Keeping up with Arthritis
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July 6, 2015
UCSF Essentials of Women’s Health

I have nothing to disclose
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
3. Immediate treatment recommendations for this patient.

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
- 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.
Differential diagnosis?

Differential monoarticular arthritis

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

You aspirate her knee and find 50,000 WBCs, 80% PMNs. There are no crystals. Gram stain is pending. Next step?

A. Acetaminophen
B. Nonsteroidal anti-inflammatory drugs
C. Oral steroids
D. Knee corticosteroid injection
E. Emergent knee arthroscopy
Categories of synovial fluid based upon clinical and laboratory findings

<table>
<thead>
<tr>
<th>Measure</th>
<th>Normal</th>
<th>Noninflammatory</th>
<th>Inflammatory</th>
<th>Septic</th>
<th>Hemorrhagic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, ml (knee)</td>
<td>&lt;3.5</td>
<td>Often &gt;3.5</td>
<td>Often &gt;3.5</td>
<td>Usually &gt;3.5</td>
<td></td>
</tr>
<tr>
<td>Clarity</td>
<td>Transparent</td>
<td>Transparent-opaque</td>
<td>Opaque</td>
<td>Bloody</td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>Clear</td>
<td>Yellow</td>
<td>Yellow to sparsely disseminated</td>
<td>Yellow to green</td>
<td>Red</td>
</tr>
<tr>
<td>Worsens</td>
<td>Rate</td>
<td>Rate</td>
<td>Rate</td>
<td>Rate</td>
<td>Rate</td>
</tr>
<tr>
<td>White blood cell, per mm³</td>
<td>&lt;200</td>
<td>0 to 1000</td>
<td>1,000 to 100,000</td>
<td>15,000 to &gt;100,000*</td>
<td>200 to 2000</td>
</tr>
<tr>
<td>Polymorphonuclear leukocytes, percent</td>
<td>&lt;25</td>
<td>&lt;25</td>
<td>≥50</td>
<td>≥75</td>
<td>50 to 75</td>
</tr>
<tr>
<td>Culture</td>
<td>Negative</td>
<td>Negative</td>
<td>Negative</td>
<td>Often positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Total protein, g/dL</td>
<td>1 to 2</td>
<td>1 to 3</td>
<td>3 to 5</td>
<td>3 to 5</td>
<td>4 to 6</td>
</tr>
<tr>
<td>Glucose, mg/dL</td>
<td>Nearly equal to blood</td>
<td>Nearly equal to blood</td>
<td>&gt;25, lower than blood</td>
<td>&lt;25, much lower than blood</td>
<td>Nearly equal to blood</td>
</tr>
</tbody>
</table>

* Lower part of range with infections caused by partially treated or low virulence organisms.


History of limited use in septic arthritis

Table 3. Sensitivity of Symptoms and Signs

<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 (71-85)</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>

Abbriviation: CI, confidence interval.
With the exception of the study by Kortekangas et al,47 the studies reviewed only included patients with septic arthritis, which permits calculation of only sensitivity and not specificity or likelihood ratios.

PMH can be useful in septic arthritis

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Sensitivity, %</th>
<th>Specificity, %</th>
<th>+LR (95% CI)</th>
<th>-LR (95% CI)</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt; 80 yr*</td>
<td>18.9</td>
<td>94.6</td>
<td>3.5 (1.7-6.4)</td>
<td>0.86 (0.70-0.96)</td>
<td>3.5</td>
</tr>
<tr>
<td>Diabetes mellitus*</td>
<td>10.8</td>
<td>96.0</td>
<td>2.7 (1.1-6.2)</td>
<td>0.93 (0.79-1.0)</td>
<td>3.3</td>
</tr>
<tr>
<td>Rheumatoid arthritis*</td>
<td>67.6</td>
<td>72.5</td>
<td>2.5 (1.9-2.9)</td>
<td>0.46 (0.27-0.67)</td>
<td>4.0</td>
</tr>
<tr>
<td>Joint surgery (&lt;3 months ago)*</td>
<td>24.0</td>
<td>96.5</td>
<td>6.9 (3.7-11.5)</td>
<td>0.78 (0.63-0.90)</td>
<td>5.1</td>
</tr>
<tr>
<td>Hip or knee prosthesis*</td>
<td>35.1</td>
<td>88.8</td>
<td>3.1 (1.9-4.5)</td>
<td>0.73 (0.55-0.88)</td>
<td>15.0</td>
</tr>
<tr>
<td>Skin infection (no prosthesis)*</td>
<td>32.4</td>
<td>88.4</td>
<td>2.6 (1.7-4.2)</td>
<td>0.76 (0.58-0.91)</td>
<td>27.2</td>
</tr>
<tr>
<td>Prosthesis and skin infection*</td>
<td>24.3</td>
<td>98.4</td>
<td>15.0 (8.0-26.0)</td>
<td>0.77 (0.62-0.88)</td>
<td>72.7</td>
</tr>
<tr>
<td>HIV infection</td>
<td>75.0</td>
<td>38.8</td>
<td>1.2 (0.76-1.5)</td>
<td>0.64 (0.23-1.37)</td>
<td>N/A</td>
</tr>
</tbody>
</table>


Some exam is useful in septic arthritis

<table>
<thead>
<tr>
<th>Physical examination</th>
<th>Sensitivity for septic arthritis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain with motion</td>
<td>100.0</td>
</tr>
<tr>
<td>Limited motion</td>
<td>92.0</td>
</tr>
<tr>
<td>Tender</td>
<td>68.0-100</td>
</tr>
<tr>
<td>Swelling</td>
<td>45.0-92.0</td>
</tr>
<tr>
<td>Joint effusion</td>
<td>92.0</td>
</tr>
<tr>
<td>Increased heat</td>
<td>18.0-92.0</td>
</tr>
<tr>
<td>Redness</td>
<td>13.0-64.0</td>
</tr>
<tr>
<td>Fever &gt; 37.5°C</td>
<td>34.0-54.0</td>
</tr>
<tr>
<td>Axial load pain</td>
<td>36.0</td>
</tr>
</tbody>
</table>

(Specificity, LR, -LR not yet studied.)

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

1. Serum ESR >30mm/h
2. Serum CRP >100mg/L
3. Synovial fluid WBC >100,000 %
4. Synovial fluid LDH >250 U/L
5. Synovial fluid protein >3.0g/dL

<table>
<thead>
<tr>
<th>WBC count</th>
<th>&lt;25,000</th>
<th>25,000</th>
<th>50,000</th>
<th>100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+) Likelihood ratio for septic joint</td>
<td>0.32</td>
<td>2.9</td>
<td>7.7</td>
<td>28</td>
</tr>
</tbody>
</table>


Aspirate the joint.

PMNs > 75% → bacterial infection

Eosinophils in fluid → parasitic infection, allergy, neoplasm, or Lyme disease

If suspect gonococcal arthritis, cultures in synovial fluid (+) in < 50% of cases. Yield increased if plates of chocolate agar or Thayer-Martin medium inoculated at the bedside. Also check blood cultures.
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

Case #1, continued...

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

• No locking
• No instability
• No fever
• 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.

What is the most likely organism in this patient’s case?

A. Borrelia burgdorferi
B. Chlamydia trachomatis
C. Neisseria gonorrhea  [Circle]
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

DGI: Work-up

- Knee aspiration: Synovial fluid WBC usually around 50,000 if purulent arthritis
- Blood cultures x 2
- Synovial, skin, urethral or cervical, rectal, pharyngeal specimens for N. gonorrhoeae testing.
- Test for HIV, Chlamydia trachomatis, syphilis
DGI treatment

• Ceftriaxone 1gm IV or IM q24 hours + Azithromycin 1gm po x 1
• Once improving then change to ceftriaxone 250mg IM q 24 hours to complete at least 7 days.
• If purulent arthritis → arthroscopic drainage and lavage vs repeated needle aspirations
• Offer treatment to sexual partners


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

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

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


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 first-line medication recommended in this case?

A. Acetaminophen  
B. Nonsteroidal anti-inflammatory drug  
C. Oral steroids  
D. Sulfasalazine  
E. Methotrexate

Clues to reactive arthritis

- Recent urethritis or GI infection
- Asymmetric joint involvement
- Enthesopathy (inflammation where tendon inserts on bone)
- Keratoderma blenorrhagica

Reactive arthritis is 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 \( \rightarrow \) expect inflammatory picture
      2. Crystals
      3. Gram stain, culture


Reactive arthritis treatment part 1

1. Chlamydia trachomatis: antibiotics for patient + partner

2. Diarrhea: antibiotics if severe diarrhea, older patient, immunocompromised patient.

3. No indication for long term antibiotics in either case even if arthritis symptoms become subacute - chronic

Reactive arthritis treatment part 2

- **Acute arthritis (< 6 months)**
  - NSAIDs
    - Naproxen 500 mg bid or other unless contraindication
  - Steroid injection if symptoms despite NSAIDs
  - Oral steroids if above not helping
  - Disease-modifying anti rheumatic drugs if above not helping (sulfasalazine, methotrexate)

- **Chronic arthritis (> 6 months)**
  - All of above and if doesn’t help, then
  - Disease-modifying anti rheumatic drugs (sulfasalazine, methotrexate)
  - TNF inhibitor


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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 local 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

Gout = negatively birefringent crystals

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
How should this acute gout flare be managed?

A. Nonsteroidal anti-inflammatory drug
B. Colchicine
C. Nonsteroidal anti-inflammatory drug + colchicine
D. Oral steroid
E. Intraarticular steroid injection

Acute gout attack: severity

1. 1 joint involved, mild-moderate pain: monotherapy
2. Multiple joints or severe pain: combination therapy with any 2 of the following

Acute gout attack medication options

1. NSAID
   - Naproxen 500mg bid x 5 days OR
   - Indomethacin 50mg po x 2 days then 25mg tid x 3 days
   - Caution in kidney disease
2. Colchicine 1.2 mg po at first sign of flare then 0.6mg po 1 hour later
   - Then 0.6mg daily or bid until attack resolves
   - Use only if within 36 hours of onset of symptoms
   - Caution in kidney disease
3. Prednisone (0.5 mg/kg per day x 5-10 days or taper)
4. Intraarticular steroid injection if 1-2 joints

Acute gout: Cox-2 inhib > NSAIDs?

- Cochrane review 9/2014
- Compared NSAIDs (excluding Cox-2 inhibitors) to Cox-2 inhibitors
  - Equally effective in reducing pain
  - Equally effective in reducing inflammation
  - Fewer side effects with Cox-2 inhibitors compared to NSAIDs


How should her gout be managed long term?

A. Advise her not to eat sweetbreads.
B. Advise her to cut back on beer (no more than 1 serving per day).
C. Recommend weight loss.
D. Change hydrochlorothiazide to different anti-hypertensive medication.
E. All of the above.
Gout: non pharmacologic tx

1. Diet
2. 2ndary causes hyperuricemia
3. Eliminate non-essential rx that cause hyperuricemia (HCTZ)
4. Evaluate disease severity
   1. Tophi
   2. Frequency and severity of attacks
   3. Chronic symptoms


Gout: diet/life recommendations

- Weight loss for obese patients, to achieve BMI that promotes general health
- Healthy overall diet
- Smoking cessation
- Exercise (Achieve physical fitness)
- Stay well hydrated

<table>
<thead>
<tr>
<th>Avoid</th>
<th>Limit</th>
<th>Encourage</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Organ meats high in purine content (eg. sweetbreads, liver, kidney)</td>
<td>• Serving sizes of: Beef, Lamb, Pork</td>
<td>• Low-fat or non-fat dairy products</td>
</tr>
<tr>
<td>• High fructose corn syrup-sweetened sodas, other beverages, or foods</td>
<td>• Seafood with high purine content (eg. sardines, shrimp)</td>
<td></td>
</tr>
<tr>
<td>• Alcohol overuse (defined as more than 2 servings per day for a male and 1 serving per day for a female) in all gout patients</td>
<td>• Servings of naturally sweet fruit juices</td>
<td>• Vegetables</td>
</tr>
<tr>
<td>• Any alcohol use in gout during periods of frequent gout attacks, or advanced gout under poor control</td>
<td>• Table sugar, and sweetened beverages and desserts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Table salt, including in sauces and gravies</td>
<td></td>
</tr>
</tbody>
</table>

Gout: pharmacologic tx

- **Indications**
  - Tophus or tophi
  - ≥ 2 gout attacks/year
  - CKD stage 2 or worse
  - H/o urolithiasis
- **Target uric acid < 6mg/dL, but may need to go < 5mg/dL to improve signs/symptoms of gout**
- **Wait 2 weeks after acute flare has resolved**


Gout pharmacologic ppx

- **Xanthine oxidase inhibitor**
  - Allopurinol start at 100mg daily
    - Gradually uptitrate every 2-5 weeks
    - Often need > 300mg/day to be useful
    - s/e: Stevens-Johnson syndrome, toxic epidermal necrolysis in first few months of therapy
    - Caution in kidney disease
  - Febuxostat
- **Uricosuric urate-lowering**
  - Probenecid:
    - contraindicated if h/o urolithiasis or if high urine uric acid
- **Colchicine 0.6mg daily – bid when starting ppx and continue until 6 months after reaching goal uric acid.**
  - As long as normal renal function

Case #5

67 y/o woman with h/o obesity presenting with R knee pain. Pain x 10 years, gradually worsening, relieved by naproxen which she takes 1-2x/week. She has recently stopped playing golf due to the knee pain. She has morning stiffness lasting < 30 minutes.


What do you recommend for treatment at this time?

A. Weight loss
B. Water-based exercise
C. Physical therapy
D. Self-management educational program
E. Corticosteroid injections
F. Hyaluronic acid injections
G. Platelet rich plasma injections
Schematic of the Knee Joint, Showing the Synovial Joint Tissues Affected in Osteoarthritis.

Table 8. Criteria for classification of idiopathic osteoarthritis (OA) of the knee*

<table>
<thead>
<tr>
<th>Clinical and laboratory</th>
<th>Clinical and radiographic</th>
<th>Clinical†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee pain + at least 5 of 9:</td>
<td>Knee pain + at least 1 of 3:</td>
<td>Knee pain + at least 3 of 6:</td>
</tr>
<tr>
<td>Age &gt;50 years</td>
<td>Age &gt;50 years</td>
<td>Age &gt;50 years</td>
</tr>
<tr>
<td>Stiffness &lt;30 minutes</td>
<td>Stiffness &lt;30 minutes</td>
<td>Stiffness &lt;30 minutes</td>
</tr>
<tr>
<td>Crepitus</td>
<td>Crepitus</td>
<td>Crepitus</td>
</tr>
<tr>
<td>Bony tenderness</td>
<td>Bony tenderness</td>
<td>Bony tenderness</td>
</tr>
<tr>
<td>Bony enlargement</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>No palpable warmth</td>
<td>Osteophytes</td>
<td>Osteophytes</td>
</tr>
<tr>
<td>ESR &lt;40 mm/hour</td>
<td>RF &lt;1.40</td>
<td>SF OA</td>
</tr>
<tr>
<td>92% sensitive</td>
<td>95% sensitive</td>
<td>95% sensitive</td>
</tr>
<tr>
<td>79% specific</td>
<td>88% specific</td>
<td>69% specific</td>
</tr>
</tbody>
</table>

* ESR = erythrocyte sedimentation rate (Westergren); RF = rheumatoid factor; SF OA = synovial fluid signs of OA (clear, viscous, or white blood cell count <2,000/mm³).
† Alternative for the clinical category would be 4 of 6, which is 84% sensitive and 88% specific.

Knee OA and xrays

- Radiographic features correlate poorly with clinical symptoms of OA.
- Xrays are insensitive to early features of OA.

Indication for aspiration in knee OA patient?

- If joint effusion and
  - Diagnostic uncertainty
  - New pattern of large volume swelling
  - Red or hot joint
- Send fluid for cell count, differential, crystals, gram stain, culture
- If OA \( \rightarrow \) WBC 200-2000 WBC/mm\(^3\)

http://www.arthritis.org/chapters/northern-california/program.php?id=2220
Weight loss

• If BMI ≥ 25
• Minimum 5% body weight
• Significant functional improvement by WOMAC scale
• Reduced pain
• Health benefits beyond OA of the knee


Exercise

• Low-impact, aerobic exercise
  – Significant pain relief
  – Significantly decreased disability
  – Low cost
  – Likely additional health benefits
• AAOS: recommends (level I)
Avoid toxicity with NSAIDs

- High risk people
  - > 65 years
  - Taking anticoagulants
  - H/o ulcers or GI bleeding
- Use nonselective NSAID + proton pump inhibitor OR
- Use COX-2 selective inhibitor
  - Caution in patients with cardiac risk factors

Knee OA: cutting edge treatments?

- Supplements
- Hyaluronic acid
- Platelet rich plasma
Supplements

- **Glucosamine + chondroitin**
  - Similar to placebo
  - Do not recommend

- **Avocado soybean unsaponifiables (ASU)**
  - Moderate-quality evidence that improves pain and function slightly

- **Boswellia serrata**
  - High-quality evidence that improves pain and function slightly

- None of the products is disease-modifying


Hyaluronic acid

- High molecular-weight polysaccharide in the cartilage and synovial fluid
- Provides lubrication and acts as shock absorber in the joint (adult knee normally has 2ml HA)
- Knee OA: decreased amt of HA in the joint → reduced viscoelasticity of the synovial fluid
- Injections
  - Theoretically reestablish joint homeostasis via increased joint production of HA after the injection has left the joint
  - Proposed anti-inflammatory, analgesic effects
  - ? Protects cartilage

Hyaluronic acid injections

- No data for 1 brand name over another
- Can provide pain relief for longer than steroid (5-13 weeks)
- Evidence is heterogeneous
- Significant placebo response
- Risk = 1-3% pseudoseptic reaction
- Less likely to benefit
  - > 65 yrs old
  - Severe joint space narrowing
- “Uncertain” recommendation from OARSI 2014
- “Cannot recommend” (strength of recommendation = strong) from AAOS 2013


Platelet rich plasma (PRP) injections

- Data heterogeneous
  - Different preparations of PRP
  - Different injection protocols
- More benefit in more mild disease
- Potential to relieve pain x 12 months
- More data needed

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
3. Immediate treatment recommendations for this patient.

Mahalo
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