

Signs and Symptoms of Abscess and/or Cellulitis

Evaluate for Complicating Factors^{1,2}

- s/sx system infection: WBC > 12,000 or < 4000; T > 38.0 or < 36°C ; HR > 90; RR > 24
- immunosuppressed
- End-stage organ failure
- Diabetes
- Extensive surrounding cellulitis
- Advanced age (> 65 years of age)
- Obesity (BMI > 30)
- Abscess difficult to drain (face, hand, perineum)
- Abscess > 5 cm in diameter
- Multiple lesions
- Bites
- Water exposure
- History of trauma, purulent cellulitis, recurrent MRSA infection, MRSA exposure
- No response to treatment after 48 hours

0-1 complicating factors²

2 or more complicating factors²

Purulent lesion or concern for abscess?

COMPLICATED

Cutaneous abscess and/or cellulitis

no

yes

SIMPLE CELLULITIS

(No evidence of abscess, bites, water exposure, diabetic foot ulcer, or recent surgery)

SIMPLE ABSCESS

(painful, tender, fluctuant red nodules)

Extending cellulitis?

no

yes

Treat simple cellulitis--> (a)

Treat abscess (< 5 cm)
--> I & D only

Treat abscess + cellulitis
--> I & D + (a)

Evaluate need for hospitalization^{1,2}

Severe SSTI with one or more of the following:

- Failed outpatient therapy (> 48 hours) and patient requires hospital support
- Severe SSTI in immunocompromised patients (transplant patients, diabetes, chemotherapy, end-stage organ dysfunction, etc.)
- Necrotizing fasciitis concerns (Consider CT, surgical consult)
- Abscess of face, hand or perineum (difficult to drain areas)
- Severe sepsis not responding to fluids
- Septic shock

ANY of the above

NONE of the above

Hospital Admission

- Blood cultures x2
- ASO titer
- MRSA mol amp (nares)
- Culture of drainage or exudate prior to antibiotics
- Treatment based on algorithms (f) - (i) (see pages 2-5) or sepsis bundle

ED or Infusion Center

- Blood cultures x2
- Culture of drainage or exudate prior to antibiotics
- PO or IV antibiotics in ED or infusion center
See algorithm (b)
- MD assessment of response after 48-72 hours

Observation or Follow-up

- If **complicating factor** (from list above), recommend close observation for clinical decline (inpatient or outpatient)
- If **NO complicating factors**, 48-hr follow-up with ED or PCP

If **no improvement**, start antibiotics based on risk/presentation -> see algorithm (a) and consider adding gram-negative or MRSA coverage if initial therapy has failed (d)

(a) UNCOMPLICATED CELLULITIS/ABSCESS: Outpatient Treatment¹		
CELLULITIS, NO MRSA RISK	CELLULITIS with MRSA RISK	ABSCESS + CELLULITIS
<ul style="list-style-type: none"> Cephalexin 500mg po QID* Dicloxacillin 250mg po QID Clindamycin 300-450mg po QID (use for severe PCN allergy) 	<ul style="list-style-type: none"> Cephalexin 500mg po QID* + TMP/SMX DS 1-2 tabs BID* Cephalexin 500mg po QID* + Doxycycline 100mg po BID (for > 65 y.o. and/or decreased RF) Clindamycin 300-450mg po QID (use for severe PCN allergy) 	<ul style="list-style-type: none"> TMP/SMX DS 1-2 tabs BID* Doxycycline 100mg po BID (for > 65 y.o. and/or decreased RF) Clindamycin 300-450mg po QID
<p>Duration of therapy¹ = 5 days for uncomplicated Cellulitis or abscess, however treatment may be extended if not improved¹</p>		<p>For added Strep coverage:</p> <ul style="list-style-type: none"> Consider adding cephalexin (with doxycycline or TMP/SMX)
<p>Non-purulent Cellulitis Microbiology³: 73% B-hemolytic Strep 27% not identifiable</p> <p>Purulent Cellulitis Microbiology⁴: 59% MRSA 3% B-hem Strep 9% unknown 17% MSSA 4% other Strep 8% other</p>	<p>MRSA Risk Factors⁵:</p> <ul style="list-style-type: none"> Penetrating trauma MRSA colonization IV Drug abusers SIRS Failure to respond to Beta-lactam therapy 	<p>Oral options for higher blood levels:</p> <ul style="list-style-type: none"> Linezolid **600mg po BID or Tedizolid** 200mg po daily <p>[Cost may be a consideration with these 2 options, in addition to interactions with serotonergic agents (linezolid) and possible myelosuppressive effects]</p> <p>For simple Abscess < 5 cm: I & D only</p>

(b) COMPLICATED CELLULITIS +/- ABSCESS: Treatment at ED or INFUSION CENTER		
Oral antibiotics	IV Therapy: Non-Purulent Cellulitis	IV Therapy: Purulent Cellulitis
<ul style="list-style-type: none"> Cephalexin 500mg po QID* + TMP/SMX DS 1-2 tabs BID* Cephalexin 500mg po QID* + Doxycycline 100mg po BID (for > 65 y.o. and/or decreased RF) Clindamycin 300-450mg po QID (use for severe PCN allergy) 	<ul style="list-style-type: none"> Ceftriaxone 1-2g IV q24h <p>ADD if MRSA RISK: (see risk factors above) -TMP/SMX DS 1-2 tabs BID* or -Doxycycline 100mg po BID (for > 65 y.o. and/or decreased RF)</p> <p>Duration of Therapy¹ =: 5-10 days for Complicated Cellulitis/Abscess, based on response</p>	<ul style="list-style-type: none"> Vancomycin 20mg/kg load f/b Pharmacy consult

(c) BITE INFECTIONS		
Criteria for antibiotic therapy	Empiric Therapy: Oral/IV options	Cat Scratch Disease
<p>Prophylactic antibiotic treatment x 3-5 days if:</p> <ul style="list-style-type: none"> Immunocompromised or asplenic Advanced liver disease Edema in affected area Mod-severe injuries, especially to the hand or face Penetration of periosteum or joint capsule <p>Consider HIV, Hepatitis B or C risks with human bites</p>	<ul style="list-style-type: none"> Amoxicillin-clavulanate 875mg BID* or Ampicillin/sulbactam 3g IV q6h* Cefuroxime* + metronidazole Doxycycline 100mg po BID TMP-SMX* + metronidazole <p>For treatment of tenosynovitis or abscess development, surgical debridement and a longer duration of therapy (7-14 days) may be required</p> <p>Also consider addition of:</p> <ul style="list-style-type: none"> Post-exposure prophylaxis for rabies TDAP or Tetanus toxoid if not up to date 	<p>Azithromycin:</p> <ul style="list-style-type: none"> Patients >45 kg: 500mg x 1, then 250mg/day x 4 Patients <45kg: 10mg/kg x 1, then 5mg/kg/d x 4 <p>Bacillary angiomatosis: Erythromycin 500mg qid or Doxycycline 100mg bid Duration: 2 weeks to 2 months</p>



TREATMENT ALGORITHM: SKIN & SOFT TISSUE INFECTIONS (SSTI)

(Options are listed in order of preference)

(d) FACIAL SKIN & SOFT TISSUE INFECTION

Facial Cellulitis	Deep Head & Neck Soft Tissue Infections originating from skin/sinuses	Odontogenic source
<p>Pathogens: <i>S.aureus</i>, <i>Strep sp.</i>, <i>anaerobes</i></p> <p>Treatment:</p> <ul style="list-style-type: none"> Cephalexin 500mg po QID* + TMP/SMX DS 1-2 tabs BID* Cephalexin 500mg po QID* + Doxycycline 100mg po BID (for > 65 y.o .and/or decreased RF) Clindamycin 300-450mg po QID (use for severe PCN allergy) 	<p>Pathogens: <u>Common:</u> <i>S. aureus</i>, <i>S. pneumoniae</i> and other <i>Strep sp.</i>, <i>anaerobes</i> <u>Uncommon:</u> <i>H. influenza</i>, <i>A. hydrophila</i>, <i>E.corrodens</i>, <i>Mucorales</i>, <i>Aspergillus</i></p> <p>Treatment:</p> <ul style="list-style-type: none"> Vancomycin: 20mg/kg load, f/b Pharmacy consult + Ceftriaxone 1-2g IV q24h or Amp-sulbactam 3g IV q6h 	<p>Treatment:</p> <ul style="list-style-type: none"> Amoxicillin-clavulanate 875mg TID* Ampicillin/sulbactam 3g IV q6h* Cefuroxime 500mg BID* + Clindamycin 300mg QID Cefuroxime 750-1.5g IV q8h* + Clindamycin 600-900mg IV q8h (for severe penicillin allergy)

(e) RECURRENT CELLULITIS/ABSCESS: ADJUNCTIVE THERAPIES

Non-purulent Cellulitis	Recurrent Abscess
<p>Treat pre-disposing factors:</p> <ul style="list-style-type: none"> Tinea pedis-> Clotrimazole 1% cream bid Edema Venous insufficiency Underlying cutaneous disorders, i.e. eczema Obesity Prophylactic antibiotics (penicillin or erythromycin BID) if pre-disposing factors persist and >3-4 episodes/year 	<ul style="list-style-type: none"> Drain & culture 5-10 day course of appropriate antibiotic Search for local causes: pilonidal cyst, hidradenitis suppurativa, or foreign material Consider 5-day decolonization: intranasal mupirocin, daily chlorhexidine washes, daily decontamination of sheets, towels & clothes

Other notes:

-**Duration** of Therapy for Complicated Cellulitis/Abscess: **5-10 days** based on response

-**Erysipelas** may require 7-10 days of treatment

-**Pyomyositis** should be treated as complicated purulent cellulitis with recommended duration of therapy extended to 2-3 weeks.

-**Minocycline** may be substituted for **Doxycycline**, to avoid photosensitivity (same dose)

-The addition of **Probiotic** therapy is recommended with antimicrobial courses for prevention of *C.difficile* infections associated with antimicrobial therapy

MRSA Resistance to Vancomycin:

Although our antibiograms report 100% *S.aureus* vancomycin susceptibility, with 5% of SHC isolates (n=6181) having an MIC=2.0, alternatives may be considered for infections that do not respond to Vancomycin:

- Linezolid** 600mg po/IV BID
- Tedizolid** 200mg po/IV daily
- Daptomycin † 6mg/kg IV q24h*
- Ceftaroline † 600mg IV q12h*

(f) COMPLICATED NON-PURULENT CELLULITIS: Treatment for Hospital Admission

If NON-Sepsis or ICU	NON-Sepsis w/MRSA Risk	Severe Sepsis / ICU admission
<ul style="list-style-type: none"> Cefazolin 1-2g IV q8h* or Ceftriaxone 1-2g IV q24h <i>(substitute for broader gram-negative coverage - see risk factors below)</i> 	<ul style="list-style-type: none"> Cefazolin 1-2g IV q8h* + Vancomycin 20mg/kg load f/b Pharmacy consult or Clindamycin 600-900mg IV q8h Substitute for broader gram-negative coverage if needed: Ceftriaxone 1-2g IV q24h (see risk factors below) 	<ul style="list-style-type: none"> Vancomycin per Pharmacy + Clindamycin 900mg IV q8h + Piperacillin-tazo 4.5g IV q8h* Vancomycin + Clindamycin IV + Meropenem** 1g IV q8h* <i>(for severe penicillin allergy)</i>
<p><i>Please note:</i></p> <ul style="list-style-type: none"> -Duration of Therapy for Complicated Cellulitis/Abscess: 5-10 days¹ based on response -Dosing: Higher listed doses of cefazolin, clindamycin, cefuroxime, nafcillin and ceftriaxone are recommended for patients >100kg -De-escalate IV to oral therapy after 48-72 hours, or as patient responds/improves -Diabetic Foot Infections are not covered in this treatment algorithm. Please refer to the IDSA guideline for specific treatment.⁸ 		<p>Gram Negative Rod Risk Factors:</p> <ul style="list-style-type: none"> Neutropenia [see (f) page 3] HIV or severely immunocompromised Trauma in aquatic environment Burns Infection after skin graft

(g) COMPLICATED PURULENT CELLULITIS: Treatment for Hospital Admission

Empiric IV Therapy Options	Defined IV Therapy	Severe Sepsis / ICU admission
<ul style="list-style-type: none"> Vancomycin 20mg/kg x1 f/b Pharmacy consult. Linezolid** 600mg po BID Tedizolid** 200mg po daily Daptomycin† 6mg/kg IV q24h* Ceftaroline† 600mg IV q12h* 	<p>IF MSSA:</p> <ul style="list-style-type: none"> Cefazolin 1-2g IV q8h* or Nafcillin 1-2g IV q4h <p>IF MRSA: Continue empiric therapy</p> <p>OTHER: (see page 3)</p>	<ul style="list-style-type: none"> Vancomycin 20mg/kg load f/b Pharmacy consult + Clindamycin 900mg IV q8h^{6,7} + Piperacillin-tazo 4.5g IV q8h* Vancomycin + Clindamycin IV + Meropenem** 1g IV q8h* <i>(use for severe penicillin allergy)</i>

(h) NECROTIZING FASCIITIS or GAS GANGRENE**

Empiric IV Therapy Options:	Defined Therapy: ¹
<ul style="list-style-type: none"> Vancomycin 20mg/kg load f/b Pharmacy consult + Clindamycin 900mg IV q8h + Piperacillin-tazobactam 4.5g IV q8h* Vancomycin + Clindamycin IV + Meropenem** 1g IV q8h* <i>(for severe penicillin allergy)</i> <p>**Prompt surgical consultation is recommended for aggressive infections associated with s/sx systemic toxicity</p>	<p>-Strep pyogenes or Clostridial sp.:</p> <ul style="list-style-type: none"> Penicillin 2-4milu q4-6h + Clindamycin 900mg IV q8h Cefazolin + Clindamycin <p>-Vibrio vulnificus:</p> <ul style="list-style-type: none"> Doxycycline + ceftriaxone <p>-Aeromonas hydrophila:</p> <ul style="list-style-type: none"> Doxycycline + ceftriaxone Doxycycline + ciprofloxacin <p>-Polymicrobial: vancomycin + pip/tazo</p>

(i) NEUTROPENIC FEVER w/SSTI

<ul style="list-style-type: none"> Vancomycin + Cefepime (or pip/tazo or Meropenem**) Duration 7-14 days <p>Also consider addition of:</p> <ul style="list-style-type: none"> Acyclovir IV for suspected HSV or VZV infection Antifungal therapy in persistent or recurrent infections
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TREATMENT ALGORITHM: SKIN & SOFT TISSUE INFECTIONS (SSTI)

(Options are listed in order of preference)

*Antibiotic Dosing in Decreased Renal Function:

Antibiotic	Clcr 30-50ml/min	Clcr 10-29ml/min	Clcr <10ml/min or HD
Cefazolin	1-2g q8h	1g q12h	1g q24h
Cefepime	1g q8h (<i>neutropenic</i>)	1g q12h (<i>neutropenic</i>)	1g q24h (<i>neutropenic</i>)
Ceftaroline †‡	400mg q12h	300mg q12h	200mg q12h
Cefuroxime po	500mg BID	250mg BID	250-500mg daily
Cefuroxime IV	750mg-1.5g IV q8h	750mg-1.5g IV q12h	750mg-1.5g IV q24h
Cephalexin	500mg TID-QID	500mg TID	250-500mg daily
Ciprofloxacin	500mg BID	250mg BID	500mg daily
Dalbavancin †	1.5g or 1g f/b 500mg in 1wk	1.125g or 750mg f/b 375mg	1.125g or 750mg f/b 375mg
Daptomycin †	6mg/kg q24h	6mg/kg q48h	6mg/kg q48h
Meropenem**	1g q12h (3hr infusion)	500mg q12h (3hr infusion)	500mg q24h (30min infusion)
Piperacillin-tazobactam	3.375g q8h (4hr infusion)	<20ml/min: 3.375g q12h 4hr	2.25g q8h (HD, 30min infusion)
TMP/SMX	1 DS tablet BID	1 DS tablet q24h	Not recommended

**ID/ASP review required

† ID restricted antibiotic

‡ q8h for *S.aureus* bacteremia

Source: Sharp Healthcare SARC-approved Renal Dosing

The above guidelines are recommendations based on available literature and are not intended to replace clinical judgment.

These recommendations take on new importance because of a dramatic increase in the frequency and severity of infections and the emergence of resistance to many of the antimicrobial agents commonly used to treat SSTIs in the past.¹

References:

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