Boils and Carbuncles

Definitions

A boil (furuncle) is an acute infection of a hair follicle, usually caused by *Staphylococcus aureus*.

A carbuncle is a swollen, painful area discharging pus from several points. It occurs when a group of adjacent hair follicles becomes deeply infected; *S. aureus* is usually the pathogen.

An inflammatory reaction occurs in the surrounding and underlying connective tissue, including the subcutaneous fat. The source of staphylococcal infection is usually in the nose or the perineum and it is thought that the infection is disseminated by the fingers and by clothing.

Epidemiology

The incidence of boils is uncertain\(^1\). They are rare in children except in those with atopic eczema. They are rather more common in adolescents and in early adulthood - especially in boys - and the peak incidence is the same as for acne vulgaris.

In England, hospital admissions for severe staphylococcal boils and abscesses trebled between 1989 and 2004\(^2\).

Aetiology

**Boils**

There is usually no predisposing cause, although boils may complicate atopic dermatitis, excoriations, abrasions, scabies or pediculosis. Staphylococcal colonisation is more common on atopic eczema and may contribute to the pathogenesis\(^3\).

- The evidence to link diabetes with furunculosis (multiple crops of boils) is conflicting but when boils affect people with diabetes, they tend to be more extensive.
- Other conditions associated with furunculosis include obesity\(^4\) and immune compromise, as with HIV, blood dyscrasias and treatment with immunosuppressive drugs.

**Carbuncles**

- Carbuncles are associated with malnutrition, heart failure, drug addiction, severe generalised skin disease and prolonged steroid therapy.
- The evidence is conflicting with regard to association with diabetes.
- In adults the use of topical steroids is associated with the development of folliculitis.

Presentation

**Boils**

- A boil starts as a hard, tender, red nodule surrounding a hair follicle. It enlarges and becomes fluctuant (see definition under 'Management', below) over several days as an abscess forms.
- Later it may discharge pus from its centre, before healing and it may leave a scar.
- Boils arise in hair-bearing areas, especially where there is friction, occlusion and perspiration. This includes the neck, face, axillae, arms, wrists, fingers, buttocks and anogenital region.
- Boils may be isolated or multiple lesions; the latter are particularly likely on the buttocks.
- There are sometimes mild constitutional symptoms, such as fever and malaise.
Carbuncles

- A carbuncle starts as a smooth, dome-shaped, acutely tender, painful lesion. It often occurs at the nape of the neck, the back, or thighs and it develops into a swollen, painful area discharging pus from several sites.
- Constitutional symptoms, such as fever and malaise, may accompany or even precede the development of the carbuncle.

Investigations

It is usually safe to assume that this is a staphylococcal infection. However, in persistent or recurrent infection, swabs should be taken from the nose, throat, umbilicus, axillae and perineum. Culture and sensitivities are required.

If there are multiple, severe or recurrent infections, FBC and fasting blood glucose are indicated.

Differential diagnosis

- Cystic acne (usually confined to the face and trunk).
- Hidradenitis suppurativa (only the groin and the axillae are involved).
- Infected epidermal inclusion cyst.
- Cellulitis.
- Osteomyelitis.
- Orf.
- Anthrax.
- Herpetic whitlow.

Management

- If lesions are not fluctuant (fluctuance is a wave-like feeling on palpating skin overlying a fluid-filled cavity with non-rigid walls - eg, a cavity containing pus), the application of moist heat 3-4 times daily relieves discomfort, helps to localise the infection and promotes drainage.
- Treatment with oral antibiotics (until the inflammation resolves) is recommended:
  - If there is fever or surrounding cellulitis, oral antibiotics for seven days are indicated.
  - If infection occurs where complications can be dangerous (eg, the face), antibiotics should be started promptly.
  - If there is a large area of cellulitis.
  - If there is significant comorbidity - eg, diabetes or immunocompromise.

- Oral flucloxacillin is usually the drug of choice against *S. aureus*, with erythromycin or clarithromycin if penicillin is contraindicated.
- Metillin-resistant *S. aureus* (MRSA) is a growing threat in hospitals but is also being reported in the community.
- Drainage may be spontaneous or surgical but cover the lesion with a sterile dressing to prevent autoinoculation.
- Incision and drainage are indicated for lesions that are large, localised, painful and fluctuant.

Observe the patient for signs of systemic upset. Most cases can be treated in primary care; however, the decision of whether to admit the person will depend on clinical judgement, taking into account the rapidity and degree of spread and comorbidities - eg, diabetes.

Persistent and recurrent infection

*S. aureus* is a persistent part of normal microbial flora in 10-20% of the population and around 30-50% of healthy adults are colonised with *S. aureus* at some site, at any given time.

10% of patients with a boil or abscess develop a repeat boil or abscess within 12 months. Obesity, diabetes, young age, smoking and prescription of an antibiotic in the six months before initial presentation have been shown to be associated with recurrent infection.

- In persistent or recurrent infection, swabs should be taken for culture and sensitivities.
- Seek specialist advice if there is a possibility or confirmation of Panton-Valentine leukocidin S. aureus (PVL-SA) or MRSA[8].
- Exclude underlying causes (eg, systemic disease) that may have compromised the immune system. Also consider skin disease - eg, scabies, pediculosis or eczema.
- There may be industrial exposure to chemicals or oils, or simply poor hygiene.
- Consider sources of infection such as autoinoculation, pyogenic infections in family members, and contact sports.
- If furunculosis persists after screening and treating the person, consider outside sources of infection such as family and close contacts. Overt infection is more likely as a source than asymptomatic carriage but consider screening household members, if they will co-operate.

Extraneous sources of infection

- Eradication of nasal carriage of staphylococci can be achieved with a cream of chlorhexidine with neomycin (Naseptin®) applied to the nostrils four times a day for 10 days. Re-colonisation is common. Mupirocin nasal ointment is excellent at eliminating nasal staphylococci but should be reserved for resistant cases[8].
- If other sites are involved then oral antibiotics may be necessary. The choice is guided by sensitivities.
- Antiseptics can reduce staphylococci on the skin. Washing the body and hair daily, and bathing in an antiseptic solution of chlorhexidine or triclosan (eg, Hibiscrub®) in a detergent vehicle, help eliminate infection. If there is dry or inflamed skin then an antiseptic emollient should be used. Examples include Dermol® 500, Oilatum®, Emulsiderm® or Dermol® 600.
- The patient should also:
  - Wash sheets and underwear regularly in a hot wash (above 55°C). The clothes should be turned inside out and the machine not overloaded so that the water can penetrate.
  - Thoroughly clean the bedroom when treatment is started.
  - Maintain a personal towel and flannel and rinse the flannel in hot water before use.
  - Oral flucloxacillin or erythromycin are usually effective against S. aureus infections. There is no evidence base for the best duration of treatment but treatment for seven days is generally recommended.
  - In chronic furunculosis the choice of antibiotic ideally should be guided by sensitivities. Flucloxacillin is recommended for blind treatment or erythromycin if there is a penicillin allergy. Treat for two weeks initially; however, some people will need a longer course of perhaps six or eight weeks.

Complications

- Boils and carbuncles can leave scars.
- Surrounding cellulitis or bacteraemia may develop if furunculosis or carbuncles extend.
- Cavernous sinus thrombosis can complicate boils or carbuncles on the face but this is rare.
- Metastatic infection is rare but can include osteomyelitis, acute endocarditis or brain abscess. Septicaemia is a very rare complication of both furuncles and carbuncles.

Prognosis

- Over a course of two days to three weeks the boil becomes necrotic and develops into an abscess. It ruptures and discharges pus and often a core of necrotic material. Pain subsides as pressure is reduced; the redness and oedema diminish over days to weeks.
- In people who have HIV, boils may coalesce into violaceous plaques.
- A carbuncle grows in size for a few days to reach a diameter of 3-10 cm, occasionally more. After 5-7 days, suppuration occurs and multiple pustules soon appear on the surface, draining externally around multiple hair follicles:
  - A yellow-grey irregular crater develops at the centre. In some cases the necrosis develops more acutely without a follicular discharge and the entire central core is shed to leave a deep ulcer with a purulent floor.
  - Healing takes place slowly by granulation and the area may remain deeply violaceous for a prolonged period of time.
  - Death from toxaemia or from metastatic infection may occur in the frail and the ill.

Further reading & references

5. Boils, carbuncles, and staphylococcal carriage; NICE CKS, January 2017 (UK access only)
8. British National Formulary (BNF); NICE Evidence Services (UK access only)

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