Skin Infections

Cellulitis is a diffuse inflammation of the soft tissue or connective tissue due to infection. The most common causes are Staphylococcus aureus and Streptococcus pyogenes (Group A beta-haemolytic strep). Any break in the skin may lead to infection e.g. insect bites, abrasions, lacerations, burns and eczema, however the skin often appears intact.

A child with cellulitis will have a red, warm and tender area of skin often with swelling. There may be signs of local spread: proximal red streaking, regional lymph node involvement, abscess formation, or systemic symptoms: fever, malaise, chills and sweats.

Abscess – an abscess is a cavity containing pus with or without surrounding cellulitis.

Allergic skin reactions may be confused with cellulitis but are usually itchy and non tender.

Impetigo (“school sores”) is a highly contagious superficial skin infection caused by S.aureus or S.pyogenes (or both). It is associated with crusting and weeping.

Bullous impetigo is usually caused by a toxin produced by S.aureus. It begins as vesicles which rapidly enlarge to form flaccid bullae.

Furunculosis (“boils”) involves infection that is centred on a hair follicle. It may be superficial with single or multiple red papules or pustules or deeper with abscess formation. It is usually caused by S.aureus and is associated with excessive sweating, friction or occlusion of hair follicles.

Erysipelas is a distinct infection of skin, subcutaneous tissues & lymphatics, usually caused by S.pyogenes. It is associated with abrupt onset of systemic upset. The skin lesion is a fiery red, hot, tender indurated plaque that spreads rapidly with a well demarcated raised border. Commonly occurs on the face or extremities.

Necrotising fasciitis is a life-threatening infection of fascia & sub-cutaneous tissues. It may initially be mistaken for cellulitis but is associated with disproportionate pain & tenderness, rapidly advancing soft tissue involvement & signs of sepsis. Necrotising fasciitis is a medical and surgical emergency that requires prompt surgical exploration & debridement, PICU involvement & broad spectrum IV antibiotics.

Periorbital cellulitis is swelling and erythema in the soft tissues around the eye. See Eye Infection guideline

Orbital cellulitis – these patients have clinical evidence of exophthalmos, pain on eye movement, or limitation of eye movement OR radiographic evidence of subperiosteal or orbital abscess. Urgent ophthalmology review is mandatory for these patients and urgent imaging may be required. See Eye Infection guideline
Assessment

Remember to ask about:

- Systemic upset
- Underlying skin disorders (e.g. eczema)
- Insect bites
- Recent chicken pox infection (in the month prior)
- Significant water exposure (e.g. traumatic lesion / cut sustained while in a pond, stream)
- Immunisations (H.influenzae is an important causative organism in unimmunised children)
- Personal or family history of previous skin sepsis (remember MRSA)
- Overseas travel
- Past history and family history of cellulitis and other skin sepsis.
- Swabs done in the community
- Antibiotics & dose given (if any) in the community
- Perinatal risks (group B streptococcus may be a causative organism in neonates).

Examine for: signs of sepsis, insect bites, wounds, lymphadenopathy, abscess formation (fluctuant swelling or overt discharge of pus). Marking the extent of the erythema is useful to assess clinical progress.

For infections around the eye see Eye Infections guideline

Abscess - If the child has a fluctuant lump, the child is to be referred to the surgical team for consultation/ incision and drainage.

Investigations

Wound/Pus Swabs: only if pus is present or the skin is broken. A swab for AFB (acid fast bacilli) should be taken where nontuberculous mycobacteria is suspected.

Blood Culture & FBC: if child has significant systemic upset or an unusual cause of infection is suspected.

Radiology: X-rays are NOT routine for limb cellulitis and should only be requested if there is:
1. A possible radio-opaque foreign body or,
2. A history of trauma (to exclude an underlying fracture) or,
3. Suspicion of osteomyelitis (including at least 7 days of symptoms)

Ultrasonography: to exclude a non-radio-opaque foreign body (such as wood), or if there is uncertainty about a drainable collection
Cellulitis Management

A well child with early & mild cellulitis should be trialed on oral antibiotics with medical review within 24-48 hours by the GP. Treat uncomplicated cellulitis for 5 days. If the child had been on oral antibiotics prior to presentation consider a trial of a different antibiotic if the child is stable and there was intolerance or an inappropriate antibiotic used in the first instance. It is also worth checking the dose of the antibiotic prescribed to see that it was adequate. For infections in or around the eye please refer to the Eye Infection guideline

Admit ALL children who:
- are systemically unwell
- neonates
- have not responded to appropriate oral antibiotics within 48hrs
- have families unable to cope with the illness at home
- require IV antibiotic therapy

Admit MOST children who:
- have another serious systemic illness (e.g. diabetes)
- have facial cellulitis / abscess
- are young infants

Managing Teams
- Cellulitis +/- abscess of the limbs - orthopedics
- Cellulitis of the trunk, head & neck without abscess – general paediatrics
- Abscess +/- cellulitis of trunk, head or neck – surgical or ENT

Other Considerations for Admission

There are certain issues that will influence the decision made whether to discharge or admit a child. These may not reflect the state of illness but some of the following should be considered:

- Social e.g. issues of compliance, coping skills, anxiety etc.
- Transport and phone access.
- Lack of community services in areas, for example no district nurses.

Discharge on oral antibiotics once systemically well and cellulitis improving.

If the child has had previous skin infections or has been swabbed by their GP look up the swab results in case of previous MRSA.

Analgesia - Cellulitis is painful. Ensure adequate analgesia. Paracetamol is first line. Avoid NSAID’s in suspected post-varicella infection & necrotising fasciitis (associated with increased risk of severe soft tissue infections possibly due to impaired neutrophil function).

All inpatients with cellulitis should be examined at least daily to check for abscess development. If fluctuance develops referral should be made to the appropriate surgical team (depending on the location of the infection).
**Abscess Management**

Abscesses require incision & drainage if fluctuant. If minimal or no cellulitis is associated with the abscess and the child is systemically well antibiotic treatment is not necessary. If induration is present without fluctuance then consider discharge with oral antibiotics and GP follow up. Advise caregivers that it may still need I&D. I&D may be performed in the Children’s Emergency Department with appropriate analgesia & sedation in selected cases – consult with senior.

**Infection Control**

The mode of transmission is through direct contact with a person who has a purulent lesion. Hands are the main vehicle for transmitting infection. Washing and drying your hands is the most important means of preventing the spread of infection.

**Methicillin Resistant Staph Aureus (M.R.S.A.)**

If a patient is found to be positive for MRSA from a wound swab, or is known to be MRSA positive from previous swabs, they should be placed into contact isolation.

**Antibiotic Choice**

**Topical antibiotics**

Only useful for uncomplicated localized impetigo (≤ 3 lesions).

Clean off crusts and apply fusidic acid cream tds to lesions.

**Oral antibiotics:**

*Cephalexin* – good Staphylococcal & Streptococcal cover, palatable suspension, well tolerated, funded. Dose 20 mg/kg/dose bd. Max 500 mg/dose.

*Flucloxacillin* – if able to take capsules (suspension unpalatable). Very effective against S.aureus & has adequate cover for S.pyogenes. Dose 10-25 mg/kg/dose tds (max 500 mg/dose)

**Intravenous Antibiotics:**

*Flucloxacillin* - Dose 25-50 mg/kg/dose q6hrly. Max 2g per dose.

**For MRSA:**

Known or suspected MRSA. (NB: previous MRSA does not necessarily mean this infection is due to MRSA)

**Oral**

*Co-trimoxazole* - Palatable suspension or tablets. Dose 1.5-3 mg/kg/dose bd (trimethoprim component). Max 80-160 mg/dose.

**IV**

Antibiotic choices below require approval from the Infectious Diseases tem)

*Clindamycin* – Dose 10 mg/kg/dose q6-8 hourly. Max 600 mg per dose.

*Vancomycin* – Dose 15 mg/kg/dose q6 hourly. Max dose 500mg q6h
For penicillin allergy:

**Oral:**
- **Erythromycin** – Dose 10 mg/kg/dose qds or 20 mg/kg bd. Max 500 mg/dose.
- **Roxithromycin** – Alternative if able to swallow tablets. Dose 4 mg/kg/dose. Twice daily. Max 150 mg/dose.

**Intravenous:**
- **Clindamycin** – Dose 10 mg/kg/dose q6-8 hourly. Max 600mg/dose.

For animal or human bites:

**Amoxycillin & Clavulanic acid**

**Oral:** 15-25 mg/kg/dose tds (amoxycillin component). Max oral dose 500mg/dose.

**IV:** 25-50 mg/kg/dose. q8h Max IV dose 1g/dose.

**Education**

Parents should be reminded to:
- avoid sharing towels and bedding at home,
- wash linen and clothing regularly,
- maintain children’s short / clean fingernails to avoid skin breaks from scratching,
- examine their child’s skin and clean breaks in the skin,
- see their GP early if redness develops,
- encourage all family members to wash and dry hands properly,
- avoid sharing bath, swimming, and cleaning water when the child has an infected wound,
- restrict their child from swimming in unclean water when they have an open wound.

**Recurrent cellulitis/abscess**

Various strategies can be tried to reduce bacterial skin colonisation but requires motivation from the family. Prevention of infected eczema is best done by proactive management of the eczema rather than repeated antibiotics alone. The infectious disease team is happy to see these patients as out-patients. The typical waiting time is a few weeks. If no cultures are available please swab any lesions plus the nose & groin for bacterial culture.

For children/families who have multiple episodes of skin infection:
- Reinforce personal hygiene measures
- Encourage early presentation to the GP
- Household members are frequently also infected with Staph – it is appropriate to ask about skin infections and examine family members (even adults) to ensure they also receive treatment.
- Some families may find adding Janola to bathwater useful for reducing the bacterial load on the skin. 5ml Janola per 5L of water twice a week. This is approximately 100ml for a 15cm deep full sized bath. Baby’s baths use a capful. Alternatives include antiseptic bath oils (oilatum plus, QV flare up). If there is no bath then Chlorhexidine washes or even Protex soap (these two not recommended in eczema).
- Family to consider discussion with GP regarding other possible decontamination strategies (may include short/medium term antibiotics or intranasal mupirocin).
Referral to Community Nursing

Some children may benefit from follow-up by Paediatric Homecare nurses or Public Health Nurses. Consider this if:

- Wound has a copious high exudate.
- There is a drain in situ.
- Dressings are required.
- The child has multiple skin infections,
- There is a potential for cellulitis to develop into an abscess,

References