

Osteomyelitis

- ▶ defined as inflammation of bone and bone marrow, it is virtually synonymous with infection.
- ▶ can be secondary to systemic infection but more frequently occurs as a primary isolated infection
- ▶ can be an acute or a chronic process.
- ▶ Any microorganism can cause osteomyelitis, but the most common are **pyogenic bacteria**, followed by *Mycobacterium tuberculosis*

Pyogenic osteomyelitis

- ▶ **Most cases of acute osteomyelitis are caused by bacteria.**
- ▶ **The offending organisms reach the bone by one of three routes:**
 - (1) Hematogenous dissemination (most common)**
 - (2) Extension from adjacent joint or soft tissue**
 - (3) Traumatic implantation after fractures or orthopedic procedures.**

Causative bacteria

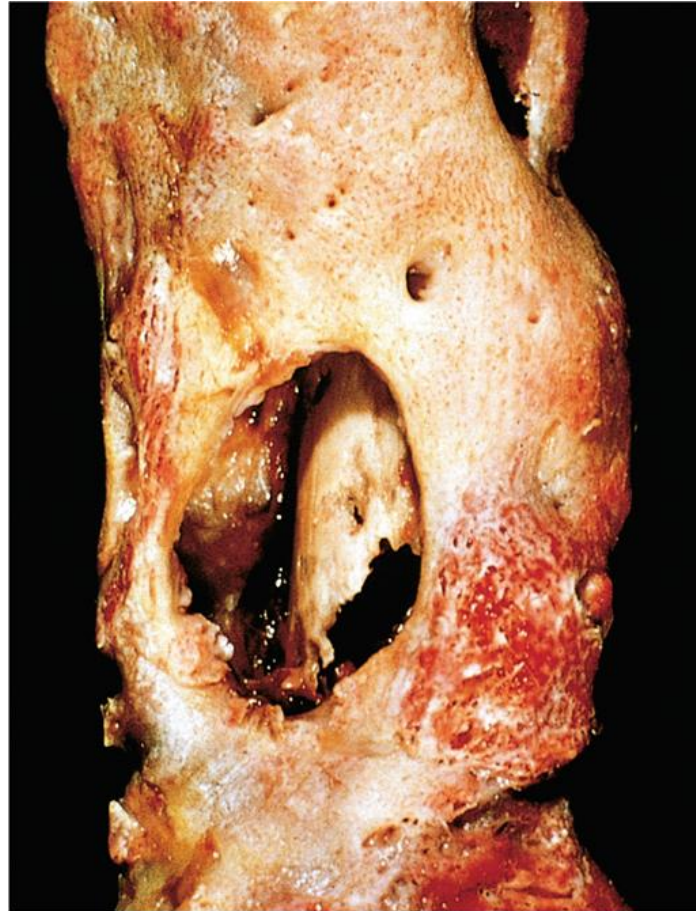
1-*Staphylococcus aureus* : the most common

- ▶ *Staph. aureus* → expression of surface proteins that allow adhesion to bone matrix.
- 2- *E.coli* and group B strept → important causes of acute osteomyelitis in neonates
- 3- *Salmonella* → esp. in pts with sickle cell disease.
- 4- Mixed bacterial infections (e.g. *anaerobes*) → osteomyelitis secondary to bone trauma.
- 5- 50% of osteomyelitis cases → no organisms can be isolated

MORPHOLOGY

- ▶ Acute inflammatory reaction
- ▶ Entrapped bone becomes necrotic (non-viable bone = **sequestrum**).
- ▶ If infection reaches the periosteum → **subperiosteal abscesses** (esp. children where the periosteum is loosely attached to the cortex)
- ▶ If the periosteum ruptures → **abscess formation in the surrounding soft tissue** that may lead to a **draining sinus**.

Resected femur from a patient with chronic osteomyelitis. Necrotic bone (the sequestrum) visible in the center of a draining sinus tract is surrounded by a rim of new bone (the involucrum).



- ▶ if infection spreads into the adjoining joint → suppurative arthritis (esp. in infants (and uncommonly in adults)).
- ▶ if involve vertebrae → destroying intervertebral discs and spreading into adjacent vertebrae.
- ▶ Reactive bone is deposited forming a shell of living tissue around a sequestrum = an **involucrum**.

Clinical Features

- ▶ **Acute systemic illness:** malaise, fever, leukocytosis, and throbbing pain over the affected region.
- ▶ **Subtle symptoms** in some cases: unexplained fever (infants); localized pain in adults.
- ▶ **The diagnosis :**
- ▶ suggested by characteristic radiologic findings → a destructive lytic focus surrounded by edema and a sclerotic rim.
- ▶ In some cases → Blood cultures are positive
- ▶ **Biopsy and bone cultures :** required for Dx & Rx

▶ **Treatment**

- ▶ A combination of antibiotics and surgical drainage
- ▶ (1/4) of cases → do not resolve and persist as chronic infections.
- ▶ **Causes of chronicity:**
- ▶ delayed diagnosis; extensive bone necrosis; shortened antibiotic therapy; inadequate surgical debridement; weak host defenses
- ▶ **chronic osteomyelitis can be complicated by:**
 - pathologic fracture
 - secondary amyloidosis
 - Endocarditis
 - Sepsis
 - development of squamous cell carcinoma if the infection creates a sinus tract
 - rarely osteosarcoma

Tuberculous (TB) Osteomyelitis

- ▶ Gained importance with the resurgence of tuberculosis (due to immigration patterns and increasing numbers of immunocompromised persons)
- ▶ Bone TB infection complicates 1% to 3% of cases of pulmonary tuberculosis.
- ▶ The mycobacteria reach the bone through:
 - 1- Bloodstream
 - 2- Direct spread from a contiguous focus of infection (e.g., from mediastinal nodes to the vertebrae).

- ▶ *long bones and vertebrae are favored sites* (esp. with hematogenous spread)
- ▶ Often solitary but can be multifocal (esp. immunodeficiency).
- ▶ **The synovium, with its higher oxygen pressures, is a common site of initial infection** (Because the tubercle bacillus is microaerophilic)
- ▶ The infection then spreads = *granulomatous inflammation* with **caseous necrosis** and extensive bone destruction.

Tuberculosis of the vertebral bodies (Pott disease)

- ▶ *is a clinically serious form of TB osteomyelitis.*
- ▶ Complications: vertebral deformity, collapse, leading to neurologic deficits.
- ▶ Extension of the infection to the adjacent soft tissues → development of psoas muscle abscesses