

**MUSCULOSKELETAL BLOCK: LECTURE THREE**

**OSTEOMYELITIS AND SEPTIC ARTHRITIS**

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## **OSTEOMYELITIS**

Osteomyelitis refers to inflammation of the bone and marrow and is usually the result of infection.

### ***Aetiology***

Organisms may gain access to the bone by bloodstream spread from a distant infected site, by contiguous spread from neighboring tissues or by direct access via a penetrating injury. Almost any organism can cause osteomyelitis, but those most frequently implicated are bacteria. Staphylococcus aureus is responsible for many cases. Patients with sickle cell disease are predisposed to Salmonella osteomyelitis. Mycobacterium tuberculosis is sometimes implicated.

### ***Pathogenesis***

The location of the lesions within a particular bone depends on the intraosseous vascular circulation, which varies with age. In infants less than a year old, the epiphysis is usually affected. In children, the metaphysis is usually affected and in adults the diaphysis is most commonly affected.

In acute osteomyelitis, once the infection has become localized in bone, an intense acute inflammatory process begins. The release of numerous mediators into the haversian canals leads to compression of the arteries and veins, resulting in localized bone death (osteonecrosis). The

bacteria and inflammation spread via the haversian systems to reach the periosteum. Subperiosteal abscess formation and lifting of the periosteum also occurs. Subperiosteal abscess formation and lifting of the periosteum further impairs the blood supply to the bone, resulting in further necrosis. The dead piece of bone is called **the sequestrum**. Rupture of the periosteum leads to formation of drainage sinuses, which drain pus onto the skin. If osteomyelitis becomes chronic, a rim of viable new bone is formed around the sequestrum and below the periosteum. This new bone is called an **involucrum**. An intraosseous abscess, called a Brodie's abscess may form.

### ***Clinical features and treatment***

Acute osteomyelitis presents with localized bone pain and soft tissue swelling. If there is systemic infection, patients may present with an acute systemic illness. Presentation may be extremely subtle in children and infants, who may present only with pyrexia (pyrexia of unknown origin, PUO). Characteristic X-ray changes consist of a lytic focus of bone surrounded by a zone of sclerosis. Treatment requires aggressive antibiotic therapy. Inadequate treatment of acute osteomyelitis may lead to chronic osteomyelitis which is notoriously difficult to manage. Surgical removal of bony tissue may be required.

## **AVASCULAR NECROSIS**

This necrosis of bone is due to ischemia. Ischemia may result if the blood supply to a bone is interrupted which may occur if there is a fracture particularly in areas where blood supply is suboptimal (e.g. the scaphoid and the femoral neck). Most other cases of avascular necrosis are either idiopathic or follow corticosteroid administration.

## **INFECTIVE ARTHRITIS**

Organisms can gain access to the joint by three main routes:

- Haematogenous spread from a distant infected site (most common).
- Direct access via a penetrating injury.
- Direct spread from a neighbouring infected site, e.g osteomyelitis, soft tissue abscess.

Infected arthritis, particularly bacterial and tuberculous arthritis is potentially serious because it can cause rapid destruction of the joint.

## **BACTERIAL ARTHRITIS**

Most cases of infective arthritis are caused by bacteria. The most common organisms are gonococcus (*Neisseria*), *Staphylococcus*, *Streptococcus*, *Haemophilus influenza* and Gram-negative bacilli. In general, children are affected more commonly than adults. Gonococcal

arthritis is seen mainly in late adolescence and adulthood and patients with sickle-cell disease tend to develop Salmonella arthritis. Affected patients develop pain and swelling of the affected joint and there may be systemic indicators of infection, e.g fever. Aspiration and culture of the joint fluid gives the diagnosis. Prompt treatment with antibiotics is paramount.

### **VIRAL ARTHRITIS**

Infections such as viral hepatitis, rubella and parvovirus B19 may be complicated by an arthritis. Symptoms are of a mild arthralgia (aching joints). It is not certain whether the virus directly infects the joint, or whether the arthritis is simply a reactive process due to systemic viral infection.

### **TUBERCULOUS ARTHRITIS**

Tuberculous arthritis is due to haematogenous spread from an established focus of infection elsewhere, usually the lungs. This condition usually presents with insidious development of a joint pain associated with limitation of movement. The vertebral column is commonly involved and when there is an associated osteomyelitis vertebral collapse may result (Pott's disease of the spine).

