## Cellulitis

## *Executive summary*

## Introduction

The term cellulitis is commonly used to indicate a non-necrotizing inflammation of the skin and subcutaneous tissues, usually from acute infection. Cellulitis usually follows a breach in the skin, although a portal of entry may not be obvious; the breach may involve microscopic skin changes or invasive qualities of certain bacteria.

## Target Users

* Doctors
* Nurses

## Target area of use

* Ward
* Outpatient department
* Gate clinic

## Key areas of focus/new additions/changes

These guidelines addresses the management of cellulitis in adults and children.

## Limitations

Patient with complicated cellulitis associated with compartment syndrome or necrosis must be referred to a surgeon.

## Presenting symptoms and signs

Nonpurulent cellulitis is associated with the 4 cardinal signs of infections, as follows:

* Erythema
* Pain
* Swelling
* Warmth

The follow findings suggest severe infection:

* Malaise
* Chills
* Fever and toxicity
* Circumferential cellulitis
* Lymphangitic spread (red lines streaking away from the area of infection)
* Crepitus
* Pain disproportionate to examination findings

## Examination findings

The involved site(s) is/are red, hot, swollen and tender. The leg is the most common site. Tinea pedis lesions may be the sites of entry

* Regional lymphadenopathy may be present
* Malaise, chills, fever, and toxicity may be present

Skin infections without associated drainage, penetrating trauma, eschar, or abscess is most likely caused by streptococci; on the other hand**, *S aureus***, often community acquired methicillin-resistant *S aureus* (MRSA), is the most likely pathogen when these factors are present.

Perianal cellulitis is usually observed in children with perianal fissures; it is characterized by **perianal erythema** and **pruritis, purulent secretions**, **painful defecation** and **blood in stools**

Cellulitis characterized by violet colour and bullae suggests more serious or systemic infection with organisms such as*V. vulnificus* or *S. pneumoniae.*

Lymphangitic spread (red lines streaking away from area of infection), crepitus, .and hemodynamic instability are indications of severe infection, requiring more aggressive treatment.

Circumferential cellulitis or pain that is disproportional to examination findings should prompt consideration of severe soft tissue infection

[**Periorbital**](https://www.hopkinsguides.com/hopkins/view/Johns_Hopkins_ABX_Guide/540402/all/Orbital_Cellulitis) **(preseptal) cellulitis**  is potentially serious and merits an ophthalmology consultation and a CT scan to exclude an orbital infection

**Indication for referral for emergent surgical evaluation** are as follows:

* Violaceous bullae
* Cutaneous haemorrhage
* Skin sloughing
* Skin anaesthesia
* Rapid progression
* Gas in the tissue (crepitus)

## Differential Diagnoses

* Erysipelas (more superficial with sharply demarcated borders)
* Thrombophlebitis
* [Necrotizing fasciitis](https://www.hopkinsguides.com/hopkins/view/Johns_Hopkins_ABX_Guide/540378/all/Necrotizing_Fasciitis)
* Erythroderma
* Panniculitis
* Pyoderma
* Dermatitis
* Allergic reactions
* Drug reaction

## Investigations

Generally no work-up is required in uncomplicated cases of cellulitis.

For patients with cellulitis who have signs and symptoms of systemic inflammatory response, do:

* FBC
* Creatinine and Bicarbonate
* Aspirate gram stain and culture (purulent cellulitis only)
* Blood culture should be performed for serious infections to pinpoint the etiology

Blood cultures are only positive in 5-15 % of patients with cellulitis)

Blood cultures are also indicated in special populations (immunosuppressed, severe post-surgical wounds).

## Management

### Management at the Gate Clinic

Patients with cellulitis should be referred to OPD for evaluation by a doctor.

### Management in OPD or on the ward

Management of cellulitis should include elevation of the affected area and treatment of underlying conditions.

Many patients with cellulitis have underlying conditions that predispose them to developing recurrent cellulitis (these include tinea pedis, lymphedema, and chronic venous insufficiency). In such patients, treatment should be directed at both the infection and the predisposing condition if modifiable. As an example, patients with oedema may benefit from treatment with compressive stockings and diuretic therapy.

Consider in-patient care when there is:

* An elevated creatinine level
* A low serum bicarbonate level
* Systemic signs of toxicity (e.g. fever > 38°C, hypotension, or sustained tachycardia)
* Rapid progression of erythema
* Progression of clinical findings after 48 hours of oral antibiotic therapy
* Inability to tolerate oral therapy
* Proximity of the lesion to an indwelling medical device (e.g. prosthetic joint or vascular graft)

### Nonpurulent cellulitis

Patients with nonpurulent cellulitis (e.g. cellulitis with no purulent drainage or exudate and no associated abscess) should be managed with empiric therapy for infection due to beta-hemolytic streptococci and methicillin-susceptible Staphylococcus aureus. Common options for mild infections are:

* Cloxacillin 25 mg/kg/dose (max. 500 mg) PO QDS
* Amoxicillin/Clavulanate 625 – 875 mg PO BD

For patients with penicillin allergies:

* Azithromycin 10 mg/kg (max. 500 mg) PO OD for 3 days, or
* Clindamycin 150 – 300 mg PO QDS (3 – 6 mg/kg/dose in children)

In patients with moderately severe infection, intravenous antibiotics options include:

* IV Cloxacillin 1 – 2 g QDS

For severe infections:

* IV Ceftriaxone 1 – 2 g OD (children 50 – 80 mg/kg OD)

### **Purulent infection**

Purulent infection refers to presence of a drainable abscess **or** cellulitis associated with purulent drainage in the absence of drainable abscess. Any infection involving purulence is potentially attributable to MRSA, which should be reflected in the choice of empiric antimicrobial therapy.

**Incision and drainage** of abscess is indicated for all purulent infections and is sufficient for **mild infections.**

For moderate infections, options for oral antibiotics include the following:

* Doxycycline 100 mg PO BD (non-pregnant adults only), or
* Trimethoprim-sulfamethoxazole 24 mg/kg/dose (max. 960 mg) PO BD

Once microorganisms are identified based on cultures, treatment is tailored to the patient’s need. The most common organism are staphylococcal and streptococcal strains.

### Duration of therapy

The appropriate duration of therapy for treatment of skin and soft tissue infection depends on the nature of the clinical presentation, and the clinical response should guide duration of therapy.

Patients with mild infection who receive outpatient management with oral antibiotic therapy should have repeat evaluation after 48 hours to verify clinical response.

Patients with MRSA responsive to oral therapy are typically treated for 5 days; treatment may be extended up to 14 days where there is severe infection, slow response to therapy, or immunosuppression. Lack of response may be due to infection with resistant organism(s), inadequate adherence, or presence of a deeper, more serious infection than previously realized.

Patients with infection warranting parenteral therapy (in the absence of bacteraemia or involvement beyond soft tissue) are typically treated for a total duration of 5 to 14 days. Once there are signs of clinical improvement with no evidence of systemic toxicity, antibiotics may be transitioned from parenteral to oral therapy.

For patients with abscess that was detected radiographically, follow-up imaging may be useful for assessing response to therapy.

## Key Issues for Nursing care

* Ensure that patient get adequate bed rest: Passive exercise can reduce the associated complications
* Limb elevation is important to reduce oedema
* Pressure area care
* Cleaning any skin breaks carefully and monitoring for signs of infection
* Advise on basic skin care and avoidance of predisposing factors where possible
* Advise on avoidance of skin damage by wearing appropriate protective equipment when taking part in work or sport.

## References

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John Hopkins ABX guide for cellulitis

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