Relevant anatomy

Synovium
- Defense
- Nourish
- Lubricate

Subchondral bone
- Pain sensitive

Hyaline cartilage
- Avascular
- Aneural
- Once for all!
Definition

• Inflammation of a joint due to a pus forming micro-organism
Incidence

- Usually children; 50% < age 3
- M=F
- Any joint
- **Knee is most common joint affected overall**
- Infants
  - Hip
- Children
  - Knee
- Adults
  - Large Joints
- IVDU
  - SCJ & SIJ
Routes of spread

• Haematogenous: 80%
• Direct:
  1. Extension of osteomyelitis
  2. Intracapsular metaphysisis with OM
• Local penetrating injuries
1 - The hematogenous route.
2 - Dissemination from osteomyelitis.
3 - Spread from an adjacent soft tissue infection.
4 - Diagnostic or therapeutic measures.
5 - Penetrating damage by puncture or trauma.
At risk

- Young children
- Elderly
- Immunocompromised/suppressed
- Diabetics
- With malignancy
- IV drug abusers
- Rheumatoid arthritis
Causative microbes
Causative microbes

- Staph. aureus
- Streptococcus
- Pneumococcus
- Gonococcus
- H. influenzae
- E. coli
Causative microbes

• Fungi - Histoplasma, coccidiomyces

• Viruses:
  1. Hepatitis A, B, C
  2. HIV
  3. Adeno, coxsakie
Causative microbes

• Staph. aureus
• H. Influenzae
• Gonococcus: sexually active young adult
• E. coli: neonate
• Pseudomonas: Elderly, IV drug abusers
• Salmonella: Sickle cell anaemia
• Staph epidermidis: prosthetic joint
Pattern of joint involvement

• Monoarticular: Staph
• Sternoclavicular, SI joint: Strepto
• Polyarticular: Gonococcal, Lyme, viral
Pathogenesis

1. Stage of synovitis
2. Stage of arthritis
3. Stage of ankylosis & deformity
Pathogenesis

1. Stage of synovitis

Microbes attacked by synovial macrophages

Inflammation of synovium

Synovial hypertrophy, effusion: serous
Bacteria multiplies, causes infection

Destroys synovium

Fluid becomes serofibrinous and later purulent

Pannus

(layer of inflammatory granulation tissue which grows over cartilage)
Pathogenesis

2. Stage of arthritis

Enzymes released due to cell death & inflammation
- Lysosomal enzymes
- Collagenases
- Metalloproteinases

Less movement of joint

Pannus chokes the cartilage

Directly damage the cartilage

Less nutrition of cartilage

Cartilage fragmentation & destruction

Pus cannot nourish

Arthritis
Pathogenesis

• Pannus – chokes
• Enzymes - destroys
• Pus - cant nourish
End result is..

• Destruction of cartilage
Pathogenesis

3. Stage of deformity & ankylosis

- Cartilage destroyed
- Subchondral bone exposed on both sides
- Two bare bone ends facing each other
- Bony bridge forms between them
- Bony ankylosis
Clinical features

Infants:

• H/o prior infection:
• Refusal to feed, irritable
• Failure to thrive
• High/no fever/hypothermia
• Joint swelling, decreased active and passive ROM
• Deformity at joint
Clinical features

Children:

• Fever, chills, rigors
• Toxemia
• Tachycardia, tachypnea
• Febrile convulsions
• Severe pain, swelling of joint
• Deformity with joint assuming position of ease
• Pseudoparalysis with extremely painful ROM
Clinical features

Adults:

• Preexisting arthritis, RA, trauma
• Fever, Tachycardia
• Severe pain, swelling of joint
• Deformity with joint assuming position of ease
• Extremely painful ROM
• Muscle spasm
Investigations

1. CBP:
   • Leucocytosis: increased neutrophils
   • Raised ESR
   • Raised CRP

2. Blood culture: positive only in 60-70%
Investigations

3. Joint aspiration - reveals pus
- opaque/purulent
- Gram stain, C/S
- WBC > 50,000/mm³, >75% neutrophils
- Low glucose
- High protein
Investigations

4. X-ray:
   In early stages
   - increased capsular shadow
   - increased joint space
   - osteolytic lesions

Later
- Decreased joint space, osteopenia
- Deformity, ankylosis
4. X-ray.....
   In later stages
   - Decreased joint space
   - Localized osteoporosis
   - Margins irregular
   - Joint subluxation / dislocation
   - Ankylosis
Other investigations

• MRI
• USG
• Tc$^{99}$ Bone scan especially helpful in differentiating with OM
Treatment

*No medical management alone*

1. **General:** Analgesics
   Antipyretics
   I.V. fluids for hydration
   Correct anaemia if any
   Treat primary focus if..
Treatment

2. **Antibiotics**: broad spectrum
   Cloxacillin + gentamycin + metronidazole
   later switch over according to C/S

3. **Splint the limb**
   - rest
   - decreases muscle spasm
   - prevents deformity
4. Surgical:

Open Arthrotomy/ Arthroscopic debridement

- Drain the pus
- Irrigate the joint with NS
- Remove pannus
- Synovectomy
Differential diagnosis

- Acute osteomyelitis: less decrease ROM
- Cellulitis: ROM fine
- JRA; indolent course
- Hemophilia: past history, no fever
- Traumatic: H/O trauma
- Perthes:
- Transient synovitis:
Complication

• **Acute**
  1. Septicemia
  2. Acute osteomyelitis
  3. Pathological dislocation / subluxation

• **Chronic**
  1. Bony ankylosis
  2. Secondary OA
  3. Deformity
  4. Limb length discrepancy usually shortening
Tom smith arthritis

• Def: Septic arthritis of hip in infancy when the age is less than 9 months

• Pathology: Head of femur ossifies at 9 months

  If arthritis < 9 months

    Cartilage totally destroys

    Femur head never forms