Objectives
At the end of this lecture you will know…

1. The differential diagnosis for a patient with atraumatic monoarticular arthritis.
2. The keys to working this patient up
   1. Knee aspiration and interpretation
   2. Labs

Case #1

A 25 y/o woman presents with 2 weeks of increasingly painful atraumatic swelling of her left knee.

- No locking
- No instability
- No fever or night sweats
- No recent GI or GU illness.
- Sexually active with one partner x 1 month.

Exam: Difficulty bearing weight on the L leg, large L knee effusion, diffuse tenderness of the L knee, limited passive range of motion L knee due to pain, knee feels warm to touch. No skin erythema.
What would you do next?

A. 2 week trial of NSAIDs + hydrocodone/APAP for breakthrough pain
B. 2 week trial of NSAIDs + physical therapy
C. Knee x-rays
D. Knee aspiration
E. Blood work

Differential monoarticular arthritis

- **Noninflammatory**
  - Osteoarthritis
  - Neuropathic arthropathy
- **Inflammatory**
  - Crystal arthropathy
    - Gout (Monosodium urate crystals)
    - CPPD (Calcium pyrophosphate dihydrate crystals, aka pseudogout)
  - Spondyloarthropathy (involves low back, but can be peripheral only, also can affect entheses)
    - Reactive arthritis (used to be called Reiter’s syndrome)
    - Psoriatic arthropathy
    - IBD-associated
  - Rheumatoid arthritis, Systemic lupus erythematosus
- **Septic**
  - Bacteria (remember gonorrhea, Lyme disease)
  - Mycobacteria
  - Fungus
- **Hemorrhagic**
  - Hemophilia
  - Supratherapeutic INR
  - Trauma
  - Tumor

History of limited use in septic arthritis

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Studies</th>
<th>Sensitivity, % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint pain</td>
<td>2</td>
<td>85 (78-90)</td>
</tr>
<tr>
<td>History of joint edema</td>
<td>2</td>
<td>78 (74-85)</td>
</tr>
<tr>
<td>Fever</td>
<td>7</td>
<td>57 (52-62)</td>
</tr>
<tr>
<td>Sweats</td>
<td>2</td>
<td>27 (20-34)</td>
</tr>
<tr>
<td>Rigors</td>
<td>4</td>
<td>19 (15-24)</td>
</tr>
</tbody>
</table>

* Abbreviation: CI, confidence interval.

PMH can be useful in septic arthritis


Some exam is useful in septic arthritis


What's the most specific lab test for septic arthritis?

A. Serum ESR >30mm/h
B. Serum CRP >100mg/L
C. Synovial fluid WBC >100,000
D. Synovial fluid LDH > 250 U/L
E. Synovial fluid protein > 3.0g/dL

Aspirate the joint.

If concern for septic arthritis the joint must be aspirated emergently

- Aspirate in clinic OR
- Call orthopaedics with emergent consult.
- Insist on exam and consideration of aspiration within hours
- Septic joint needs emergent wash-out in OR (sometimes bedside serial lavage)

Importance of recognizing and treating septic arthritis

- Destroys cartilage within days of onset
- Inpatients: 7-15% mortality rate even with antibiotic use

The knee aspirate contains 50,000 WBCs, 80% PMNs. There are no crystals. Gram stain is pending. What is the most likely organism in this patient’s case?

A. Borrelia burgdorferi
B. Chlamydia trachomatis
C. Neisseria gonorrhea
D. Staphylococcus aureus
E. Mycobacterium tuberculosis

Disseminated gonococcal infection (DGI)

- Mostly starts with asymptomatic mucosal infection
- Rarely preceded by symptomatic genital infection
- 2 syndromes possible
  1. Tenosynovitis + dermatitis
  2. Purulent arthritis without dermatitis


Case #2

30 y/o woman presents to your clinic with seven weeks of R knee swelling with no injury. On review of systems, she endorses a 2-month history of finger joint pain and swelling bilaterally.

On exam you find that 3 of the MCP joints on the R hand are swollen and tender. The R knee has an effusion.

Which of the following labs is not recommended in her case?

A. Rheumatoid factor  
B. **HLA B-27**  
C. Anti-cyclic citrullinated peptide  
D. C reactive protein  
E. Sedimentation rate

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2010 ACR classification criteria for rheumatoid arthritis

- Synovitis in at least 1 joint and Lack of alternative dx  and ≥ 6 of the following:
  - Joint involvement
    - 2-10 large joints = 1 point
    - 1-3 small joints = 2 points
    - 4-10 small joints = 3 points
    - > 10 joints = 5 points
  - RF or anti-CCP abnormal
    - Low positive = 2 points
    - High positive = 3 points
  - Increased ESR or CRP = 1 point
  - Symptoms ≥ 6 weeks = 1 point

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Caveats to ACR rheumatoid arthritis criteria

- Seronegative RA
  - Population of RA patients without RF or anti-CCP antibodies
- Disease < 6 weeks
  - If all other testing points to RA then can be diagnosed at < 6 weeks
- Inactive RA
  - After treatment the labs may normalize but RA can be diagnosed based on past findings

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Case #3

A 25 y/o woman presents with 2 weeks of increasingly painful atraumatic swelling of her left knee.
- No locking
- No instability
- No fevers
- Diagnosed with gastroenteritis 3 weeks ago, now resolved.
- Sexually active, in monogamous relationship x 6 months.

Exam: Difficulty bearing weight on the L leg, large L knee effusion, diffuse tenderness of the L knee, pain with passive L knee range of motion, range of motion limited to 10-90 degrees.

You aspirate her knee and find the following:

- 20,000 WBCs
- 50% PMNs
- No crystals
- Gram stain negative
- Culture pending

What is the most likely diagnosis?

A. IBD-associated arthritis  
B. Reactive arthritis  
C. Systemic lupus erythematosus  
D. Rheumatoid arthritis  
E. Pseudogout

Reactive arthritis is a clinical diagnosis

1. Musculoskeletal findings
   1. Asymmetric joint swelling +/- enthesitis +/- dactylitis +/- inflammatory back pain
2. Infection preceded the musculoskeletal findings
   1. Diarrhea
   2. Urethritis (Chlamydia trachomatis)
3. No other obvious cause for symptoms
   1. Check labs and fluid to r/o gout, rheumatoid arthritis, lupus, Lyme disease, septic arthritis
      1. Stool culture if active diarrhea
      2. Urine or vaginal swab for Chlamydia in asymptomatic or those with urethritis
   2. Consider xray to r/o osteoarthritis, stress fracture
   3. Perform arthrocentesis if effusion present
      1. Cell count, differential → expect inflammatory picture
      2. Crystals
      3. Gram stain, culture

Yu DT from UpToDate, “Reactive arthritis,” last updated May 15, 2015.  
Case #4

A 60 y/o woman presents with swelling of her right knee. The pain started when she woke up 3 days ago and is severe. She has obesity and takes hydrochlorothiazide for hypertension. Her creatinine is 1.0 mg per deciliter. The night before this started she was on her feet for hours cooking a risotto with sweetbreads which she paired with a craft beer.

What is the next step?

A. Order serum uric acid
B. Order 24-hour urine uric acid
C. Aspirate the knee effusion, send for cell count + differential, crystals, gram stain, culture
D. Order R knee xrays, 3 views, weight bearing if possible

Crystal search in synovial fluid

<table>
<thead>
<tr>
<th>Type of crystal</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>(+) Likelihood ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOUT (Monosodium urate crystals)</td>
<td>63-78%</td>
<td>93-100%</td>
<td>14</td>
</tr>
<tr>
<td>CPPD (Calcium pyrophosphate dihydrate crystals)</td>
<td>12-83%</td>
<td>78.96%</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Gout facts

- Men:women = 3-4:1
  - Sex difference decreases with age
  - Lower estrogen → less uric acid excretion
- Risk factors
  - Eating food rich in purines
  - Alcohol
  - Soft drinks
  - Fructose
- Consider aspirating knees of your knee OA patients if they have a new pattern of swelling/pain (may be crystal arthropathy)

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