

DEFINITION

Cellulitis is an acute, spreading inflammation of the dermis and subcutaneous tissue, often complicating a wound or other skin condition.

Cellulitis may be further classified by the unique area of the body it affects (e.g., periorbital or orbital, peritonsillar, etc.).

IMMEDIATE CONSULTATION REQUIRED IN THE FOLLOWING SITUATIONS

- Extensive cellulitis (including signs of abscess formation)
- Diminished arterial pulse in a cool swollen, infected extremity
- Cutaneous necrosis
- Rapidly progressing cellulitis (may indicate invasive streptococcal infection)
- Cellulitis of the face or a joint
- Immunocompromised client
- Suspected foreign body
- Signs of sepsis (e.g., fever, tachycardia, hypotension, tachypnea, altered mental status)

CAUSES

- *Staphylococcus aureus* (*S. aureus*)
- Group A - hemolytic streptococci (*Streptococcus pyogenes*)
- *Streptococcus pneumoniae*
- *Haemophilus influenzae* type B (HIB)
- *Pseudomonas aeruginosa*, anaerobic bacteria: immunocompromised client
- Pasteurella species: from cat and dog bites
- *Eikenella corrodens*: from human bites

PREDISPOSING AND RISK FACTORS

- Increase risk in clients with venous or lymphatic compromise, diabetes mellitus, and prior skin lesion
- Local trauma
- Bites
- Furuncle
- Carbuncle
- Surgery

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- Underlying skin condition (e.g., atopic dermatitis)
- Obesity
- Lymphedema

HISTORY

- An expanding, red, painful area of swelling is the most common presentation.
- Surrounding area may also be firm and indurated.
- Mild constitutional symptoms (with or without fever) are commonly associated with cellulitis.

Enquire about:

- Pre-existing recent wound
- Recent surgery
- Pre-existing skin condition (psoriasis, decubitus ulcer)
- Symptom onset usually over several days
- Previous medical history (trauma, surgery, dermatitis)
- Immunization status
- Visual changes, proptosis, painful or limited eye movements are worrisome for orbital cellulitis
- Painful swallowing, pain with opening mouth (trismus), muffled (“hot potato”) voice are classic presenting symptoms of peritonsillar cellulitis/abscess
- Contact with infected person

Suspect methicillin-resistant *S. aureus* (MRSA) in any client who presents with the following:

- A skin or soft tissue infection in a community where > 10-15% of all *S. aureus* isolates are MRSA
- Clients from high risk groups (e.g., contact sports, institutionalized, homeless, parenteral drug user, HIV, malnutrition)
- Any client who has not responded to treatment with a β -lactam antibiotic; prior antibiotic therapy (especially broad spectrum) in last 6 months
- Invasive procedures/devices (e.g., dialysis, indwelling catheter); advanced age, young adults

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Refer to *Northern Saskatchewan guidelines (2014) for skin and soft tissue infections including suspect MRSA in the community setting.* (Population Health Unit, Northern Saskatchewan, 2014) (Refer to Appendix)

PHYSICAL FINDINGS

- Temperature may be elevated
- Heart rate may be elevated
- Redness, swelling, tenderness, warmth
- Advancing edge of lesion diffuse, not sharply demarcated (mark the area for comparison on follow-up)
- Small amount of purulent discharge may be present
- Induration
- Regional lymph nodes may be enlarged and tender

Classification

Mild Cellulitis

- Localized limited cellulitis
- Small area of erythema, warmth, and induration
- Tenderness
- May or may not be exudative

Moderate Cellulitis

- Spreading area of erythema, warmth, and induration
- Pain
- Lymphadenopathy
- Fever
- Swelling of the effected limb
- May or may not be exudative

Severe Cellulitis

- Extensive cellulitis
- Rapidly spreading
- Fever
- Lymphadenopathy
- Diminished arterial pulse in a cool swollen infected extremity
- Cutaneous necrosis

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Erysipelas (St. Anthony's Fire) is a distinct form of cellulitis notable for acute, well-demarcated, superficial bacterial skin infection with lymphatic involvement, almost always caused by *S. pyogenes*. It is usually acute but a chronic recurrent form also exists.

- Prodromal signs may include chills, malaise, moderate to high-grade fever, headache, vomiting, and anorexia usually in the first 48 hours
- Arthralgia
- Acute onset of erythematous patch
- Sharply demarcated, raised border, fiery-red plaque that spreads circumferentially over hours/days
- Lesion characteristically hot, indurated, tender with marked swelling
- Location:
 - Lower extremity 70-80% of cases
 - Face involvement is less common (5-20%), especially nose and ears

DIFFERENTIAL DIAGNOSIS

- Folliculitis
- Foreign body
- Abscess
- Contact dermatitis
- Necrotizing fasciitis (ill client, severe local symptoms, bullae, crepitus, or anesthesia of the involved skin)
- Osteomyelitis
- Allergic angioedema can be excluded by its lack of tenderness and absence of fever
- Deep vein thrombosis

COMPLICATIONS

- Local or distant spread of infection is possible.
- Suppuration and abscess formation may occur.
- Extremity cellulitis may extend into deep tissues to produce an arthritis or osteomyelitis, or it may extend proximally as a lymphangitis.
- Orbital cellulitis may be complicated by visual loss and/or cavernous sinus thrombosis.

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- Prior to widespread immunization against HIB, the bacteremia associated with facial cellulitis was associated with pneumonia, meningitis, pericarditis, epiglottitis, arthritis, and osteomyelitis.

INVESTIGATIONS AND DIAGNOSTIC TESTS

- Swabs for cellulitis are not routinely recommended.
- Refer to Northern Saskatchewan guidelines (2014) in Appendix.

MAKING THE DIAGNOSIS

Diagnosis is usually made by history and clinical assessment. Cellulitis is characterized by local area of diffuse inflammation with the following:

- Redness
- Warmth
- Edema
- Tenderness
- Poorly demarcated margins
- Clients on systemic steroids may be more difficult to diagnose because the signs and symptoms of the infection may be masked by the anti-inflammatory action of the steroid.

Abscess is identified by:

- Area of rim of erythema or swelling
- Fluctuance, indicating a fluid filled cavity beneath the skin
- A pustule may be seen at the area where the abscess is closest to the skin.

MANAGEMENT AND INTERVENTIONS

Goals of Treatment

- Control infection
- Identify, treat/or modify predisposing factors when applicable

Appropriate Consultation

- Treatment failure
- Secondary bacterial cellulitis from a pre-existing wound or trauma (e.g., post-surgery site, burns)

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- Moderate to severe cellulitis
- Clients with diabetes, consider consultation

Non-Pharmacological Interventions

Mild Cellulitis

- Treat on an outpatient basis
- Apply saline compresses to affected areas qid to remove any purulent exudates
- Elevate, rest, and gently splint the affected limb

Adjuvant Therapy

- Update tetanus vaccination

Pharmacological Interventions

Mild Cellulitis

- Oral antibiotics (choose one of the following):
 - Cephalexin (Keflex) 500 mg orally q6h for 7-10 days
 - Cloxacillin 500 mg orally q6h for 7-10 days
 - Note: Penicillin and amoxicillin are never good empiric choices for even superficial cellulitis (poor *S. aureus* coverage).
- For clients who are allergic to penicillin:
 - Azithromycin 500 mg orally first day, then 250 orally for remaining 4 days
 - Clarithromycin 250-500 mg orally q12h for 7-10 days
- Consider treatment for MRSA depending on regional prevalence, clinical judgment, or if no response to initial therapy, use one of the following:
 - Sulfamethoxazole/Trimethoprim (SMX/TMP) 1-2 DS tabs (800/160 mg) orally q8-12h for 10 days
 - Doxycycline 100 mg orally q12h for 10 days
 - Clindamycin 150-450 mg orally qid for 10 days
 - Refer to Northern Saskatchewan guidelines (2014) - attached

Moderate to Severe Cellulitis (Consult a physician/RN(NP))

- Start IV therapy with normal saline to keep vein open; adjust rate according to state of hydration and age.
- Administer IV antibiotics only as directed by a physician/RN(NP).

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Antipyretics and analgesia:

- Acetaminophen 500-1000 mg orally qid prn (maximum dose 4 g/day)
- Or
- Ibuprofen 400-600 mg q8h prn (maximum dose 3200 mg/day)

For bite related cellulitis, refer to SRNA CDT Bites for management.

Topical antibiotic should not be used in the management of cellulitis.

Abscess is managed according to the employer policy or SRNA CDT Cutaneous Infections.

Client and Caregiver Education

- Counsel about appropriate use of medications (dose, frequency, compliance, etc.).
- Encourage proper hygiene of all skin wounds to prevent future infection (e.g., keeping fingernails short, avoid scratching lesions).
- Stress importance of close follow-up and reporting of early skin changes to provider.

Monitoring and Follow-Up

- Follow-up daily to ensure that infection is controlled.
- Mark area of erythema and induration to assess changes to the size of the infection.
- Instruct client to return immediately if lesion becomes fluctuant, pain increases, or if fever develops or becomes worse.

Referral

- Treatment failure
- Disseminated infection
- Recurrent cellulitis
- Abscess in sensitive areas and mucous membrane (e.g., labial, supraalevator, ischiorectal, perirectal)
- Abscess near major blood vessels
- Abscess that requires extensive incision

DOCUMENTATION

- As per employer policy

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SASKATCHEWAN REGISTERED NURSES' ASSOCIATION

RNs WITH ADDITIONAL AUTHORIZED PRACTICE
CLINICAL DECISION TOOL
DECEMBER 1, 2016

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Appendix

[MRSA Guidelines 2014](#)