BC CHILDREN'S HOSPITAL

EMERGENCY DEPARTMENT

BRITISH COLUMBIA CHILDREN'S HOSPITAL

Cellulitis Clinical Pathway & Guideline

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DEFINITIONS

Cellulitis is a spreading infection of the skin extending to the subcutaneous tissues. The most common causes are group A b -haemolytic streptococci (GABHS) and Staphylococcus aureus. Common predisposing factors include skin abrasions, lacerations, burns and eczematous skin, although the portal of entry of organisms is often not seen.

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

Erysipelas is a specific superficial form of cellulitis usually caused by GABHS. There may be lymphatic involvement.

Necrotizing fasciitis is a rapidly progressive soft tissue infection characterized by necrosis of subcutaneous tissue. Etiology is often polymicrobial. Main causative organisms include GABHS, S. aureus and anaerobes. It can cause severe illness with a high mortality rate.

Allergic reactions *I* contact dermatitis (e.g. to insect bites, immunizations, plants, etc) are frequently misdiagnosed as cellulitis. If there is itchiness and no tenderness, cellulitis is unlikely.

EXCLUSION CRITERIA

The following are the exclusion criteria for the Cellulitis Pathway:

Babies:≤ 3 months of age.
Children who are immunocompromised.
Animal bites.
Surgical wounds.
Head & Neck cellulitis (includes orbital, periorbital and dental cellu litis).
Underlying osteomyelitis or septic arthritis.

INITIAL ASSESSMENT

The typical presenting features of all skin infections include soft tissue redness, warmth and swelling, but other features are variable (see table below). It is difficult to distinguish between skin infections caused by different organisms on a clinical basis alone.

	Tenderness	Fever	Exudates, crusting	Systemic sysptoms	HR up, BP down	Other
Cellulitis	+/-	+/-	+/-	+/-	-	
Erysipelas	+	+/-	+/-	+	+/-	Well-defined border
Necrotizing fasciitis	++	+	+/-	++	++	Thrombocytopenia may be present
Allergic reaction / Contact dermatitis	-	+/-	-	-	-	Often itchy. May see insect bite.

HISTORY

Remember to ask about:

Underlying skin disorder (e.g. eczema)
Insect bites
Trauma/ cuts
Immunizations (H. influenzae & Pneuomoccocal)
Recent/ current antibiotic use

PHYSICAL EXAMINATION

Toxic looking infant/ child is;

Pale or cyanotic
Lethargic or inconsolably irritable
Signs of sever dehydration
Tachypneic or tachycardic with;
Poor perfusion, mottled or cool extremities (Baraff 1993)

Remember to:

Mark the site with a ballpoint pen all around
Measure the biggest diameter/s
Document the site on the body figure chart
Examine for lymphadenopathy/ lymphatic streaking
Document the fever

INVESTIGATIONS

- Do investigations for patients who require out patient IV therapy or needs admission.
- It includes;

- CBC & Differential
- Blood culture
- Swab (if applicable) for G stain & culture
- X- ray (if applicable)
- Others e.g. ESR, CRP ... etc
-

- No need for investigations for patients who do not look toxic and require oral antibiotics.

TREATMENT PLAN

1. Oral antibiotics:

- Non-toxic looking patients
- Able to take PO
- Reliable parents
- Follow up can be arranged within 48h (family physician/ pediatrician)

2. Intravenous antibiotics:

- Toxic looking
- More extensive disease e.g. complicated chicken pox.
- Unable to take oral antibiotics

3. Admit to hospital if:

- Persistently toxic looking patient
- Positive blood culture patients
- Unreliable parents/ follow up
- Unresponsive to out patient therapy

TREATMENT REGIME

1. Oral antibiotics:

- Cephalexin (Keflex) 100 mg/ kg/day divided q 6- 8h for 7 days
- Clindamycin (penicillin allergy) 20 mg/ kg/ day divided q 8h for 7 days

2. IV antibiotics:

- Cefazolin 100 mg/ kg/ day divided q 12h

plus

- Probenecid 25 mg/ kg PO divided q 12h (max 500 mg/dose); given 30 minutes prior to IV antibiotics

OR

- Cefazolin 100 mg/ kg/ day divided q 8h

FOLLOW UP

Remember that minimal spread beyond the marked margins can be tolerated if other signs of inflammation have decreased e.g. no fluctuation and the general condition of the child is better e.g. feeding and activity is improved.

- Each return visit order sheet has a number space, fill accordingly
- To minimize waiting in ER, fill the on arrival orders so the patient can receive the PO premedication (Probenecid) & IV antibiotic dose prior to physician assessment.
- In the same order sheet, you can choose to check the previous lab Investigations while patient is waiting for physical assessment.
- Switch to PO antibiotics as soon as the patient can take PO and insure arranged follow up within 48h
- Refer to other surgical/ non- surgical subspecialties accordingly
- Consider admission if ;
    1. cellulitis not responding to out patient treatment
    2. Developing an abscess needs surgical intervention
    3. Developing underlying systemic disease

EDUCATION

All caregivers/ parents are to be given the "Cellulitis" patient information handout.

- Antibiotics: Parents should be informed about the importance of completing the course of the antibiotics and informed about possible adverse effects e.g. diarrhea
- Pain / fever relief: Parents should be aware of the pain and the discomfort the cellulitis causes for their child and to be encouraged to use relieving medications as needed.
- Skin site care: Particularly if the affected area is draining pus, Parents should be aware of what precautions needed.
- Other advices: Particularly to encourage the oral fluid intake, rest the affected limb and keep the child home till the general condition is better and regain full mobility.

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PROBENECID

Canadian Brand Name: Benuryl

Therapeutic Category:

- Adjuvant Therapy; prolong serum levels of penicillin/ cephalosporin
- Antigout Agent; lowers uric acid level and uricosuric agent

Mechanism of Action:

- Competitively inhibits the reabsorption of uric acid at the proximal convoluted tubules, thereby promoting its excretion and reducing serum acid levels.
- Increase plasma levels of weak organic acids (penicillins, cephalosporins or other beta- lactam antibiotics) by competitively inhibiting their renal tubular secretions.

Pharmacodynamics:

- Exerts maximal effects on penicillin levels after 2 hours.
- Produces maximum renal clearance of uric acid in 30 minutes.

Pharmacokinetics:

- Absorption: Rapid and complete from GI tract.
- Protein binding: 85% - 95%
- Metabolism: In the liver
- Half - life: 4 - 17 hours
- Time to peak serum concentration; Within 2 - 4 hours

Usual dosage: Oral

- **Prolongation of penicillin serum levels:**
  Children 2 - 14 years; Initial 25 mg/kg/dose or 0.7 g/m2 /dose
  Maintenance: 40 mg/kg/day or 1.2 g/m2/day QID
  (Maximum single dose; 500 mg)
  Adults: 500 mg 4 times/ day
- **Hyperuricemia:**
  Adults: Initial: 250 mg twice daily for 1 week; increase to 500 mg twice daily; may increase in 500 mg increments every 4 weeks if needed to a maximum of 2-3 gl day.
- **Gonorrhea:** Adults: 1 g 30 minutes before penicillin, ampicillin, or amoxicillin.

Administration: With food or antiacids to minimize GI effects

Contraindications:

- Hypersensitivity to probenecid or any component
- High dose aspirin therapy
- Moderate to severe renal impairment
- Children < 2 years of age, although have been used safely in younger age (infants).
- Bloody dyscrasias
- Uric acid kidney stones

Precautions:

- Patients with peptic ulcer disease
- Hematuria
- Renal colic
- Formation of uric acid stones associated with the use of probenecid may be prevented by liberal fluid intake and alkalinization of urine

Adverse Reaction:

- Cardiovascular; Flushing
- Central nervous system: Dizziness, headache
- Dermatologic: Rash
- Gastrointestinal: Anorexia, nausea, vomiting, sore gums
- Genitourinary; Urinary frequency
- Hematological: Anemia, leucopenia, aplastic anemia, hemolytic anemia (possibly related to G6PD deficiency)
- Hepatic; Hepatic necrosis
- Renal; Nephrotic syndrome, renal colic, uric acid stones
- Miscellaneous: Hypersensitivity reactions

Test Interactions:

- False - positive glucosuria with Clinitest
- Falsely elevated serum theophyllin level (Schack & Waxler technique)

Patients Information:

- Drink plenty of fluids
- Avoid taking large doses of aspirin or other salicylates/ alcohol