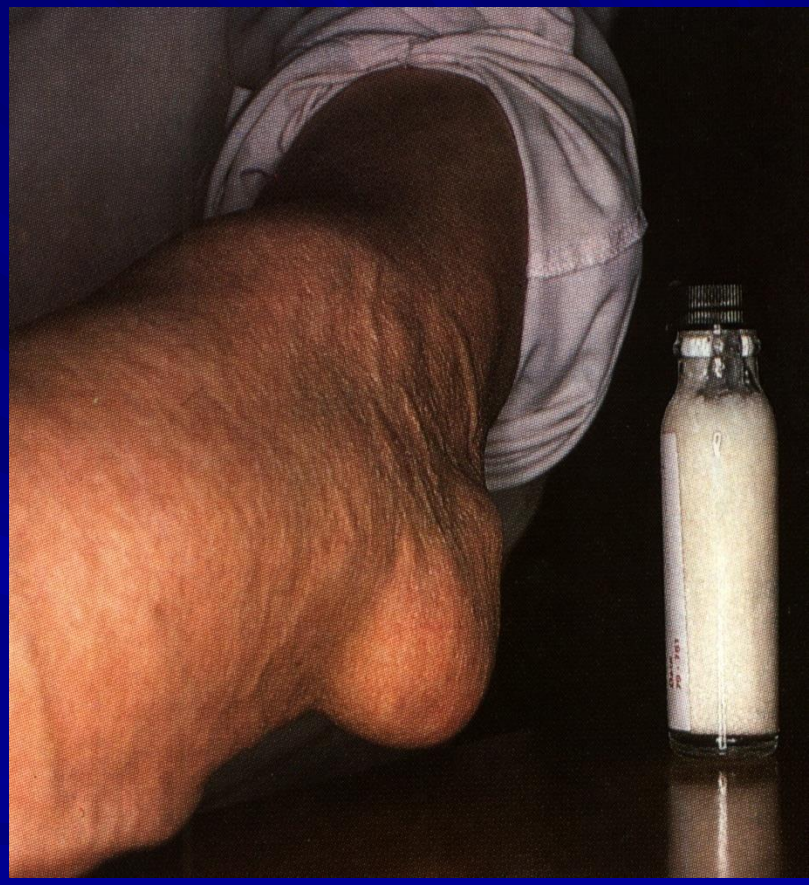
NEGATIVE ASSOCIATIONS

- Rheumatoid Arthritis
- SLE
- Ankylosing Spondylitis

CLINICAL

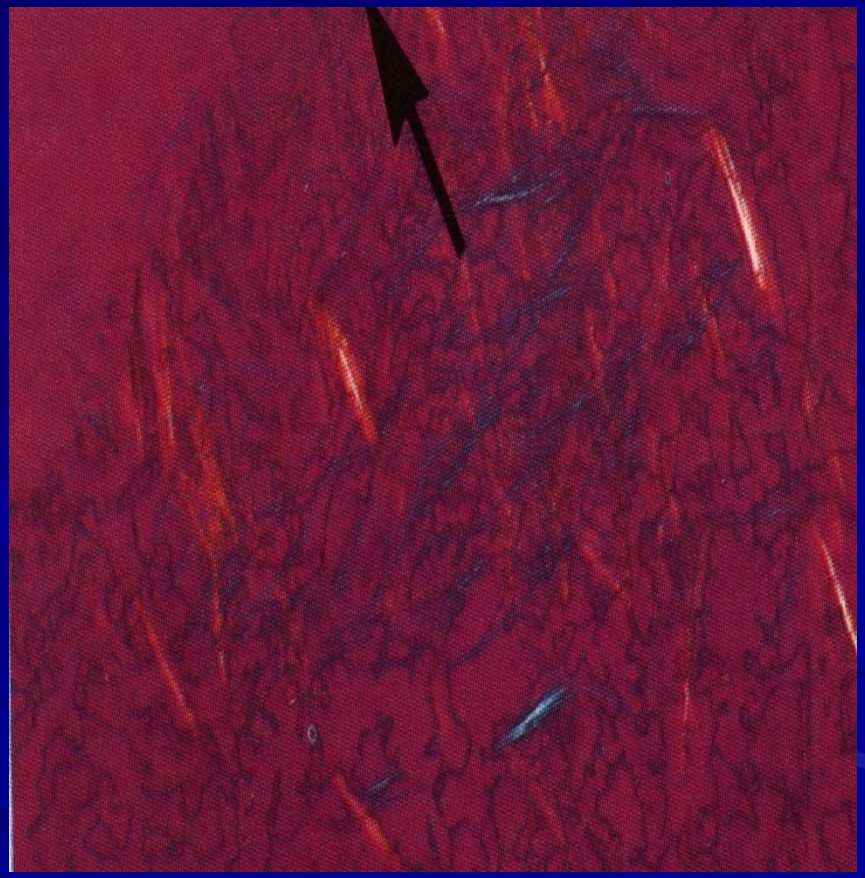
- Asymptomatic Hyperuricemia
- Acute Gout
- Intercurrent Period
- Acute Gout
- Chronic Gout

PRESENTATION



PATHOLOGY

- Monosodium Urate Crystals are formed when the bodies capacity to store uric acid is surpassed
- Uric acid is a byproduct of purine metabolism
- Serum saturation 6.7mg/dl



TOPHI

RADIOGRAPHIC FINDINGS

Hyperuricemia

- *Primary Hyperuricemia* Hyperuricemia which is not caused by or secondary to another disorder.
- Idiopathic
- underexcretion - 90%
- overproduction - 10%

- *Secondary Hyperuricemia* Hyperuricemia which occurs as a result of a drug effect or is secondary to another disease

OVERPRODUCTION PRIMARY HYPERURICEMIA

- HGPRT Deficiency
  (Hypoxanthine Guanine Phosphoribosyltransferase Deficiency)
- PRPP Synthetase Superactivity
  (Phosphoribosylpyrophosphate synthetase superactivity)
- G-6-P-D Deficiency
- Fructose-1-Phosphate Aldolase Deficiency

OVERPRODUCTION SECONDARY HYPERURICEMIA

- Diet
- Myeloproliferative Disorders
- Lymphoproliferative Disorders
- Accelerated ATP Degradation
- Glycogen Storage Disease (type I, III, V, VII)
- Severe Muscle Exertion
- Hemolytic Disease
- Psoriasis
- G-6-PD Deficiency
- Fructose-1-Phosphate Aldolase Deficiency
- HGPRT Deficiency

Under Excretion

- 1º Hyperuricemia
  - Idiopathic
- 2º Hyperuricemia
  - inhibition of tubular urate secretion (DKA, lactic acidosis, Maple Syrup Urine Disease, Alcoholic Ketosis)
  - enhanced tubular reabsorbtion (dehydration, diuretics)
- Unknown Mechanism
  - Hypertension
  - Lead
  - Hyperparathyroid
  - Drugs
    - Cyclosporine
    - ASA
    - Ethambutol
    - Pyrazidamide
    - Ethanol
    - Nicotinic Acid

Combined Overproduction & Underexcretion

- Glucose - 6- Phosphatase Deficiency
- Fructose -1-phosphate aldolase deficiency

INDICATIONS FOR TREATMENT

- Acute Gout
- Tophi
- Uric Acid Stones
- Uric Acid Nephropathy
- Interstitial Nephritis

TREATMENT GOALS

- Stop acute attacks
- Resolve Tophi
- Prevent joint damage
- Decrease uric acid below 6.0

TREATMENT

- Acute
  - colchicine
  - Indomethacin
  - Other NSAID
  - Steroid
  - Pain Medication
  - ACTH
  - Joint Injection
  - Anakinra (Kineret) Interleukin-1 receptor antagonist
- Chronic
  - Allopurinol
  - Febuxostat
  - Probenecid
  - NSAID
  - Colchicine
  - Sulfinpyrazone
  - Pegloticase (Krystexxa)
  - Anakinra ? (Kineret)

CALCIUM PYROPHOSPHATE

- Common name Pseudogout
- Occurs exclusively in and around joints
- May be asymptomatic or cause disease

CLINICAL PRESENTATIONS

- Acute
  - similar to gout
  - may have fever, leukocytosis, elevated ESR
- Chronic
  - similar to OA
  - symmetrical
  - mainly in knees, wrists, hips
  - isolated patellofemoral disease

CLINICAL PRESENTATIONS

- Polyarticular-may mimic Rheumatoid Arthritis
- Oligoarticular-usually elderly
- Pyrophosphate Arthropathy
  - Early-mimics Osteoarthritis
  - Late-Charcot Joint
- Precocious Osteoarthritis

CHONDROCALCINOSIS

- Rheumatoid 5%
  - 10% RF positive
- Gout 25%
- OA 50%
- Asymptomatic 20%

- Present in
  - 4% of adult population
  - 50% over age 90

EPIDEMIOLOGY

- Hereditary - autosomal dominant
- Post Traumatic
- Sporadic-rare under age 40
- Osteochondro-dysplasia

- 2^{o} To Metabolic Disease
  - hemachromatosis
  - hyperparathyroid
  - hypothyroid
  - amyloid
  - hypomagnesemia
  - hypophosphatemia
  - Rickets
  - Familial hypocalcuric hypocalcemia

RADIOGRAPHIC FINDINGS

- Chondrocalcinosis
- Crowned Dens
  - neck pain due to crystal deposits surrounding dens
- Cord compression
- Wrap Around Patella
- Erosive OA

DIAGNOSIS

- Definite
  - crystals in joint
- Probable
  - other calcium crystals in joint
- Possible
  - X-Ray findings
  - Typical joint distribution
  - History

CALCIUM PYROPHOSPHATE

PATHOLOGY

- Normal serum phosphate
- Normal phosphate excretion
- Elevated levels of inorganic phosphate in synovial fluid
- NTPPPHase = Cause
  (Nucleoside triphosphate pyrophosphohydrolase)

TREATMENT

- NSAID
- Colchicine
- Steroids
- Physical Therapy
- Surgery
- Joint Injections

APATITE -LIKE CRYSTALS

- Carbonate substituted apatite
- Octacalcium Phosphate (OCP)
- Tricalcium phosphate (TCP)
- Dicalcium phosphate dihydrate (brushite)

APATITE - LIKE DISEASE

- Bursitis
- Tendonitis
- Arthritis
- Renal Failure
- epiphyseal dysplasia
- destructive OA

- Crystals not visible on microscopy
- Alizaren Red-stain red
- von Kossa-stain black
- precise ID requires x-ray diffraction

Contact Information

Howard Feinberg, D.O., F.A.C.O.I., F.A.C.R.
1310 Club Drive
Vallejo, CA 94592

Howard.Feinberg@TU.edu