



# “It was only a little scratch!”



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## Richard's Case

A 38-year-old man is transferred from the local correctional facility complaining of severe pain in his right leg.

On examination, he appears severely distressed and looks quite sick.

He has a large patch of erythematous skin on his lower leg, extending from his right ankle to above his knee (Figure 1), with a 3 cm central blister (Figure 2). The patch is exquisitely tender and he says that the area of pain has extended dramatically in the past few hours.

It seems to have started at a spot where he scratched his leg on a metal pole a few days earlier.

He has vomited twice. His vital signs are:

- Temperature: 39°C
- Pulse: 130/min
- BP: 104/60
- Respiratory rate: 22 bpm

## Questions & Answers

### 1. What is going on?

The most concerning (and most likely) possibility is that he is suffering from a necrotizing soft tissue infection. These uncommon infections spread rapidly and easily across and along the fascial planes within the subcutaneous tissue. The infection can involve the skin (necrotizing cellulitis), subcutaneous fat (panniculitis), fascia (fasciitis), or muscle (myonecrosis). They rapidly progress and are always more complicated and serious than superficial cellulitis. Tissue necrosis and lack of response to antimicrobial treatment differentiate it from cellulitis. As necrosis extends beyond the cutaneous layers, nerves are damaged and an initially painful area may become numb. Necrotizing infections are rare in healthy individuals and are more likely in diabetics, the malnourished and burn patients. However, previous good health does not rule out this diagnosis, so it should be at least considered in all cases of cellulitis.

Necrotizing fasciitis is generally either monomicrobial (Type II), usually due to Group A *Streptococcus*, although is occasionally due to other organisms, especially *Staphylococcus aureus* (both methicillin-sensitive and resistant), or polymicrobial (Type I). Polymicrobial infections usually include a mixture of anaerobic and aerobic bacteria, in addition to the Type II organisms, Type I offenders include *Clostridium perfringens*, *Vibrio vulnificus* and *Bacteroides fragilis*.

### 2. What are the typical features of this condition?

Clinical features of necrotizing soft tissue infections include:

- Patients acutely ill and toxic with painful erythema containing scattered patchy gangrenous or necrotic skin changes or anesthesia



Figure 1. Large patch of erythematous skin.



Figure 2. A central blister on the lower leg.

- Severe systemic symptoms or pain, out of proportion to skin findings (skin findings may be absent initially)
- Edema or pain out of proportion to erythema
- Subcutaneous gas, or skin vesicles
- The absence of response to antibiotics
- “Dishwater pus” from vesicles or bullae
- Lymphangitis and lymphadenitis, commonly associated with non-necrotizing cellulitis, are usually absent
- Diarrhea and vomiting are common
- Early necrotizing infections may masquerade as simple cellulitis, so a high index of suspicion and precise patient instructions are always appropriate

### 3. *What does the immediate management entail?*

Because of the potential of very rapid spread of infection and threat to life and/or limb, response to the potential diagnosis should be instantaneous. IV access (preferably two wide bore lines if systemic sepsis is suspected) with IV antibiotic administration as soon as possible. Broad spectrum empiric coverage should include agents against anaerobes and both Gram-positives and negatives (clindamycin, ceftriaxone and vancomycin are a reasonable initial choice, with the intention of adjusting antimicrobial coverage according to the results of microbiologic studies). Aggressive fluid resuscitation should also be initiated early. Specimens to identify the offending organism(s) (blood, pus) should be obtained early, but not at the expense of delaying antimicrobial administration. Definitive treatment includes aggressive debridement of infected tissue as expeditiously as possible, so surgical referral should also be immediate. In severely ill patients, early endotracheal intubation may be necessary. Early infectious disease and critical care referral should also be sought.

### 4. *What other skin/soft tissue infections constitute serious emergencies?*

Even the most benign appearing soft tissue infection could be the beginning of something serious. Although this is very unlikely in the vast majority of cases, careful patient instructions for self-monitoring and follow-up are always indicated.

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Soft tissue infection emergencies to specifically consider in the ED include:

- **Orbital cellulitis** presents with proptosis, orbital pain and restricted eye movements (periorbital swelling without pain with eye movements is more likely to be periorbital cellulitis). Orbital cellulitis is an ocular emergency mandating immediate initiation of treatment and ophthalmology referral
- **Septic arthritis** (or prosthetic joint infection): consider the diagnosis in any patient with cellulitis in proximity to a joint
- **Diabetic foot infection**: foot infection is a leading cause of hospital admission in people with diabetes and a major cause of lower-extremity amputation. Organisms (and empiric treatment) in new infections is the same as in non-diabetics, but in previously treated infections, both anaerobe and Gram-negative infections should be considered. Osteitis complicates diabetic foot ulcers in about 15%. Early referral to a multidisciplinary team has been shown to decrease the incidence of amputation significantly
- **Infected bite wounds** including “fight bites” (wounds over the metacarpo-phalangeal joints secondary to punching someone in the tooth): frequently result from organisms that do not respond to the usual empiric antibiotic choices
- **Malignant otitis externa**: osteomyelitis of the temporal and adjacent bones, a relatively rare complication of external otitis, occurring primarily in immunocompromised patients (especially older persons with diabetes mellitus). The most frequent pathogen isolated is *Pseudomonas aeruginosa*. Patients with necrotizing external otitis complain of severe otalgia that worsens at night and otorrhea. Severe cases can result in hearing loss and/or facial nerve paralysis
- **Pyogenic flexor tenosynovitis**: most commonly presents in the flexor tendons of the hand with pain during finger extension. The infection can spread rapidly along the tendon sheath. Empiric IV antibiotics and prompt referral to a hand surgeon for potential surgical drainage is indicated. Remember that the offending agent may be gonococcus, even in the absence of urethral symptoms, so cultures of the urethra, cervix, rectum and/or pharynx may be appropriate
- **Fournier’s gangrene**: a form of necrotizing fasciitis that is localized to the scrotum and perineal area. It begins with local pain, edema and erythema of the scrotal skin and progresses rapidly to an aggressive necrotic infection. Fournier’s gangrene carries a mortality of up to 75%

### *Back to our patient*

The patient continued to deteriorate systemically and required endotracheal intubation, ventilation and treatment with inotropes. He underwent extensive debridement of tissue in the OR, eventually recovering after significant plastic surgery. 