The Evaluation of the Patient With Monoarthritis

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Disclosures

• Consultant: Abbott, Genentech

Definitions

• The “itis” implies inflammation
• In general, what applies to monoarthritis holds true for oligoarthritis (additional joint)
• How do we detect inflammation clinically on examination?

Monoarthritis

• Distinguish true arthritis from arthralgia or adjacent soft tissue pain

“itis” requires the following:

• Is there swelling, erythema or warmth?
• Is there loss of motion?
• Is pain worse with movement?

Monoarthritis?

Distinguish arthritis from arthralgia, soft tissue pain

• Olecranon bursal swelling
• Loss of motion
• Pain with movement
What Are The Commonest Diagnoses?

- **Infection** - usually the key diagnosis that needs to be ruled out
- **Crystalline disorders** - gout, pseudogout
- **Spondyloarthritis** (reactive arthritis, IBD, spA, AS)
- **Trauma** --> bleeding, hemophilia, coagulopathies
- **Less common** - the monoarthritis evolves into a polyarticular presentation (eg RA, gout)

### Differential Dx of Monoarthritis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Parker et al.</th>
<th>Fred et al.</th>
<th>Messing et al.</th>
<th>Jang et al.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gout</td>
<td>27 (97)</td>
<td>9 (75)</td>
<td>0</td>
<td>23 (95)</td>
</tr>
<tr>
<td>Septic arthritis</td>
<td>6 (25)</td>
<td>11 (75)</td>
<td>5 (63)</td>
<td>20 (75)</td>
</tr>
<tr>
<td>Gouty arthritis</td>
<td>6 (25)</td>
<td>10 (75)</td>
<td>14 (71)</td>
<td>11 (50)</td>
</tr>
<tr>
<td>Spondyloarthritis</td>
<td>15 (62)</td>
<td>11 (38)</td>
<td>12 (60)</td>
<td>14 (70)</td>
</tr>
<tr>
<td>Trauma</td>
<td>25 (100)</td>
<td>1 (4)</td>
<td>7 (30)</td>
<td></td>
</tr>
<tr>
<td>Lesions</td>
<td>0 (0)</td>
<td>5 (0)</td>
<td>5 (0)</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>5 (20)</td>
<td>5 (20)</td>
<td>5 (20)</td>
<td></td>
</tr>
<tr>
<td>Psoriatic arthritis</td>
<td>4 (16)</td>
<td>2 (16)</td>
<td>2 (16)</td>
<td></td>
</tr>
<tr>
<td>Synovial sarcoma</td>
<td>2 (8)</td>
<td>2 (8)</td>
<td>2 (8)</td>
<td></td>
</tr>
<tr>
<td>Echinococcus</td>
<td>1 (4)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Reactive arthritis</td>
<td>1 (4)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Septic arthritis</td>
<td>3 (12)</td>
<td>1 (4)</td>
<td>1 (4)</td>
<td></td>
</tr>
<tr>
<td>Septic arthritis</td>
<td>1 (4)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

*Data for each diagnostic group are given as number (percentage of total)*

Some Joints Cannot Be Assessed for Effusion Very Easily

- Normal
- Not normally visualized

Ankles are Notoriously Difficult To Detect Effusions
This is NOT an ankle effusion

and MRI can be
When necessary we can detect
effusions using ultrasonography

The Outcome of Bacterial Arthritis

<table>
<thead>
<tr>
<th>Pathogen Population</th>
<th>Pathogen</th>
<th>Population</th>
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</thead>
<tbody>
<tr>
<td><strong>Bacterial (non-gonococcal)</strong></td>
<td>Gram positive</td>
<td>Staphylococcus aureus</td>
</tr>
<tr>
<td></td>
<td>Staphylococcus pneumonia</td>
<td>Pneumococci (common in healthy group A individuals)</td>
</tr>
<tr>
<td></td>
<td>Streptococcus pyogenes</td>
<td>Group A</td>
</tr>
<tr>
<td></td>
<td>Staphylococcus epidermidis</td>
<td>Post-instrumentation</td>
</tr>
<tr>
<td></td>
<td>Gram negative rods</td>
<td>Pseudomonas aeruginosa</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bacterial (gonococcal)</strong></td>
<td>Gram negative coccci</td>
<td>Neisseria gonorrhoeae</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Making the Diagnosis

Aspirate The Joint

Synovial Fluid Findings

• Even in most confirmed cases of septic arthritis, the Gram stain may be negative
• A negative Gram stain provides a false assurance in a highly suspicious case

Infection: GC Arthritis

Two Presentations:
• Tenosynovitis, polyarthritis and vesicopustular skin lesions
• Purulent arthritis with skin lesions

Infection: GC Arthritis

THE GRAM STAIN CONFIRMS The DX of GC

Antibiotic regimens for bacterial arthritis according to suspected organism

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Treatment</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. aureus</td>
<td>Nafcillin or oxacillin 2gm IV q4h</td>
<td>No MRSA risk factors</td>
</tr>
<tr>
<td>S. aureus (MRSA nak)</td>
<td>Vancomycin 1gm IV q12h</td>
<td></td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td>Carbenicilline or Cefepime 2gm q8h</td>
<td></td>
</tr>
<tr>
<td>N. gonorrhoe</td>
<td>Ceftriaxone 1gm IV q2h or Cefotaxime 1gm IV q8h</td>
<td>For patients with prior exposure to ceftriaxone, doxycycline 100mg QD x 7d</td>
</tr>
<tr>
<td>Empiric coverage for gram positive and negatives</td>
<td>Vancomycin 1gm IV q12h or Cefotaxime 2gm IV q8h or Cefepime 2gm IV q12h or Piperacillin/tazobactam 4.5gm IV q8h</td>
<td>Health care associated, MRSA, IVDU</td>
</tr>
</tbody>
</table>

Adapted from Johns Hopkins Antibiotic Guide Online
Septic Bursitis May Mimic Arthritis

- Distinguish bursitis from arthritis
- When aspirating be careful not to seed the joint from the bursa
- Consider the overall health status of the patient
- Does not routinely require prolonged course of IV antibiotics

Some examples of septic bursitis
- Note the abrasions over the bursae

Other Infections
- Mycobacterial
- Fungal
- HIV
  - Require high index of suspicion
  - Lack of response to traditional RX
  - Susceptible host
Table 1: Clinical presentations and therapy for Lyme disease

<table>
<thead>
<tr>
<th>Disease Stage</th>
<th>Clinical Manifestations</th>
<th>Treatment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early localized</td>
<td>erythema migrans</td>
<td>Oral</td>
<td>14-21 days</td>
</tr>
<tr>
<td>Early disseminated</td>
<td>multiple erythemas, meningitis, cranial nerve palsy</td>
<td>Oral</td>
<td>14-21 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intravenous or oral</td>
<td>14-21 days</td>
</tr>
<tr>
<td>Late localized</td>
<td>arthritis</td>
<td>Oral or intravenous</td>
<td>28 days or 1-28 days</td>
</tr>
<tr>
<td></td>
<td>recurrent arthritis after oral therapy</td>
<td>Oral or intravenous</td>
<td>28 days or 1-28 days</td>
</tr>
<tr>
<td></td>
<td>encephalitis</td>
<td>Intravenous</td>
<td>14-28 days</td>
</tr>
<tr>
<td></td>
<td>meningitis</td>
<td>Oral</td>
<td>28 days</td>
</tr>
</tbody>
</table>

* At the time of discharge, the patient may receive oral medication to complete therapy.
Crystal Induced Arthritis

Gout Podagra/LE ↑ U.A.

Pseudogout Wrist/Knee CPPD

Hydroxyapatite Shoulder/Fingers Ca dep.

Gout: acute- lower extremity

When The Dx of Gout is Missed-->>>>>>>

Acute Gout
Gout: urate crystal (polarized light microscopy)

CLINICAL ASPECTS OF GOUT
- Serum Urate > 7
- But diagnostic proof remains crystal dx
- Intracellular urate
- Mono or oligoarticular
- Podagra
- Review diet, ETOH (beer>liquor>wine)
- Diuretic use
- Family hx

- Diff dx of Podagra:
  - Gout/OA/SpA
  - Infection uncommon
  - Upper extremity involvement implies greater urate load

Gout
- Lower > upper extremity
- Diffuse inflammation extending beyond the affected joint (skin desquamation)
- Attacks peak over hours, then slowly resolve over days

Acute Pseudogout

Wrist, shoulders and knees
Two groups:
- older patient-- aging effect
- (younger pt :consider metabolic H
  - Hemachromatosis
  - Hyperparathyroidism

CHONDROCALCINOSIS
/PSEUDOGOUT
CALCIFIC PERIARTHROSIS
Most commonly noted around shoulder, knees or digits
Intense swelling, redness
Unlike CPPD, ca+ more globular, not linear

Systemic Disorders Presenting as Monoarthritis
- SPONDYLOARTHRITIS
  - IBD, AS, Psoriasis
  - Reactive (salmonella, shigella, yersinia)
- SARCOID
  - periartthritis with swelling
  - associated with E. nodosum
- RHEUMATOID ARTHRITIS
  - rarely presents with monoarticular presentation
- OSTEOARTHRITIS
  - inflammatory features affecting single joint

Other Monoarticular Disorders
- Trauma/Fracture
- Osteonecrosis
- Hemarthrosis

The Checklist for Monoarthritis
- Recent travel
- Habits, hobbies
- Immune suppressed?
- Sexual history
- Tick bites
- Recent hospitalization
- Prior history of same
- Endemic area
- Fish tanks, gardening
- Chemo, steroids,
- HIV, DM
- New partner?
- Surgery, cardiac issues, diuresis
- Crystal dx, prior podagra

Imaging studies
Know the limits of your imaging modality:
- x-ray: can demonstrate fracture, calcification, joint effusion--- erosions, JSN occur late
- CT imaging good for bone lesions, limited for effusions
- MRI most sensitive at detecting effusions, masses, fracture--- $$ $$

LAB STUDIES
CBC, ESR, (C-RP)
GRAM STAIN AND CULTURES
IF Indicated : Serum URATE
LYME TITER
RARELY: ANA, RF, HLA-B27
TAP THE JOINT!

SYNOVIAL FLUID ANALYSIS

THE 5 C's

- COLOR
- CLARITY
- CELL COUNT
- CULTURE
- CRYSTALS

<table>
<thead>
<tr>
<th>Exam</th>
<th>Normal</th>
<th>Noninflammatory</th>
<th>Inflammatory</th>
<th>Septic</th>
<th>Hemorrhagic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity</td>
<td>High-Thick</td>
<td>High</td>
<td>Low</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless to Straw</td>
<td>Straw to Yellow</td>
<td>Yellow</td>
<td>Variable</td>
<td>Bloody - Hematocrit</td>
</tr>
<tr>
<td>Clarity</td>
<td>Transparent</td>
<td>Transparent</td>
<td>Cloudy</td>
<td>Opaque</td>
<td>Opaque</td>
</tr>
<tr>
<td>WBC</td>
<td>&lt;5000</td>
<td>50,000-1,000</td>
<td>1000-75,000</td>
<td>&gt;50,000</td>
<td>RBC&lt;&lt;WBC</td>
</tr>
<tr>
<td>DDx</td>
<td>OA, Osteonecrosis, Charcot's joint, Trauma, Tumors, Wilson's disease, Amyloidosis</td>
<td>RA, PsA, RA, Crystal arthropathy, Infectious</td>
<td>Bacteria, TB, Fungal, Crystal arthropathy, RA</td>
<td>Trauma, Hemophilia, Pigmented Villonodular Synovitis</td>
<td></td>
</tr>
</tbody>
</table>

Rule out Infection

- Gram stain is key; may consider treating pt. pending final cultures.
- The higher the cell count, the greater the likelihood of infection
- Glucose, LDH, complement levels all lack sensitivity for dx of sepsis

Summary

- Confirm the presence of a monoarthritis
- Identify risk factors pro/con infection
- When in doubt, aspirate joint
- Recognize limitations of imaging studies