Bendigo ED/SSOU Cellulitis Guideline

PURPOSE AND SCOPE

To assist ED and SSOU staff in the diagnosis and management of cellulitis

To reduce the length of ED/SSOU stay of patients with cellulitis, and to reduce the rates of unsuccessful SSOU admissions

To assist in making early and appropriate disposition decisions

KEY POINTS

Consider key differential diagnoses

Most uncomplicated cases of cellulitis **do not** require investigation

Oral antibiotics are suitable for **most** patients. Intravenous antibiotics should only be used for those with evidence of severe infection, uncontrolled comorbidities, failure of oral antibiotics or specific circumstances that may limit oral therapy

Spreading erythema, ongoing fever and lymphangitis <72 hours after commencing appropriate antibiotics **does not** necessarily constitute failure of oral therapy. Consider a longer course or higher dose of oral antibiotics

Rest, elevation and splinting/immobilisation of any affected limb in order to reduce lymphatic spread are just as important as antibiotics in the successful treatment of cellulitis

Under certain circumstances, patients may need investigation and management by units other than ED/SSOU

OVERVIEW

Cellulitis is a spreading bacterial infection of the skin. There may be associated lymphangitis, lymphadenopathy, fever or haemodynamic compromise.

Impetigo is a highly contagious infection of the epidermis, particularly common in young children (hence known as "school sores"), often notable for its characteristic honey-coloured crust.

Common aetiology:

- *Streptococcus* spp or *Staphylococcus aureus*
- Purulent cellulitis is caused by *Staphylococcus aureus*
- Cellulitis associated with animal bites (*Capnocytophagia*, *Pasteurella*, *Eikenella*), fresh water exposure (*Aeromonas* spp) or salt water exposure (*Vibrio* spp) require specific antibiotic regimes – refer to eTG for the most up to date recommendations
- Cellulitis caused by MRSA is uncommon but is associated with penetrating trauma or ulcerated wounds
- In immunocompromised patients, there are many possible causes which may include Gram negative bacteria, fungi or mycobacteria

Many conditions can present similarly to cellulitis, and are therefore often not treated appropriately. Consider the following differential diagnoses:

- **Necrotising fasciitis** is a rare but life-threatening infection causing necrosis of subcutaneous tissues and fulminant sepsis. It can be caused by Group A streptococcal species, Clostridium species spp, or be polymicrobial. It presents as rapidly spreading erythema, severe pain +/- gas in tissues (crepitus) and haemodynamic compromise, mostly in diabetic and immunosuppressed patients. It requires urgent IV antibiotics and source control through surgical debridement by the Plastics team. Fournier's gangrene is an acute necrotising infection of the perineum or genitalia and should be referred urgently to Urology
- Lipodermatosclerosis is a chronic, often bilateral inflammatory condition of the lower limb associated with venous insufficiency causing oedematous brown-red discolouration of the skin. It does NOT respond to antibiotics. Bilateral lower limb cellulitis is rare and more likely to be lipodermatosclerosis
- Varicose eczema
- Joint pathology: septic arthritis, gout/pseudogout, inflammatory arthritis
- DVT
- Hypersensitivity reaction
- Pyoderma gangrenosum

Predisposing factors to cellulitis include any skin breech, IV drug use, lymphoedema, chronic venous insufficiency, peripheral vascular disease, diabetes, obesity, tinea, fissured dermatitis and CCF.

Local audits and published studies have shown that patients with cellulitis have relatively long admissions to SSOU, high rates of unnecessary SSOU admission, and high rates of unsuccessful SSOU admissions. These factors demonstrate a need to identify the likely trajectory of the patient's illness, and to admit/refer appropriately and early. The rates of necessary admission with cellulitis have been estimated at less than 10%, however this rate increases significantly in patients 55 years or older.

CLINICAL PRESENTATION

Acute onset of skin erythema, warmth, tenderness and swelling +/- lymphangitis, lymphadenopathy or systemic features.

Severe cellulitis is defined by the presence of cellulitis AND hypotension, or cellulitis plus two or more of the following:

- Temperature >38.0 or <36.0
- HR >90
- RR >20
- WCC <4 or >12 (or >10% bands)
- Risk factors: IV drug use, immunocompromise, diabetes

Violaceous colour or the presence of bullae are highly suggestive of severe or systemic infection by organisms such as *Vibrio* or *Streptococcus pneumoniae*, and should be treated as such.

Pain out of proportion to clinical findings, palpable crepitus, hypotension and rapid spread of cellulitis should raise concern for a necrotising infection and an urgent surgical consult should be sought.

INVESTIGATIONS

Most uncomplicated cases of cellulitis DO NOT require investigation.

FBE, UEC, LFTs, CRP and blood cultures are only required if the patient is systemically unwell, is immunosuppressed, has significant comorbidities (including valvular heart disease or prosthetic heart valve) or where liver/renal dysfunction may affect the dose or choice of antimicrobials.

Blood cultures should otherwise **not** be routine.

US should be utilised if a foreign body is suspected, and to identify and quantify abscesses for surgical drainage.

MANAGEMENT

Patients are commonly referred to hospital for IV antibiotics after "failure of oral therapy".

Rest, elevation and splinting/immobilisation of any affected limb in order to reduce lymphatic spread are just as important as antibiotics in the successful treatment of cellulitis.

Non-adhesive dressings should be applied to eroded skin.

Do NOT draw around the edge of cellulitis (see note below*).

Incision and drainage is the definitive treatment for abscesses – only patients with signs of systemic infection, or cellulitis extending beyond the abscess require antibiotic therapy.

Oral antibiotics are suitable for **most** patients.

Intravenous antibiotics should **only** be used for those with evidence of sepsis, uncontrolled comorbidities, failure of oral antibiotics (see note below*), or under specific circumstances (see section "Inpatient Management")

*** Spreading erythema, ongoing fever and lymphangitis <72 hours after commencing appropriate antibiotics does not necessarily constitute failure of oral therapy.** Erythema often progresses after treatment is initiated and bacterial toxins are released. If otherwise clinically improving and no evidence of sepsis, oral antibiotics should generally be continued, and the need for rest/elevation/immobilisation reiterated. Consider increasing the dose of oral antibiotics (see outpatient management below).

Cellulitis associated with bites (either human or animal) should be referred to AGSU for consideration of washout +/- surgical debridement under general anaesthesia.

OUTPATIENT MANAGEMENT

Rest, elevation and splinting/immobilisation if a limb is affected is imperative to treatment.

Consider a tetanus booster (if not up to date) if cuts, bites or abrasions are suspected to be the cause of cellulitis.

Impetigo can be treated with topical mupirocin ointment, or cephalexin if widespread or large lesions.

1. Mupirocin ointment 2% to affected areas TDS for 5 days

OR

2. Cephalexin 33mg/kg (max 500mg) PO BD for 5 days

Oral flucloxacillin is considered first-line treatment for adults with cellulitis due to its narrow spectrum of activity against *Staphylococcal* and *Streptococcal* species. Cephalexin has broader activity against Gram negative organisms, which can alter intestinal flora and lead to antibiotic resistance in these organisms. There is emerging resistance against erythromycin and roxithromycin in *Staphylococcus* and *Streptococcus* species. Cephalexin is preferred for use in children with mild cellulitis due to the poor palatability of flucloxacillin. Note the *reduced* frequency of dosing in children.

1. Flucloxacillin 500mg PO QID for 5 days

OR

2. Cephalexin 500mg PO QID (paediatrics: 33mg/kg (max 500mg) TDS) for 5 days

Clindamycin is the antibiotic of choice for patients with severe hypersensitivity to penicillins or cephalosporins. Be mindful though that there is an increased risk of antibiotic-associated diarrhoea and *Clostridium difficile* colitis. Note the *increased* frequency of dosing in children.

1. Clindamycin 450mg PO TDS (paediatrics: 10mg/kg (max 450mg) QID) for 5 days

MRSA is an uncommon cause of cellulitis but may be associated with penetrating or ulcerated wounds. Risk factors include:

- Residence in an area with a high prevalence of MRSA (NT, remote communities in northern Queensland, some areas of WA)
- Patients of ATSI or Pacific Island descent
- Previous colonisation or infection with MRSA
- Frequent hospital stays, especially if associated with surgery
- Residence in an aged-care facility, especially if the patient has had multiple courses of antibiotics

For proven or suspected MRSA infections, use clindamycin or trimethoprim/sulfamethoxazole.

1. Clindamycin 450mg PO TDS (paediatrics: 10mg/kg (max 450mg) QID) for 5 days

OR

2. Trimethoprim/sulfamethoxazole 160/800mg (paediatrics 8/40mg (max 320/1600mg)) PO BD for 5 days

Patients with persistent skin changes after 5 days of oral therapy, but who are otherwise systemically well, should be considered for a longer course of oral antibiotics (10-14 days in total), or a higher dose of oral antibiotics (e.g. flucloxacillin 1000mg QID for 5 days OR cephalexin 1000mg QID for 5 days).

It should be noted, however, that prolonged or high dose treatment with flucloxacillin has been associated with rare cases of severe cholestatic hepatitis. The incidence of this reaction has been estimated to be between 1 in 12,000 and 1 in 100,000. The risk is predominantly in patients who are greater than 55 years of age, or who are treated for more than 14 days. Consider the patient's individual circumstances, changing to another agent if longer or high dose therapy is required (e.g. cephalexin), and careful monitoring of liver function during treatment.

INPATIENT MANAGEMENT

This can occur in SSU (if anticipated stay is <24 hours), HITH, AMU or other inpatient specialty units depending on location, comorbidities and likely duration of treatment. Paediatric patients not requiring surgical input should be referred to the Paediatrics team.

Patients requiring hospital admission for IV antibiotics:

- Sepsis or significant comorbidities (IV drug use, immunosuppressed, chronic heart/lung/liver/renal disease, diabetes) – SSOU or AMU
- Not tolerant of oral intake
- Genuine failure of oral antibiotics
- Suspected necrotising infections – urgent AGSU (Plastics) referral (or Urology in cases of Fournier's gangrene) plus IV antibiotics as per eTG and allergy history
- Diabetic foot ulcer with associated cellulitis – AMU, may need discussion with a Vascular service
- Cellulitis complicating penetrating injuries and retention of foreign bodies – AGSU (Plastics)
- Hand cellulitis – consider AGSU (Plastics) referral
- Cellulitis of finger/hand with concern for tenosynovitis – AGSU (Plastics)
- Orbital cellulitis – transfer to a Melbourne-based service with an ENT/Ophthalmology service
- Cellulitis associated with an abscess that requires inpatient incision and drainage (AGSU (Plastics))
- Cellulitis associated with either animal or human bites – AGSU (Plastics) for consideration of washout under general anaesthesia
- Social issues that will significantly impact upon care – SSU or AMU

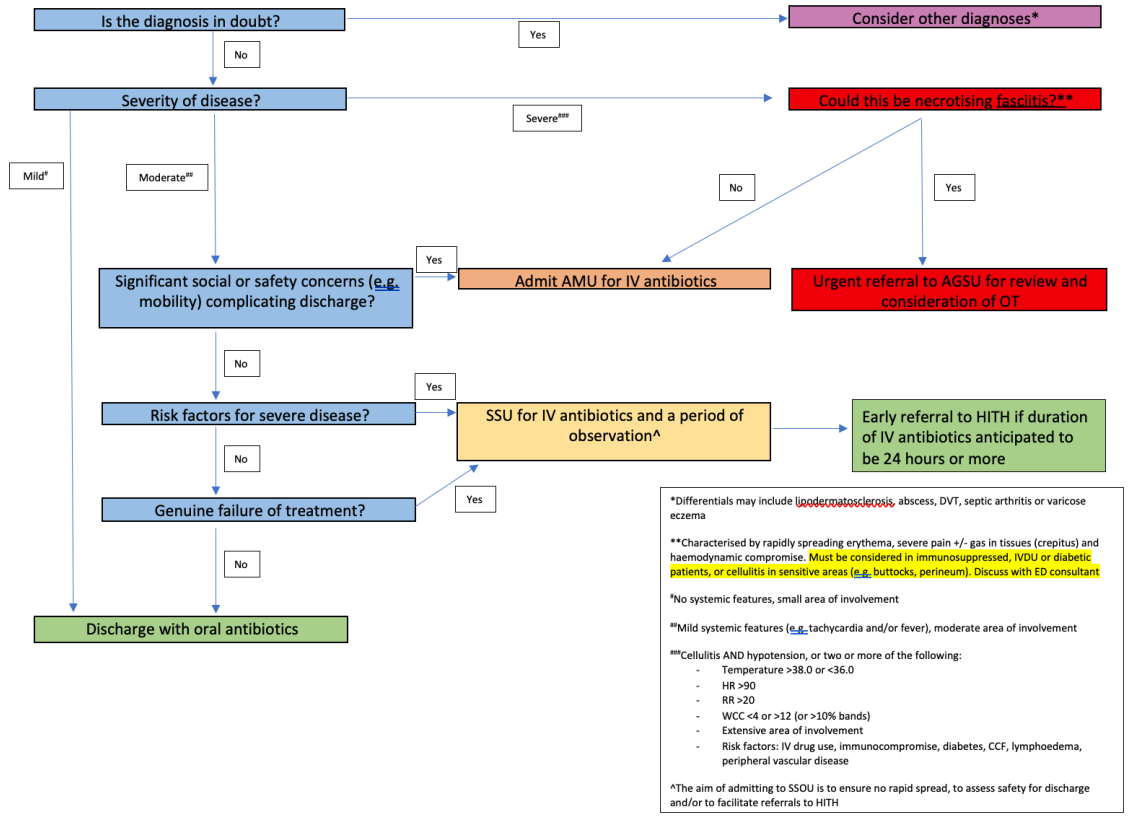

Figure 1: Disposition for patients with cellulitis

When systemic features have resolved, switch to oral therapy – this may occur as rapidly as 1 or 2 doses of IV antiobiotics. A total of 5-10 days duration of treatment is recommended.

Antibiotic choice:

1. Flucloxacillin 1-2g (paediatrics: 50mg/kg (max 2g)) IV QID

OR

2. Cephazolin 1-2g IV TDS

Clindamycin can be used in patients with severe cellulitis who have either an immediate or severe allergy to penicillins/cephalosporins, or if MRSA infection is suspected or proven and the organism is considered susceptible (based on sensitivity testing and local strain susceptibility)

1. Clindamycin 600mg (paediatrics: 10mg/kg (max 600mg)) IV TDS

For proven or suspected MRSA infections, use vancomycin or clindamycin (depending on sensitivities if proven to be the cause of infection)

1. Vancomycin IV (refer to eTG, AMH Handbook and RCH website for dosage and principles of use)

OR

2. Clindamycin 600mg (paediatrics: 10mg/kg (max 600mg)) IV TDS

If community-based IV treatment is appropriate, please discuss with the Hospital In The Home (HITH) team as soon as possible. Patients typically suitable for their service have risk factors for severe disease, extensive areas of cellulitis or are not responding to appropriate oral antibiotics. They must meet the following criteria:

- resolution of systemic features
- no associated abscess (may require US to exclude)
- no concern for limb compromise
- exclusion of other diagnoses (where appropriate) prior to acceptance of care (e.g. DVT or abscess)
- must live within a 30km radius of Bendigo, or be able to reside somewhere within this radius (e.g. with a relative or friend); patients outside of this area may be accepted for brokerage following review and in consultation with HITH nursing staff
- must have access to a phone and carer in the event of an emergency
- patient or appropriate medical decision maker must provide consent to treatment
- patient and their home environment (e.g. pets) must not pose a threat to the safety of staff

The antibiotic of choice for HITH patients with cellulitis is cephazolin (due to its less frequent dosing), with or without probenecid (see below).

1. Cephazolin 2g IV daily
   PLUS
   Probenecid 1g PO daily

OR

2. Cephazolin 2g (paediatrics 50mg/kg (max 2g)) IV BD

Probenecid is a medication that increases the excretion of uric acid into the urine. It is typically used in the treatment of gout and hyperuricaemia. Studies have also shown that probenecid increases the serum concentration of penicillins and cephalosporins by inhibiting their renal excretion, making once or twice daily dosing possible in the community via HITH.

It is not used in paediatric patients with cellulitis.

It should not be used when gout is active and can sometimes precipitate liver dysfunction and uric acid kidney stones so should be used cautiously in these instances.

OTHER

Fungal infection of the toes and their interspaces can provide a portal of entry for bacterial invasion – patients with lower extremity cellulitis (particularly if recurrent) may require antifungal therapy in addition to antibiotics

Patients with cellulitis associated with chronic wounds and other chronic conditions (such as lymphoedema, diabetes or peripheral vascular disease) may benefit from referral to a number of available community-based services:

- High risk foot clinic
- Lymphoedema service
- Wound clinic
- RDNS (now known as Bolton Clarke)

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Original Author: Dr Scott Taylor
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