# ANMC Pediatric Acute Hematogenous Septic Arthritis/Osteomyelitis Guideline

## Signs and Symptoms
- **Fever**
- **Joint warmth, swelling, and/or tenderness** (Frequency: Knee>hip>ankle>elbow>shoulder)
- **Refusal to bear weight or range extremity**
- **Pseudo-paralysis in infants**

## Initial Work Up
- Labs:
  - CBC, ESR, CRP
  - Blood culture if non-weight bearing and febrile
- Radiology:
  - X-Rays of the affected area

## Kocher Score for Septic Arthritis

### Assign 1 point each:
- **Non-weight bearing**
- **Temperature >101.3F (38.5 C)**
- **ESR >40mm/hr or CRP >2.0 mg/dL**
- **Peripheral WBC >12,000 cells/mm³**

## Kocher Score Interpretation

### Risk of Septic Arthritis

<table>
<thead>
<tr>
<th>Score</th>
<th>Risk of Septic Arthritis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>3</td>
<td>93%</td>
</tr>
<tr>
<td>4</td>
<td>99%</td>
</tr>
</tbody>
</table>

### Initial Management of Kocher Score ≥2

**Urgent diagnosis and management is critical to prevent long-term joint damage.**

- Make NPO and start IV fluids
- Collect blood culture if not already obtained
- Consult orthopedics immediately
- STAT MRI* with contrast of wide region of suspicion
- Aspiration considered for joint effusion
- Surgical drainage considered for: sub-periosteal abscess, intramedullary abscess, soft tissue abscess or necrotizing fasciitis, septic joint.
  - If NO SURGERY: consider needle aspiration of joint effusion or area of osteomyelitis
- Send sample for cell count, gram stain, and culture.
- **Initiate empiric antibiotics as soon as culture is obtained.**
- Admit to the hospital including infectious disease consult
- **Narrow to targeted antibiotic therapy based on specimen results**

### Initial Management of Kocher Score ≤1

- Candidate for close outpatient observation
- Ibuprofen 10 mg/kg q6h PRN pain
- Repeat workup if no improvement or worsening in 2-3 days

**Synovial fluid WBC Counts Typically Seen in Septic Arthritis:**
- >25,000 cells/microL (hip), >50,000 cells/microL (all other joints)
- PMN predominance

## Antibiotic Selection

**Common Organisms:** *Staphylococcus aureus*, *Beta-hemolytic Streptococci*, *Haemophilus influenza a*, *Kingella kingae*

### Initial Therapy

<table>
<thead>
<tr>
<th>Empiric therapy*</th>
<th>Preferred Therapy</th>
<th>Type I PCN allergy</th>
<th>IV to PO Conversion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vancomycin</strong></td>
<td>Initial dose 15 mg/kg/dose IV q6h (Max 4g/day; pharmacy will manage dosing)</td>
<td>*</td>
<td>Afribele x48h</td>
</tr>
<tr>
<td><strong>AND</strong></td>
<td><strong>Ceftiraxone</strong></td>
<td>100 mg/kg/day IV q24h (Max 2g/dose)</td>
<td>CRP &lt;3 mg/dL</td>
</tr>
<tr>
<td><strong>AND</strong></td>
<td><strong>Gentamicin</strong></td>
<td>5-7.5 mg/kg/day IV (pharmacy will manage dosing)</td>
<td>Susceptibility of organism reveals adequate oral therapy option</td>
</tr>
</tbody>
</table>

### Treatment Duration and Follow-up

#### Septic Arthritis
- At 3 week visit: CBC, ESR, CRP and x-ray
- If evidence of osteomyelitis by x-ray or ESR >20 mm/hr or CRP >1 mg/dL, extend therapy to 6 weeks
- End of therapy: Stable x-ray, ESR <20mm/hr, CRP <1mg/dL

#### Osteomyelitis
- At 3 week visit: CBC, ESR, CRP
- At 6 week visit: CBC, ESR, CRP and x-ray
- End of therapy: Stable x-ray, ESR <20mm/hr, CRP <1mg/dL

## Considerations

* If sedation required for MRI, with appropriate coordination MRI and surgery can often be performed under one anesthesia

* If delay to antibiotics of >6 hours, consider empiric antibiotics in discussion with orthopedics and pediatrics

*Empiric antibiotics selected to cover MRSA, MSSA, beta-hemolytic streptococci, Haemophilus influenza a, Kingella, and enteric GNRs

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ANMC Pediatric
Acute Hematogenous
Septic Arthritis/Osteomyelitis
Guideline
-Initial Management Flow Diagram-

For information including Kocher score, dosages, specimen interpretation, and ongoing management see the accompanying table format guideline.

Clinical Concern for Septic Arthritis/Osteomyelitis

Hemodynamically stable?
Yes

Place PN
Draw Blood Culture, CBC, CRP, ESR
Sepsis shock resuscitation per PALS guidelines

Consult orthopedics immediately

Evaluate for possibility of immediate joint aspiration

Possible to immediately get a culture by aspiration?
Yes

Consider needle aspiration of joint effusion or area of osteomyelitis

Start EMPIRIC ANTIBIOTICS

No

No

Blood culture (if non-weight bearing + febrile)
X-ray affected area

Calculate Kocher Score
Score 0-1

Score 2-4

Draw blood culture if not already obtained

Consult Orthopedics immediately and Arrange for STAT MRI*

Stat MRI* with contrast of wide region of suspicion

Consider emergent surgical incision and drainage

Joint Effusion?
Yes

Aspirate joint and send for STAT cell count, gram stain, and culture

Start EMPIRIC ANTIBIOTICS as soon as culture is obtained

Interpret Specimen Results

TARGETED ANTIBIOTICS

No

Send specimens for STAT cell count, gram stain, and culture

Imaging and surgical incision and drainage as soon as safely possible

Goal 1: Obtain sample prior to starting antibiotics if patient stable
Goal 2: Start empiric antibiotics as soon as possible after specimen collection
Goal 3: Transition to targeted antibiotics as soon as possible based on specimen results

Empiric Antibiotics:
Preferred Therapy: Vancomycin + Ceftriaxone
Type I PCM Allergy: Vancomycin + Gentamicin
Targeted Antibiotics: Based on gram stain and culture

*If requires sedation for MRI consult anesthesia for sedation with goal of MRI + surgery to be performed under one sedation.
If delay MRI of >6 hours consider EMPIRIC ANTIBIOTICS in discussion with orthopedics and pediatrics.