



# POSNA

## The Core Curriculum

### Acute osteomyelitis

#### Objectives

1. Describe the pathology of acute osteomyelitis
2. Describe the natural history of untreated acute osteomyelitis
3. Discuss therapy for each stage of natural history of untreated acute osteomyelitis
4. Describe the workup of a child with suspected acute osteomyelitis
5. Describe the most common offending organism causing osteomyelitis in the premature infant, the neonate, the toddler, and the older child
6. Discuss antibiotic management, including route and duration, for acute osteomyelitis
7. Discuss laboratory tests useful for following the clinical course of acute osteomyelitis
8. List conditions can clinically mimic acute osteomyelitis
9. Describe the features of chronic recurrent multifocal osteomyelitis (CRMO)

#### Discussion points

1. What is the incidence of acute osteomyelitis? Which limbs are most often affected?
2. What imaging studies are valuable for the child with early acute osteomyelitis?
3. What findings would make one suspect osteomyelitis in the premature infant?
4. What criteria are helpful for deciding when oral antibiotics would be appropriate? How long is treatment necessary?
5. Are there any indications for surgical intervention for acute osteomyelitis? Why or why not?

#### Discussion

Acute osteomyelitis is one of the most important conditions on a global basis that is treated by the orthopaedic surgeon. In Norway, the incidence is roughly 1/10,000 children per year; but in susceptible populations such as premature infants with other complications, children with malignancies or juvenile arthritis on immunosuppressives, or malnourished children; the incidence is higher. In the child, the primary site of infection is the metaphysis, where the blood flow becomes sluggish in the capillary loops. The inflammatory response is identical to that observed in other anatomic areas, but the response is initially contained in metaphyseal bone, either in long bones or flat bones. Rarely, the epiphysis can be primarily infected. The cardinal signs of early osteomyelitis are soft tissue swelling and marked bony tenderness with voluntary guarding of the affected limb. WBC with differential, sed rate, C reactive protein, and plain radiographs are initially obtained, and technetium imaging is helpful if there is doubt about the diagnosis. Bone aspiration and blood cultures (preferably drawn during rising portion of temperature spike) are the

most initial valuable laboratory studies. Bone aspiration should not be delayed for imaging studies, as aspiration does not alter results of bone scanning. Ultrasound may be helpful in detecting and localizing subperiosteal abscess. MRI has been reported as the most helpful imaging modality for diagnosis and localization of the inflammatory process in the earlier stages of the condition when plain radiographs are not helpful (although soft tissue swelling is an early sign). When an abscess has formed in the bone, pain is more severe; eventually the abscess will penetrate the thin metaphyseal cortical bone, and can result in secondary septic arthritis, especially in the hip, elbow, and shoulder. For more complex diagnostic situations, indium and/or gallium scanning have been advocated. Photopenic scans indicate a more ominous prognosis.

The natural history of acute osteomyelitis has been dramatically changed since the availability of antibiotics, with a mortality rate of 25% in the preantibiotic era. If intravenous antibiotics specific for the offending organism can be delivered to the bone before abscess formation has occurred, or even if a small abscess has formed, a rapid clinical response is usually noted. In such a case, present thought allows administration of oral antibiotics when a clinical response has been confirmed, and the C reactive protein is dropping. A recent study from Finland concluded that routine bactericidal monitoring is not necessary when changing from intravenous to oral antibiotics, but Nelson, the originator of replacing intravenous antibiotics with oral, was not convinced. 6 weeks of treatment has been standard, but recent studies have documented the effectiveness of much shorter durations. However, if presentation is late, and/or devitalized bone is responsible for a diminished response to antibiotic treatment, surgical intervention is often necessary. Since vaccination against hemophilus has been introduced, the incidence of osteomyelitis secondary to that organism has been markedly reduced.

Childhood bony neoplasms such as osteosarcoma or Ewings, fractures in anesthetic limbs, juvenile arthritis, septic arthritis, and cellulitis are the most common conditions mimicking acute osteomyelitis.

Chronic recurrent multifocal osteomyelitis is a rare systemic condition characterized by multiple sites of lytic defects of bone; with varying states of chronicity among various, often concomitant lesions. It is most prevalent between ages 5-15, and has a 2:1 female preponderance. Laboratory values are generally normal. Long bones are most often affected. Treatment is symptomatic, nonsteriodals have been noted to afford some symptomatic relief. The bony lesions are sterile.

Tuberculous infections still occur in many areas of the world. Delay in diagnosis is common. If the growth plate is not affected, the prognosis from treatment is good.

Osteomyelitis will have a constantly changing picture, as the balance between antibiotics, host resistance, and the virulence of various organisms tips one way or the other. The clinician must always be alert to unusual presentations or infecting organisms.

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