GOUT & PSEUODOGOUT

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ACOI BOARD REVIEW 2018
(No Disclosures)
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
- Hypothyroidism

- 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
Monosodium Urate Crystals are formed when the body's 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

1° Hyperuricemia
- Idiopathic

2° Hyperuricemia
- inhibition of tubular urate secretion (DKA, lactic acidosis, Maple Syrup Urine Disease, Alcoholic Ketosis)
- enhanced tubular reabsorption (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
- Osteochondrodysplasia

- 2° 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

NTPPPPHase = 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
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