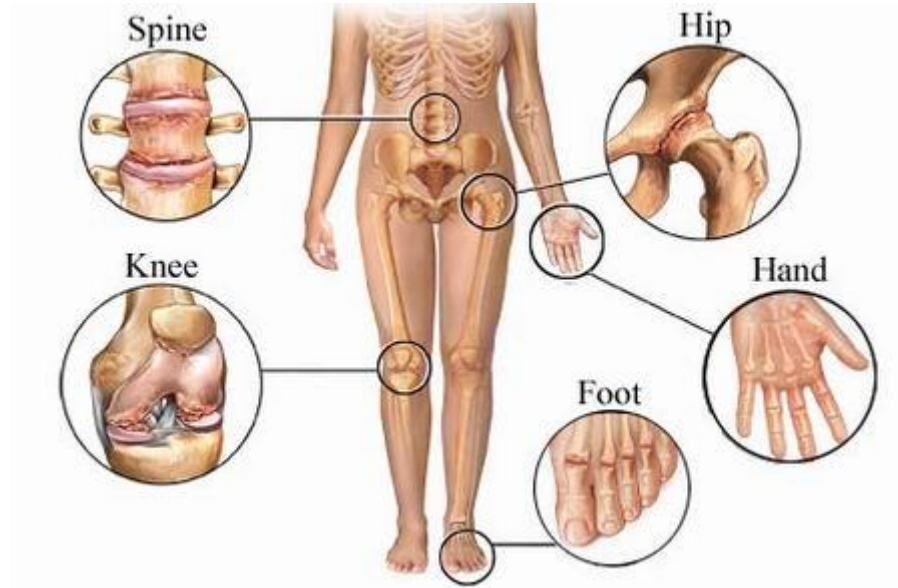


# Diseases of the Joint



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# Learning Objectives

## ARTHRITIS (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

Vascular

Infectious

Neoplastic

Degenerative

Iatrogenic

Congenital

Autoimmune

Trauma

Endocrine

*OTHER*

*PEDIATRIC*

Hemarthrosis

Septic Arthritis, Osteomyelitis

Metastasis, Chondrosarcoma

Osteoarthritis, Crystals

**RA, SLE, Psoriatic Arthritis, Ankylosing Spondylitis, Reactive Arthritis**

*Tendonitis, Bursitis, Ligament Tear, Meniscus*

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

**\*POLYARTHRITIS IS RED**

# Commons symptoms and diseases

Symptom ↓	OA	RA	Gout	Septic
Heat		✓	✓	✓
Redness		✓	✓	✓
Swelling	✓	✓	✓	✓
Symmetry		✓		
Fever				✓
Malaise		✓		
Stiffness	✓	✓		

# 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

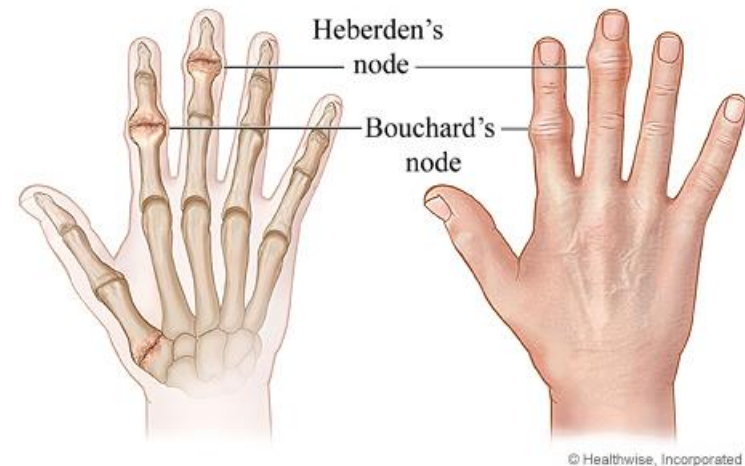
# Osteoarthritis (OA) Part 1

## History

- Gradual, pain worse with activity/better with rest
- Risk factors
- DIP, PIP, 1<sup>st</sup> 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 → 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

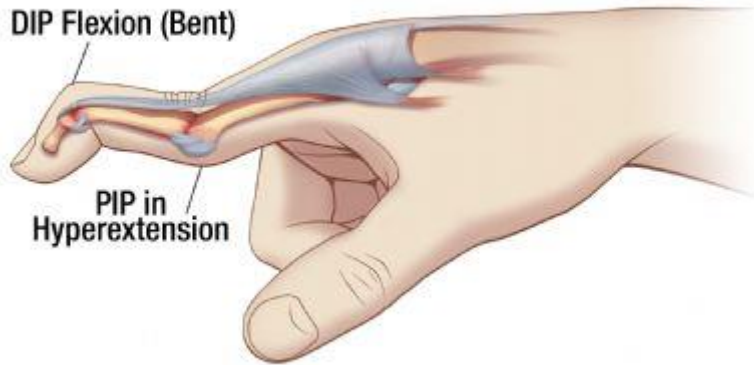
- Warm, red, swollen and symmetrically involved joints
- Hands: PIP, MCP, wrists; boutonniere, swan neck deformities; ulnar deviation
- Arms: shoulders, elbows, acromioclavicular
- Legs: knees, ankles > hips
- Feet: MTP joint

# Rheumatoid Arthritis (RA) Part 3

Swan Neck Deformity

DIP Flexion (Bent)

PIP in  
Hyperextension

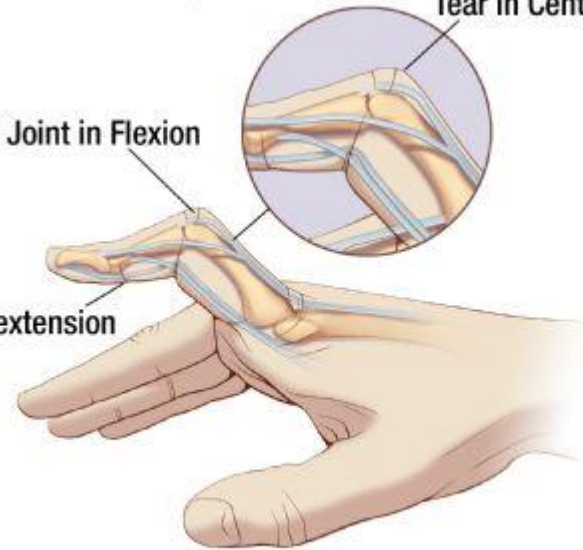


Boutonniere Deformity

PIP Joint in Flexion

DIP in  
Hyperextension

Tear in Central Slip



# Rheumatoid Arthritis (RA) Part 4



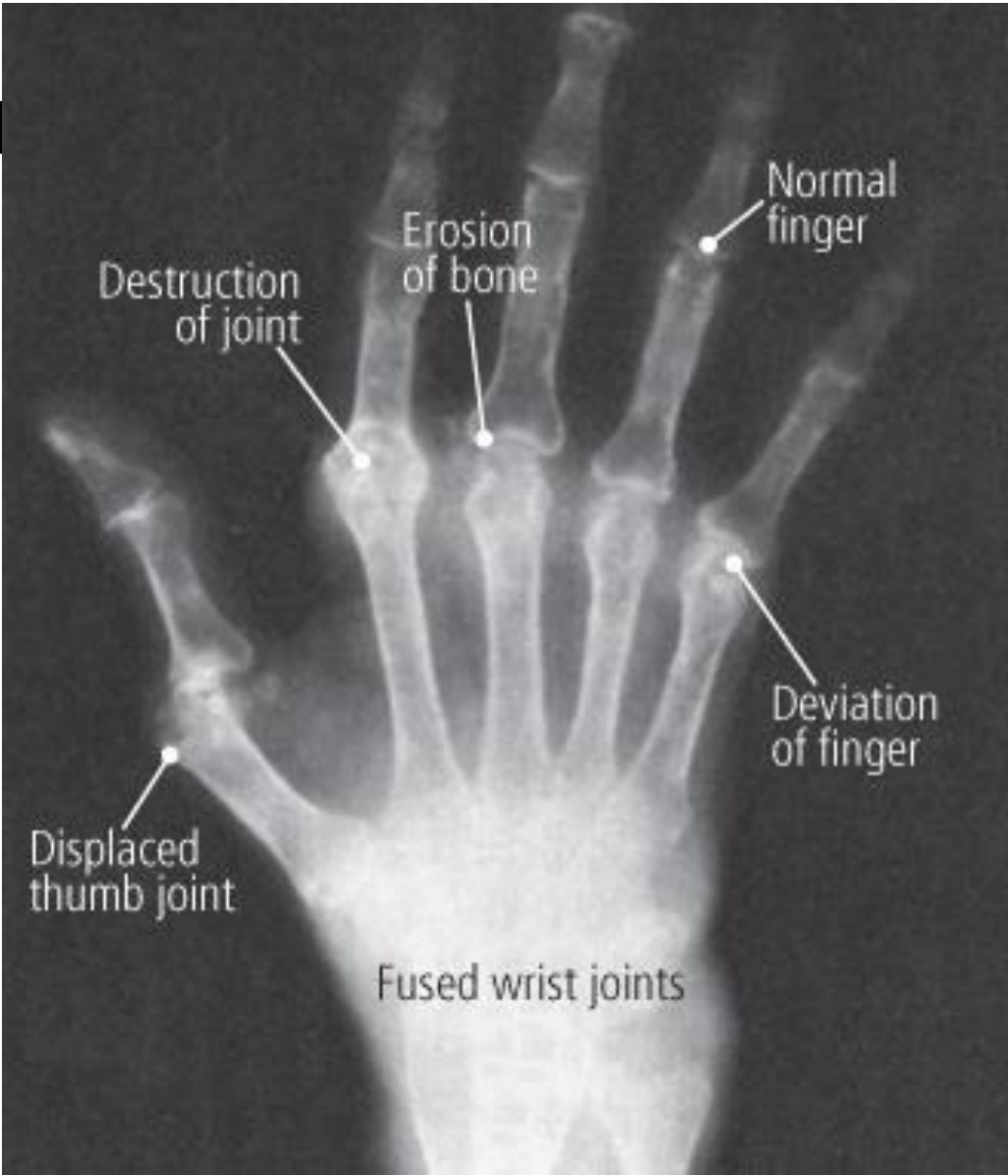
# Rheumatoid Arthritis (RA) Part 5

## Diagnosis

- Bloodwork: CBC and diff, ESR, CRP, RF, ANA
- Imaging
  - Soft tissue swelling, narrowing of joint space, bony erosions, subluxation, joint destruction

Rheu

e hand



# American College of Rheumatology Revised Criteria for Diagnosis of Rheumatoid Arthritis

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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 X6 weeks
2. Arthritis of three or more joint areas X6 weeks
3. Arthritis of hand joints X6 weeks
4. Symmetric arthritis X6 weeks
5. Rheumatoid nodules
6. Serum rheumatoid factor
7. Radiographic changes

Source: Callegari PE, Williams WV. Laboratory tests for rheumatic diseases. When are they useful? *Postgrad Med* 1995 Apr;97(4):65-68, 71-74.

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# Rheumatoid Arthritis (RA) Part 6

## Management

- Symptom control: NSAIDs/Tylenol, intra-articular steroids, PT
- DMARDs: hydroxychloroquine, gold, methotrexate, sulfasalazine, TNFa inhibitors, B-cell inhibitor, etc.
- Low dose prednisone + bisphosphonate
- Surgical intervention

# Rheumatoid Arthritis (RA) Part 7

- 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

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

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 1<sup>st</sup> MTP joint), ankles, heels, knees, fingers, wrists and elbows
- Tophi

# Gout images



# Gout Part 2

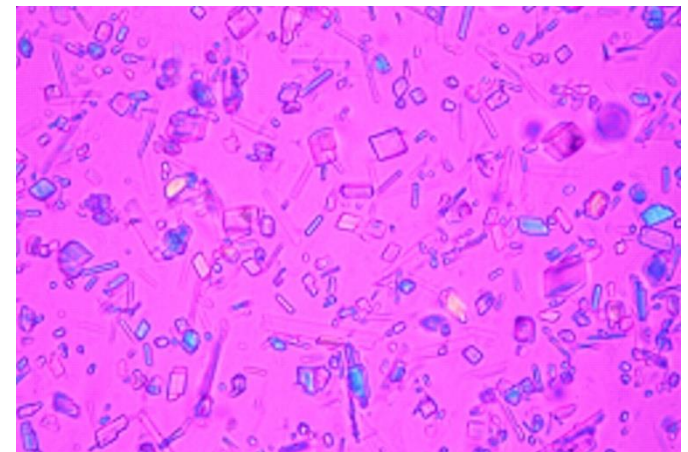
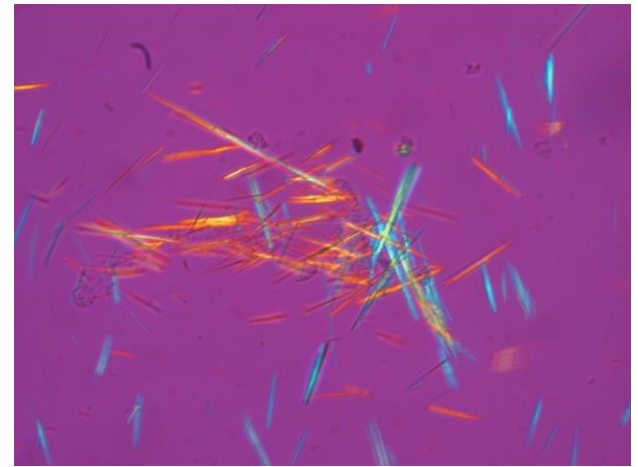
## Diagnosis

- 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 disease (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)

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

Can still use VINDICATE!

# Low Back Pain (LBP) Part 1

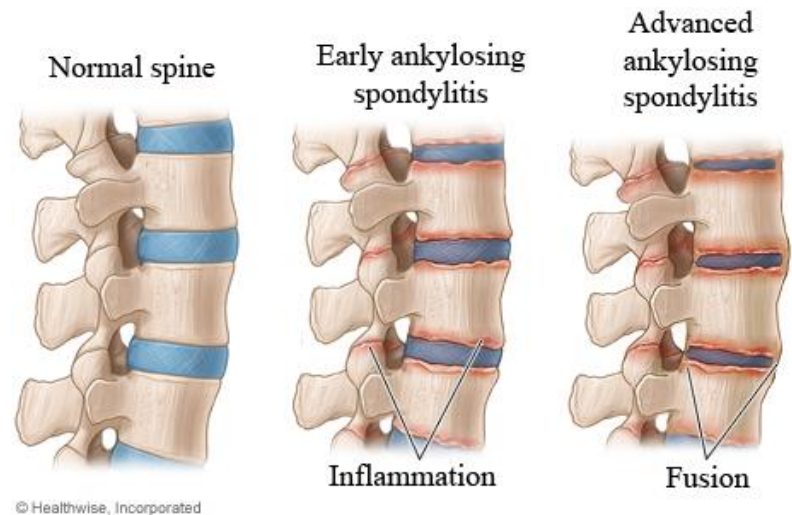
## History

- 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

Finding	Diagnosis of concern				Evaluation strategy		
	Cauda equina syndrome	Fracture	Cancer	Infection	CBC/ESR/CRP level	Plain radiography	MRI
Age older than 50 years		X	X		1*	1	2
Fever; chills; recent urinary tract or skin infection; penetrating wound near spine				X	1	1	1
Significant trauma		X				1	2
Unrelenting night pain or pain at rest			X	X	1*	1	2
Progressive motor or sensory deficit	X		X				1E
Saddle anesthesia; bilateral sciatica or leg weakness; difficulty urinating; fecal incontinence	X						1E
Unexplained weight loss			X		1*	1	2
History of cancer or strong suspicion for current cancer			X		1*	1	2
History of osteoporosis		X				1	2
Immunosuppression				X	1	1	2
Chronic oral steroid use		X		X	1	1	2
Intravenous drug use		X		X	1	1	2
Substance abuse		X		X	1	1	2
Failure to improve after six weeks of conservative therapy			X	X	1*	1	2 (or unnecessary)

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