Treatment of acute osteomyelitis in children

In high-income countries, acute osteomyelitis occurs in about 8 of 100,000 children per year, but it is considerably more common in low-income countries. Boys are affected twice as often as girls. Unless acute osteomyelitis is diagnosed promptly and treated appropriately, it can be a devastating or even fatal disease with a high rate of sequelae, especially in resource-poor countries where patients present with advanced disease and survivors often have complications that are serious and long-lasting.

Clinical Pearls

• What is the most common origin of acute bone infection in children?
  Bacteria may reach bone through direct inoculation from traumatic wounds, by spreading from adjacent tissue affected by cellulitis or septic arthritis, or through hematogenous seeding. In children, an acute bone infection is most often hematogenous in origin.
What laboratory measures and radiographic studies are most useful in the diagnosis of osteomyelitis in children?

Serum C-reactive protein (CRP) and procalcitonin levels are sensitive as diagnostic tests and useful in follow-up, but measurements of procalcitonin are more expensive and rarely outperform those of CRP, which are easily determined from a whole-blood finger-prick sample. Results of CRP testing are available within 10 minutes. Declining levels of CRP usually suggest a favorable response to treatment, even if the fever continues. Since the erythrocyte sedimentation rate increases rapidly but decreases significantly more slowly than the CRP level, it is less useful in monitoring the course of the illness. The “rat bite” in bone that is often seen in osteomyelitis becomes visible on plain radiography 2 to 3 weeks after the onset of symptoms and signs. A normal radiograph on admission to the hospital by no means rules out acute osteomyelitis. Scintigraphy is sensitive and useful, especially if a long bone is affected or symptoms are poorly localized. Although computed tomography (CT) is useful, it is cumbersome and entails significant radiation exposure. Magnetic resonance imaging (MRI) is often considered the best imaging method, especially in difficult-to-diagnose cases.

Morning Report Questions

Q: How is acute osteomyelitis managed empirically in children?

A: Treatment of acute osteomyelitis is almost always instituted empirically without knowledge of the causative agent and its resistance pattern. The most relevant antibiotics must have an acceptable side-effect profile when administered orally because the doses are unusually large. Absorption and penetration into the bony structure should be satisfactory, and time-dependent antibiotics with a short circulating half-life are likely to require frequent dosing. Clindamycin and first-generation cephalosporins fulfill these requirements. Their efficacy as monotherapy for osteomyelitis has been documented, and large doses usually have an acceptable side-effect profile. The side-effect profile of clindamycin in children is
acceptable; diarrhea is very rare, but rash sometimes develops. Treatment with antistaphylococcal penicillins has also been shown to be effective and safe, albeit in noncomparative or small prospective trials.

**Table 1. Antibiotic Treatment for Acute Osteomyelitis in Children.**

*Q: What are current recommendations for the duration of treatment in children with acute osteomyelitis, and what complications are more common with MRSA (methicillin resistant Staphylococcus aureus) infections than MSSA (methicillin sensitive S. aureus) infections?*

*A: Current clinical-practice guidelines of the Infectious Diseases Society of America recommend individualized therapy and typically a minimum of 4 to 6 weeks of medication for children with acute osteomyelitis due to MRSA. Pathologic fractures are associated with a type of MRSA that is characterized by a single pulsed-field pattern (strain USA300-0114), but even a fracture does not necessarily warrant surgical intervention. As compared with MSSA, MRSA is more frequently associated with deep-vein thrombosis, septic pulmonary emboli, or both.*