



“Don’t I need an IV?”



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Mark’s Case

A 29-year-old man presents with a red, swollen area covering most of the dorsum of his left foot (Figure 1). It has progressed steadily over the past 24-48 hours. This is his first episode and he reports no fever nor chills, no injury to the area, no calf pain and remarks that it feels better when he lies holding the leg higher than the rest of his body. He is on no medications and has no comorbidities.

His vital signs are:

- Pulse 80/min
- Respiratory rate 14/min
- BP 134/74
- Temperature 36.7°C
- SaO₂ 99%

He has been told he may get flesh-eating disease if he does not get an IV at once.



Figure 1. Red, swollen area on the foot.



Figure 2. Interdigital spaces between fourth and fifth toes.

Questions & Answers

1. What is going on and what do I need to “rule out?”

A first glance strongly suggests mild cellulitis. Loculated pus (abscess) should be considered in every case of cellulitis and if present should be drained. In cases where the presence of pus is in doubt, diagnostic aspiration or ultrasound may be useful.

Even where the diagnosis of cellulitis seems obvious, there are a number of cellulitis “mimics” that need to be specifically considered (Table 1).

Remember that although most causes of community-acquired cellulitis are caused by *Staphylococcus aureus* or *Streptococcus pyogenes*, certain clinical pictures are associated with other organisms and may need different antibiotics (Table 2).

2. What tests should I order?

In mild cellulitis, a history and physical examination are ample to guide management. “Routine” laboratory tests are rarely helpful and point of care serum glucose measurement is adequate to investigate for hyperglycaemia. X-rays may be useful in cases where radio-opaque foreign bodies are suspected. In purulent infections, pus swabs may be appropriate in some circumstances¹ (Table 3).

3. Does he need “an IV” and if not, who does?

In the majority of cases, mild cellulitis can be appropriately treated with oral antibiotics. Features of “mild” cellulitis are cases with symptoms or signs restricted to superficial swelling, erythema, warmth, mild lymphadenopathy and mild pain. Systemic symptoms should be absent and patients should not have risk factors for poor outcome (Table 4).

Table 1

Examples of conditions to be considered before making a diagnosis of simple cellulitis

Less concerning possibilities (in terms of danger to life/limb)	More concerning diagnoses
Superficial thrombophlebitis	Deep vein thrombosis
Insect bite	Ischemic limb
Contact/allergic dermatitis	Necrotizing soft tissue infection
Poison ivy	Rhabdomyolysis
Erythema nodosum	Infected animal bite (different organisms may be involved)
Gout	Tenosynovitis
Soft tissue injury	Septic arthritis or osteitis

Table 2

Pictures where less common organisms may cause cellulitis

- Bite wounds
- Wounds sustained in natural water (sea, lakes, rivers)
- Previously treated diabetic foot infections
- Surgical wound infections
- Immunocompromised patients
- Puncture wounds through shoes (especially sneakers)

Table 3

Consider pus swabs

- In the case of purulent wounds where systemic antibiotics will be prescribed (not simple abscesses treated with incision and drainage, or skin infections treated with topical antimicrobials)
- In cases where response to antibiotics has been suboptimal
- In circumstances where clusters of resistant skin infections have been occurring without a particular organism being discovered
- As part of a screening protocol designed by local infectious disease and public health officials

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4. What about community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA)?

CA-MRSA is an ever increasing problem across Canada and emergency physicians should make an effort to find out what the incidence of disease is in the areas they practice. In contrast to hospital-acquired MRSA, CA-MRSA is usually responsive to other easily available non- β -lactam antibiotics. Although clinical characteristics associated with the infection have been published,² one ED based US study found that identification of risk factors for CA-MRSA was not helpful; most patients without CA-MRSA had at least one risk factor, while nearly half of those with positive CA-MRSA cultures had no identifiable risk factors.³ To muddy the water even further, most data on CA-MRSA in skin infections is obtained from pus drained from abscesses in the ED, which generally do not need to be treated with antibiotics.⁴ At this time, unless the incidence of CA-MRSA in your area is high (> 15%), standard empiric therapy with a first generation cephalosporin is still appropriate.⁵ In other cases, co-trimoxazole can be added to the cephalosporin, or (also for penicillin allergy) doxycycline or clindamycin can be used.

Non-antibiotic treatment includes analgesia, elevation and specific treatment of predisposition to poor response or recurrence (Tables 4 and 5).

5. What else is important in “mild” cellulitis?

Cellulitis will respond to your first choice of therapy in about 90% of cases (so it may fail in 10% whatever regimen you

Table 4

Risk factors for poor outcome for patients with cellulitis

- Neutropenia
- Asplenia
- Active cancer
- Systemic lupus erythematosus
- Liver disease
- Organ transplant
- Prosthetic joint or valve
- HIV with CD4 count < 200
- Chronic venous insufficiency
- Chronic lymphedema
- Post mastectomy
- Axillary node dissection
- Radical pelvic surgery affecting the infected body part

Table 5

Examples of underlying predisposition to cellulitis (or recurrence) that may need to be investigated/treated

- Removal of a saphenous vein for coronary artery bypass graft
- Lymphatic anomalies/chronic edema
- Diabetes mellitus
- Peripheral vascular disease
- Ingrown nails
- Psoriasis
- Tinea infections (especially interdigital)
- IV drug user—consider bacterial endocarditis
- Dry, cracked skin

Table 6

Factors to consider in cases of poor response to empiric treatment

- Have you waited sufficient time (at least 48 hours unless rapid progression of pain, or systemic symptoms)?
- Persistent signs/symptoms in spite of clear evidence of improvement are common at the end of the course of therapy and do not need additional antimicrobial treatment.
- Could this be a resistant organism (e.g., CA-MRSA or unusual organism)?
- Consider an alternative diagnosis, such as deep vein thrombosis if in the limbs, dependent rubor of an ischemic limb or lymphatic obstruction from other causes (Table 1).
- Consider an infective complication (e.g., abscess, septic arthritis, necrotizing infection).
- Is there a retained foreign body?

CA-MRSA: Community-acquired methicillin-resistant *Staphylococcus aureus*

choose). Necrotizing infections may look very much like simple cellulitis in early stages. It follows, therefore, that appropriate patient education and follow-up are as, if not more important, than which antibiotics you prescribe. Instruct your patient to return at once if he experiences severe pain, rapid progression of symptoms, or if he becomes systemically unwell. Advise him that cellulitis is an inflammatory reaction to an infective organism and the inflammation may progress initially, even on the right antibiotic. Resist the impulse to change antibiotics in a patient who returns in < 48 hours with progression of redness, but who remains systemically well and without severe pain (Table 6).

Cellulitis results from a breach in the skin's natural defences. When an obvious predisposing factor (such as an open wound or sore) is not found, a treatable predisposing cause should be sought (Table 5).

Back to our patient

Examination of his interdigital spaces shows tinea pedis between his fourth and fifth toes (Figure 2). He is prescribed cephalexin 500 mg q.i.d. for five days and clotrimazole cream twice a day for 10 days, with instructions to ensure complete dryness between his toes before putting his shoes on. At 48-hour follow-up with his FP, his discomfort has abated and the redness has decreased by 50%.

National guidelines for the management of cellulitis are currently in progress. In the meantime, a copy of one set of regional guidelines can be requested at emsgc@cdha.nshealth.ca.



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