CLINICAL PATHWAY:
Osteomyelitis

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.

Inclusion Criteria: Age >2 months with suspicion for acute osteoarticular infection (<4 weeks since symptom onset)
Exclusion Criteria: Age ≤2months, chronic osteomyelitis (≥4 weeks from symptom onset), suspected skull (including orbital) or vertebral osteomyelitis, infection surrounding open fracture or hardware, immunocompromised patients, concern for septic shock (see Septic Shock Clinical Pathway)

Initial Evaluation
- **History & physical exam:** consistent with acute osteoarticular infection[1]
- **Labs:** CBC with diff, CRP, ESR, CMP, blood culture
- **Initial imaging:** 2-view x-rays of affected area
- **Make NPO** for possible surgical procedure
- **Hold empiric antibiotic coverage** until imaging completed (if patient stable, may hold up to 48 hours), unless ***ill-appearing/ concern for sepsis/hemodynamic instability*** (should be treated per Septic Shock Clinical Pathway) or positive blood culture

[1]**High Suspicion for Osteomyelitis**
- Fever
- Focal pain and/or decreased function/ weight-bearing of affected area
- Localized edema, tenderness, erythema, and/or warmth on exam
- Superficial infection (i.e., cellulitis) not improving as expected
- ↑ CRP and/or ESR

High suspicion for osteomyelitis[1]?
- No → Treat off pathway. Consider alternative diagnosis (e.g., septic/ reactive arthritis, Lyme arthritis, myositis, fracture, malignancy, etc).
- Yes

Consultations in the Emergency Department (ED):
- Orthopedics ASAP to guide imaging; Infectious Diseases (ID) if positive blood culture or imaging consistent w/osteo

Imaging:
- MRI with and without gadolinium contrast of region of suspicion, per Orthopedics
  - *If sedation is required for MRI*: coordinate with Orthopedics (who will discuss with Anesthesia) so that a potential surgical procedure can occur while the patient is still under sedation
- *If high suspicion for septic joint*: consider joint ultrasound while awaiting MRI, per Orthopedics

Evidence of osteomyelitis on imaging (or high suspicion of osteo but unable to obtain imaging in the ED)?
- No → Treat off pathway. Consider alternative diagnosis. Consider discharge with close PCP follow-up.
- Yes

Admit to Pediatric Hospital Medicine (PHM) service
If sickle cell disease or other hemoglobinopathy present, admit to Heme/Onc.
Consult Infectious Diseases (ID) once imaging confirms osteomyelitis, if not already done.

Antibiotics

Empiric Antibiotic Coverage
[Target: MSSA (most common), MRSA, *Strep pyogenes, Strep pneumoniae, Kingella* (≤4 yrs)]

Antibiotic Timing:
- **Obtain blood culture before antibiotics**
- Discuss timing of antibiotics with ID:
  - Hold antibiotics until after surgery if surgery done≤48 hours after admission
  - Give antibiotics immediately if surgery is not indicated, surgery is delayed >48 hours, or if blood culture is positive

Antibiotic Selection:
- *If no known history of MRSA*:
  - *Preferred:* **Cefazolin IV** 150 mg/kg/day div q8hr (max 6 g/day)
  - *Alternatives:*
    - *If bone abscess:* Nafcillin 200 mg/kg/day div q6hr (max 8 g/day)
    - *If cefazolin allergy:* consider nafcillin, another cephalosporin, or clindamycin (consult ID and pharmacy)
- *If history of MRSA* **or** *suspicion for Salmonella or other less common pathogens:* discuss with ID

Ongoing Antibiotic Management
- [2]*If blood culture positive*: adjust antibiotics according to BioFire BCID PCR and/or blood culture sensitivities per ID guidance

Assessment

Labs:
- Repeat CBC w diff after 48 hours, then PRN
- Trend CRP q48hrs
- *If blood culture positive*[2]: repeat blood culture after 36-48 hours to document sterility

Assess for risk of acute and chronic complications when repeat CRP is available at 48-96 hours after starting antibiotics
- Use A-SCORE and C-SCORE in Appendix A

Low risk for acute **and** chronic complications?
- Yes (A-SCORE ≤4 **and** C-SCORE ≤3?)
- No (A-SCORE >4 **or** C-SCORE >3)

Surgical Management

Indications for surgical drainage/debridement or IR drainage:
(ideally <24 hours after admission and before antibiotics; diagnostic and therapeutic)
- bone abscess (≥1cm); smaller abscess may warrant drainage on case-by-case basis
- subperiosteal abscess
- associated muscle or soft tissue abscess (≥1cm)
- septic arthritis
- sequestrum or necrotic bone
- need for rapid source control (e.g., sepsis, rapidly progressive disease, persistent bacteremia, or failure to respond to antibiotic therapy)

Studies to send *(confirm w/ID prior to OR/IR):*
- Aspirated fluid/pus in sterile cup for gram stain and aerobic/anaerobic cultures
- Tissue for pathology and culture
- If ≤4 years old: Innoculate a portion of pus into aerobic blood culture bottle using sterile technique to check for *Kingella*

Discharge criteria for PO antibiotic course:
Afebrile >24 hrs; improving pain and function; CRP ≤50% of maximum value

Outpatient Medications (consider trial of PO antibiotic before discharge for young children):
Final antibiotic selection based on response to inpatient antibiotic, micro results and ID recs. Minimum duration 3-4 weeks.
- Cephalexin 100-150 mg/kg/day div TID depending on severity of infection (max 1.5 g/dose: 4.5 g/day if div TID; for large adolescents up to 6 g/day div QID) **or** Clindamycin 30 mg/kg/day div TID (max 1.8 g/day)
- If no PICC in place: offer probiotics

Disposition
- Follow up: ID within 7-10 days; orthopedics within 2-4 weeks
- If discharged on IV antibiotics, order weekly labs: CBC with diff, CMP, ESR, CRP
  - Fax to ID Department at 860-545-9371 with name of ID attending
- Long term follow up at orthopedics for detection of possible sequelae, including ≥1 year if C-SCORE ≥4

Not yet eligible for PO antibiotics
- Consider: repeat MRI; surgical drainage/ culture; antibiotic changes per ID; PICC for prolonged antibiotics
- ID to determine ideal timing to change to PO antibiotics on case-by-case basis

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Acute and Chronic Scores for Complications of Osteomyelitis Risk Evaluation

A-SCORE: Acute Score for Complications of Osteomyelitis Risk Evaluation *(≤4 has negative predictive value of ≥91%)*	
Complication	**A-SCORE Points**
Bone abscess	**2**
Prolonged fever > 48 hours after starting antibiotics	**2**
Suppurative arthritis	**3**
Disseminated disease[1]	**4**
Delayed source control[2]	**4**
Maximum score	**15**
A-SCORE interpretation	≤4 = low risk for acute complications

C-SCORE Chronic Score for Complications of Osteomyelitis Risk Evaluation *(≤3 has negative predictive value of ≥95%)*	
Complication	**C-SCORE Points**
CRP ≥ 10mg/dL at 2-4 days after starting antibiotics	**1**
Disseminated disease[1]	**1**
Bone drainage/debridement	**2**
Maximum score	**4**
C-SCORE interpretation	≤3 = low risk for chronic complications

[1]**Disseminated disease**: multifocal infection, pneumonia, septic pulmonary embolism, deep vein thrombosis, or endocarditis
[2]**Delayed source control**: >72 hours after admission

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