Septic Arthritis

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Outline:

- Definition
- Epidemiology
- Risk factors
- Routes of microorganism transmission
- Pathophysiology
- Microbiology (Bacterial)
- Clinical Presentation
- Diagnosis and evaluation
- Management
- Complications

Definition

- Infections of the joints:
  - Known as septic arthritis, pyogenic arthritis, suppurative arthritis, purulent arthritis, or pyarthrosis
  - Caused by bacteria, fungi, mycobacteria, and viruses.
- “Septic Arthritis” usually refers to bacterial arthritis.

Epidemiology

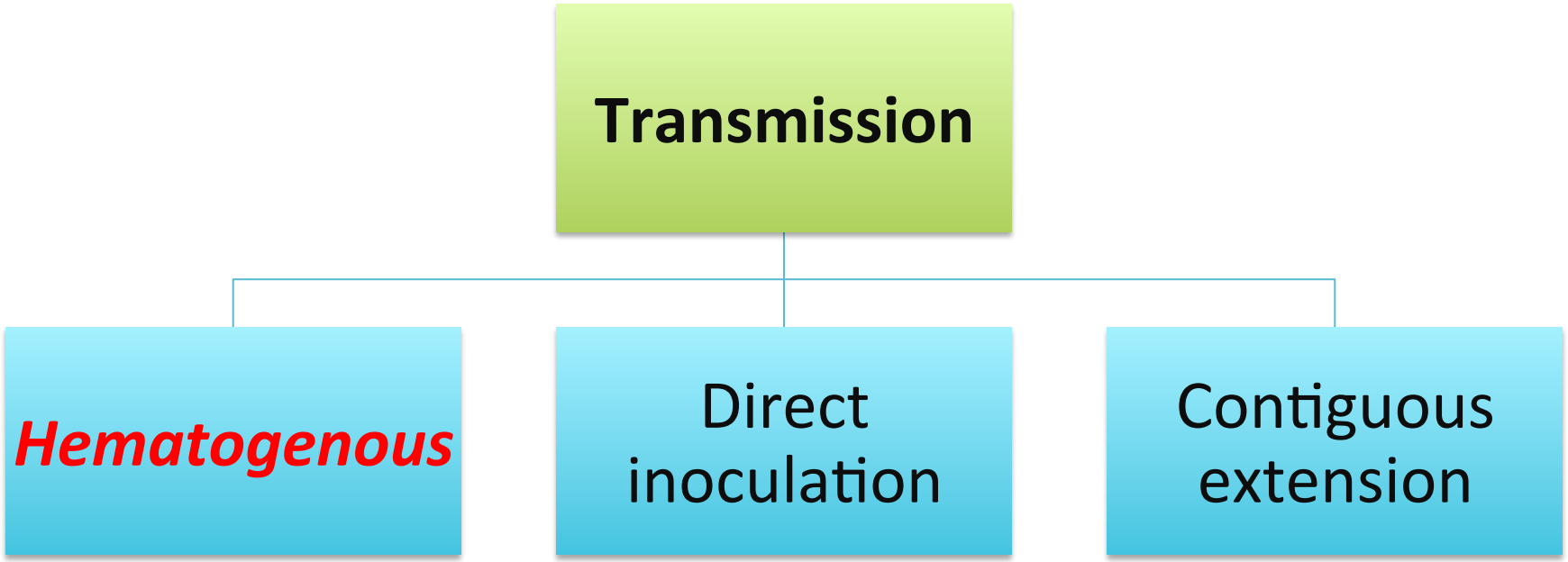
- Childhood > adulthood.
- Particularly in children <3 Y/O.
- M:F = 2:1
- Hip and knee joints are the most commonly involved joints.

Risk Factors

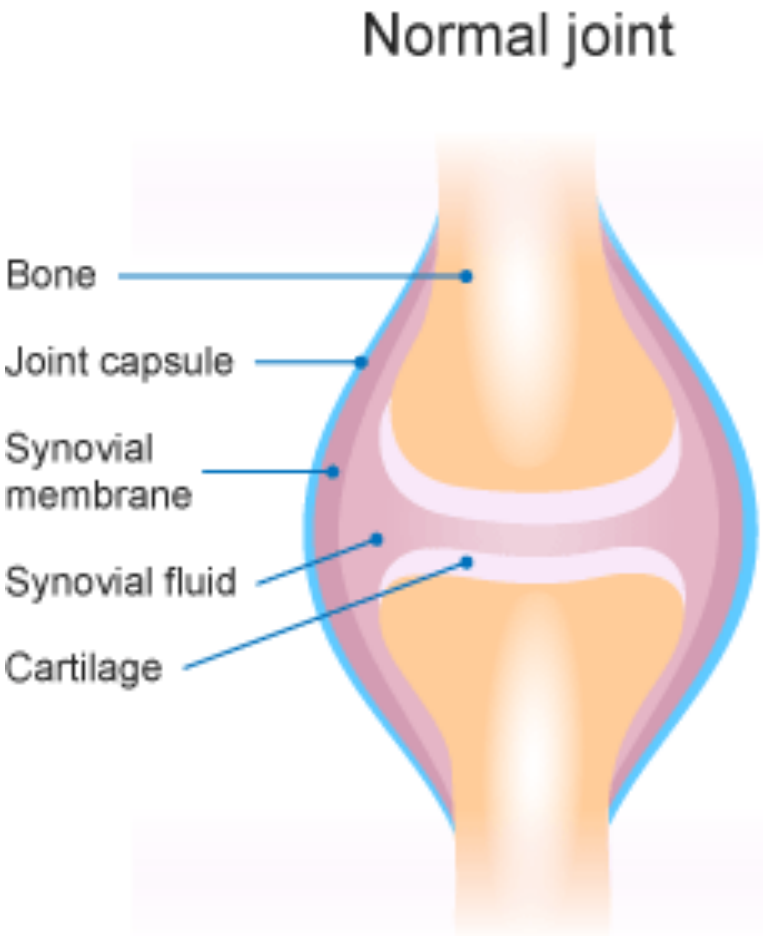
- **Neonates:**
  - Umbilical vessel catheterization
  - Central line
  - Femoral vessel blood sampling
  - Osteomyelitis
- **Older children:**
  - Immunodeficiency
  - Joint surgery
  - Hemoglobnopathy
  - Underlying arthritis
  - Diabetes
  - juvenile idiopathic arthritis
- **Adults:**
  - DJD
  - RA
  - Prosthetic joints
  - IV Drug abuse

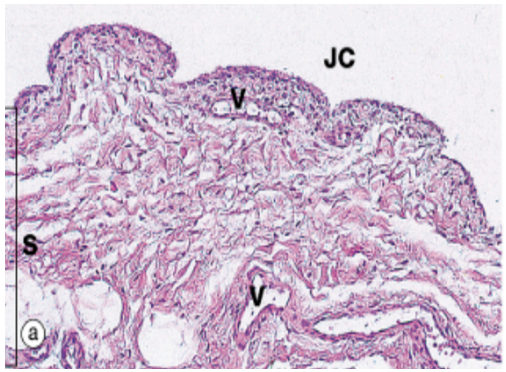
Most older infants and children who develop bacterial arthritis are without chronic medical problems!

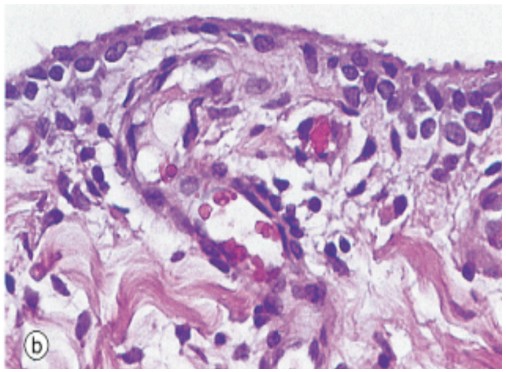
Routes of Transmission



Pathophysiology

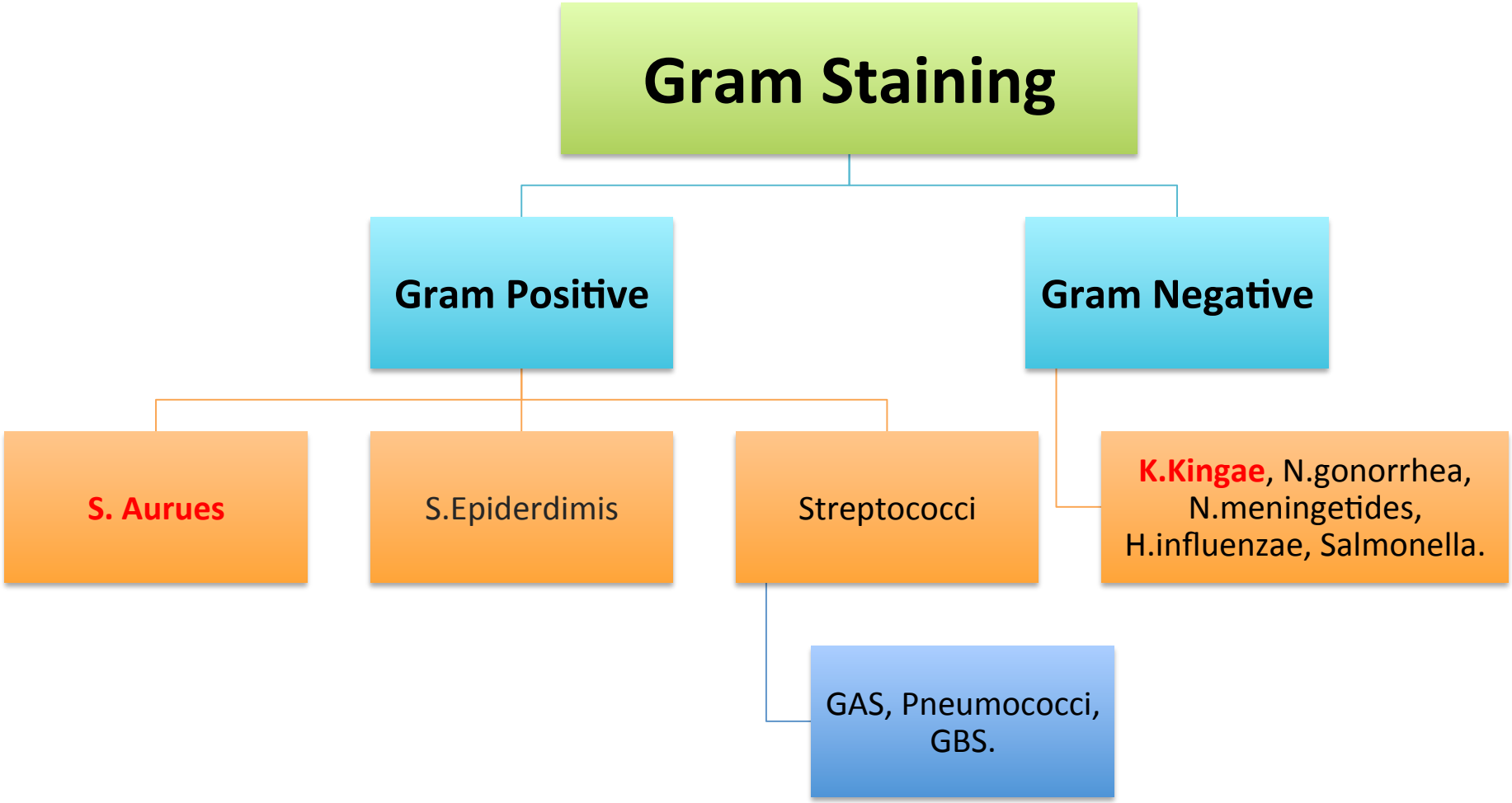




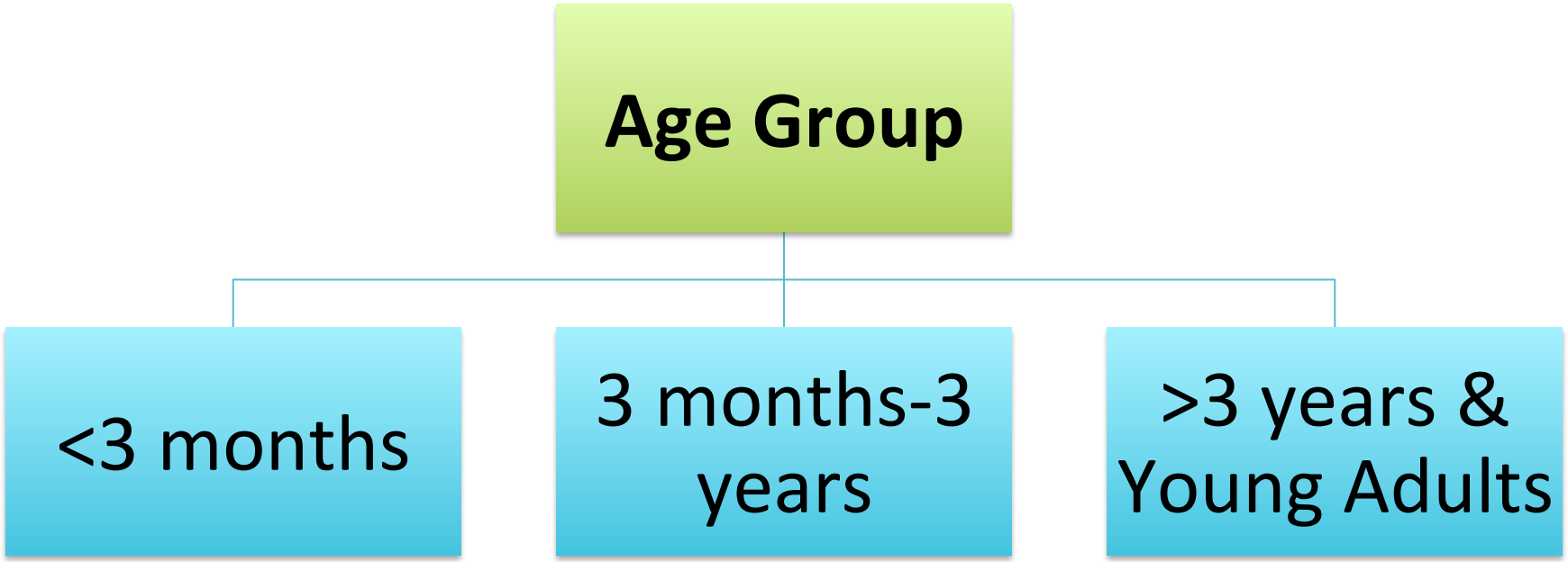


http://www.aihw.gov.au/osteoarthritis/what-is-osteoarthritis/

Microbiology (Bacterial)



Microbiology (Bacterial)



The most common organism for recently placed artificial joints is **Staphylococcus epidermidis.**

Microbiology (Bacterial)

Age group	Bacterial organisms
<3 months	• ***Staphylococcus aureus (MSSA and MRSA)*** • Group B Streptococcus (Streptococcus agalactiae) • Gram negative bacilli (K.kingae) • Neisseria gonorrhoeae
3 months-3 years	• ***S. aureus (MSSA and MRSA)*** • Kingella kingae • Group A Streptococcus (S. pyogenes) • Streptococcus pneumoniae • Haemophilus influenzae type b (Hib)
> 3 years	• ***S. aureus (MSSA and MRSA)*** • Group A Streptococcus • S. pneumoniae • N. gonorrhoeae (in sexually active adolescents)

Clinical Presentation

- Acute onset (two to five days) of fever and chills:
  - Bacteremia
- Joint pain, swelling, and limited range of motion.

Always Serious!

Clinical Presentation

- Neonates:
  - Subtle non specific symptoms
  - Septicemia (poor feeding, irritability, discomforts etc)
  - More than one joint
  - Hip arthritis
- Older children and Adults:
  - Fever and constitutional symptoms (malaise, poor appetite, irritability, tachycardia).
  - Mimicking other pathologies.

Diagnosis & Evaluation

- History:

Clinical feature	Significance
Pain progression	Constant pain in septic arthritis
Joint trauma	Possible direct inoculation organisms
Rash	Associated with N.gonorrhea and N.meningitides
Skin and soft tissue infections	Possible entry of S.aureus and GAS bacteremia.
Recent or concurrent illness	Recent URTIs, GI and genitourinary infections.
Onset of most recent menses (for postpubertal females)	Disseminated gonococcal infection usually occurs in the first seven days of the menstrual cycle
Exposure and travel history	TB, and other organisms
Immunization status	Hib vaccine and PCV vaccines
Family history of rheumatologic disease or inflammatory bowel disease	Other DDx.

Diagnosis & Evaluation

- Physical Examination:
  - Inspection and general observation
  - Skin examination:
    - *N. gonorrhoeae* (picture 2) or *N. meningitidis*
  - Eye examination
  - Liver examination
  - Musculoskeletal examination
    - All bones should be palpated and all joints moved
    - The involved joint is typically swollen, red, warm, and tender to palpation
    - Asymmetric buttock creases or swelling of a buttock or the genitalia
    - Active and passive range of motion usually are decreased

Skin Lesions in Disseminated Gonococcal Infection

Acute Meningococcemia Skin Lesion

Bacterial Septic Arthritis

Joint Effusion

https://en.wikipedia.org/wiki/Joint_effusion

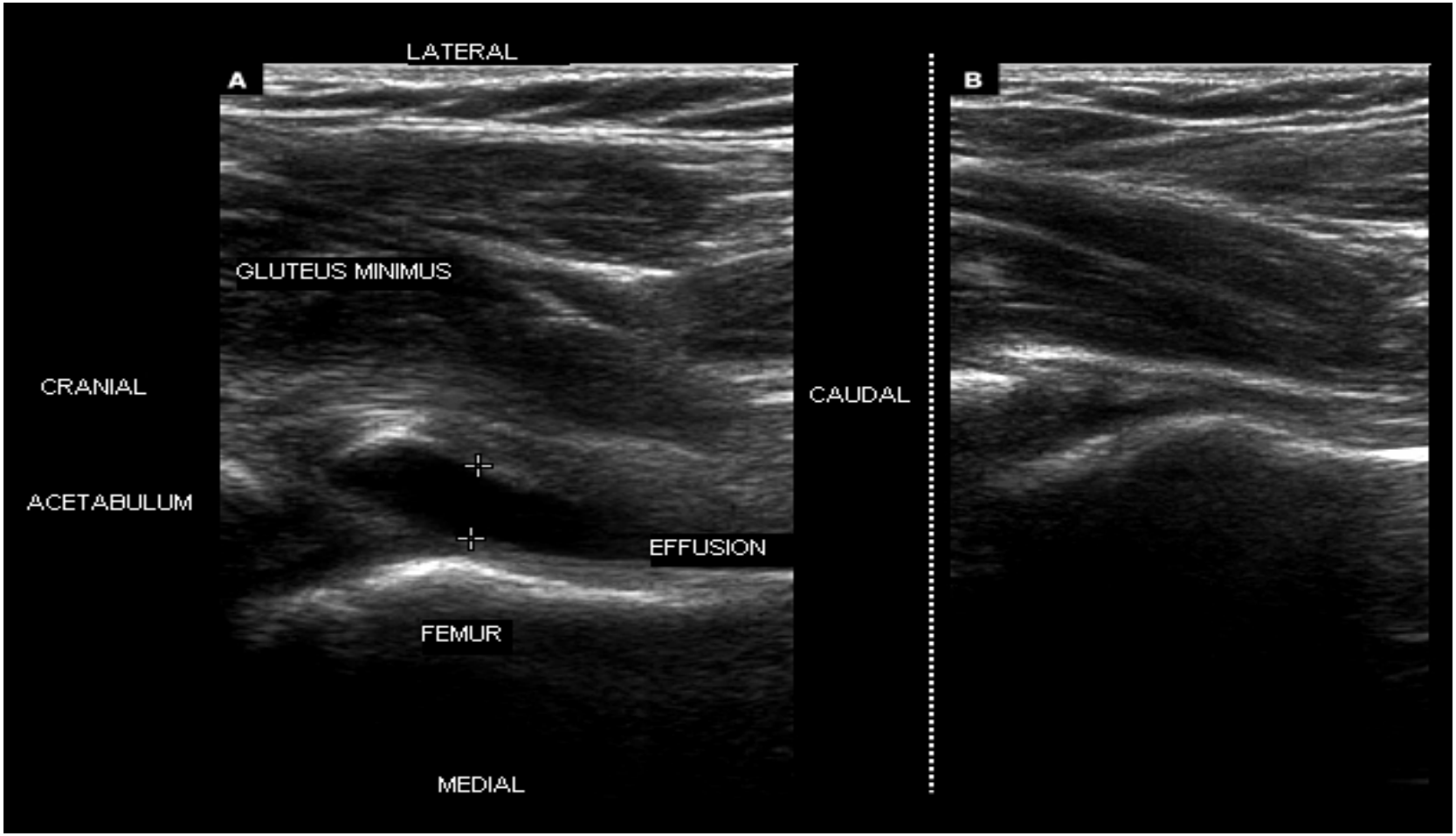
Diagnosis

- Investigations:
  - Blood tests:
    - CBC
    - ESR and C-reactive protein
    - Blood cultures
  - Synovial fluid (Gold Standard!):
    - cell count, Gram stain, culture (aerobic and anaerobic), and susceptibility testing.
    - PCR testing of synovial fluid for *K. kingae.*
    - Culture for unusual pathogens: TB, *Pasteurella*, sporotrichosis, or brucellosis.

Diagnosis

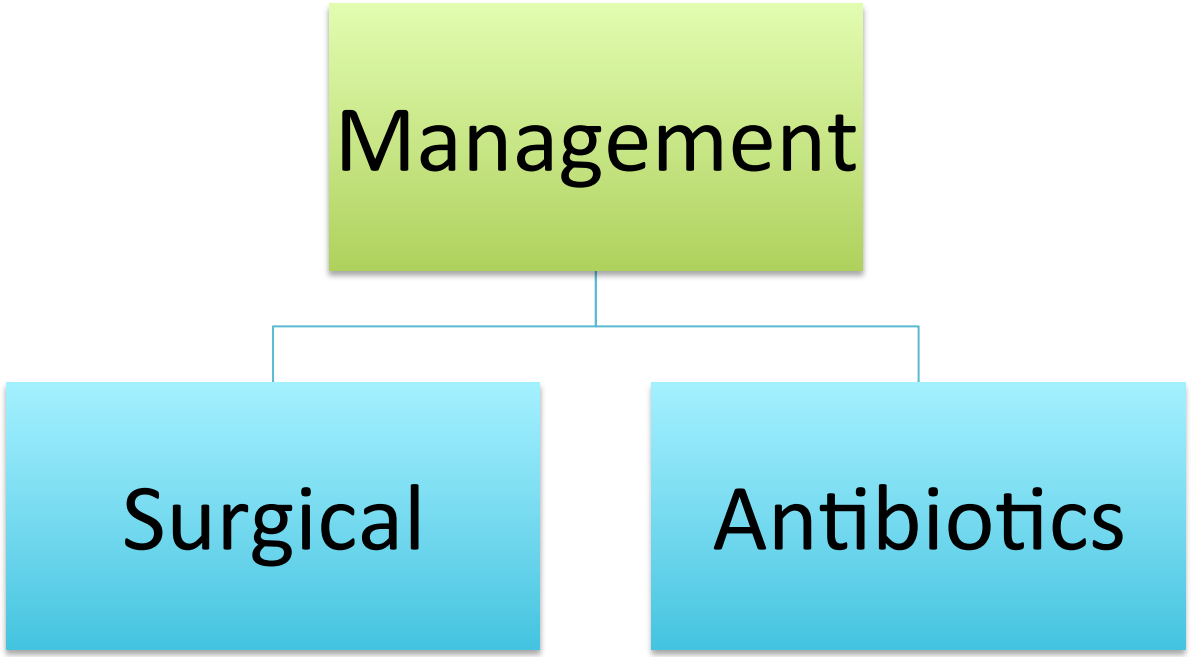
- Imaging:
  - Plain X-ray:
    - Identify fractures, foci of osteomyelitis, and other causes of osteoarticular pain and swelling.
  - Ultrasound and MRI:
    - More sensitive for joint effusion.
  - CT

http://www.reumatologiaclinica.org/en/tuberculous-arthritis-in-2-year-old-toddler/articulo/S2173574311000554/


LATERAL
A
B
GLUTEUS MINIMUS
CRANIAL
CAUDAL
ACETABULUM
EFFUSION
FEMUR
MEDIAL

Management

- The goals:
  - Sterilization and decompression.



Management:Antibiotics

- Empirical antibiotic therapy

Age group	Antibiotics	Notes
0-3 months	Nafcillin, or Amoxicillin + Gentamicin or Cefotaxime	Vancomycin should be instead of nafcillin or amoxicillin for neonates who have been in ICU >1 week.
>3 months- adults	Nafcillin Clindamycin or Vancomycin Cefazolin	_____

Ceftriaxone and vancomycin are the best initial empiric therapy.

Management: Antibiotics

- Specific antibiotic therapy:

Organism	Antibiotics
S.Aureus	MSSA: Nafcillin, or Amoxicillin. MRSA: Vancomycin or Clindamycin.
S.Epiderdimis	Antistaphylococcal (Nafcillin or Vancomycin)
GAS	Penicillin
GBS	Penicillin
S.Pneumoniae	Penicillin sensitive: penicillin Penicillin resistant: Ceftriaxone or Cefotaxime
K.Kingae	Ceftriaxone or Cefotaxime
H. Influenzae B	Ceftriaxone or Cefotaxime

Management: Surgical

- Arthrotomy
- Arthroscopy
- Needle Aspiration

Rx of infected prosthetic joints:
The first stage is to remove the joint, treat with antibiotics for 6 to 8 weeks, and then replace the joint.

Management: Other Aspects

- Pain and fever
- At home NSAIDs
- Dexamethasone (controversial)
- Physical therapy

Complications

- Joint laxity, subluxation, or dislocation
- Joint restriction
- Limb-length discrepancy
- Avascular necrosis
- Enlargement of the femoral head
- Pathologic fractures

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