

Include in the pathway

Suspected focal osteomyelitis or a single septic joint with symptoms including:

- Bone or joint pain (solitary)
- Limited ROM
- Limping, inability to bear weight
- Fever

Exclude from the pathway

- Any child with unstable vital signs
- Presumed multi-focal disease
- PICU admission
- History of puncture wound
- Infants less than 3 months of age
- Suspected vertebral, cranial or digital osteomyelitis
- Any child with serious co-morbidities

Patients should be considered for removal from the pathway if:

(Nursing staff should contact physician if any of the following apply)

- The blood culture is positive for a gram negative organism
- Two or more positive blood cultures 24 hours apart
- Persistent bacteremia > 24 hours despite appropriate antibiotics
- Unstable vital signs or clinical worsening
- Confirmed multi-focal disease

Criteria for Admission

- Suspected focal osteomyelitis or single septic joint

Criteria for Discharge

- Normalizing CRP (decrease by 50%) and decreasing WBC
- Afebrile for 48-72 hours
- Clinically improved
- Ambulating without pain or moving affected joint without pain
- Safe home environment with good compliance

Background Information:

Management:

- Aspiration should be done for all presumed septic joints.
- An orthopedic consult should be obtained immediately in the ED for suspected septic hip or shoulder for incision and drainage (surgical emergency) if painful, limited range of motion to a joint, WBC >12,000, ESR >40, CRP >2 or temperature >38.5° C.
- Needle aspiration or open biopsy is still the gold standard for diagnosis of osteomyelitis (consider for moderate or severe infection).
- Aspiration with >50,000 WBC is highly suggestive of bacterial infection
- 25,000 – 50,000 possible septic joint
- < 25,000 unlikely infectious, consider rheumatologic process
- All aspirations need cell count and differential, gram stain and culture with sensitivities.

Additional Considerations:**Osteomyelitis:**

Exposure to farm animals	<i>Coxiella burnetti</i>
Kitten exposure	<i>Bartonella</i>
Travel	<i>Mycobacterium tuberculosis</i>
Sinusitis/dental abscess	<i>Anaerobes</i>
South of Fresno	<i>Coccidiomycosis</i>
Daycare or oral ulcers (Children under age 5 years)	<i>Kingella kingae</i>

Arthritis:

Tick exposure	<i>Borrelia burgdorferi</i>
Rat exposure	<i>Streptobacillus moniliformis, Spirillum minus</i>
South of Fresno	<i>Coccidiomycosis</i>
Viral etiologies	<i>Rubella, Parvovirus B19, Varicella, Hepatitis B</i>

References:

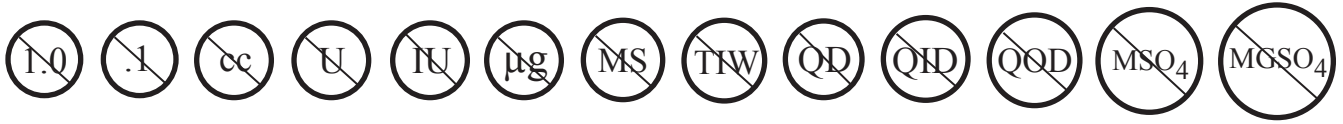
Septic Arthritis Clinical Practice Guideline, Boston Children's Hospital

Garcia-De La Torre, I. Advances in the Management of Septic Arthritis. Infectious Disease Clinic of North America, (2006) Volume 20.

Gutierrez, K. Bone and Joint Infections in Children. Pediatric Clinics of North America, (2005). Volume 52.

Krogstad, Paul. Treatment of Hematogenous Osteomyelitis in Children. Up to Date, September 2006.

Reviewed with J. McCarty, MD and D. Pugatch, MD 8/10 and 10/10



DRUG SENSITIVITY: _____ WT: _____ kg
ORDERS: GENERIC EQUIVELANT WILL BE DISPENSED UNLESS ORDER SPECIFIES "DO NOT SUBSTITUTE"

General

Admitting physician: _____
Attending physician: _____
Primary service: Hospitalist Team A Team B _____
Patient Status: Admit Observation
Admission Diagnosis: Suspected focal osteomyelitis Suspected single septic joint
Condition: Stable
Code status: Full Code or _____
Isolation: CONTACT
 Pediatric Bone and Infection Pathway

Dietary

Regular diet.

Medications: IV Antibiotics

- Clindamycin 13 mg/kg (max = 900 mg) IV every 8 hours
- Ceftriaxone 50 mg/kg IV every 24 hours (max = 2000 mg) (Consider if Kingella or gonococcal infection is suspected)

Medications: PO Antibiotics

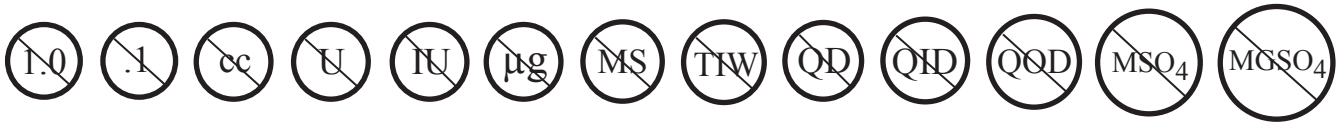
Text box: For oral antibiotics, consider Clindamycin for MRSA or Cephalexin for MSSA.

- Clindamycin 13 mg/kg PO TID
- Cephalexin 33 mg/kg PO TID
- Rifampin 5 mg/kg (max = 300 mg) PO BID

Medications: Pain Control

- Acetaminophen 15 mg/kg (max = 650 mg) PO every 4 hrs PRN T > 38.0 C-38.9 C or mild pain (max dose= 75 mg/kg/day or 4000 mg/day, whichever is less). If patient's temperature remains above 38.0 C one hour after administration, then give Ibuprofen.
- Acetaminophen 15 mg/kg (max = 650 mg) PR every 4 hrs PRN T > 38.0 C-38.9 C or mild pain (max dose= 75 mg/kg/day or 4000 mg/day, whichever is less). If patient's temperature remains above 38.0 C one hour after administration, then give Ibuprofen.
- Ibuprofen 10 mg/kg (max = 600 mg) PO every 6 hrs PRN T > 38.9 C or moderate pain. If patient's temperature remains above 38.0 C one hour after administration, then give Acetaminophen.
- Morphine 0.1 mg/kg (max = 8 mg) IV every 4 hrs PRN severe pain (Nurse to contact physician for unrelieved pain)





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Nursing Care

- Saline lock PIV
- PICC line evaluation
- RN Communication, Medication: **Criteria for switching IV antibiotics to po:**
 - o Minimum 7 days of IV antibiotics if positive blood culture
 - o Minimum 4 days of IV antibiotics if negative blood culture
 - o Normalizing CRP (decrease by 50%)
 - o Tolerating po intake
 - o Ambulating without pain or moving affected joint without pain
 - o Stable home situation with good compliance
 - o Afebrile for 48-72 hours
 - o Clinically improved
 - o Decreasing WBC

Nursing Care

- If lower extremity involved change activity to bed rest with BR privileges.
- Activity: no restrictions.
 - Activity: Bedrest with BRP

Labs

Unselect any labs or cultures that were done prior to admission.

- CRP Stat
- ESR Routine
- CBC with diff Stat
- CMP Routine

Micro

Text box: repeat blood cultures daily until negative.

- Blood culture Daily X 2.

Imaging

Text box: Reason for XR, US (hip or shoulder joints only) or MRI with IV contrast would be looking for radiolucency of bone suggestive of osteomyelitis or joint effusion suggestive of septic arthritis. Order additional images if indicated.

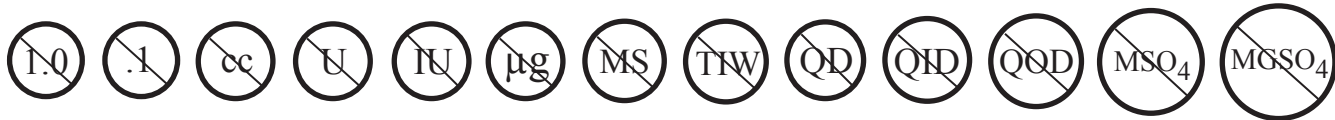
- Load outside imaging CD or films for secondary interpretation (OFI)
- Load outside imaging CD or films – no interpretation (COF)

Joint and Bone Infection

Patient Label

0032





DRUG SENSITIVITY: _____ WT: _____ kg
ORDERS: GENERIC EQUIVELANT WILL BE DISPENSED UNLESS ORDER SPECIFIES "DO NOT SUBSTITUTE"

Consults

Consider ID consult for abx choice, Orthopedic consult for surgical intervention and Case manager consult for home IV planning.

- Physical Therapy Consultation: _____.
- Case manager consultation. Reason: Home IV infusion.
- Provider Consult: Orthopedics. Surgeon: _____. Reason: possible aspiration of ____.
- Provider Consult: ID consult.. Provider: _____. Reason: _____.

Education

- Education, Pathway: Begin education materials regarding bone and joint infections with the family on admission.

Discharge planning

- RN Communication, DC Plan: Anticipate ID follow-up 1-2 weeks after discharge from CHCC on all patients. Orthopedics follow-up only if they were involved in inpatient care.

Interdisciplinary Patient/Family Learning Evaluation

Initial Patient/Family Learner Assessment

A learning evaluation is done with each initial teaching intervention for each learner. Teaching interventions should be documented in an ongoing manner with ongoing assessment and evaluation of readiness to learn, barriers to learning, and learning outcomes. Use your department or topic specific Interdisciplinary Patient/Family Education Documentation forms for ongoing patient/parent/family education documentation. Use this form for the initial assessment of a learner and keep this form with the ongoing patient/family education documentation forms.

Initial Learner Evaluation (assess one or multiple learners)			
1. _____ Date _____ (Pt./Primary care giver)	2. _____ Date _____ learner	3. _____ Date _____ learner	4. _____ Date _____ learner
Prior Knowledge of Plan of Care or care needs: <input type="checkbox"/> Comprehensive <input type="checkbox"/> Good <input type="checkbox"/> Limited <input type="checkbox"/> None <input type="checkbox"/> Other _____	Prior Knowledge of Plan of Care or care needs: <input type="checkbox"/> Comprehensive <input type="checkbox"/> Good <input type="checkbox"/> Limited <input type="checkbox"/> None <input type="checkbox"/> Other _____	Prior Knowledge of Plan of Care or care needs: <input type="checkbox"/> Comprehensive <input type="checkbox"/> Good <input type="checkbox"/> Limited <input type="checkbox"/> None <input type="checkbox"/> Other _____	Prior Knowledge of Plan of Care or care needs: <input type="checkbox"/> Comprehensive <input type="checkbox"/> Good <input type="checkbox"/> Limited <input type="checkbox"/> None <input type="checkbox"/> Other _____
Primary Language: check <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Hmong Other _____ <input type="checkbox"/> Writes <input type="checkbox"/> Reads	Primary Language: check <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Hmong Other _____ <input type="checkbox"/> Writes <input type="checkbox"/> Reads	Primary Language: check <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Hmong Other _____ <input type="checkbox"/> Writes <input type="checkbox"/> Reads	Primary Language: check <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Hmong Other _____ <input type="checkbox"/> Writes <input type="checkbox"/> Reads
Readiness to learn: check <input type="checkbox"/> Asking pertinent questions <input type="checkbox"/> Actively Listening <input type="checkbox"/> Unreceptive <input type="checkbox"/> No interest demonstrated <input type="checkbox"/> Distracted	Readiness to learn: check <input type="checkbox"/> Asking pertinent questions <input type="checkbox"/> Actively Listening <input type="checkbox"/> Unreceptive <input type="checkbox"/> No interest demonstrated <input type="checkbox"/> Distracted	Readiness to learn: check <input type="checkbox"/> Asking pertinent questions <input type="checkbox"/> Actively Listening <input type="checkbox"/> Unreceptive <input type="checkbox"/> No interest demonstrated <input type="checkbox"/> Distracted	Readiness to learn: check <input type="checkbox"/> Asking pertinent questions <input type="checkbox"/> Actively Listening <input type="checkbox"/> Unreceptive <input type="checkbox"/> No interest demonstrated <input type="checkbox"/> Distracted
Barriers to learning: check <input type="checkbox"/> No barriers <input type="checkbox"/> Low literacy or Edu level <input type="checkbox"/> Cultural <input type="checkbox"/> Language <input type="checkbox"/> Visual, hearing, speaking <input type="checkbox"/> Religious, spiritual <input type="checkbox"/> Cognitive <input type="checkbox"/> Emotional <input type="checkbox"/> Motivation <input type="checkbox"/> Pain or fatigue <input type="checkbox"/> Other _____ Accommodation: <input type="checkbox"/> Interpreter <input type="checkbox"/> Audio <input type="checkbox"/> Visuals <input type="checkbox"/> Handouts <input type="checkbox"/> Explanations <input type="checkbox"/> Demonstrations <input type="checkbox"/> Other	Barriers to learning: check <input type="checkbox"/> No barriers <input type="checkbox"/> Low literacy or Edu level <input type="checkbox"/> Cultural <input type="checkbox"/> Language <input type="checkbox"/> Visual, hearing, speaking <input type="checkbox"/> Religious, spiritual <input type="checkbox"/> Cognitive <input type="checkbox"/> Emotional <input type="checkbox"/> Motivation <input type="checkbox"/> Pain or fatigue <input type="checkbox"/> Other _____ Accommodation: <input type="checkbox"/> Interpreter <input type="checkbox"/> Audio <input type="checkbox"/> Visuals <input type="checkbox"/> Handouts <input type="checkbox"/> Explanations <input type="checkbox"/> Demonstrations <input type="checkbox"/> Other	Barriers to learning: check <input type="checkbox"/> No barriers <input type="checkbox"/> Low literacy or Edu level <input type="checkbox"/> Cultural <input type="checkbox"/> Language <input type="checkbox"/> Visual, hearing, speaking <input type="checkbox"/> Religious, spiritual <input type="checkbox"/> Cognitive <input type="checkbox"/> Emotional <input type="checkbox"/> Motivation <input type="checkbox"/> Pain or fatigue <input type="checkbox"/> Other _____ Accommodation: <input type="checkbox"/> Interpreter <input type="checkbox"/> Audio <input type="checkbox"/> Visuals <input type="checkbox"/> Handouts <input type="checkbox"/> Explanations <input type="checkbox"/> Demonstrations <input type="checkbox"/> Other	Barriers to learning: check <input type="checkbox"/> No barriers <input type="checkbox"/> Low literacy or Edu level <input type="checkbox"/> Cultural <input type="checkbox"/> Language <input type="checkbox"/> Visual, hearing, speaking <input type="checkbox"/> Religious, spiritual <input type="checkbox"/> Cognitive <input type="checkbox"/> Emotional <input type="checkbox"/> Motivation <input type="checkbox"/> Pain or fatigue <input type="checkbox"/> Other _____ Accommodation: <input type="checkbox"/> Interpreter <input type="checkbox"/> Audio <input type="checkbox"/> Visuals <input type="checkbox"/> Handouts <input type="checkbox"/> Explanations <input type="checkbox"/> Demonstrations <input type="checkbox"/> Other
Learning Preferences: <input type="checkbox"/> Demonstration <input type="checkbox"/> Written handouts <input type="checkbox"/> Verbal or audio <input type="checkbox"/> Video or TV <input type="checkbox"/> Hands on <input type="checkbox"/> Other _____	Learning Preferences: <input type="checkbox"/> Demonstration <input type="checkbox"/> Written handouts <input type="checkbox"/> Verbal or audio <input type="checkbox"/> Video or TV <input type="checkbox"/> Hands on <input type="checkbox"/> Other _____	Learning Preferences: <input type="checkbox"/> Demonstration <input type="checkbox"/> Written handouts <input type="checkbox"/> Verbal or audio <input type="checkbox"/> Video or TV <input type="checkbox"/> Hands on <input type="checkbox"/> Other _____	Learning Preferences: <input type="checkbox"/> Demonstration <input type="checkbox"/> Written handouts <input type="checkbox"/> Verbal or audio <input type="checkbox"/> Video or TV <input type="checkbox"/> Hands on <input type="checkbox"/> Other _____
Signature _____ Date _____	Signature _____ Date _____	Signature _____ Date _____	Signature _____ Date _____
Signature _____ Date _____	Signature _____ Date _____	Signature _____ Date _____	Signature _____ Date _____

Patient Label



0006
pathway

Patient/Family Learner Assessment



What is Osteomyelitis?

Osteomyelitis is an infection in a bone. Infection is more common in the long bones of the body, but it can be found in any bone in the body. Osteomyelitis can occur in children of any age. About half of all cases are in preschool children.

What causes Osteomyelitis?

Different types of bacteria and viruses can cause Osteomyelitis. The most common type of bacteria is called Staphylococcus Aureus. The bacteria can enter the body by:

- Open fractures – broken bones that break through the skin
- Foreign object that break through the skin
- Infected joints and wounds
- Infection that spreads from another place inside the body, such as ear infections
- Trauma or serious injury
- Hematogenous, (when bacteria in the blood is carried to the bone by blood vessels)

What are the symptoms?

The following are the most common symptoms of Osteomyelitis. However, your child may have different symptoms. Symptoms may include:

- Tenderness or pain in the infected area
- Your child may not use the infected body part much or at all
- Your child will try to protect it from being touched or seen
- Swelling and redness in the infected area
- Warmth around the infected area
- Fever

Get medical help right away if you think your child may have Osteomyelitis. The symptoms of Osteomyelitis may look like other conditions or medical problems. Always talk to your child's doctor for a diagnosis.

How is it diagnosed?

Your child's doctor will decide if it is Osteomyelitis. He will use



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- a complete medical history of the child
- physical exam
- tests

To get the complete medical history of your child, the doctor will ask you about your baby and your pregnancy. He will also want to know if your child has had any recent colds or other infections.

Some of the tests used may be:

- X-rays – a test which uses invisible energy beams to take pictures of your child's tissues, bones and organs.
- Bone scans – a test to check for changes in the joints and bones; to look for bone diseases and tumors; and to determine the cause of bone pain or swelling.
- MRI
- Blood tests
- Cultures may be taken from the affected bone or joint.

How is it treated?

The goal of treatment is to relieve the pain and to cure the infection. Your child's treatment may include:

- Antibiotics (to fight the infection)
- Pain medicines
- Surgery (to clean out the infected area in and around the bone)

Your Child's doctor will decide the specific treatment for Osteomyelitis based on:

- Your child's age, overall health and medical history
- The extent of the infection
- Your child's tolerance for some medicines, procedures or therapies
- Your opinion
- A minimum of 4 weeks of antibiotics (to fight the infection)

In most cases, the infection is cured with antibiotic medication. In severe cases of Osteomyelitis, the infection may require additional treatment or surgery.

Discharge Sheet

For Hospital Use Only

Dictation:

1-800-411-1001 (#963)

Discharge sheet FAXed to primary care physician (initial/date) _____

D/S Job #: _____

Follow-up appointment SCHEDULED with primary care physician (initial/date) _____

Patient's Name: _____

Discharge date: _____

Dx: Joint infection

Osteomyelitis

Hospital Course

Patient admitted to the Joint and Bone Infection Pathway. Treated with IV antibiotics

Required I & D

Date: _____

Treated with: Clindamycin Ceftriaxone Rifampin

Blood culture: Positive Negative Not done

Wound culture: _____ Not done

Complications during hospitalization: _____

Discharge condition: _____ Discharge weight: _____

Instruction to Patient

Activity:

Diet: Regular

Medications: See Medication Reconciliation Form

Additional instructions: See Patient Education Sheet

Followup ID Clinic _____

Signed: _____ M.D./D.O.

Signature of Parent or Guardian

Attending Physician

Attending Resident

Primary Care Physician

City

Joint and Bone Infection

0083



pathway 03/2012

Children's
Hospital
Central California 

Patient Label

Discharge Instructions