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Common Skin Infections in the Older Adult

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Skin and soft tissue infections are an important cause of morbidity and mortality in older adults. Decreased immunity, changes in skin anatomy, and comorbidities contribute to an increased susceptibility to infections. Methicillin-resistant Staphylococcus aureus is an increasingly common problem in both the community as well as hospitals. Clinical features and management of some common skin infections encountered in this population are reviewed here. Local microbiological guidelines and drug susceptibilities should be taken into account in the treatment.

Key words: *bacterial skin infections, cellulitis, MRSA, fungal infection, scabies*

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Introduction

Skin infections are common in older people due to decreased immunity, malnutrition, and comorbidity as well as an increased incidence of nosocomial infections secondary to institutionalization. The skin barrier function decreases due to epidermal atrophy. Pruritus is more common due to reduction in sebaceous glands and diminished water binding capacity, leading to xerosis.[1] Skin breakage secondary to scratching allows the entry of pathogenic flora into the skin, leading to infection. Decreased blood flow and a reduced rate of cell turnover in the epidermis result in slower healing.

Treatment may be complicated by polypharmacy and impaired compliance due to dementia or comorbidities such as arthritis.

Skin and soft tissue infections in aging adults incorporate a wide spectrum of bacterial, viral, and fungal infections, as well as parasite infestations (Table 1).

Cellulitis and Erysipelas

Cellulitis is an acute infection of the dermis and subcutaneous tissue, whereas erysipelas involves the more superficial dermis and subcutis. Erysipelas and cellulitis are often considered part of the same disease spectrum. Cellulitis is more common on the extremities and presents with ill-defined erythema, pain, increased warmth, and edema (Figure 1). The infection can spread quickly and some patients may develop blisters. Erysipelas typically presents as a bright red, edematous, and tender area with a well-demarcated edge on the face or legs (Figure 2). A classic sign is peau d'orange or orange-peel appearance of the skin.

Beta-hemolytic streptococci (especially group A or G) and less commonly *Staphylococcus aureus* (*S. aureus*) are the main causative organisms. Gram-negative bacteria and anaerobes such as *Pseudomonas spp., Serratia spp., Proteus mirabilis, Escherichia coli* and *Klebsiella spp.* have also been isolated.[2]

Table 1: Skin Infections in the Older Adult

Bacterial		
Cellulitis	Abscess	Furuncle
Erysipelas	Carbuncle	
Impetigo	Necrotizing fasciitis	
Folliculitis	Infected leg ulcers	
Viral		
Herpes Zoster (shingles)		
Herpes simplex (cold sores)		
Fungal		
Onychomycosis	Tinea pedis	
Candidiasis	Tinea cruris	
Tinea incognito	Tinea corporis	
Infestations		
Scabies		
Head lice		

Figure 1: Cellulitis

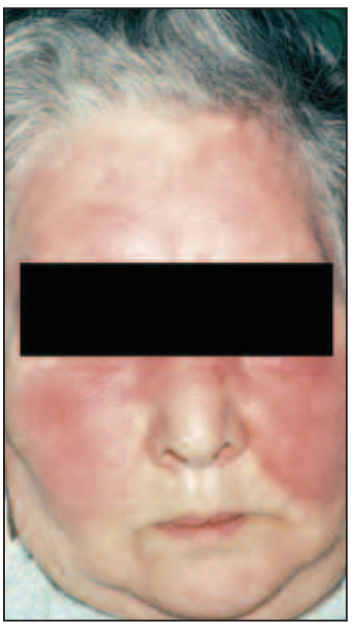
Erythema and edema of the leg associated with cellulitis.
Sources: All images courtesy of the authors.

Trauma or breach in the skin such as cuts, abrasions, ulcers, or fissures can act as a portal of entry for pathogens. Other risk factors include edema from venous insufficiency or lymphatic obstruction, and obesity.[3]

Some patients may develop lymphangitis and lymphadenopathy. In addition, systemic involvement with malaise, fever, confusion, tachycardia, and leukocytosis can occur. About one-third of patients have recurrence of cellulitis.[4]

It is important to consider noninfectious causes of red legs such as deep vein thrombosis (DVT), acute lipodermatosclerosis, allergic contact dermatitis, and asteatotic dermatitis in the differential diagnosis. A Doppler ultrasound may be required to rule out DVT in case of doubt. If there is no evidence of infection antibiotics should not be given as efforts are being made to reduce unnecessary prescribing of antibiotics due to rising resistance rates. If in doubt, seek a second opinion.

Figure 2: Erysipelas



Note the shiny, well-demarcated erythema and marked edema.

Choice of antibiotics will depend upon the local microbiological profile, resistance patterns, and severity of the disease. Oral therapy is appropriate for most patients. In uncomplicated cases, a semisynthetic penicillin or dicloxacillin are first-choice agents. Cephalosporins, clindamycin, or erythromycin are alternatives in penicillin-allergic patients. Patients who fail to respond after 48 hours of therapy, are unable to tolerate tablets, or develop septicemia should be considered for parenteral therapy.

Methicillin-Resistant *Staphylococcus aureus*

The emergence of methicillin-resistant *Staphylococcus aureus* (MRSA) is a growing problem worldwide; there was a 10-fold increase in MRSA cases in Canada between 1995 and 2003.[5] Hospital-acquired MRSA (HA-MRSA) causes mainly bloodstream infections; in contrast, community-acquired MRSA (CA-MRSA) is an increasingly common cause of skin and soft tissue infections.

CA-MRSA appears to have a narrow spectrum of antibiotic resistance, including β-lactam antibiotics, but is often susceptible to clindamycin, trimethoprim-sulfamethoxazole, doxycycline, and some fluoroquinolones with enhanced activity against gram-positive bacteria.[6] Vancomycin is reserved for severe infections but resistant strains are emerging.

Newer antibiotics have been developed for complicated skin and soft-tissue infections such as with MRSA. Linezolid is an oral antibiotic that is effective against gram-positive bacteria. Some studies found it to be more effective than vancomycin.[7] However, it is expensive, can cause myelosuppression, and should not be given to patients taking monoamine oxidase inhibitors.

Impetigo

Figure 3: Impetigo

Honey-coloured crusting on the face typical of impetigo.

Impetigo is a superficial infection of the skin caused by *S. aureus* and less commonly *Streptococcus pyogenes*. It is more prevalent in summer.[8] Patients typically develop pustules and blisters, which then form honey-coloured yellowish crusts or leave erosions (Figure 3). In older patients impetigo often develops secondary to an underlying itchy skin condition such as eczema or scabies.

Treatment with topical antibiotics such as mupirocin or fusidic acid for 7–10 days is beneficial for small areas.[9] However, resistance to mupirocin has now started to emerge.[10] Patients who fail to respond to topical treatment or have widespread disease will require oral antibiotics such as flucloxacillin, erythromycin, or a first-generation cephalosporin. The addition of penicillin may be required to cover streptococcus in some cases. Emollients and antiseptic cleansers, e.g., povidine-iodine or chlorhexidine, are helpful in removing the crusts.

Herpes Zoster

Herpes zoster (shingles) occurs due to reactivation of the varicella zoster virus, which lies latent in the nerve ganglia

Figure 4:
Physiology of Herpes Zoster

the presentation
1–2 days following the inital pain, vesicles form on an erythematous base. The vesicles continue to appear in crops for several days. There is a correlation between the severity of the pain and the extent of the skin lesions.

the dermatomes
Typically, patients initially notice pain and tingling sensation in a unilateral dermatome distribution. Most commonly affected are the thoracic, cranial, lumbar, and sacral dermatomes.

Opthalmic Zoster
Ophthalmic zoster is an infection of the first division of the trigeminal nerve and can result in scarring of the cornea and loss of vision. Lesions may be present on the tip of nose.

Herpes Zoster
Herpes Zoster *(Shingles)* occurs due to reactivation of the varicella zoster virus, which lies latent in the nerve ganglia following a prior chicken pox infection. Symptoms are often more severe in older people.

following a prior chicken pox infection. The lifetime risk of developing shingles is 10–30% in white people, which is greater than the incidence in nonwhites for unknown reasons.[11] Symptoms are often more severe in older individuals.

Typically, patients initially notice pain and tingling sensations in a unilateral dermatome distribution, followed one to two days later by vesicles on an erythematous base (Figure 4). The vesicles continue to appear in crops for several days. There is a correlation between the severity of the pain and the extent of the skin lesions. The patient is contagious until all the vesicles have developed into crusts, which takes two to three weeks. Most commonly affected are the thoracic, cranial, lumbar, and sacral dermatomes. Ophthalmic zoster is an infection of the first division of the trigeminal nerve and can result in scarring of the cornea and loss of vision. Lesions may be present on the tip of nose.

Postherpetic neuralgia (PHN) is the most frequent complication. The pain, either spontaneous or evoked by minor stimuli, may continue to occur for many months after resolution of shingles. Scarring and disseminated zoster are more common in older and immunosuppressed patients, including organ transplant recipients.

Antiviral drugs, if started within 48–72 hours of onset, reduce the duration of disease and incidence of PHN.[12] Valacyclovir and famciclovir are newer antiviral drugs with increased oral bioavailability and hence reduced frequency of dosage.[13] Treatment for shingles involves appropriate analgesia and care of the affected skin with emollients and antiseptics. Gabapentin and tricyclic antidepressants can be beneficial in relieving PHN.[12]

Onychomycosis

Onychomycosis is a fungal infection of the nails, especially the big toenails, which occurs more commonly in older people.[14] Dermatophytes, predominantly *Trichophyton rubrum*, are frequently the pathogenic organisms. Several risk factors are associated with the development of onychomycosis including male gender, increasing age, diabetes mellitus, peripheral vascular disease, and immunosuppression.[15]

Figure 5: Onychomycosis

Patient has hyperkeratosis and discolouration of the big toenail due to onychomycosis.

Infected nails become thickened, crumbly, and discoloured (Figure 5). Some patients also develop onycholysis. Differential diagnoses worthwhile considering include psoriasis, lichen planus, and hyperkeratotic eczema. Nail clippings and scrapings from underneath the affected nails should be obtained for microscopy and culture prior to starting treatment.

The most commonly used oral antifungal drugs are terbinafine and itraconazole. In general, dermatophyte infections respond to terbinafine 250 mg daily for six weeks for fingernails and 12 weeks for toenails. Itraconazole is used at 400 mg / day for one week given monthly for three months. Terbinafine appears to be more efficacious than itraconazole.[16] Topical agents do not work as well as oral agents. Since cosmetic disfigurement is usually the main concern in older adults, and the side-effect profile and cost of most oral antifungals can be prohibitive, it may be appropriate not to treat onychomycosis. Good regular nail care by a professional chiropodist, podiatrist, or nail-care nurse should be in place to prevent pain or reduced mobility resulting from severe onychomycosis.

Candidiasis

Candidiasis is a superficial skin infection with candida yeasts. It may present as chronic paronychia with secondary nail dystrophy, nail infection, or mucocutaneous candidiasis (Figure 6). It is more common in immunosuppressed patients. On the skin, it often involves the flexural areas of the body such as groins, axillary folds and inframammary area. Clinically it appears as macerated, eroded skin on a background of erythema, often with satellite papules and pustules. Topical treatment with azoles such as clotrimazole (1% hydrocortisone in clotrimazole cream to affected areas b.i.d. and p.r.n.), or polyenes such as nystatin, either alone or in combination with topical steroids, is usually sufficient.

Figure 6: Oral Candidiasis

This is a common clinical type of mucocutaneous candidiasis.

Scabies

Scabies is caused by the mite *Sarcoptes scabiei*. It is a very contagious disease and is more prevalent in facilities where people share close quarters, such as long-term care institutions. Once transferred by close contact, the female mites lay eggs as they burrow the skin. Typically, burrows occur in the skin folds and flexural areas such as wrists and fingernails. The larvae hatch and come to the skin surface after three to four days and the whole process is then repeated. The latency period between infection and onset of clinical features is usually four to six weeks. Marked itching is the result of an immune response to the mites and their products. Itching can be severe and is often worse at night. Secondary bacterial

Figure 7: Scabies

Marked crusting and inflammation of right hand is notable in this patient with Norwegian scabies.

infection can occur due to scratching.

Norwegian or crusted scabies is a severe form of scabies, which is seen in immunosuppressed or disabled people unable to scratch (Figure 7). These patients are extremely contagious due to the high number of mites in the skin.

Topical scabicides are usually the mainstay of treatment (Table 2). Permethrin, due to its better efficacy and low toxicity, is the first-line drug in many countries.[17,18] The U.S. Food and Drug administration recommends that lindane should only be used as a second-line agent because of its potentially serious neurotoxic side effects, which are more common in children and adults of advanced age.[19]

It is important to treat the patient and all close contacts at the same time, and to wash the bed linen and clothing in highest heat possible (i.e., 60° or 90°C) after each treatment. Two applications of a scabicide, one week apart, are applied to the whole body including genitalia and under the fingernails. Alternatively, oral ivermectin (one or two doses one week apart) can be used, especially in Norwegian scabies or institutional outbreaks (note that ivermectin is not approved in Canada for treatment of scabies). Pruritus may persist for several weeks after successful treatment of scabies.

Conclusion

Skin and soft tissue infections are a common problem in older adults. Accurate diagnosis is important to reduce the risk of complications. Treatment should follow local microbiology recommendations. It is important to remember that older people may have difficulties reporting symptoms accurately and are more likely to present with atypical features.

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Table 2: Treatment Options for Scabies

Topical	
Benzyl benzoate	Permethrin
Lindane	Malathion
Crotamiton	Sulphur compounds

Key Points

Skin infections are common in older adults due to decreased immunity, malnutrition, and comorbidity as well as an increased incidence of nosocomial infections.

Treatment may be complicated by polypharmacy and impaired compliance due to dementia or comorbidities such as arthritis.

Skin and soft tissue infections in aging adults incorporate a wide spectrum of bacterial, viral, and fungal infections.

Cellulitis (acute infection of dermis/subcutaneous tissue) and erysipelas (infection of more superficial dermis and subcutis) are often considered part of the same disease spectrum; beta-hemolytic streptococci (especially group A or G) and less commonly *Staphylococcus aureus* are the main causative organisms.

The emergence of methicillin-resistant *S. aureus* (MRSA) is a growing problem worldwide; cases of MRSA in Canada increased 10-fold between 1995 and 2003.

Impetigo is a superficial skin infection caused by *S. aureus* and less commonly *S. pyogenes* in which patients typically develop pustules and blisters, which are generally treated with topical antibiotics.

Herpes zoster (shingles), the expression of reactivated varicella zoster virus, often manifests more severely in older adults.

Onychomycosis, a fungal infection of the nails, occurs more commonly in older people.

Scabies is more prevalent in facilities such as long-term care institutions and is caused by the mite *Sarcoptes scabiei*; Norwegian or crusted scabies is a severe form of scabies seen in immunosuppressed or disabled people unable to scratch.

Accurate diagnosis is important to reduce the risk of complications of skin and soft tissue infections, and treatment should follow local microbiology recommendations.

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