Osteoarticular Infections in Children

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KEYWORDS

• Pediatric • Osteoarticular infection • Acute bacterial osteomyelitis
• Acute bacterial arthritis • Septic arthritis • Hematogenous • C-reactive protein (CRP)

KEY POINTS

- Pediatric bone and joint infections peak at a rate of 80 per 100,000.
- Osteomyelitis and septic arthritis have a distinct profile of pathogens, age group affected, and duration of therapy, so consideration as separate entities is reasonable.
- Early diagnosis and treatment of osteoarticular infections is important to minimize complications.
- A thorough history and physical examination is critical to diagnose bone and joint infections.
- Laboratory evaluation should include, at a minimum, a complete blood count, blood culture, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP).
- Empiric therapy should target *Staphylococcus aureus* (methicillin susceptible and resistant) as the most common pathogen.
- Initial intravenous courses of antibiotic therapy are usually short: 3 to 7 days in most cases.
- Clinical examination, fever, and CRP dictate the duration of therapy and need for additional debridement surgery.

INTRODUCTION

Disease Description

Acute bacterial osteomyelitis (ABO) and acute bacterial arthritis (ABA) occur when a bacterial infection of the bone or joint occurs and are manifested most often by fever and pain or inability to use the affected limb. Although traumatic infections do occur,

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hematogenous ABA/ABO are much more common. The likely pathogenesis of acute hematogenous osteomyelitis in children is the simultaneous occurrence of occult bacteremia and an anatomic susceptibility to bacterial invasion of the well-vascularized metaphysis (most often of the long-bones) in children.[1–4] Between 15% and 50% of osteoarticular infections involved both the joint and the bone (**Fig. 1**).[5–7] Transphyseal vessels may allow direct invasion of the joint, and the joint may become infected as a result of infection of the adjacent metaphysis, which is intra-articular in young children.[7] These combined ABO + ABA infections tend to be more serious, with higher levels of inflammatory markers, more sequelae, and longer treatment courses.[5,7,8]

In 2015, the organisms for which a child is most likely to be bacteremic are also the most common organisms that cause ABO and ABA. Specifically, *S aureus*, methicillin susceptible (MSSA) and methicillin resistant (MRSA), have been the most commonly cultured organisms during the past 4 decades.[9,10] Before an effective vaccine, *Haemophilus influenzae*, type B, was the second most common cause of ABA,[10] although it is now rarely reported in well-immunized populations. *Kingella kingae* is an oral gram-negative bacterium, and descriptions of this fastidious organism causing ABO and ABA have been increasingly common because of better culture techniques, inoculating sterile body fluids into blood culture bottles, and advancing molecular techniques. A study suggested that by using molecular diagnostic methods, *K kingae* actually supplanted *S aureus* as the most common pathogen in ABO/ABA,[11] especially in children aged 1 to 2 years (**Fig. 2**). The list of pathogens is rounded out by less frequent but consistent isolation of *Streptococcus pyogenes, Streptococcus pneumoniae*, and even less commonly gram-negative enteric organisms such as *Salmonella* species and *Escherichia coli*. **Table 1** lists less common infections and possible exposures associated with them.

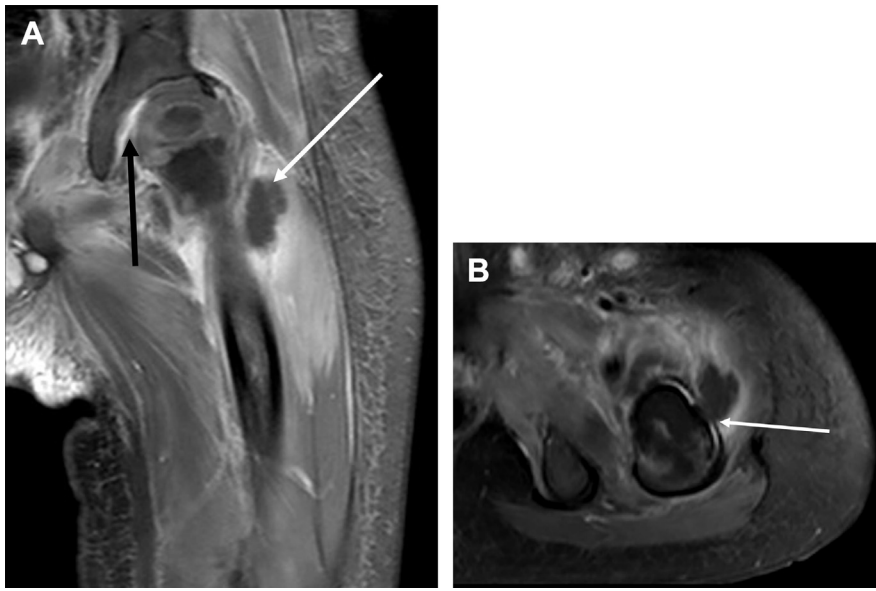

Fig. 1. (*A*) Coronal MRI of the hip. T1-weighted image of a child with osteomyelitis, arthritis (*black arrow* directed at joint effusion), and pyomyositis (*white arrow*) of the hip, caused by MRSA. (*B*) Axial MRI of the hip. T1-weighted image of the same child. In the axial image, the continuity of the proximal femur metaphysis and the adjacent abscess is appreciated (*white arrow*).