



# MSS

## PATHOLOGY

# 4



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# CHRONIC OSTEOMYELITIS

x **Chronic Osteomyelitis is a very bad debilitating disease** as bad as cancer and the most important is to prevent it.

x **5-25% of acute osteomyelitis persists as chronic osteomyelitis.**

x It is very rare to have a patient with a chronic OM without them going first through the acute phase, however, certain infections can start as chronic infections without the acute phase, for example, TB (insidious) or from subacute or smoldering (like inflammation).

## ❖ Causes of Chronic Osteomyelitis:

1- **Delay in diagnosis.**

2- **Extensive necrosis** (unlucky patients will have a huge amount of necrotic bone in acute osteomyelitis which is very hard to clear with antibiotics due to the presence of an **extremely virulent organism** like *Pseudomonas* and *Klebsiella*).

3- **Inadequate therapy: Inappropriate antibiotic or incomplete treatment with an antibiotic.** The appropriate way is giving it intravenously not oral so can be in high concentrations.

4- **Weakened Host Immunity:** the patient is taking **immunosuppressive drugs** (cancer patients) or **steroids** (chronic bronchial asthma).

## ❖ COMPLICATIONS OF CHRONIC OSTEOMYELITIS:

1- **Pathologic fractures (abnormal bone)**

2- **Secondary amyloidosis:** deposition of a protein called amyloid (**which leads to organ failure or organ disease**); amyloidosis is associated with chronic diseases including chronic osteomyelitis and chronic tuberculosis.

3- **Endocarditis:** a rare condition that involves inflammation of the heart lining, it can be lethal

4- **Sepsis:** the bacteria and bacterial toxins in the bloodstream. It can be lethal if it is a G- bacteria (**G- Sepsis**).

5- **Squamous cell carcinoma of draining sinus:** the draining sinus around the skin can cause Squamous cell carcinoma and it is very rare.

6- **Sarcoma of the bone:** similar to Paget's disease of bone.

# MYCOBACTERIAL OSTEOMYELITIS

x Caused by mycobacterium tuberculosis.

x Used to be a disease in developing countries.

x Now: there are more cases in developed countries like the USA due to immigration (**don't be racist people!!!**), but the main reason is immunocompromised patients (HIV, Cancer, CT disease, ... etc).

x 1-3% of patients with pulmonary TB or extrapulmonary TB can have bone involvement.

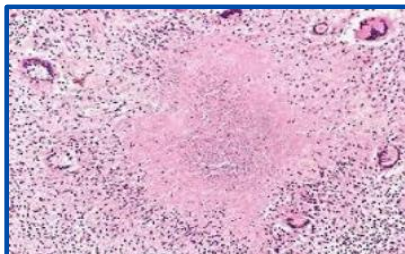
x Hematogenous (spreads through the blood) or direct spread

-Examples:

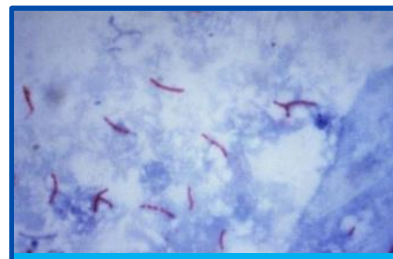
- I. TB in the lung can spread to the ribs or the humerus through the blood.
- II. TB in the skin (diabetic foot), the bacteria go to the underlying bone.

x Clinically: it is very hard to diagnose maybe subtle (**not obvious**) and chronic course, so you should have an index of suspicion.

x Pathology: necrotizing (caseating) granulomas



H&E stain shows granuloma with central necrosis (caseating)



Acid fast bacilli stain showing red snappers (Mycobacterium)

Ziehl-Neelsen stain

**So, it is a:** chronic-specific infection caused by bacteria and characterized by tissue destruction by necrotizing granuloma. The most bone affected is vertebrae.

## TB SPONDYLITIS (POTT DISEASE)

x **Pott disease:** is a disease caused by TB infecting the vertebral body (**destructive spine TB**)

x Can be referred to as chronic osteomyelitis of the vertebral body

x After taking a biopsy and staining it with H&E, we can see necrotizing granuloma.

### x **Difficult to treat**

x May lead to pathologic fractures (compression fractures) that may compress the nerves leading to **the neurologic deficit, scoliosis, and kyphosis.**

Notice the lytic lesion and compression fracture at this MRI photage.

When you look at this picture the first comes in mind is TB (especially if it is a 55 y.o Jordanian (means a smoker!) ... it was a joke relax).



## **BONE TUMORS AND TUMOR-LIKE CONDITIONS**

- **Primary bone tumors are rare:** That is, secondary bone tumors arising from metastasis are much more common than those originating primarily from the bone.
- **Benign is much more common than malignant tumors (10:1).**
- **Most tumors in the First 3 decades are benign; adults are more to be malignant.**
- **Treatment: aims to optimize survival while maintaining function.** (Survival rate after the treatment has improved dramatically in the last 25-30 years).
- **Age & location help narrow diagnosis.**
- **Signs and symptoms:** most of them are **asymptomatic** because most of them are benign (he lives with it and die with it) , sometimes they present with **pain** or **pathological fracture**.

Category	Behavior	Tumor Type	Common Locations	Age (yr)	Morphology
<b>Cartilage forming</b>	Benign	Osteochondroma	Metaphysis of long bones	10–30	Bony excrescence with cartilage cap
	—	Chondroma	Small bones of hands and feet	30–50	Circumscribed hyaline cartilage nodule in medulla
	Malignant	Chondrosarcoma (conventional)	Pelvis, shoulder	40–60	Extends from medulla through cortex into soft tissue, chondrocytes with increased cellularity and atypia
<b>Bone forming</b>	Benign	Osteoid osteoma	Metaphysis of long bones	10–20	Cortical, interlacing microtrabeculae of woven bone
	—	Osteoblastoma	Vertebral column	10–20	Posterior elements of vertebra, histology similar to osteoid osteoma
	Malignant	Osteosarcoma	Metaphysis of distal femur, proximal tibia	10–20	Extends from medulla to lift periosteum, malignant cells producing woven bone
<b>Unknown origin</b>	Benign	Giant cell tumor	Epiphysis of long bones	20–40	Destroys medulla and cortex, sheets of osteoclasts
	—	Aneurysmal bone cyst	Proximal tibia, distal femur, vertebra	10–20	Vertebral body, hemorrhagic spaces separated by cellular, fibrous septae
	Malignant	Ewing sarcoma	Diaphysis of long bones	10–20	Sheets of primitive small round cells

- Notice each tumor type with its common location & age.
- Common location doesn't mean that the tumor can't be in a different bone, but we should memorize the common location & age to aid us in the diagnosis.

**THANK YOU**

**V1**