Blank Children's Hospital
UnityPoint Health

Clinical Pathway for Evaluation/Treatment of Children with Suspected Musculoskeletal Infection

Exclusion Criteria:

- Septic shock
- Necrotizing fasciitis
- Recent known MSK infection
- Chronic MSK infection (>6 weeks)
- >4 joint involvement
- Post-op infection
- Infection associated with surgical hardware
- Infection associated with foreign body
- Concern for vertebral osteomyelitis
- Infections from penetrating trauma
- Decubitus ulcers
- Sickle cell disease
- Neonates

Concerning Signs and Symptoms:

- Painful fixed joint
- Point tenderness, warmth, or swelling over the bony metaphysis
- Hip rests in a position of flexion, abduction, and external rotation
- Constitutional symptoms
- Fever >38C (100.4F) **Absent in 1/3 of cases**
- Limb pain in absence of trauma
- Refusal to bear weight or use an extremity
- Previous health care visit for the same problem

Risk Factors for *Kingella kingae*

- 6 months-4 years
- Indolent course, frequently >3 days of symptoms
- Well-appearing
- May have preceding viral URI or gastritis
- Often attends daycare

Risk Factors for MRSA

- Personal history of MRSA
- Family history of MRSA
- Recent or frequent hospitalization
- Recurrent skin boils

Risk Factors for Lyme Disease

- Mono– or oligoarticular large joint arthritis (most commonly knee) with joint swelling out of proportion to pain or disability
- Known tick bite OR significant outdoor exposure to wooded areas

*Children of all ages can be affected but most common from 5-9 years

*Occurs throughout the year

*Not having history of tick bite DOES NOT rule out Lyme arthritis

Initial Evaluation:

Complete history and physical exam

Obtain plain radiographs of the affected area AND joint ultrasound if suspected effusion

Order and review the following labs:

-CBC and differential

-Blood culture

-CRP AND ESR (Procalcitonin is ***not*** recommended)

-Consider Lyme serologies (Lyme serology IgG/IgM Lab2593) in patients with risk factors (see left bottom box)

*The combination of elevated CRP and refusal to bear weight may increase the probability of MSK infection. CRP alone has insufficient sensitivity and specificity.

*Kocher Criteria only applies to concern for septic hip. (PIDS/IDSA 2021, 2023)

Is the clinical presentation still concerning for MSK infection?

No → Consider alternative diagnoses. Recommend follow-up in 24-48 hours if discharged

Yes

NON-HIP joint affected:

- **Consult orthopedics from ED for bedside tap.**
- **Provide sedation** as needed for procedure.
- **Start antibiotics** once sample collected
- **Joint aspirate labs (see below)**
- **Admit for IV antibiotics, MRI, and further management**
- **Consult Infectious Disease**

HIP joint affected:

- **Consult orthopedics from ED.**
- **Admit** for MRI ± hip tap. Await antibiotic administration unless patient is ill-appearing.
- **Consult Interventional Radiology.** MRI ± hip tap will be arranged by IR to determine timing of all procedures with sedation. (IR Consult order: MRI ± hip tap with sedation; Hip aspiration labs at same time)
- **Consult Peds Sedation** to coordinate with IR.
- **Joint aspirate labs (see below)**
- **Consult Infectious Disease**

JOINT ASPIRATE LABS (volume needed for testing):

In order of preference

- **Culture,** body fluid (LAB269) (0.5ml)
- Body fluid **cell counts**(LAB210) (0.5ml)
- **Kingella** PCR (LAB2608) *if risk factor for Kingella*
- Culture body fluid, **automated** (LAB2847) (3-10ml)
- **HOLD** additional specimen for further testing if needed by infectious disease

CELL COUNT INTERPRETATION

≥50,000: Suggestive of bacterial septic arthritis

<50,000: Consider septic arthritis (including *K. kingae*, Lyme arthritis) AND other non-infectious etiologies depending on clinical setting

Woods et al. Clinical Practice Guideline: 2021 Acute Hematogenous Osteomyelitis. IDSA.
Woods et al. Clinical Practice Guidelines: 2023 Acute Bacterial Arthritis. IDSA

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ANTIBIOTIC SELECTION FOR SUSPECTED MSK INFECTION (>1 month of age)

Delay antibiotics until specimen obtained unless clinically worsening

No risk factor for MRSA:

- Cefazolin 100-120 mg/kg/day divided every 8 hours (max: 2g/dose)

Risk factors for MRSA:

- **Hemodynamic stability:** Clindamycin 40mg/kg/day divided every 8 hours (max: 600mg/dose)
- **Hemodynamic instability:** Vancomycin 15mg/kg/dose every 6-8 hours (max: 2000mg/day)

Documented bacteremia:

- **MSSA known:** Cefazolin 100-120 mg/kg/day divided every 8 hours (max: 2g/dose)
- **MRSA known:** Vancomycin 15mg/kg/dose every 6-8 hours (max: 2000mg/day)
- **Organism unknown:** Vancomycin 15mg/kg/dose every 6-8 hours (max: 2000mg/day)

For patients with special consideration (e.g. Sickle cell disease, hardware or device related infection, critically ill, malignancy, immunosuppression, etc.) consultation with Infectious Disease is recommended for antimicrobial selection

DURATION:

Requires at least 2-3 weeks (septic arthritis) or 4 weeks (osteomyelitis). Final duration to be determined by peds ID at outpatient follow-up.

POST-OPERATIVE MANAGEMENT

-Daily Blood culture **while febrile**

-CBC with differential and CRP **while febrile AND until trending to normal**

Notes about imaging

MRI has the highest sensitivity and specificity to detect early bone infection within 3-5 days of onset. A negative MRI result is sufficient for the exclusion of disease if symptoms have been present for at least one week. The use of IV contrast does not improve the detection of disease but helps provide the distinction between a phlegmon, necrotic tissue, and abscess. A CT scan is more used to determine the extent of bony destruction (especially in the spine) to guide biopsies or in patients with contraindications to MRI.

Woods et al. Clinical Practice Guideline: 2021 Acute Hematogenous Osteomyelitis. IDSA.

Woods et al. Clinical Practice Guidelines: 2023 Acute Bacterial Arthritis. IDSA