

Cellulitis Data for Students



Condition: Cellulitis — Diagnosis and Management

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Pathophysiology:

Cellulitis is an acute bacterial infection of the **dermis and subcutaneous tissue**. It occurs when bacteria — most commonly ***Streptococcus pyogenes*** (Group A Strep) and ***Staphylococcus aureus*** — breach the skin barrier through cuts, abrasions, ulcers, or dermatoses such as tinea pedis. The infection triggers an inflammatory cascade leading to local erythema, warmth, swelling, and pain. Unchecked, it can spread via lymphatics and the bloodstream, causing **bacteremia and sepsis**. MRSA strains are an important cause of purulent cellulitis.

Brief Report:

Cellulitis is one of the most common skin and soft-tissue infections encountered in clinical practice. It most frequently affects the lower extremities and is characterized by rapidly spreading erythema, edema, warmth, and tenderness. Diagnosis is primarily clinical. Most non-purulent cases respond well to **beta-lactam antibiotics** targeting streptococcal species, while purulent cellulitis or abscesses warrant coverage for **MRSA**. Marking the borders of erythema and monitoring for systemic features are key aspects of management.

Clinical Features:

Presentation is typically unilateral. Local features include:

- **Erythema:** spreading, non-demarcated redness of the skin
- **Edema:** pitting or non-pitting swelling of the affected area
- **Warmth and tenderness:** to touch
- **Skin tightness or glossy appearance**
- Blistering or bullae in severe cases
- Lymphangitis (red streaking) and regional lymphadenopathy

Systemic features (if severe or spreading):

- Fever and chills
- Malaise and fatigue
- Tachycardia and hypotension (sepsis if severe)
- Confusion or altered mental status in elderly patients

Purulent vs. Non-purulent cellulitis:

- **Purulent:** associated with abscess, furuncle, or carbuncle — suspect *S. aureus* (including MRSA)
- **Non-purulent:** no pus — predominantly caused by beta-hemolytic *Streptococcus*

Risk Factors:

- Disruption of the skin barrier (wounds, ulcers, insect bites, eczema, tinea pedis)
- Lymphedema or chronic venous insufficiency
- Obesity

- Diabetes mellitus
- Immunosuppression (HIV, chemotherapy, corticosteroid use)
- Prior episode of cellulitis (strongest risk factor for recurrence)
- Peripheral vascular disease
- Injection drug use
- Animal or human bites

Investigations:

Cellulitis is a clinical diagnosis. Investigations are used to assess severity, rule out differentials, and guide antibiotic therapy:

Laboratory Tests:

- CBC: leukocytosis with neutrophilia in systemic infection
- CRP and ESR: elevated; useful for monitoring treatment response
- Blood cultures: in febrile, immunocompromised, or septic patients (yield is low ~2%)
- Wound swab or abscess culture: if purulent discharge present
- Blood glucose and HbA1c: to screen for undiagnosed diabetes
- Renal function and electrolytes: for IV antibiotic dosing

Imaging:

- Ultrasound: to detect underlying abscess, fluid collection, or foreign body
- MRI: gold standard if necrotizing fasciitis is suspected (deep tissue involvement)
- X-ray: to exclude subcutaneous gas (gas-forming organisms) or osteomyelitis

Important: Mark the border of erythema with a skin marker at presentation and reassess at 24-48 hours to monitor progression or regression.

Management:

Step 1: Assess Severity (Eron Classification)

- **Class I:** No systemic signs, no significant comorbidities — treat with oral antibiotics
- **Class II:** Systemic features (fever, tachycardia) OR significant comorbidity — may need IV antibiotics
- **Class III:** Significant systemic upset, limb-threatening — hospitalize, IV antibiotics
- **Class IV:** Life-threatening (sepsis, necrotizing infection) — urgent surgical and ICU involvement

Step 2: Antibiotic Therapy

Non-purulent cellulitis (Streptococcal coverage):

- **Mild (oral):** Cefalexin, Amoxicillin-Clavulanate, or Flucloxacillin for 5-7 days
- **Moderate-severe (IV):** Benzylpenicillin, Cefazolin, or Flucloxacillin IV; step down to oral once improving
- **Penicillin allergy:** Clindamycin or Erythromycin

Purulent cellulitis / suspected MRSA:

- **Mild (oral):** Trimethoprim-Sulfamethoxazole (TMP-SMX) or Doxycycline
- **Severe (IV):** Vancomycin, Daptomycin, or Linezolid
- **Drain any abscess:** incision and drainage is the primary treatment for abscesses

Step 3: Supportive Measures

- Elevate the affected limb to reduce edema
- Adequate analgesia
- Treat underlying conditions (tinea pedis, edema, venous insufficiency)
- Ensure adequate hydration
- Tetanus prophylaxis if wound-related

Step 4: Recurrent Cellulitis Prevention

- Treat predisposing skin conditions (e.g., tinea pedis with topical antifungals)
- Compress stockings for lymphedema or chronic venous insufficiency
- Prophylactic penicillin V or erythromycin for patients with 2+ episodes per year
- Skin care: moisturize, avoid trauma, prompt wound care

Key Home Messages:

- Cellulitis is a clinical diagnosis — erythema, warmth, swelling, and tenderness in skin and subcutaneous tissue.
- The most common causative organisms are Group A Streptococcus (non-purulent) and *S. aureus* including MRSA (purulent).
- Mark erythema borders at presentation and reassess at 24-48 hours to monitor for progression.
- Non-purulent cellulitis is treated with beta-lactams; purulent or MRSA-suspected cases require TMP-SMX or vancomycin.
- Consider necrotizing fasciitis if there is severe pain, rapid spread, skin necrosis, or gas on imaging — this is a surgical emergency.
- Address underlying risk factors to reduce the risk of recurrence.