ED/INPATIENT GUIDELINE

SUSPECTED MUSCULOSKELETAL (MSK) INFECTION

Includes acute hematogenous osteomyelitis, septic arthritis and deep (pelvic, hip) pyomyositis in patients ages 6 mo–18 yr

Children's MINNESOTA

Aim: To decrease variation in management of patients with musculoskeletal infections.

Patients referred into system with definite diagnosis of MSK infection should be directed to **Minneapolis campus**

CONCERN FOR MUSCULOSKELETAL INFECTION?

DO:

- Make patient NPO
- Obtain labs including CBC with diff, CRP, ESR, blood cx, BMP (for creatinine). Consider Lyme, strep testing.
- Obtain imaging: Plain films, possibly US (if hip). MRI recommended even for septic joints, radiology + ortho to discuss contrast need.
- If isolated joint swelling, if it is felt that an initial joint tap may be warranted, discuss with ortho.
- Manage pain (NSAIDS ***are*** ok to use)
- Administer IV fluids if needed
- **Call ortho early — *must call prior to obtaining diagnostic MRI***

DON'T: Give antibiotics unless instructed by Ortho, or ill-appearing

Likelihood of musculoskeletal infection

Low (or unsedated MRI feasible)

Medium/High (or sedated MRI needed)

MRI or admit to short stay, depending on MRI and bed availability

MSK infection?

Yes

No

Off guideline

- Consult Ortho, including decision about transfer to Minneapolis
- Explore MRI availability
- Transfer to Minneapolis campus if MRI available
- Ortho to speak with radiologist re: MRI strategy
- Ortho to coordinate OR options if indicated

- Admit to inpatient
- To OR with Ortho if indicated
- Start antibiotics (discuss with ortho first)
  - After bone/joint fluid cultured
  - If significantly ill-appearing
  - If no OR planned in > 12 hours

EXCLUSION GUIDELINES

Patients **excluded** from this guideline:

- ≥ 14 days of symptoms
- Critically ill
- Immunodeficiency
- Sickle Cell disease
- Trauma
- Post operative infection
- Skull/vertebral, hand/foot infection
- Concern for necrotizing fasciitis or unusual organism

INPATIENT GUIDELINE

MUSCULOSKELETAL (MSK) INFECTION

Includes acute hematogenous osteomyelitis, septic arthritis and deep (pelvic, hip) pyomyositis in patients ages 6 mo–18 yr

Children's MINNESOTA

Aim: To decrease variation in management of patients with musculoskeletal infections.

See page 1 (ED/Inpatient guideline) for details on exclusions and initial workup

Admit to hospitalist service with Ortho and ID consults

- Use "Pediatric Musculoskeletal Infection Admission" Orderset
- RN to give MSK infection guide to patient/caregiver

- Initiate empiric antibiotic therapy once instructed by Ortho
- Assess for risk of DVT

Daily care:

- Monitor fever curve
- Labs: CRP every other day at 0500
- Determine need for NPO status (generally found in Ortho daily notes or updates)
- Ortho to make decision about surgery by 0830 daily (via labs, fever trend, exam, imaging) and communicate to primary team. Will also indicate recommendations in daily note.
- Multidisciplinary bedside rounds if feasible
- DVT prophylaxis as indicated
- PT when appropriate

Cefazolin
40 mg/kg/dose (max 2000 mg/dose) IV Q8H

Antibiotic Special Scenarios

- Add Vancomycin 20 mg/kg IV q8h (Max 1250mg/dose initially) if clinically deteriorating
- Add Clindamycin 13 mg/kg/dose IV q8h (max 900 mg/dose) if known MRSA carrier, history of MRSA abscesses in the family, recently or frequently hospitalized
- Confer with ID for antibiotic selection on patients at risk for non-staph/strep pathogens (e.g., sickle cell disease - Salmonella; underimmunized for age - H. flu; risk of gonorrhea)

Adjust antibiotics based on bone and blood culture results

Negative cultures
See page 3 (Note 1)

Positive cultures
See page 4

D/C planning:

- ID follow-up within 1 week
- Ortho follow-up per ortho team
- DME (crutches, wheelchair if indicated)
- Physical therapy at discretion of orthopedist
- Child life oral med teaching (start 48 hr prior to anticipated discharge)

D/C criteria (and consider for oral therapy):

- Completed minimum 72 hr IV antibiotics
- Significant decline in CRP
- Afebrile x 48 hr
- Most recent blood cultures negative x 48 hr
- Regaining use of involved extremity
- Demonstrates oral intake including meds
- No further surgery planned
- No barrier to outpatient care

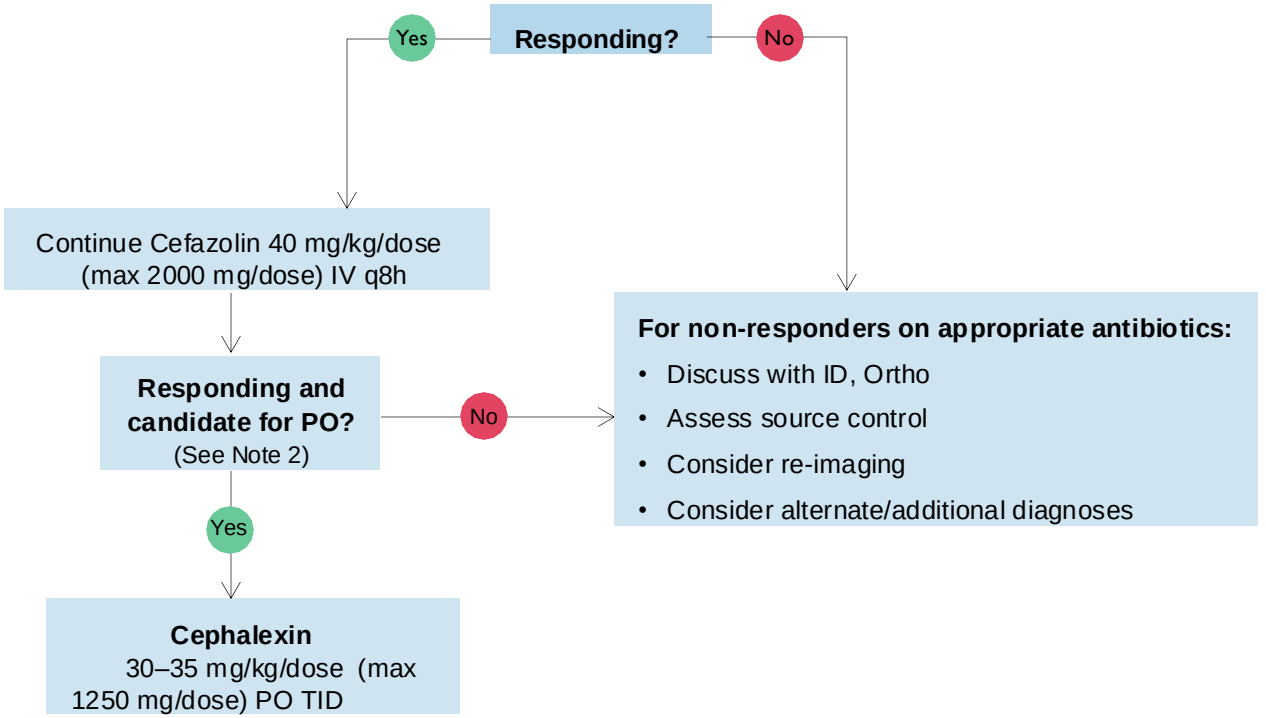
INPATIENT GUIDELINE

MUSCULOSKELETAL (MSK) INFECTION

Antibiotics at 72 hours if: No organism identified on any culture; on Cefazolin monotherapy *(See Note 1)*

Children's MINNESOTA

Aim: To decrease variation in management of patients with musculoskeletal infections.



NOTE 1.

Consider transition to oral antibiotics if:

- Completed minimum 72 hr IV antibiotics
- Significant decline in CRP
- Most recent blood cultures negative x 48 hr
- Afebrile x 48 hr
- Regaining use of involved extremity
- Demonstrates oral intake including meds
- No further surgery planned
- No barrier to outpatient care

INPATIENT GUIDELINE

MUSCULOSKELETAL (MSK) INFECTION

Antibiotics at 48 hours (organism identified on culture)

Children's MINNESOTA

Aim: To decrease variation in management of patients with musculoskeletal infections.

MSSA, Group A Strep, Kingella

- Continue Cefazolin
- Discontinue Vancomycin (if applicable)

Responding and candidate for PO? (See Note 3)

- No → **For non-responders on appropriate antibiotics:**
- Yes → **Cephalexin** 30-35 mg/kg/dose (max 1250 mg/dose) PO TID

MRSA sensitive to Clindamycin

- Discontinue Cefazolin
- Change Vancomycin to Clindamycin 13 mg/kg/dose IV q8h (max 900 mg/dose) (See Note 2)

Discuss antibiotic plan with ID

- No → **For non-responders on appropriate antibiotics:**
- Yes → **Clindamycin** 10 mg/kg/dose POTID (max 600 mg/dose)

MRSA resistant to Clindamycin

- Continue Vancomycin
- Discontinue Cefazolin

Discuss antibiotic plan with ID

For non-responders on appropriate antibiotics:

- Consult with ID, Ortho
- Assess source control
- Consider re-imaging
- Consider alternate/additional diagnoses

NOTE 2.
Only change from Vanco if most recent blood cultures negative x 48 hours and good source control.

NOTE 3.
Consider transition to oral antibiotics if:

- Completed minimum 72 hr IV antibiotics
- Significant decline in CRP
- Most recent blood cultures negative x 48 hr
- Afebrile x 48 hr
- Regaining use of involved extremity
- Demonstrates oral intake including meds
- No further surgery planned
- No barrier to outpatient care

REFERENCES

1. Woods CR, Bradley JS, Chatterjee A et al. Clinical Practice Guideline by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of America: 2021 Guideline on Diagnosis and Management of Acute Hematogenous Osteomyelitis in Pediatrics. *J Pediatric Infect Dis Soc*. 2021 Sep 23;10(8):801-844.
2. Donaldson N, Sanders J, Child J et al. Acute Hematogenous Bacterial Osteoarticular Infections in Children. *Pediatr Rev.* 2020 Mar;41(3):120-136