Surgery- II

Credit Hours = 3
contact hours=48

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5. ORTHOPEDICS SURGERY

Introduction

- Orthopedics deals with disorders of the musculoskeletal system,

  - Bones, joints, muscles, tendons

  - Affected by several conditions like congenital, metabolic or neoplastic diseases, traumatic and infectious disorders are the most important ones in developing countries.

1. INFECTIONS OF BONES AND JOINTS

1.1. Osteomyelitis

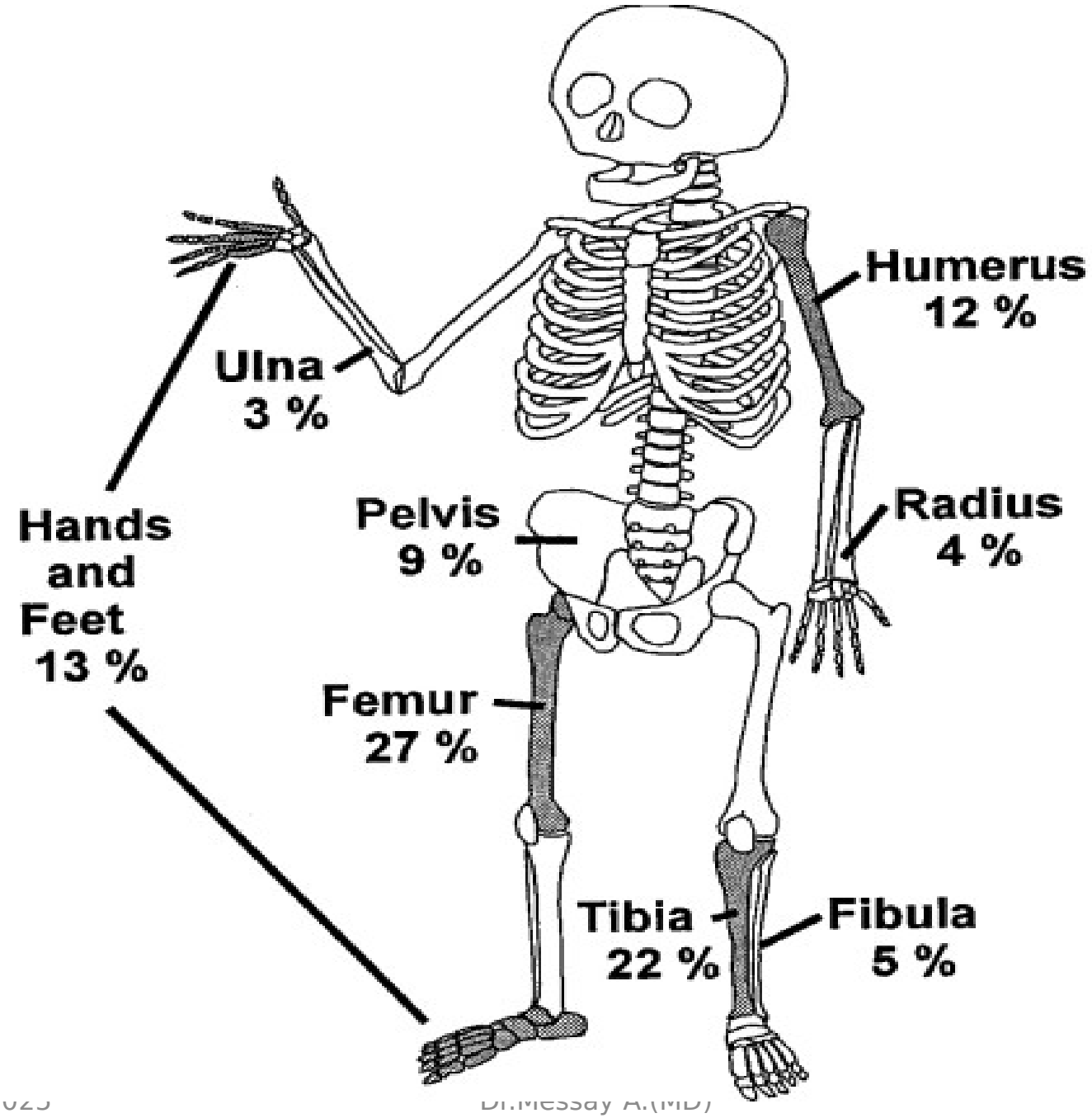
- Acute
- Chronic

2.2. Arthritis

- Acute

1.1. osteomyelitis

- OM is an infection of bone involving the **periosteum**, **cortical** bone and the **medullary** cavity with **bacteria**
- Relatively common & important b/se of their potential to cause permanent disability
- The risk is greatest if the physis (growth plate of bone) damaged.


Humerus
12 %
Ulna
3 %
Hands
and
Feet
13 %
Pelvis
9 %
Radius
4 %
Femur
27 %
Tibia
22 %
Fibula
5 %

A. acute osteomyelitis

- Acute osteomyelitis is an acute bacterial infection of the bone and its modularly cavity.
- It commonly affects children, boys more than girls.

Etiology

- Bacteria → most common
- **Staph. aureus** → most common in **all age** groups including newborns….. >80% of cases

• Gram negative rods and Group B streptococcus in neonates

/ E.Coli & GBS/

• Streptococcus pneumoniae & S. pyogenes

• ??? H. Influenza is seen in children under 5 years of age

Risk factor

- Minor close trauma, common risk factors, in ~ 30%
- Penetrating injuries or open fracture
- Orthopedic surgery → uncommon
- Impaired host defenses

Epidemiology

- Osteomyelitis can occur at any age.
- particularly common between the ages of **3-15** years of age and is more common in **males** (**M:F** of 3:1).
- The incidence of in children is estimated to be 1 : 5,000.
- The majority of osteomyelitis cases in previously healthy children are **hematogenous**

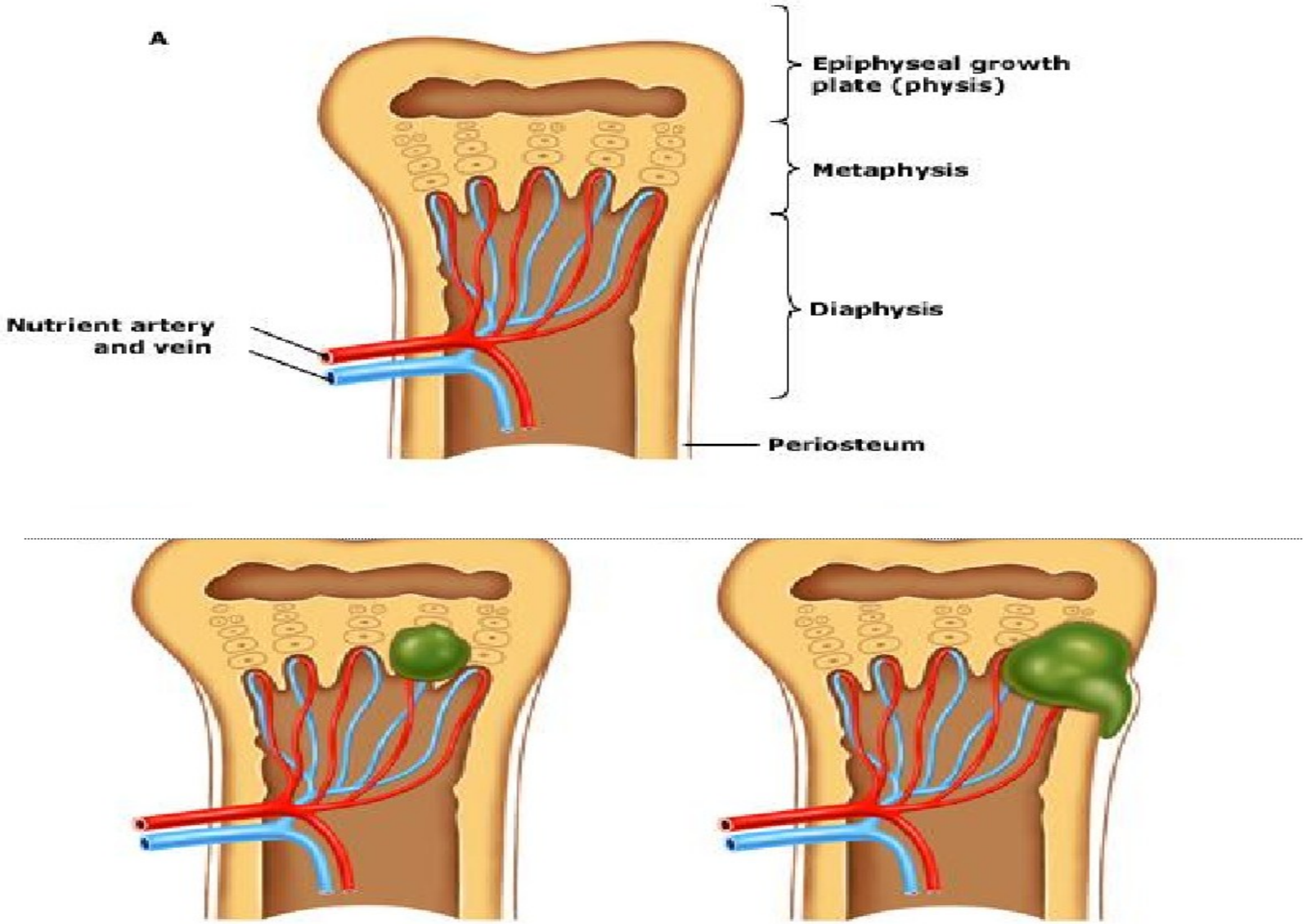
Pathogenesis

- Osteomyelitis results in one of three ways:
  - **Haematogenous spread** - bacteria reach bone tissue via the blood stream from a distant site
  - **Direct extension** of infection into bone from adjacent soft tissue infection (e.g. a cellulitis)
  - **Direct bone infection** from:
    - Foreign Body
    - Open Fracture
    - Bites
    - Post op

- Bone infections in children are:
  - primarily hematogenous in origin,
  - secondary to : - penetrating trauma,
    - surgery, or
    - infection in a contiguous site.

- Bacteria reach the bone mostly via the hematogenous route. Infection begins in the……
- In the metaphysis, nutrient arteries branch into nonanastomosing capillaries under the physis
- Blood flow in this area is “sluggish,” predisposing to bacterial invasion
- Once a bacterial focus is established, phagocytes migrate to the site and produce an inflammatory exudate

- As thinflammatory exudate progresses, pressure increases spread through the porous metaphyseal space via the **haversian** system and **Volkmann** canals into the subperiosteal space .
- **Purulence** beneath the periosteum may lift the periosteal membrane of the bony surface, further impairing blood supply to the cortex and metaphysis



A) During an episode of bacteremia, bacteria are deposited in the metaphysis from the metaphyseal vessels (nutrient artery and vein). B) A focus of infection develops in the metaphysis, which leads to cellulitis in the bone marrow. C) Exudate under pressure is forced laterally through the Haversian systems and Volkmann canals and into the cortex of the bone, where it can lift or rupture through the periosteum.

Diagnosis

- **History**

- Pain, which is gradually increasing in severity
- Fever, Toxicity
- Failure to use the involved limb

- **Physical Examination**

Look…….Feel……..Move prinipe

- **L-** Swelling, redness, wound
- **F**- Localized bony tenderness (most important), edema, erythema, & warmth
- **M**- Movements of the adjacent joint may be restricted
- Adjacent joint may contain effusion

-**Long bones**; femur & tibia are equally affected (together accounts 50% of all cases), upper extremity bones ~ 25%, flat bones less common

- **Lab. Investigation**

- Leucocytosis and raised ESR,CRP
- Blood culture
- X-ray changes of bone: late to develop (10-15 days)
- and is thus not helpful for diagnosis of acute osteomyelitis

Deffrential Diagnosis

- Cellulitis
- Septic arthritis
- Acute rheumatic arthritis
- Myositis & pyomyositis
- Fractures
- Bone tumors – Osteosarcoma

Treatment

1. Antibiotics: IV antibiotic should be started empirically after taking blood sample for culture

Choice of antibiotics depends on the age:

- **Neonates**:- Penicillinase resistant penicillins + Aminoglycosides

E.g. Cloxacillin IV. + Gentamycine I.

- **Children** under 5 years:- Penicillinase resistant penicillins + Anti H.influenzae

E.g. Cloxacillin IV + Chloramphenicol

- Patients **above 5 years**:- Penicllinase resistant penicillin

E.g. Cloxacillin IV.+ **Ciprofloxacin PO.**

- The duration of antibiotic treatment is **6 weeks**. IV route is changed to oral after **fever** and **leucocytosis** have disappeared (about 7-14 days).

2. **??** **Surgery:** is recommended if there is evidence of pus collection.
- **Analgesics and splinting:** Analgesics and splinting of the limb in functional position using

B. Chronic osteomyelitis

- Chronic osteomyelitis usually follows a delay or inappropriate treatment of an acute stage osteomyelitis.
- It may also follow direct infection of bone in compound fracture.
- **Pathology:**
- The dead bone (**sequester**) lies in an abscess cavity surrounded by a newly formed bone (**Involcrum**) under the elevated periosteum

Diagnosis

- The Dx is clinical
- There may be skin hyper pigmentation around the sinus and palpable bone thickening.
- Aspiration or biopsy of bone or subperiosteal abscess for **G-stain** & **culture**
- **X-ray** may show **sequester**, abscess cavity, involucrum or diffuse sclerosis.

Treatment

Antibiotics*:* Used for acute exacerbation and perioperate for about six weeks.

Surgery: Surgery is done to remove a dead bone (sequesterectomy) or to eliminate an abscess cavity (saucerization).

Physical Therapy : The major role of physical medicine is a preventive one

Amputation: may be considered for extensive bone involvement and heavy discharge or frequent flare-ups which incapacitate the patient.









General complications

- Septicemia
- Septic Arthritis
- Chronic osteomyelitis
- Recurrence of Acute Osteomylitis
- *Growth arrest*
- *Pathological fracture*
- *Amputation*

2.2. SEPTIC ARTHRITIS

***Definition**: Septic arthritis is an acute bacterial infection of joints.*

- ✓ Has potential to cause permanent disability
- ✓ -Early recognition & therapy minimize further damage to the synovium, adjacent cartilage & bone.

Etiology: - It varies in different age groups and is similar to that of acute osteomyelitis.

- S. aureus is the most common cause in all age group
- Neisseria gonorrhea should be considered in the sexually active age group.
- **Group B streptococcus** - in neonates

Risk factors : Old age, Diabetes mellitus, skin infection, alcoholism, intra-articular injections are

Pathology

- Primarily occurs as a result of hematogenous seeding of the synovial space
- Less often, organisms enter the joint space by **direct** inoculation or **extension** from a contiguous focus
- Triggering of inflammatory cascade
- The ↑ed pressure with in the joint space from accumulation of purulent material can compromise the vascular supply & induce pressure necrosis of the **cartilage**.
- The pus formed in the joint is **chondrolytic** and destroys the joint cartilage if not evacuated.

CLN

- Most are mono articular
-Early signs & sympytoms may be subtle particulary in neonates
-Fever, pain, localizing signs such as swelling, erythema & warmth
-Limping
-Joints of the lower extremity constitute 75 % of all cases
-Elbow, wrist & shoulder joints: 25%
-Small joints: uncommon

Diagnosis:

History: The usual presenting symptoms are joint pain, swelling and fever.

- Septic arthritis presents **acutely** and mostly with a **single** swollen and painful joint

Physical examination: The joint becomes swollen with effusion, tender and warm. The range of active and passive movement also gets severely limited.

Lab: Joint fluid analysis reveals opaque yellow to green fluid with

- High cell count (mostly**>50-100,000**/mm3, with >90% PMN).
- Decreased glucose level (50 mg/dl lower than blood)
- Culture is often positive. X-ray of the affected joint

Treatment

- Start with *IV antibiotics then to oral antibioics*
- *Do joint aspiration repeatedly under aseptic condition.*
- *If frank pus is* found, drain it by making *arthrotomy.*

  Immobilize the affected joint in functional position until
- inflammation subsides and physiotherapy to prevent joint stiffness

Complications

- **Early**: Destruction of articular cartilage, dislocation, epiphyseal necrosis.
- **Late**: Secondary osteomyelitis, joint stiffness and ankylosis


THANK
YOU