ORTHOPEDIC INFECTIONS

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OSTEOMYELITIS

Definition:

This is inflammation of bone and bone marrow

Classification

Duration ⇒

- Acute
- Subacute
- Chronic

Route of infection

- Exogenous (2ry)
- Hematogenous (1ry)

Host response

- Pyogneic infection
- Non pyogenic (granulomatous as T.B.)

Acute hematogenous osteomyelitis







Pathology

Incidence Bacteria Source of infection Route of infection Predisposing factors Local changes Pathology according to age Course Complications

Incidence

Age ... More common < 2y and between 8-12 y
Site ... metaphyseal areas of long bones
Vascular arrangement
Attachment of ligaments and muscles
Fewer phagocytic activity

Bacteria

- Staph. aureus
- Strept. Pyogens
- Gram –ve … spondylitis
- Mixed flora ... exogneous
- Pseudomonas ... drug addicts
- Salmonella ... sickle cell anemia
- Hemophilus influenza ... child 6m 4y

 Source of infection Septic focus Route of infection – Hematogenous ⇒ bacteremia (bacteremia is a daily incident in childhood) Predisposing factors (localizing factor) - General factors Debilitation , malnutrition and inadequacy of immune system Localizing factor Trauma

Stages of disease

1-Inflammation: Initial inflammation with vascular congestion and increased intra-osseous pressure.

2-Suppuration: Pus within the bones forces its way through the Haversian system and forms a subperiosteal abscess in 2-3 days. **3-Sequestrum:** Vascular obstruction and infective thrombus decrease or obstruct the periosteal and endosteal blood supply, causing **bone necrosis** and sequestrum formation in approximately 7 days.

4-Involucrum: This is new bone formation from the stripped surface of periosteum.

5-Resolution or progression to complications: With antibiotics and surgical treatment early in the course of disease, osteomyelitis resolves without any complications. Local changes
 – Suppuration
 – Sequestration
 – Involucrum formation



 Course - Resolution Chronicity Complications - Chronicity – Septic arthritis – Pathological fracture – Pyemia

Diagnosis

Clinical picture

- Systemic signs ⇒ constitutional
- Localized pain, tenderness and swelling

Investigations

- ESR, WBC, CRP
- Blood culture +ve in 50%
- Bone aspiration

Radiological

- X-ray Usually normal till 2 3 weeks
- Technetium 99 bone scan
- MRI







Treatment

 General - Antibiotic (empirical) General supportive measures (fluids) Loca – Splint - Aspiration \Rightarrow Pus ... drainage and drilling • No pus ... conservative for 48 hours then reevaluate - Clinical improvement \Rightarrow continue antibiotic for 6 weeks - No clinical improvement \Rightarrow surgical drainage and drilling

Subacute osteomyelitis



Chronic osteomyelitis

Predisposing factors for chronicity

Cavity
Sequestrum
Bacteria
Sinus



Classification

- Anatomic types
 - Medullary
 - Superficial
 - Localized
 - Diffuse
 - Physiologic class (Host)
 - Type A ... normal
 - Type B ... compromised (local or systemic factors that compromise immunity or healing)
 - Type C ... prohibitive (poor prognosis for cure)



Diagnosis

Clinical

- History of acute osteomyelitis
- The bone is thickened and tender
- Sinus
- Lab
 - ESR & CRP
 - Imaging
 - X-ray
 - Cortical destruction with periosteal new bone formation
 - bone is thickened, with patchy irregular sclerosis surrounding cavity or cavities.
 - A sequestrum show a dense loose fragment with irregular but sharply demarcated edges lying within a cavity in the bone
 - Sinograms
 - C.T.
 - Defines cortical bone destruction, identify sequestra
 - MRI

Bone biopsy ... histological and microbiological evaluation









Complications

Pathological fractures
Amyloidosis
Squamous cell carcinoma in the sinus track
Irregular growth





Brodie's abscess

 localized form of subacute osteomyelitis that occurs most often in the long bones of the lower extremities of young adults.

Treatment ...
 – open biopsy and curettage

Sclerosing osteomyelitis of Garré

 bone is thickened and distended but abscesses and sequestra are absent

low-grade anaerobic bacteria.

Treatment
 – Fenestration of bone
 – Antibiotic

Pyogenic (Septic) arthritis

Pathology

Organisms

- In children ... S. aureus & Streptococci
- In adults ... N. gonorrhea , S. aureus

Route of infection

- Hematogenous spread
- Contiguous infection
- Direct implantation

• Site ...

any joint but knee and hip are common sites

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ROUTES BY WHICH BACTERIA CAN REACH THE JOINT

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- 1 Hematogenous route 2 Dissemination from osteomyelitis
- 3 Spread from adjacent soft tissues
- 4 Diagnostic or therapeutic measures
- 5 Penetrating damage or trauma

Local changes

Synovium

- Synovitis
- Effusion ... first is serous and then become more cellular until it becomes frankly purulent
- Articular cartilage ... chondrolysis and destruction
- Bone involvement ... extension of pus into subchondral bone (in septic hip in infants there is necrosis of capital epiphysis)
 Ligaments ... softened and stretched
 Pathological dislocation

Course Recovery of joint mobility Ankylosis Complications - Pathological dislocation - Chronicity – Osteomyelitis – Ankylosis

Diagnosis

Clinically

- General constitutional symptoms
- Pain
- Swelling
- Deformity
- Absolute limitation of motion

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- ESR & CRP
- Blood culture
- Aspiration of joint ... synovial fluid analysis and culture and sensitivity

Imaging

- X-rays
 - Early ... normal
 - Late ... destruction of subchondral bone and articular cartilage
- C.T. & MRI

• Differential diagnosis

- Acute osteomyelitis
- Rheumatic fever
- Hemarthrosis
- Tuberculous arthritis

Treatment

General

- Bed rest and good nutrition
- Antibiotic

Local

- Drainage
 - Aspiration of joint ... diagnostic, therapeutic and prognostic
 - Arthrotomy
 - Arthroscopic drainage
- Splintage for joint

