Diseases of the Joint

Gary Viner MD, CCFP
Fify Soeyonggo MD, FM PGY1
Learning Objectives

ARTHITIS (MONO AND POLY)
• List frequent causes
• Distinguish OA, RA, septic arthritis and gout
• Discuss management

LOW BACK PAIN
• List causes
• Risk factors and red flags
• Diagnostic imaging

MEDICATIONS
• Indications, contraindications and side effects
## Joint Pain

<table>
<thead>
<tr>
<th>Category</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular</td>
<td>Hemarthrosis</td>
</tr>
<tr>
<td>Infectious</td>
<td>Septic Arthritis, Osteomyelitis</td>
</tr>
<tr>
<td>Neoplastic</td>
<td>Metastasis, Chondrosarcoma</td>
</tr>
<tr>
<td>Degenerative</td>
<td>Osteoarthritis, Crystals</td>
</tr>
<tr>
<td>Iatrogenic</td>
<td></td>
</tr>
<tr>
<td>Congenital</td>
<td></td>
</tr>
<tr>
<td>Autoimmune</td>
<td>RA, SLE, Psoriatic Arthritis, Ankylosing Spondylitis, Reactive Arthritis</td>
</tr>
<tr>
<td>Trauma</td>
<td></td>
</tr>
<tr>
<td>Endocrine</td>
<td></td>
</tr>
</tbody>
</table>

**OTHER**

Tendonitis, Bursitis, Ligament Tear, Meniscus

**PEDIATRIC**

SCFE, Legg-Calve-Perthes, Osgood Schlatter, Henoch-Schönlein purpura, Juvenile Idiopathic Arthritis

*POLYARTHRITIS IS RED*
# Commons symptoms and diseases

<table>
<thead>
<tr>
<th>Symptom</th>
<th>OA</th>
<th>RA</th>
<th>Gout</th>
<th>Septic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Redness</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Swelling</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Symmetry</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Malaise</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stiffness</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
Osteoarthritis (OA)

Pathophysiology

- Degradation of cartilage and degeneration of surrounding soft tissues
- Risk factors: age, female, obesity, high bone mass, previous joint injury, smoking, genetics
Osteoarthritis (OA) Part 1

History
- Gradual, pain worse with activity/better with rest
- Risk factors
- DIP, PIP, 1st MCP, large joints

Physical
- DIP – Heberden, PIP – Bouchard
- Crepitation, decreased ROM
Osteoarthritis (OA) Part 2

Diagnosis

- Imaging: joint space narrowing, marginal osteophytes, subchondral sclerosis, cysts
Osteoarthritis (OA) Part 3

Management

• Tylenol (max 4g/day)
• NSAIDs
• Intra-articular steroids
• Joint replacement
• PT: Quads strengthening
Rheumatoid Arthritis (RA)

Pathophysiology

• Destruction of cartilage $\rightarrow$ irreversible damage in 6 months to 1 year

• Risk factors: age $>$ 50, female, first degree relative with RA, smoking
Rheumatoid Arthritis (RA) Part 1

History

• Morning stiffness > 1 hour, symmetric polyarticular joint pain/swelling/redness

• Systemic symptoms: fatigue, weakness, low grade fever, weight loss

• Extra-articular presentation: rheumatoid nodules, pleural effusion, pulmonary nodules, pericarditis, etc.
Rheumatoid Arthritis (RA) Part 2

Physical

• Warm, red, swollen and symmetrically involved joints

• Hands: PIP, MCP, wrists; boutonniere, swan neck deformities; ulnar deviation

• Arms: shoulders, elbows, acromioclavicular

• Legs: knees, ankles > hips

• Feet: MTP joint
Rheumatoid Arthritis (RA) Part 3

- Swan Neck Deformity
- DIP Flexion (Bent)
- PIP in Hyperextension

- Boutonniere Deformity
- Tear in Central Slip
- PIP Joint in Flexion
- DIP in Hyperextension
Rheumatoid Arthritis (RA) Part 4
Rheumatoid Arthritis (RA) Part 5

Diagnosis

• Bloodwork: CBC and diff, ESR, CRP, RF, ANA

• Imaging
  – Soft tissue swelling, narrowing of joint space, bony erosions, subluxation, joint destruction
Rheumatoid Arthritis in the hand
American College of Rheumatology
Revised Criteria for Diagnosis of Rheumatoid Arthritis

To make the diagnosis of RA, four of the following criteria must be present. Criteria 1-4 must have been present for at least six weeks.

1. Morning stiffness  
2. Arthritis of three or more joint areas  
3. Arthritis of hand joints  
4. Symmetric arthritis  
5. Rheumatoid nodules  
6. Serum rheumatoid factor  
7. Radiographic changes

Rheumatoid Arthritis (RA) Part 6

Management

• Symptom control: NSAIDs/Tylenol, intra-articular steroids, PT

• DMARDs: hydroxychloroquine, gold, methotrexate, sulfasalazine, TNFα inhibitors, B-cell inhibitor, etc.

• Low dose prednisone + bisphosphonate

• Surgical intervention
Patients with active RA should be assessed by a rheumatologist on a regular basis

The goals:

- Minimize pain, stiffness and joint swelling
- Retard joint damage
- Reduce future disability
Distinguishing Clinical and laboratory features of chronic inflammatory polyarthritis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Symptoms</th>
<th>Signs</th>
<th>Laboratory tests</th>
<th>Key features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rheumatoid arthritis</td>
<td>Pain, swelling and stiffness for &gt; 6 weeks</td>
<td>Swelling and tenderness, especially in wrists, MCP and MTP joints</td>
<td>Rheumatoid factor positive in 70% of patients</td>
<td>Symmetry</td>
</tr>
<tr>
<td>Psoriatic arthritis and spondyloarthropathies</td>
<td>Pain, tenderness and swelling in joints and tendon and ligament attachment sites</td>
<td>Tenderness at sites of tendon attachments, dactylitis (swelling of entire digit caused by tenosynovitis)</td>
<td>Blood tests are not helpful</td>
<td>May have sacroiliitis, spondylitis, plantar fascitis, DIP arthritis, nail pitting or onycholysis History of psoriasis in patient or family</td>
</tr>
<tr>
<td>Systemic lupus erythematosus</td>
<td>Symptoms of multisystem involvement (e.g., rash, pleurisy) Photosensitivity</td>
<td>Often more joint tenderness than swelling</td>
<td>ANA test always positive Other antibodies, including ENA and DNA antibodies, commonly present Cytopenias may occur</td>
<td>Nonerosive</td>
</tr>
<tr>
<td>Maturity-onset seronegative synovitis</td>
<td>Pain swelling and stiffness in joints (often develops suddenly in patients over 60 years of age)</td>
<td>Wrists and shoulders are commonly affected</td>
<td>Rheumatoid factor and ANA tests are negative Marked increase in ESR</td>
<td>Behaves like polymyalgia rheumatica</td>
</tr>
<tr>
<td>Polyarticular gout</td>
<td>History of episodic monoarthritis for years before polyarticular disease</td>
<td>Any joint can be affected Tophi are usually present</td>
<td>Marked increase in serum uric acid; urate crystals in joint fluid</td>
<td>Patients are often on diuretics, drink alcohol to excess and have family history of the disease Prevalence higher in men</td>
</tr>
<tr>
<td>Osteoarthritis with inflammation</td>
<td>Pain and tenderness in DIP, PIP and CMC, as well as weight-bearing joints</td>
<td>Affected joints may be tender and swollen Heberden and Bouchard’s nodes palpable</td>
<td>Laboratory tests not helpful Radiographs show osteoarthritis</td>
<td>Often symmetric Patients are often on diuretics, drink alcohol to excess and have family history of the disease Prevalence higher in men</td>
</tr>
</tbody>
</table>

Note: MCP = metacarpophalangeal, MTP = metatarsophalangeal, DIP = distal interphalangeal, ANA = antinuclear antibodies, ENA = extractable nuclear antigens, ESR = erythrocyte sedimentation rate, PIP = proximal interphalangeal, CMC = carpometacarpal.
Septic Arthritis

Risk factors
- STI (50% of sexually active cases of SA are due to Gonococcal infections)
- Diabetes, CKD, cancer, immunosuppressive therapy, prosthetic joint

Complications
- Osteomyelitis (30%), permanent joint damage, sepsis
Septic Arthritis Part 1

Etiologies

• Bacterial: Gonococci, Staph aureus, Streptococcus, GNB, Borrelia burgdorferi (Lyme)
• Viral: HIV, HBV, parvovirus, enterovirus
• Fungal
• TB
Septic Arthritis Part 2

History
- Pain and decreased ROM of joint
- Fever, trauma, recent infections, cervical/urethral discharge, sexual encounters, PMHx
- Shoulder, hip, knee, ankle

Physical
- Vitals (fever)
- Joint tenderness, swelling, decreased ROM
- Urethral discharge, penile ulcers, pelvic exam
Septic Arthritis images
Septic Arthritis Part 3

Diagnosis

• Blood work: CBC and diff, ESR, CRP
• Joint aspiration: 3Cs
  – Cell count with diff (WBCs and PMNs)
  – Culture and Gram stain
  – Crystals
• Imaging
• G&C testing: Swab or urine
• Blood culture
Septic Arthritis Part 4

Management

• Symptom control: NSAIDs/opioids
• IV antibiotic
• Therapeutic arthrocentesis
• Arthroscopic or surgical drainage
  – If joint inaccessible to needle drainage
  – Organism resistant to abx
  – No improvement in 3-4 days
Gout

Pathophysiology

• Decreased urate excretion (90%) – renal disease, drugs (ETOH, thiazides, loop diuretics, ASA, etc.)
• Increased urate production (10%) – metabolic syndrome
• Precipitants: dehydration, binge eating/drinking, fasting, surgery, exercise, trauma

• Uric acid crystals deposit in joint, skin and kidneys → arthritis, tophi, renal failure
Gout Part 1

History
• Risk factors/precipitants, fevers
• Very tender (can’t put blanket over it)

Physical
• Arthritis: Podagra (inflammation of 1st MTP joint), ankles, heels, knees, fingers, wrists and elbows
• Tophi
Gout images
Gout Part 2

Diagnosis

• Blood work: CBC and diff, uric acid, ESR, CRP, BUN, Cr

• Joint aspiration: 3Cs
  – Cell count with diff (WBCs and PMNs)
  – Culture and Gram stain
  – Crystals

• Imaging

• G&C testing: Swab or urine

• Blood culture
Gout Part 3

Crystal

- Gout: monosodium urate crystals (needle shaped, negative birefringence)
- Pseudogout: calcium pyrophosphate deposition diserase (rhomboid, positive birefringence)
Gout Part 4

Acute Management

- NSAIDs: Naproxen/Celecoxib x 10 days
- Prednisone x 6 days (only if joint sepsis excluded)
- Intra-articular steroids
- Colchicine
Gout Part 5

Long Term Management

• Purine-restricted diet: less red meats and seafood

• Allopurinol
  – Must start NSAIDs or colchicine prior to allopurinol to prevent flare

• Colchicine x 6 months
## Low Back Pain (LBP)

<table>
<thead>
<tr>
<th>Category</th>
<th>Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idiopathic (70%)</td>
<td>Lumbar sprain/strain</td>
</tr>
<tr>
<td>Mechanical (27%)</td>
<td>Fracture (osteoporotic/traumatic), facet arthritis, degenerative discs,</td>
</tr>
<tr>
<td></td>
<td>herniated disc, spinal stenosis</td>
</tr>
<tr>
<td>Referred (2%)</td>
<td>Aortic aneurysm, GI, GU, PELVIC</td>
</tr>
<tr>
<td>Non-mechanical (1%)</td>
<td>Neoplasia: multiple myeloma, metastasis, spinal cord tumors, etc.</td>
</tr>
<tr>
<td></td>
<td>Inflammatory arthritis: ankylosing spondylitis, psoriatic spondylitis</td>
</tr>
<tr>
<td></td>
<td>Infection: osteomyelitis, septic diskitis, shingles, etc.</td>
</tr>
</tbody>
</table>

Can still use VINDICATE!
Low Back Pain (LBP) Part 1

History
- LOPQRST
- Vascular: AA risk factors
- Infection: fevers/chills, IDU, STIs
- Neoplastic: history of cancer, weight loss, pain >1 month, failure to improve
- Degenerative: older age, family history, previous imaging, smoking, steroid
- Autoimmune: younger age, insidious onset, >3 months, ++ AM stiffness, worse with rest, SI joint involvement, IBD presentation
- Trauma
- GI/GU/pelvis

- Rule out cauda equina: neurological changes in the lower limbs (sensory/motor/reflex/gait), saddle anesthesia, bladder retention, stool incontinence
Low Back Pain (LBP) Part 2

Physical
- Vitals
- Abdo exam
- MSK
  - Inspection, palpation, ROM
  - Straight leg raise
  - Schober
  - Faber
- Neurological: inspection, tone, power, sensation, reflexes, gait, DRE
Red flags indicating serious causes of chronic low back pain and evaluation strategies

<table>
<thead>
<tr>
<th>Finding</th>
<th>Diagnosis of concern</th>
<th>Evaluation strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cauda equina syndrome</td>
<td>Fracture</td>
</tr>
<tr>
<td>Age older than 50 years</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Fever; chills; recent urinary tract or skin infection; penetrating wound near spine</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Significant trauma</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Unrelenting night pain or pain at rest</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Progressive motor or sensory deficit</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Saddle anesthesia; bilateral sciatica or leg weakness; difficulty urinating; fecal incontinence</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Unexplained weight loss</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>History of cancer or strong suspicion for current cancer</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>History of osteoporosis</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Immunosuppression</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Chronic oral steroid use</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Intravenous drug use</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Substance abuse</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Failure to improve after six weeks of conservative therapy</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Note:** Red flags indicate the possibility of a serious underlying condition.

1 = first-line evaluation in most situations; 2 = follow-up evaluation; CBC = complete blood count; CRP = C-reactive protein; E = emergent evaluation required; ESR = erythrocyte sedimentation rate; MRI = magnetic resonance imaging.
Low Back Pain (LBP) Part 3

Management

• Set expectations
• Symptom management
• Exercise
• Surgery
  – Most patients will not benefit from surgery
  – Consider if significant functional disability and unremitting pain (> 1 year)
• Referral
Spinal Cord Compression

- Urgent MRI
- Pain management (usually needing narcotics)
- Immediate IV high dose dexamethasone
- Definitive treatment: surgery, external beam RT, and stereotactic body radiotherapy (SBRT)
Medications

• Acetaminophen
  – Contraindications: severe/active liver disease
  – Side effects: skin rash, nephrotoxicity (chronic overdose)

• NSAIDs
  – Contraindication: pre-CABG procedure
  – Use with caution: CAD/CVD, CHF, HTN, GI bleeding/ulcers, bleeding concerns, renal failure, liver disease, elderly patients
  – Side effects: GI upset, bleeding, dizziness
Medications Part 1

• Narcotics
  – Contraindications: severe respiratory depression, acute or severe asthma (in an unmonitored setting or without resuscitative equipment); known or suspected paralytic ileus
  – Use with caution: history of abuse, hepatic impairment, renal impairment, seizure disorder
  – Side effects: constipation, GI upset, urinary retention, decreased LOC, respiratory depression, bradycardia/hypotension
Medications Part 2

• Steroids
  – Contraindications: systemic fungal infection, cerebral malaria, chicken pox
  – Use with caution: TB, CHF/MI, DM, GI diseases, hepatic impairment, renal impairment, osteoporosis, elderly/pediatric, ocular disease
  – Side effects: adrenal suppression, acne, appetite stimulation, immunosuppression, psychiatric disturbances, cardiac
Medications Part 3

• Colchicine
  – Contraindications: serious GI, hepatic, renal, and cardiac disease; children
  – Side effects: GI upset, fatigue, headache

• Allopurinol
  – Contraindications: hepatic impairment
  – Use with caution: renal impairment
  – Side effects: GI upset, skin rash, gout