

CELLULITIS - by John Falkner-Heylings BSc (PodMed), DipPodM, FPSPract

What is cellulitis?

Cellulitis is an infection of the tissues of the dermis and subcutaneous tissues. Erysipelas is the term used to describe a more superficial infection than cellulitis, but it is difficult to know how deep an infection is, and many workers use the terms interchangeably. Erysipelas has a sharp demarcation against unaffected skin and is raised, whereas Cellulitis has no such demarcation and is level with the surrounding skin. Cellulitis is '*a common yet potentially serious condition*' (Halpern et al, 2008). Cellulitis will only affect a single limb – if both legs are similarly affected they will be suffering from another red-leg syndrome, not cellulitis.

The lower leg is the most common site for the development of cellulitis. A small area may be affected, or an infection might affect an extensive area of skin. The reddened area of skin is seen to ascend, to advance from the foot upwards as bacterial toxins damage the proteins of the skin. Left untreated, the body's immune system would fight the infection, and the cellulitis should clear. But if the immune system cannot contain the infection it can spread rapidly and become a medical emergency as the infection invades deeper, spreads into the lymphatic system, and may then be distributed throughout the body leading to complications. Untreated cellulitis can give rise to sepsis or permanent damage to the lymphatic system, and may produce a permanent oedema.



Cellulitis of leg



Cellulitis of foot

'Acute lower limb cellulitis may be defined as an acute spreading pyogenic inflammation of the dermis and subcutaneous tissues, characterised by a tender, warm, erythematous, swollen leg without sharp demarcation from uninvolved skin' (Swartz, 2004).

If the condition is mild it may be treated with antibiotics and will most often resolve. But if the condition does not quickly improve or becomes worse it may become necessary to admit to hospital for intravenous antibiotic therapy. In addition to flucloxacillin, intravenous benzylpenicillin may also need to be administered.

According to Halpern *et al*, 2008, there were 49,500 cases that required admission for acute lower limb cellulitis in England in 2003-2004 with a mean length of stay of 10 days. This has considerable resource and cost implications.

Who is at risk of developing cellulitis?

Those at greatest risk of developing cellulitis may:

- suffer from chronic Tinea pedis (athletes foot) or onychomycosis
- have cracks or maceration or intertrigo between the toes, creating portals of entry for staphylococcal or streptococcal bacteria that are responsible for causing the infection.
- have swollen legs, be overweight or obese
- have had previous episodes of cellulitis
- have a lowered immune system - may be on steroids, or chemotherapy
- have poorly controlled diabetes mellitus
- have suffered previous deep vein thrombosis (DVT)

- have experienced same -side orthopaedic surgery on the leg
- have a break in the skin, insect bite, excoriation or wound of the skin of the leg or foot through which infection might enter.

'Tinea pedis and onychomycosis were found to be significant risk factors for acute bacterial cellulitis of the leg that are readily amenable to treatment with effective pharmacological therapy.' (Roujeau *et al*, 2004)

'Prior episodes of cellulitis, pre-existing lymphoedema or venous insufficiency, and tinea pedis can all predispose to this condition.' (BMJ Best Practice, reviewed 2020).

The risk of developing cellulitis increases if:

- there has been a recent episode of skin trauma
- there is a history of diabetes mellitus
- current or recent smoker (within 1 year)
- alcohol excess (over 21 units/week)
- obesity (body mass index > 30kg/m²)
- oedema/lymphoedema/venous incompetence/ulceration.

Halpern *et al*, in their 2008 paper: *Ethnicity and Other Risk Factors for Acute Lower Limb Cellulitis: a UK-based Prospective Case-Control Study* have established that ethnicity is a risk factor for cellulitis, reporting a population attributable risk of 44.1% for those of white ethnicity, 6.2% for Afro-Caribbeans, and 11% for those of Asian origin.

Recurrence of cellulitis

Approximately one-third of cellulitis cases recur. One of the predisposing factors for cellulitis is one or more previous episodes of cellulitis. And an episode of cellulitis may be followed by one or more recurrences in rapid succession. It is thought that if antibiotic therapy is ceased too early, some small foci of infection may remain to re-establish the condition. In some cases it is considered necessary to treat cellulitis prophylactically, with continuous antibiotics for an extended period until the risk of recurrence is thought to have receded. Mild cellulitis is often treated with flucloxacillin or erythromycin.

Differential diagnosis of cellulitis

Cellulitis has similar appearance to varicose eczema, both displaying an erythematous inflammation. A distinctive feature of varicose eczema is blistering, where the blisters exude fluid which dries and crusts. Any crusting present is therefore indicative of varicose eczema. Cellulitis does not crust and the skin remains smooth and shiny.

Cellulitis produces an erythema, and the leg may be swollen and tender. Deep vein thrombosis must be excluded, and since recent hospitalisation or surgery, miscarriage, hormonal contraception and long haul flights are all known to predispose to DVT, it is appropriate to screen for these histories. If palpation of the venous tract is painful then further hospital-based investigation is indicated.

Cellulitis, usually of streptococcal origin, that infects the subcutaneous tissues and fascia can on rare occasions lead to necrotising fasciitis. This is a serious medical emergency with one of the fastest rates of spread of infection known. The bacteria produce toxins that destroy skin and muscle tissue. The condition is accompanied by feeling ill, and becomes life threatening within a few hours, organs failing as the toxins have effect. The death rate from necrotising fasciitis is in excess of 30%. Symptoms not to be overlooked include:

- pain 'out of proportion' to the appearance of the skin,
- feeling unwell and becoming ill 'out of proportion to the appearance of the skin'
- symptoms that worsen rapidly - either skin symptoms or feeling unwell
- affected skin that goes dusky, purple or blisters.

Necrotising fasciitis is rare. It is included here for the purpose of completeness.

References:

Cox NH. Management of lower leg cellulitis. *Clin Med* 2002;2:23-7

Cox NH, Colver GB, Paterson WD. Management and morbidity of cellulitis of the leg. *J R Soc Med* 1998;91:634-637

Halpern J, Holder R, Langford NJ. Ethnicity and Other Risk Factors for Acute Lower Limb Cellulitis: a UK-based Prospective Case-Control Study. *Br J Dermatol*. 2008;158(6):1288-1292.

Quarty-Papaflo, CM. Importance of distinguishing between cellulitis and varicose eczema of the leg; Clinical Review Lesson of the week; *BMJ* 1999;318:1672-1673 (19 June)
<http://www.bmj.com/cgi/content/full/318/7199/1672> - accessed 12/08/2008

Swartz M. Cellulitis *N Engl J Med* 2004;350:904-12

MC Robinson, MD, Infectious Disease Physician, *BMJ Best Practice*, updated March 2020, reviewed April 2020

Morris AD. Cellulitis and erysipelas. *BMJ Clin Evid*. 2008 Jan 2;2008:1708. PMID: 19450336; PMCID: PMC2907977.

Roujeau J, -C, Sigurgeirsson B, Korting H, -C, Kerl H, Paul C: Chronic Dermatomycoses of the Foot as Risk Factors for Acute Bacterial Cellulitis of the Leg: A Case-Control Study. *Dermatology* 2004;209:301-307. doi: 10.1159/000080853

CELLULITIS

The questions on this sheet are based upon the above paper. Answers should be submitted on A4 paper and should be of sufficient length to demonstrate full understanding of the topic. Single word answers are not permissible. Try to answer in one or two short paragraphs, not more than 1/4 page per answer.

- Q1. What is cellulitis? Can it be distinguished from Erysipelas?
- Q2. How does cellulitis arise?
- Q3. Cellulitis can lead to complications. What are those complications?
- Q4. What treatment intervention is necessary on diagnosis?
- Q5. List five factors that may predispose to development of cellulitis.
- Q6. List five factors that increase the risk.
- Q7. Why is cellulitis thought sometimes to recur?
- Q8. How would you differentially diagnose cellulitis from peripheral vascular disease?
- Q9. How are cellulitis and varicose eczema differentially diagnosed?
- Q10. Which is the pathogen that most often causes cellulitis?

**Return this page with the administration fee (see Alliance webpage) and your answers to:
Alliance CPD Dept, Gateway, Forest Moor Road, Knaresborough HG5 8JY
10 CPD points will be awarded for successful completion.**

Failure to gain 40 CPD points in a practice year will leave you eligible for audit.

Name: Alliance Membership No:

Address:

.....

.....

Post Code: