Evidence Based Practice Guideline: Skin and Soft Tissue Infections (SSTI)

Nationwide Children's
When your child needs a hospital, everything matters.℠

ED Assessment
Obtain brief history and physical exam of skin infection

<1cm fluctuance

- Prescribe empirical oral TMP-SMX or clindamycin for outpatient treatment of SSTI.
- Prescribe definitive therapy based upon susceptibility results such as cephalexin if MSSA, amoxacillin if group A streptococcus
- Treat simple cellulitis for 5 days and an undrained <1cm abscess for 7 days

Unsure if fluctuant, or in a location of concern

Ultrasound

≥1cm fluctuance

Determine Disposition

Meets admission criteria?

NO

YES

Amenable to ED staff drainage?

YES

NO

Pain control/ sedation as needed

I&D with Penrose Drain and wound cx

Prescribe oral TMP-SMX or clindamycin for 5 days

Consult Surgery

I&D by surgery in the ED

ED staff controls pain/sedates for Surgery staff as needed

Discharge with PCP follow up in 7 days if drain has not fallen out; sooner if symptoms worsen

Admit
(See Inpatient Pathway), consult surgery in the ED

I&D by Surgery in the OR

Special Circumstances to Consider:

Orthopedic Surgery Consult:
- Deep extremity infection (e.g. tenosynovitis, septic arthritis, osteomyelitis)
- Deep puncture wound of hand/fingers/feet

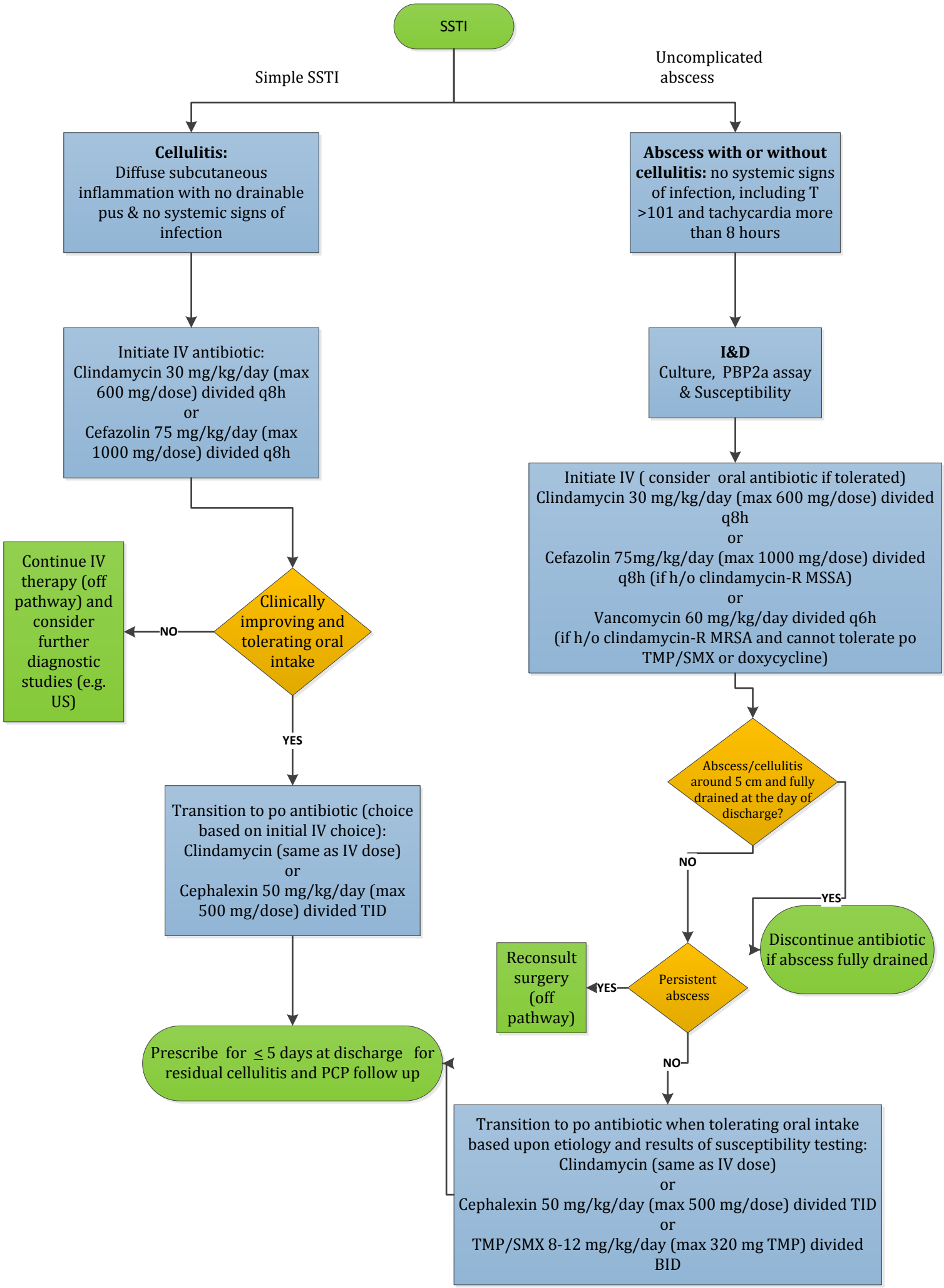
Pediatric Surgery Consult
- Breast abscess
- Perianal abscess (within 1cm of anal verge)
- Genital abscess
- Surgical site infections
- External neck abscess

ENT Consult
- Face, oropharyngeal, neck abscess

Criteria to Consider Admission:

- Systemic signs of toxicity/ bacteremia/sepsis
- Rapid progression of erythema
- Progression of clinical findings following an I&D and 48hrs of oral antibiotic therapy
- All <1mo
- Hospital-acquired and device-associated infections
- Presumed necrotizing fasciitis
- Pre/pst-septal cellulitis
- Immunodeficiency
- Pressure ulcers
- Significant abscess due to animal/human bites
- Significant abscess associated with foreign body
- Inability to tolerate oral antibiotic therapy

******Size alone*** *should not determine need for admission, nor should* ***fever alone*******


SSTI
Simple SSTI
Uncomplicated abscess
Cellulitis: Diffuse subcutaneous inflammation with no drainable pus & no systemic signs of infection
Abscess with or without cellulitis: no systemic signs of infection, including T >101 and tachycardia more than 8 hours
Initiate IV antibiotic: Clindamycin 30 mg/kg/day (max 600 mg/dose) divided q8h or Cefazolin 75 mg/kg/day (max 1000 mg/dose) divided q8h
I&D Culture, PBP2a assay & Susceptibility
Initiate IV (consider oral antibiotic if tolerated) Clindamycin 30 mg/kg/day (max 600 mg/dose) divided q8h or Cefazolin 75mg/kg/day (max 1000 mg/dose) divided q8h (if h/o clindamycin-R MSSA) or Vancomycin 60 mg/kg/day divided q6h (if h/o clindamycin-R MRSA and cannot tolerate po TMP/SMX or doxycycline)
Clinically improving and tolerating oral intake
NO
Continue IV therapy (off pathway) and consider further diagnostic studies (e.g. US)
YES
Transition to po antibiotic (choice based on initial IV choice): Clindamycin (same as IV dose) or Cephalexin 50 mg/kg/day (max 500 mg/dose) divided TID
Abscess/cellulitis around 5 cm and fully drained at the day of discharge?
NO
YES
Discontinue antibiotic if abscess fully drained
Persistent abscess
YES
Reconsult surgery (off pathway)
NO
Prescribe for ≤ 5 days at discharge for residual cellulitis and PCP follow up
Transition to po antibiotic when tolerating oral intake based upon etiology and results of susceptibility testing: Clindamycin (same as IV dose) or Cephalexin 50 mg/kg/day (max 500 mg/dose) divided TID or TMP/SMX 8-12 mg/kg/day (max 320 mg TMP) divided BID

Objectives

To improve the quality and safety of care for uncomplicated community acquired soft tissue infections/abscesses in children older than 30 days of life, specifically:

- Increase the use of bacterial cultures that will allow for targeted antimicrobial therapy
- Decrease unnecessary laboratory testing
- Reduce the use of systemic antibiotics for children with simple abscesses who meet low risk criteria
- Reduce the use of inappropriate antibiotics for cellulitis and abscess
- Decrease unnecessary hospital admissions

Inclusion and Exclusion Criteria

- Inclusion criteria:
    - Suspected community-acquired skin and soft tissue infection in a child
- Exclusion criteria:
    - Non-infectious causes of swelling, erythema and pain

Diagnosis and Definition

- The diagnosis of SSTI is usually based upon clinical manifestations. Cellulitis is an infection of the skin and underlying soft tissue. It manifests as areas of skin erythema, edema, pain and warmth. A soft tissueabscess is a cavity filled with pus which is a painful, fluctuant, erythematous nodule, with or without surrounding cellulitis
- Treatment of pediatric skin and soft-tissue infections is complex due to concern forantibiotic-resistant organisms. The leading cause of purulent infections is *S. aureus.* The leading cause of cellulitis is group A *Streptococcus* and other hemolytic streptococci, but may also be due to *Staph. aureus.*

Differential Diagnoses

Findings suggestive of another diagnosis include:

- **Erythema migrans** – Erythema migrans is an early manifestation of Lyme disease; it consists of a region of erythema surrounding the site of a tick bite, infrequently with central clearing . The diagnosis is based on clinical findings. A similar lesion may occur in patients with Southern tick–associated rash illness.
- **Herpes zoster** – The rash of herpes zoster begins as erythematous papules that evolve into grouped vesicles. The rash is generally limited to one dermatome but can affect two or three neighboring dermatomes. The diagnosis is established by polymerase chain reaction of vesicular fluid.
- **Septic arthritis** – Cellulitis may overlie a septic joint. Clinical manifestations include joint pain, swelling, warmth, and limited range of motion. The diagnosis of septic arthritis is established based on synovial fluid examination/culture and PCR.
- **Osteomyelitis** – Osteomyelitis may underlie an area of cellulitis. It is prudent to pursue MRI imaging for assessment of bone involvement in the setting of point tenderness and/or limitation of movement in the affected area.
- **Contact dermatitis** – Contact dermatitis may be distinguished from cellulitis in that the contact dermatitis lesions are pruritic. Clinical features include erythema, edema, vesicles, bullae, and oozing. The reaction is generally limited to the site of contact and is associated with burning, stinging; it is not oronly very mildly painful.
- **Insect bite** – An insect bite triggers an inflammatory reaction at the site of the punctured skin, which appears within minutes and consists of pruritic local erythema and edema. In some cases, a local reaction is followed by a delayed skin reaction consisting of local swelling, itching, and erythema. It is not painful.
- **Vaccination site reaction** – A local reaction to vaccination manifests with erythema, swelling, and tenderness at the injection site; these are typically self-limited.

Testing

- Obtain wound cultures when possible. (Quality of evidence: Moderate, Recommendation: Strong)

Admission Criteria (to be considered)

- Criteria to Consider Admission:
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- Systemic signs of toxicity/bacteremia/sepsis
- Rapid progression of erythema

- Progression of clinical findings following an I&D and 48hrs of oral antibiotic therapy
- All <1mo
- Hospital-acquired and device-associated infections
- Presumed necrotizing fasciitis
- Pre/pst-septal cellulitis
- Immunodeficiency
- Pressure ulcers
- Significant abscess due to animal/human bites
- Significant abscess associated with foreign body
- Inability to tolerate oral antibiotic therapy

- **Size alone should not determine need for admission, nor should fever alone**

Assessment and Monitoring

- An Ultrasound is recommended if there is uncertainty in the physical exam of an abscess, or it is in a concerning location, such as the umbilicus, over a joint, peri-anal, or there is uncertainty in the depth of the infection (Quality of evidence: Moderate, Recommendation: Strong)

Recommended Treatments

- After sedation and pain control, incise and drain any abscess >1cm and place a straight Penrose drain into the abscess cavity for drainage and suture into place with Fast-absorbing suture. (Quality of evidence: Low, Recommendation: Strong)
- Prescribe oral TMP-SMX (8-10 mg/kg/day bid) or clindamycin (30mg/kg/day tid) for outpatient treatment of abscesses. (Quality of evidence: High, Recommendation: Strong)
- Prescribe cephalexin if MSSA and amoxicillin (50 mg/kg/day tid)ifGAS for outpatient treatment of simple cellulitis with known susceptibility. (Quality of evidence: High, Recommendation: Strong)
- Treat simple cellulitis or an abscess that is fully drained for 5 days and an undrained abscess for a minimum of 7 days with appropriate follow up. (Quality of evidence: Moderate, Recommendation: Strong)
- PCP follow up is recommended in all patients and especially if symptoms worsen, persist or the Penrose drain hasn't fallen out after 7 days.

Treatments Not Recommended

- Do NOT obtain routine blood testing (CBC, CRP, blood culture) for most children with cellulitis or abscess. (Quality of evidence: High, Recommendation: Strong)
- No incision and drainage is needed for abscesses <1 cm on ultrasound and/or physical examination; these patients may be discharged home on antibiotics alone based on risk factors. (Quality of evidence: Low, Recommendation: Strong)
- Do not unroof or needle aspirate any abscess greater than 1cm, instead perform an I&D. (Quality of evidence: High, Recommendation: Strong)

Deterioration and Escalation of Care

- Identification of Deterioration
    - It should *not* be considered failure of oral therapy if there is a progression of clinical findings after oral antibiotic therapy if there is an abscess, and an I&D has not been performed
    - If after an I&D, which is followed by 48hrs of oral antibiotic therapy and there is a progression of clinical findings, it should be considered a failure of outpatient management
    - If there is progression of clinical findings after 48hrs and an ultrasound shows no abscess, it should be considered a failure of outpatient management
- Escalation of Care Protocol:
    - If there is a failure of outpatient management, the patient will require admission.

Discharge Criteria and Planning

- Discharge once the patient can tolerate oral antibiotics and if an abscess was present, it has been adequately drained
- Antibiotic therapy x 5 days after I&D and cellulitis ≤5 cm
- PCP follow up is recommended in all patients and especially if symptoms worsen, persist or the drain hasn't fallen out after 7 days.

Patient Education

- See helping hands attached

Provider Education

- Videos of Incision and Drainage of an abscess:
    - https://youtu.be/OxZ4vmk7bvM

Risk Awareness and Zero Hero

- Decrease hospital acquired harm by decreasing surgical complication and increasing healthcare value

Key References:

- See attached

Clinical Support Tools

- Epic Order Sets
- Epic Note templates
- Epic Patient Instructions templates

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Development and Evidence Ratings

This guideline was developed using the process described in the NCH Evidence Based Practice Guideline Development Manual v1.3.

We used the GRADE method of rating evidence quality. Clinical questions are defined in terms of Population, Intervention, Comparison and Outcome (PICO). Evidence is first assessed as to whether it is from randomized controlled trials (RCTs), which start as high-quality evidence or observational studies, which start as low-quality evidence supporting estimates of intervention effects.

The rating is then adjusted in the following manner:

Quality ratings are downgraded if studies:

- Have serious limitations or risk of bias
- Have inconsistent results
- If evidence does not directly address the clinical question (PICO format)
- If estimates are imprecise
- If it is felt that there is substantial reporting bias

Quality ratings can be upgraded if it is felt that:

- The effect size is large
- If studies are designed in a way that all

plausible biases would likely underreport the magnitude of the effect

- If a dose-response gradient is evident

Final Quality of Evidence rating:

- High quality
- Moderate quality
- Low quality
- Very low quality

Strength of Recommendations:

- Strong: When the desirable effects of an intervention clearly outweigh the undesirable effects, or clearly do not.
- Weak: When the trade-offs are less certain, either because of low quality evidence or because evidence suggests that desirable and undesirable effects are closely balanced.

Reference: Guyatt G et al. J Clin Epi 2011: 383-394

Clinical practice guidelines and algorithms at Nationwide Children's Hospital (NCH) are standards which provide general guidance to clinicians. Patient choice and clinician judgment remain central to the selection of diagnostic tests and therapy. The ordering provider is ultimately responsible for care decisions. NCH's guidelines and algorithms are reviewed periodically for consistency with new evidence; however, new developments may not be represented.

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