Common cutaneous infections

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Abstract

The skin is continuously exposed to a wide variety of pathogens and has a number of protective mechanisms to prevent invasive infection. Risk factors for infection include breaches of epithelial integrity through trauma or pre-existing dermatoses, underlying immunosuppression, diabetes mellitus, vascular disease and malnutrition. Cutaneous infections are common and can be potentially life-threatening. It is therefore important for all doctors to be able to accurately diagnose and manage common cutaneous infections. In this article, we describe the clinical features and management of the most common bacterial, viral, fungal and parasitic infestations.

Keywords Candida; herpes simplex; impetigo; molluscum contagiosum; pediculosis; scabies; varicella zoster

Key points

- *Staphylococcus aureus* and *Streptococcus pyogenes* are the most common bacteria to infect the skin; they cause impetigo, erysipelas and cellulitis
- Staphylococcal scalded skin syndrome is characterized by widespread blistering from the release of exfoliative toxin by some strains of staphylococci. Prompt treatment with intravenous antibiotics and management in a high-dependency unit is desirable
- *Tinea* is a dermatophyte fungus that can infect the scalp, body and feet. Topical treatment is usually sufficient for skin infection, but nail and scalp infections require oral antifungal agents
- Herpes simplex virus (HSV) causes a vesicular eruption that is most common on the face (HSV 1) or genitals (HSV 2). Primary infection is often asymptomatic but recurrence is common. Treatment with aciclovir is helpful for severe infection or frequent recurrence
- Primary infection with varicella zoster virus (VZV) causes chicken pox, while reactivation causes zoster (or shingles). Treatment with aciclovir is not usually required unless chicken pox occurs in an adult or a person who is immunodeficient or pregnant. Pregnant women without immunity who are exposed to VZV should be given VZV immunoglobulin to prevent fetal infection. High-dose aciclovir is needed to treat shingles
- Scabies and pediculosis (head lice) are common. First-line treatment is topical and should be reapplied after 7 days. Household contacts with scabies should be given treatment to prevent reinfection; only household contacts with live lice should be treated

Introduction

The skin is continuously exposed to a wide variety of pathogens, and cutaneous infections are common. Risk factors for infection include breaches in skin barrier function that result from trauma or pre-existing dermatoses, immunodeficiency, diabetes mellitus, vascular insufficiency, poor nutrition and critical illness.

It has been estimated that the prevalence of skin and soft tissue infections in hospitalized patients is as high as 10%.[1] It is therefore important that doctors in primary and secondary care are able to diagnose and treat common skin infections. Here we describe the most common bacterial, viral and parasitic infections encountered in the UK.

Bacterial skin infections

Impetigo

Streptococcus pyogenes and *Staphylococcus aureus* are the most common bacteria to infect the skin. They can cause impetigo, erysipelas or cellulitis depending on the depth of skin invasion.

Impetigo is an infection of the epidermis and is most commonly caused by *S. aureus*. Children are most frequently affected, although the condition can occur in adults. Impetigo most commonly affects the face, especially the nose and perioral regions. It can take bullous (characterized by blisters) or non-bullous forms. The bullous form is caused by exfoliative toxins released by phage group II staphylococci. These toxins cleave the desmoglein proteins that link keratinocytes together, causing separation of the keratinocytes and blister formation.

Clinically, impetigo is characterized by erythematous macules that evolve into vesicles or pustules and then rupture to form yellow or brown crusts (Figure 1). Bullous impetigo is characterized by blisters that can enlarge to 1–2 cm in diameter. If the infection is extensive, the patient can be systemically unwell with regional lymphadenitis.

Impetigo usually lasts 2–4 weeks and resolves without scarring. Topical treatment with fusidic acid or mupirocin with an antiseptic soap substitute is usually sufficient. For more extensive infections, systemic antibiotic therapy is recommended in combination with topical antiseptics.

Furuncles (boils)

Furuncles or boils are infections of hair follicles. They are characterized by small follicular pustules that progress to form necrotic nodules; these then rupture and heal with scarring. The infective agent is usually *S. aureus*, which can be meticillin-

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Figure 1 Impetigo affecting the perioral region. The eruption is inflammatory with pustules and a characteristic golden crust. Figures courtesy of King's College Hospital, London.

sensitive, meticillin-resistant (MRSA) or Panton Valentine leucocidin (PVL). PVL is a cytotoxin that is associated with more virulent strains of staphylococci causing widespread infections with individual lesions that are larger, more painful and have a greater tendency to ulcerate.

Given the increased frequency of MRSA and PVL staphylococci, good-quality swabs containing purulent fluid are essential to direct appropriate antibiotic therapy. Penicillins are not effective in the treatment of MRSA or PVL staphylococci; the latter may require combinations of antibiotics such as rifampicin and clindamycin. Antibiotics should be given in combination with a decolonization protocol consisting of an antimicrobial nasal ointment such as mupirocin and an antiseptic wash. With PVL staphylococci, this should also be given to close contacts to prevent re-transmission of the infection.

Staphylococcal scalded skin syndrome (SSSS)

SSSS is characterized by widespread erythema, blistering and erosions. It is caused by the haematogenous release of exfoliative toxin from a focus of staphylococcal infection. It mainly occurs in children and is rare in adults.

SSSS is caused by an initial staphylococcal infection, either in the skin or at a distant site. The patient becomes febrile and irritable, and develops confluent tender erythema with a predilection for the neck, axillae and groin. Fragile bullae develop at these sites, and Nikolsky's sign is positive — this is epidermal detachment following gentle lateral abrasion of the skin. Large, painful superficial erosions then form at the sites of blistering (Figure 2). These areas heal within 14 days without scarring.

Figure 2 A large superficial erosion in the right axilla of a patient with staphylococcal scalded skin syndrome. Figures courtesy of King's College Hospital, London.

Swabs taken from the skin are often negative for bacteria as the condition is toxin-mediated. However, intravenous antibiotics are advised to ensure that all foci of staphylococcal infection are treated. SSSS is best managed in a high-dependency setting to intensively manage fluid and electrolyte loss, and to provide sufficient analgesia and sedation. Mortality rates in children vary from 3.6% to 11% although prompt diagnosis and treatment are likely to improve outcome.[2] Localized SSSS is also recognized in children and adults, and there is some evidence this could be triggered by *Pseudomonas*.

Fungal infections

Fungal infections of the skin, hair and nails are common and can be caused by yeast or moulds. The most common yeast to infect the skin are *Candida* and *Malassezia* species. Moulds are multicellular organisms that form long filaments known as hyphae. Moulds that infect the skin are known as dermatophytes and can be subdivided into *Trichophyton, Microsporum* and *Epidermophyton* species.

Dermatophytes favour areas of the skin that are warm and macerated, and therefore commonly infect the feet and flexures. Host risk factors for infection include diabetes mellitus, corticosteroid therapy, underlying immunodeficiency and occlusive footwear and clothing.

Tinea

The term 'tinea' is interchangeable with 'ringworm' and refers to infection with dermatophyte fungi. It is best diagnosed by scrapings taken from the affected site, which are examined microscopically for the presence of fungal hyphae and cultured. With the exception of tinea capitis, it is recommended to await the results of skin scrapings before starting treatment with oral antifungal agents.

Tinea pedis is very common and refers to infection of the feet, most often with species of *Trichophyton* and *Epidermophyton*. It can present in a number of ways. Infection occurring between the toes is known as athlete's foot. Other presentations include dry scaly patches on the dorsum of the foot (Figure 3a), thick hyperkeratotic areas on the sole and clusters of pustules or blisters. It is usually itchy and the history can be very prolonged.

Treatment is with a topical imidazole such as clotrimazole twice daily for 4 weeks or topical terbinafine twice daily for 1 week. For infections that are extensive or unresponsive to topical treatment, a course of oral antifungal agents such as terbinafine may be required.

Tinea corporis occurs on the trunk and limbs. Any dermatophyte fungus can cause the infection, but the most common are *Trichophyton rubrum* and *Microsporum canis*. It is characterized by annular scaly erythematous patches with a raised 'active' edge (Figure 3b). Lesions can be single or multiple, and the nails should be examined for onychomycosis. The treatment of choice for localized infection is terbinafine cream twice daily for 2 weeks or an imidazole twice daily for 4 weeks. Oral terbinafine or itraconazole may be required for widespread or refractory disease.

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