# Septic Arthritis & Osteomyelitis

**Mahmoud Hafez,** MSc, Dip SICOT, FRCS Ed, MD
**Professor & Head of the Orthopaedic Department**
**Faculty of Medicine, October 6 University**

1

## Septic Arthritis

- Is an infection in a native or prosthetic joint(s).
- Native joint are usually badly affected with more virulent organisms and more systemic manifestation.
- Prosthetic joint infection are usually low grade infection with no systemic effects
- It is an emergency condition that requires urgent diagnosis and treatment to prevent significant morbidity (cartilage damage within few hours) and mortality.
- **Risk factors:** Old age, diabetes, rheumatoid arthritis, joint surgery (TKR or THR). skin infection and HIV, drug abusers

2

## Diagnosis

- The classic picture is a single swollen joint, warm, tender and exquisitely painful on movement. The knee is involved in about 50% of the cases, polyarticular in 15%. Fever but its absence does not exclude the diagnosis.
- Bacteraemia is a common finding. Signs may be less marked or poorly localised in elderly, prosthetic joint, drug abusers, infections of the spine, hip & shoulder.
- The Red flags in children: Fever, refusal to use a joint, ESR and CRP elevated
- Synovial tissue examination & culture: Staphylococcus aureus is the most common cause of polyarticular arthritis. Plain radiographs: Limited value, and may be normal but CT, MRI and
- Bone scan (gallium 67) are the most sensitive methods for diagnosing. In tumours, bone scan is done with Technicium

3

## Treatment

- Joint lavage and surgical drainge is very important along with intraoperative sample for culture, this could be repeated if no improvement. Arthroscopy commonly used now.
- Antibiotics may be given before culture result (in case of systemic illness) and could be changed after C & S. Initially intravenously (usually for 2-3 weeks) then oral (often for at least a further 2-4 weeks).
- The limb should be splinted in the position of function (knees in extension, elbows at 90°.
- For prosthetic joint infection, early infection (less than 6 weeks after surgery) can be cured by drainage and change of plastic liner of the prosthesis. Late-onset infections require removal of the prosthesis, insertion of an antibiotic-loaded spacer, and then replacement with a new prosthesis when infection is settled (low ESR and CRP)

4

# Prognosis

- Current mortality rates of bacterial arthritis range from 10 to 20 percent, depending on the presence of comorbid conditions, such as older age, co-existing renal or cardiac disease.
- Morbidity (eg, amputation, arthrodesis, prosthetic surgery, severe functional deterioration) occurs in 1/3 of patients.

5

# Osteomyelitis

- Is an inflammation of the bone or bone marrow, usually caused by a bacterial infection.
- Until recently, osteomyelitis and its treatment have been poorly understood by both the medical community and, in turn, the general public.

6

## Etiology

- Osteomyelitis is an infection involving the bone caused by various microorganisms such as bacteria and fungi. These organisms can infect the bones in several ways:
- through the bloodstream from other infected areas of the body
- injury – bacteria enter the bone through a traumatic wound
- direct extension – spread to the bone from an adjacent wound or infection

7

## Post-operative infection

- A post-operative infection can quadruple the length of stay in hospital.
- This reduces a patient's quality of life, increases the likelihood of further operations, and ties up hospital resources.
- That's why it's important to treat the infection effectively' and get patients home as soon as possible.
- When treating a post-operative infection it's important to know that the antimicroble agent penetrates into the infected site.

8

## Sources of pathogens

- Organisms gain access to the bone either by direct inoculation or are carried by the blood stream from some other site of infection. Traumatic inoculations (gunshot wounds, compound fractures, open surgery, etc.) account for 88 % of cases.
- Most common pathogens are Staphylococcus and Pseudomonas, but it is important to identify the organism(s) responsible in each patient.
- To do this, the infected tissues are sampled (biopsied) and incubated in the laboratory to grow as living cultures.

9

## Management

- The organisms are then identified according to their growth characteristics and appearance under the microscope. Once identified, they are tested for their sensitivity to various antibiotics.
- The safest, most-efficient agent is chosen for delivery to the patient. Antibiotics are given by mouth (PO) as pills or liquids, by vein (IV) or by a direct application into the wound as a depot (antibiotic beads, gels, ointments, patches).
- The best is IV, treatment could extened to several weeks. Therefore, central line is better than prepheral
- In some instances, osteomyelitis can persist to become chronic due to the presence of injured tissue and foreign material within the wound. Do your best to avoid chronic status

10

## Planning of Treatment

- During the treatment process, patients are expected to be an active partner.
- Treatment may be complex and plans may be altered along the way to ensure safety and a good outcome.
- The goal is to return as much function as possible
- Prior to beginning treatment, it is imperative to know
  - Complete medical history
  - Allergies and medical conditions;
  - Compromising factors (co-morbidities) e.g. diabetes or cortisone intake
  - The selection of methods is based on specific host and wound parameters (see The Staging of Osteomyelitis).

11

## The basic treatment

- **Debridement:** All infected, and compromised tissues are surgically excised, including skin, muscle, tendon, ligaments, and bone. Foreign bodies and surgical implants are removed.
- **Rest:** The tissues must rest and recover under the protection of good nutrition, antibiotics, and adequate blood flow.
- **Reconstruction:** When the debrided wound has healed, form and function can safely be restored using any and all orthopedic techniques such as Ilizarov, bone transport, cement.

12

## Other Methods of Treatments

- Free Tissue Transfers
- Bone Grafts
- Antibiotic Beads
- External Fixators
- Amputations
- Hyperbaric Oxygen Therapy

13

## Classifications of Osteomyelitis

- Osteomyelitis is classified according to what parts of the bone are involved in the disease (Types I - IV in figure below) and the health of the patient.
- Based on medical history, patients are classified as either
  - Uncompromised (A-Hosts)
  - Compromised (B-Hosts) or

  Compromised patients have decreased healing potential when compared to uncompromised patients.

14

## Staging (Cierny classification)

- The classification (staging) of bone infection is formulated by combining the type of disease with the host class (i.e., Stage IVB).
- Dr. Cierny developed the staging system to determine which surgical procedures and antibiotic protocols are needed to manage each individual case of osteomyelitis.
- As in the field of oncology, the clinical staging of osteomyelitis is used to direct therapy and predict a successful outcome.

15

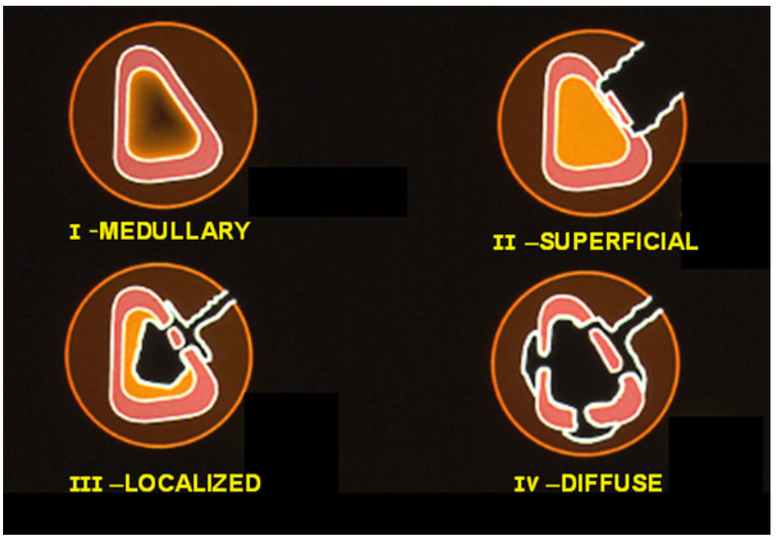
## Compromised healer

**Conditions which may classify you as a compromised healer include:**

- Diabetes
- Use of steroids
- Poor nutrition
- Extensive scarring
- Use of tobacco products
- Cancer
- Previous radiation therapy
- Organ failure
- Chronic lymphedema
- Old age

16

## Classification




17

**HOST FACTORS**
**THAT AFFECT WOUND HEALING**

| Local Factors | Systemic Factors |
|---|---|
| chronic edema | malnutrition |
| vascular diseases | immune deficiencies |
| extensive scarring | organ failures |
| previous radiation | diabetes, old age |
| tissue loss | cancers, obesity |
| | use of tobacco products |
| | steroids, other medications |

18