Clinical Guideline

SKIN AND SOFT TISSUE INFECTIONS

SETTING	Primary and Secondary Healthcare Institutions in the Western Cape which refer to Red Cross War Memorial Children's Hospital (RCWMCH)
FOR STAFF	Primary and Secondary Doctors and Nurses who refer patients to RCWMCH
PATIENTS	Patients under the age of 13 years old with skin and soft tissue infections

Introduction

Skin and soft tissue infections are a common problem in the paediatric population. Most of these infections can be managed with antimicrobial therapy, or with simple incision and drainage if there is abscess formation

Clinicians should be on the look-out for deeper, more severe infections such as necrotizing fasciitis and pyomyositis. Patients with these deeper infections need aggressive resuscitation and then urgent referral for definitive therapy by paediatric surgery.

This guideline aims to assist doctors and nurses in managing simple infections with appropriate care at the primary and secondary level of care. It will also assist in ensuring clinicians know the signs of deeper infections and when referral to paediatric surgery is the appropriate management plan.

Important details on history

How long has the lesion been present?
Is there a history of trauma?
How did the infection start and how has it evolved in the meantime?
Are there associated symptoms of systemic illness?
Does the child have any comorbidities?

Important details on examination

Assess the lesion for redness, swelling, fluctuance and surrounding induration.
It is helpful to mark the edge of erythema with a marker so that an objective assessment of spread can be made on clinical review.
Assess if the patient can bare weight on the involved limb.
Confirm that there is no limitation on movement in the affected limb.

Reluctance to weight bare or move an affected limb should prompt you to consider septic arthritis and to do an Xray of the affected area to exclude osteomyelitis.

Clinical presentations

Soft tissue infection	Clinical features
Impetigo	Discrete purulent lesions with an associated crusty exudate over the top

Cellulitis	Diffuse spreading pyogenic infection of the skin and superficial subcutaneous tissues
Abscess	Localised purulent infection, with a well demarcated purulent collection
BCG adenitis	Right sided axillary or supraclavicular lymphadenitis secondary to BCG immunisation at birth
Necrotising fasciitis	Severe, destructive infection of the fascia and muscle compartments associated with systemic sepsis
Pyomyositis	Pus collections within a localised muscle compartment associated with systemic sepsis
Toxic Shock Syndrome	Severe life-threatening multi-organ illness caused by superantigen toxins from streptococcal and staphylococcal organisms. Macular rash is a frequent associated feature.

Impetigo

Impetigo are discrete, purulent lesions which occur most commonly on exposed body parts (such as face and extremities). They are most common between the age 2 – 5 years but can occur outside this age bracket.

Lesions may be bullous or non-bullous but the clinical feature that is most associated with impetigo is a crusty exudate. Bullae may rupture, leaving a varnish-like crust and non-bullous lesions may become pustules that break down over a period of 4-6 days, forming thick crusts. These lesions may be slow to heal and can leave scars. Suppurative complications requiring drainage or debridement are very rare.

Importantly, impetigo may be complicated by post-streptococcal glomerulonephritis. A urine dipstick at the time of presentation may identify haematuria, although most cases will present after 1 -3 weeks. Please always inform parents to return urgently if their child develops dark urine or swelling or puffiness of the face or extremities so that their urine can be retested.

Management:

Cut nails short
Soak sore in soapy warm water and remove crusts once soft
Cover draining lesions in saline gauze
Apply povidone iodine 5% cream topically
Oral cephalexin 25mg/kg/dose 12 hourly (max 1g 12 hourly) for 5 – 7 days
Parents should be issued with chlorhexidine soap or povidine to add to child's bath water until lesions have resolved.
Impetigo is contagious: children may return to school after 24 hrs of antibioitics

Referral for general paediatric assessment
Spreading cellulitis
Fever >38°C

No response after treating with 2 courses of above treatment
Haematuria at presentation or after a previously treated episode of impetigo

Cellulitis

Cellulitis is a diffuse, spreading infection of the skin with no organised cavity of pus. It is limited to epidermis, dermis and superficial subcutaneous tissues.

Physical findings of cellulitis are erythema (redness), warmth to touch, induration and pain. Malaise and fever may be present but severe systemic toxicity is rare and should trigger investigation for another underlying cause.

Management

Management is with antibiotics but remember to add appropriate analgesia for symptomatic relief. Systemic oral antimicrobials will usually suffice.

Referral

If there is extensive cellulitis associated with systemic illness or poor response to oral antimicrobial therapy, the patient should be discussed with general paediatrics for possible intravenous antibiotics.

Confirm that drug choice, dosing and administration has been appropriate and strongly consider investigation for deep collections of pus or osteomyelitis with an ultrasound and xray.

If resistant organisms are found on culture, antibiotics should be changed appropriately.

Abscess

An abscess is a focal, contained, purulent infection with a well-demarcated pus-filled cavity. Surrounding inflammation may involve deep subcutaneous tissues but there should be no spread of pus along these tissue planes.

Physical findings of an abscess are painful induration with redness and an area of fluctuance. There may be a pointing pustule visible with a yellow discolouration. Fever and malaise may be present but severe systemic toxicity is rare and should prompt investigation for more extensive disease.

When assessment is challenging ultrasound may be helpful to confirm the presence of pus or fluid in the tissues.

Infections and abscesses in certain areas may point to underlying pathology which has become secondarily infected.

- Anterior, midline neck infections (possibly thyroglossal duct cysts or dermoid cysts)
- Infections anterior to the ear or associated with a pre-existing pre-auricular sinus
- Abscesses or infections on the anterior border of the sternocleidomastoid muscle (possible underlying branchial abnormality)

In the case of an infection in these areas patients should be treated for sepsis with antibiotics and incision and drainage should be avoided. Referred to the paediatric surgical outpatients department non-urgently for assessment after resolution is indicated.

Management

Analgesia should be given to all patients

Incision and drainage (I&D)

I&D alone is adequate for most simple cutaneous abscesses

This can be performed under procedural sedation in any appropriate clinical setting with sufficient, skilled staff, intra- and post-procedural monitoring and appropriate sedative and analgesic medication If the above is not possible then the patient should be referred to an appropriate facility for incision and drainage.

Please do not place gauze plugs or 'wicks' in the cavity – these are painful to remove and don't improve outcomes. Wounds can be dressed with gauze and adhesive bandages. These can be changed every day by the caregiver or at the local clinic/hospital. The wound can be kept clean with saline or clean salt water.

Adjuvant antimicrobial therapy

Additional antibiotics are usually unnecessary after I&D. They can be given at the clinician's discretion if evidence of surrounding cellulitis, ongoing induration, or for a local seeding infection.

BCG Adenitis

Presents with axillary or supra-clavicular lymph node (usually right-sided) that occurs secondary to BCG immunization at birth. Nodes may become fluctuant and possibly secondarily infected.

Management

A 'wait and see' approach is considered best practice. Note that nodes may take in excess of 6 months to disappear completely.

If the nodes become fluctuant, needle aspiration may be helpful but do not undertake formal incision and drainage or excision biopsy of nodes as these procedures result in chronic, non-healing fistulae and wounds.

For chronic wounds that have not healed within 6 – 8 weeks, we recommend referral to a paediatric surgical service for consideration for a wide local excision.

Adjuvant antimicrobial therapy

Antimycobacterial therapy has NOT been shown to improve or hasten outcomes for local axillary disease

If systemic mycobacterial disease is suspected, patients should be worked up according to standard protocols and treatment should be initiated based on the outcomes of these

Analgesia

BCG adenitis is usually painless but in cases of abscess formation simple analgesia can be given

Necrotising skin and soft tissue infections

These deep infections involve fascial plains and can involve muscle compartments. They cause major tissue destruction with severe systemic illness and can lead to death.

Infection is often secondary to trauma or surgery but can be spontaneous.

Initial clinical features may be difficult to distinguish from simple cellulitis but the following are important **RED FLAGS** that should prompt resuscitation and urgent referral to the paediatric surgical on call team.

- Severe, constant pain
- Bullae (related to thrombosis of deep blood vessels)
- Ecchymosis and skin necrosis
- Gas in soft tissues (palpable crepitus/visible on imaging)
- Cutaneous anaesthesia/numbness
- Systemic toxicity (fever, leukocytosis, organ dysfunction, delirium, hypotension, shock, coagulopathy)
- Ongoing, rapid spread of cellulitis despite appropriate antibiotic therapy

Management

Resuscitation

Fluid and haemodynamic status of patients should be assessed and addressed urgently.

Patients should be managed for severe sepsis

Recommended blood investigations when available include:

- Arterial blood gas
- Full blood count
- Creatinine, urea and electrolyte levels
- Blood culture
- International normalized ratio, clotting times and fibrinogen level

Keep the patient NPO and, if feasible, send a blood sample along for the blood bank and the receiving hospital.

Antimicrobial Therapy

Antibiotic therapy should be initiated at the time of resuscitation. The initial therapy choice should be broad-spectrum, and then rationalized as blood and tissue culture results become available later.

Empiric therapy:

- Intravenous Amoxicillin/clavulanic acid OR Ampicillin + gentamycin + metronidazole

- If renal impairment or penicillin allergy present or if poor response to treatment: Clindamycin + ciprofloxacin (See EM Guidance Medications list for dosing)

- If diagnostic criteria for streptococcal or staphylococcal toxic shock syndrome are fulfilled (refer to section below on toxic shock syndrome), clindamycin should be included as part of empiric therapy

Surgical debridement – at tertiary level

Aggressive surgical debridement is the mainstay of therapy after initial stabilisation and transfer to the paediatric surgical team. All visible necrotic and infected tissue will be debrided under general anaesthesia, and pus and tissue samples will be sent for microbiological culture.

This should be undertaken at a facility with appropriate surgical and anaesthetic services as well as High and Intensive Care facilities for peri-operative care as these patients require extensive supportive management.

Patients may require repeated debridement every 36 – 48 hours until advancing sepsis is under control and the clinical condition improves

Antibiotics will be rationalised and downscaled as blood and tissue cultures become available. If sepsis remains uncontrolled despite adequate surgical debridement, antimicrobial therapy may need to be up-scaled. This should be discussed with a microbiologist or infectious disease specialist.

Pyomyositis

Pyomyositis is the presence of pus within individual muscle groups

The clinical findings are of localised pain in single muscle group and decreased mobility in affected limb and muscle group. Overlying subcutaneous tissues are firm and boggy. Fever is present because of the localised sepsis.

A Xray of the affected area should be arranged to assess for underlying osteomyelitis.

Management

Resuscitation

Fluid and haemodynamic status of patients should be assessed and addressed urgently.

Patients should be managed for severe sepsis as per the septic shock protocol

Recommended blood investigations include:

- Arterial blood gas
- Full blood count
- Creatinine, urea and electrolyte levels
- Blood culture
- International normalized ratio, clotting times and fibrinogen level

Keep the patient NPO and, if feasible, send a blood sample along for the blood bank and the receiving hospital.

Antimicrobial Therapy

The causative organism is usually S. aureus

First-line antimicrobial therapy:

- Cloxacillin 50mg/kg/dose 6 hourly (max 2 g 6 hourly)
- This can be converted to oral flucloxacillin or cephalexin once the patient is able to take oral medication
- Treatment should be continued for 4 – 6 weeks

Surgical debridement

Aggressive drainage of pus and surgical debridement is the mainstay of therapy. All visible necrotic and infected tissue will be debrided under general anaesthesia

This should be undertaken at a facility with appropriate surgical and anaesthetic services as well as High or Intensive Care facilities for peri-operative care as these patients require extensive supportive management.

Patients may require debridement every 36 – 48 hours until advancing sepsis is under control and the clinical condition
improves

Antibiotics will be rationalised and downscaled as blood and tissue cultures become available. If sepsis remains uncontrolled despite adequate surgical debridement, antimicrobial therapy may need to be up-scaled. This should be discussed with a microbiologist or infectious disease specialist.

Toxic shock syndrome (TSS)

TSS is a multi-system, life threatening condition caused predominantly by superantigen toxin-producing strains of *Staphylococcus aureus* and *Streptococcus pyogenes*. A high index of suspicion is necessary to ensure early recognition and initiation of appropriate therapy.

There are specific case definitions for TSS based on clinical and lab factors. It is not important, as a primary level clinician, to make the definitive diagnosis of TSS, but it is important to ensure the correct initial blood and fluid cultures are done prior to starting appropriate antibiotic cover in cases where you suspect TSS.

Strongly consider the diagnosis in cases with high fever (≥38.9 °C), diffuse macular rash, multisystem involvement or shock.

Management

Baseline bloods and cultures should be done without delaying initiation of appropriate antibiotic cover (FBC, U&E, CRP, Blood culture)

Add Clindamycin as soon as it is available (causes inhibition of super-antigen toxin production, to empiric and definitive antibiotic therapy in cases of TSS.)

Patients should be urgently referred for specialist care and source control

Management of the soft tissue infection itself is as for necrotising skin and soft tissue infections above.

Western Cape Government
TOGETHER