Approach to Acute Arthritis

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Waiting Room
• Review the differential for acute arthritis, include the history, physical and lab testing.
• Distinguish arthritis from soft tissue non articular syndromes
• Single joint versus multiple joint involvement.
• Distinguish between inflammatory versus non-inflammatory arthritis.
Acute arthritis

• The sudden onset of inflammation of the joint, causing severe pain, swelling, and redness.
• Structural changes in the joint itself may result from persistence of this condition.
Room 1: Brenda with hip pain

- 55 year old female with pain on the outside of the hip
- Worse with activities climbing up stairs or getting out of her car
- Pain reproducible when you press on the outside of the hip
# Articular versus Peri-articular pain

<table>
<thead>
<tr>
<th>Clinical feature</th>
<th>Articular</th>
<th>Periarticular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomic structure</td>
<td>Synovium, cartilage, capsule</td>
<td>Tendon, bursa, ligament, muscle, bone</td>
</tr>
<tr>
<td>Painful site</td>
<td>Diffuse, deep</td>
<td>Focal “point”</td>
</tr>
<tr>
<td>Pain on movement</td>
<td>Active/passive, all planes</td>
<td>Active, in few planes</td>
</tr>
<tr>
<td>Swelling</td>
<td>Common</td>
<td>Uncommon</td>
</tr>
</tbody>
</table>
Periarticular pain

• Shoulder
  • Subacromial bursitis
  • Rotator cuff tendinitis
  • Biceps tendinitis
  • Adhesive capsulitis

• Hip
  • Trochanteric bursitis
  • Gluteus medius tendinopathy
  • Iliotibial band syndrome

• Elbow
  • Medial/Lateral epicondylitis
  • Olecranon bursitis

• Hands
  • DeQuervain’s tenosynovitis
  • Carpal Tunnel Syndrome
  • Trigger finger

• Knee
  • Prepatellar bursitis
  • Pes anserine bursitis
Trochanteric bursitis

- True hip arthritis= typically located in groin
- Lateral hip pain= Troch bursitis or gluteus medius tendinopathy
- Pain overlying the greater trochanter
- Worse by lying on affected side, walking, climbing, rising from sitting
- Worse with external rotation/abduction of the hips
- ITB tightness and leg length discrepancy predisposes
Room 2: Allen with knee pain
Room 3: Carol with bilateral hand/feet pain
Monoarticular versus polyarticular

• Acute monoarthritis: inflammation (swelling, tenderness, warmth) in one joint
• Occasionally polyarticular disease can present with monoarticular onset
  • RA, JIA, reactive/enteropathic arthritis, sarcoid arthritis, viral arthritis or psoriatic arthritis
History and Physical Examination

• Chronological history of symptom progression
• Mono vs polyarticular
• Precipitating factors (drugs, trauma, infection, diet, activity)
• Constitutional symptoms and complete ROS
Questions to Ask

- Pain come suddenly, minutes? – fracture.
- Over several hours or 1-2 days? – infectious, crystals, inflammatory arthropathy.
- Insidiously over weeks? – indolent infection, OA, tumor.
- History of IV drug abuse or a recent infection? – septic joint.
- Previous similar attacks? – crystals or inflammatory arthritis.
- On anticoagulation? – hemarthrosis
- Prolonged courses of steroids/immunosuppression? – infection or osteonecrosis of the bone, fragility fracture.
Room 2: Allen with knee pain

- 55 yo male with h/o DM, HTN, gout with a 2 day history of knee pain.
- Associated with swelling and difficulty bearing weight.
- No recent trauma/surgery.
- No IVDA or risky sexual behaviors.
Physical Exam
Differential Diagnosis - Acute Monoarthritis

- Infection
- Rheumatoid/Other inflammatory arthritis
- Crystal arthritis
- Hemarthrosis
- Osteoarthritis
- Intra-articular injury
- Neuropathic arthropathy

- Reactive arthritis
- SLE
- Dialysis related amyloidosis
- Transient synovitis of the hip
- Plant thorn synovitis
- Metastatic carcinoma
- Pigmented villonodular synovitis
Acute Monoarthritis

• **THE BIG THREE**
• Infection, infection, infection (bacterial, fungal, mycobacterial, viral, spirochete)
• Trauma
• Crystalline arthropathy (Gout, pseudogout, apatite related arthropathy)
Septic arthritis

• One of the few rheumatologic emergencies
  • Infection can destroy cartilage within a few days
  • Rule of thumb: Assume the joint is infected until proven otherwise

• SYNOVIAL FLUID ANALYSIS- single most useful diagnostic study in the evaluation of MONOarticular arthritis
Synovial fluid

- Gram stain/culture
- Total leukocyte count with differential – Differentiates between inflammatory/non-inflammatory
- Polarized microscopy to look for crystal

- NOT needed: Chemistry (glucose, total protein, LDH) unlikely to yield helpful information beyond the previous tests.
## 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>Often &gt;3.5</td>
<td>Usually &gt;3.5</td>
</tr>
<tr>
<td>Clarity</td>
<td>Transparent</td>
<td>Transparent</td>
<td>Translucent-opaque</td>
<td>Opaque</td>
<td>Bloody</td>
</tr>
<tr>
<td>Color</td>
<td>Clear</td>
<td>Yellow</td>
<td>Yellow to opalescent</td>
<td>Yellow to green</td>
<td>Red</td>
</tr>
<tr>
<td>Viscosity</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>White blood cell, per mm³</td>
<td>&lt;200</td>
<td>0 to 2000</td>
<td>&gt;2000</td>
<td>&gt;2000</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>
</tbody>
</table>

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Synovial fluid analysis

• Bacterial: ↑ likelihood with high WBC, PMN%
  • WBC 10,000-100,000+, >90% PMNs
  • Overlap with rheumatoid arthritis and crystalline arthropathy

• Polarized light Microscopy
  • Needle shaped, negative birefringence- Gout
  • Rhomboid shaped, positive birefringence- CPPD

*Crystal induced arthritis can coexist with septic arthritis
Signs of Inflammation

• Swelling
• Warmth
• Erythema
• Tenderness
• Loss of function (Limitation in range)
### Inflammatory vs Non-inflammatory

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<thead>
<tr>
<th>Feature</th>
<th>Inflammatory</th>
<th>Noninflammatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain (when?)</td>
<td>Yes (AM)</td>
<td>Yes (PM)</td>
</tr>
<tr>
<td>Swelling</td>
<td>Soft tissue</td>
<td>Bony</td>
</tr>
<tr>
<td>Erythema</td>
<td>Sometimes</td>
<td>Absent</td>
</tr>
<tr>
<td>Warmth</td>
<td>Sometimes</td>
<td>Absent</td>
</tr>
<tr>
<td>AM stiffness</td>
<td>Prominent (&gt;1 hour)</td>
<td>Minor (&lt; 30 minutes)</td>
</tr>
<tr>
<td>Systemic features</td>
<td>Sometimes</td>
<td>Absent</td>
</tr>
<tr>
<td>↑ ESR, CRP</td>
<td>Frequent</td>
<td>Uncommon</td>
</tr>
<tr>
<td>Steroid response</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Synovial fluid WBC</td>
<td>WBC &gt;2000</td>
<td>WBC &lt; 2000</td>
</tr>
<tr>
<td>Examples</td>
<td>Septic, RA, SLE, Gout</td>
<td>OA, AVN</td>
</tr>
</tbody>
</table>

Examples:
- Septic, RA, SLE, Gout
- OA, AVN
Septic Arthritis

• Most MONOarticular
• 15-20% cases polyarticular
• Most common sites: knee, hip, shoulder
• 20% patients afebrile
• Joint pain is moderate to severe
• Joints visibly swollen, warm, often red
Septic Arthritis: Predisposing Factors

- Pre-existing arthritis (likelihood ratios)
  - Age >80: 3.5
  - Diabetes Mellitus: 2.7
  - Rheumatoid Arthritis: 2.5
  - Prosthetic joint: 3.1
  - Skin infections, ulcers: 2.8
  - Recent joint surgery: 6.9
  - HIV infection: 1.7

- Others
  - Bacteremia
  - Contiguous infection
  - Penetrating injury
  - Intravenous drug use
  - Intra-articular injection
  - Immunosuppression
  - Chronic illness
  - Alcoholism

Routes of Bacterial Invasion
Infectious Arthritis

- Gonococcal
- Non-gonococcal bacterial
- Fungal
- Mycobacterial (immunocompromised)
- Lyme disease
- Viral
Gonococcal Arthritis

• Most common cause of septic arthritis in young adults
• Often preceded by disseminated gonococcemia
• 2-3 times more common in women
• Women often menstruating, pregnant or postpartum
• Genitourinary disease often asymptomatic

* Disseminated gonococcal pustules
Gonococcal Arthritis

• Two Syndromes
  • Tenosynovitis, vesiculopustular skin lesions, polyarthralgias without purulent arthritis
  • Purulent arthritis (usually monoarticular) without skin findings

• Grams stain positive <25%

• Synovial cultures often negative

• If high suspicion, culture urethra, cervix, rectum and pharynx for Neisseria
Gonococcal Pearls

• Recurrent episodes: check for complement deficiency (measure CH50)
• Treat for chlamydia (azithromycin 1 g x 1 or doxycycline 100 mg BID x 7 days)
• Test for syphilis and HIV
• Evaluate and treat partners
Non-gonococcal arthritis

• Typically affects large joints
• Staph and Strep are most common causes (~70% of cases)
• Most potentially dangerous and destructive form of acute monoarthritis (especially staph)
• Mortality rate of 7-15% in-hospital setting
• Staph epidermidis common with prosthetic joints
• Encapsulated organisms in patients with splenectomy
Room 3: Carol with bilateral hand/feet pain

- 60 year old female with bilateral hand discomfort for 3 months, followed 1 month later with bilateral foot pain with walking
- Reported 2 hours of morning stiffness daily
- Problems falling asleep and reports significant fatigue
Polyarthritis

- Definite inflammation (swelling, tenderness, warmth) of > 5 joints
- A patient with 2-4 joints is said to have pauci- or oligoarticular arthritis
Differential Diagnosis: Acute Polyarthritis

- **Infection**
  - Gonococcal
  - Meningococcal
  - Lyme disease
  - Rheumatic fever
  - Bacterial endocarditis
  - Viral (rubella, parvovirus, Hep. B)

- **Noninflammatory**
  - Osteoarthritis
  - Fibromyalgia

- **Inflammatory**
  - RA
  - JIA
  - SLE
  - Reactive arthritis
  - Psoriatic arthritis
  - Polyarticular gout
  - Sarcoid arthritis
  - Scleroderma
  - Polymyalgia Rheumatica
Patterns with Polyarthritis

- Migratory pattern: Rheumatic fever, gonococcal (disseminated gonococcemia), early phase of Lyme disease, palindromic rheumatism
- Additive pattern: RA, SLE, psoriasis
- Intermittent: Gout, reactive arthritis
Common Patterns

- Symmetric: RA, SLE, scleroderma
- Assoc with dactylitis: PsA, reactive arthritis, ankylosing spondylitis
- Affects DIP: OA (Heberden’s nodes), psoriatic arthritis
- Affects PIP: OA (Bouchard’s nodes), PsA, RA, SLE, scleroderma
- Affects MCP: RA, CPPD, hemochromatosis, SLE, scleroderma
- Affects 1st CMC: OA
Distribution of Joint Involvement

- DIP: OA, psoriatic, reactive
- PIP: OA, SLE, RA, psoriatic
- MCP: RA, pseudogout, hemochromatosis
- 1st CMC: OA
- De Quervain's tenosynovitis
- Wrist: RA, pseudogout, gonococcal arthritis, juvenile arthritis, carpal tunnel syndrome
Room 3: Carol’s physical exam
Rheumatoid Arthritis

- Symmetric, inflammatory polyarthritis, initially involving small joints, later larger joints
- Acute, severe onset 10-15%; subacute 20%
- Hand/feet characteristically involved
- Acute hand deformity: fusiform swelling of fingers due to synovitis of PIPs
- RF may be negative at onset and may remain negative in 15-20%.
- RA is a clinical diagnosis, no laboratory test is diagnostic, just supportive
Radiographic Progression

• Joint damage can begin in the first year or 2 of the disease
  • Structural damage continues to progress throughout the course of the disease.

• A key reason RA pts are seen late by rheumatologists is that patient’s delay talking about their symptoms with their PCP

Serial radiographs taken at 4 year intervals shows progressive joint damage as evidenced by worsening carpal bone ankyloses, joint space loss and MCP erosions
Early Identification

• Early identification of RA and referral to a rheumatologist can improve the long-term outcome of the disease.

• Criteria for early referral:
  1. ≥ 3 swollen joints
  2. MCP/MTP involvement: positive “squeeze test,” pain following hand or foot compression
  3. Morning stiffness ≥ 30 minutes

References

Room 4: Tony with a cough

THE END

ANY QUESTIONS?