

## Photo ID

*Visual clues to the diagnosis of infectious disease***Skin Disorders in Elderly Persons:  
Identifying Fungal Infections**

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[*Infect Med.* 2007;24:509-515]**Key words:** *Candida* species ■ Cutaneous infections ■ Elderly patients ■ Fungal infections

**A**ge-related changes heighten the risk of cutaneous infections in elderly patients. The skin of persons older than 65 years is more fragile than that of young or middle-aged persons; it is drier and thinner and possesses fewer hair follicles and sweat glands. As a result, it is more susceptible to microinjuries, which can give pathogens—including normal skin flora such as *Candida*—the opportunity to penetrate and spread, at least superficially. In addition, because elderly patients have weakened immune systems, indolent infections, such as onychomycosis, are more common among persons in this age group than in younger persons.

On the following pages, I provide a pictorial guide to the various presentations of fungal infections in elderly patients, including candidiasis, onychomycosis, and several types of tinea.

**Cutaneous candidiasis**

This infection is usually caused by *Candida albicans*, which is often present in body folds. Candidiasis is common in persons with diabetes and in obese persons. Other predisposing factors are the use of antibiotics, topical corticosteroids, or immunosuppressive drugs; poor nutrition; and immunosuppression.

Candidiasis usually appears as well-defined erythema with slight scaling, often accompanied by satellite pap-



**Figure 1** – This scaly, erythematous rash manifested under the pannus of an obese patient's stomach as a result of a candidal infection.

ules and pustules. It most commonly occurs in the axilla, the groin, under the pannus of the stomach of obese persons (Figure 1), and in the inframammary areas and other regions of the torso (Figure 2). Cracking and maceration of the skin may be present.

In many patients, candidiasis coexists with intertrigo (Figure 3); this inflammatory dermatosis results from the impairment of epidermal integrity and is not an infection. Both candidiasis and intertrigo are most pronounced in body folds. These disorders are facilitated by local factors, such as prolonged occlusion with moisture and warmth in skin flexures. Nutritional deficiencies may alter host defense mechanisms or epithelial barrier integrity, which allows increased adherence or penetration by *Candida*.

Erythrasma, which is caused by *Corynebacterium minutissimum*, also has a predilection for intertriginous areas; it typically manifests as reddish light brown or brown, smooth to slightly scaly patches in the groin and axilla (Figure 4). This infection can sometimes be diagnosed by Wood light examination (which reveals coral-red fluorescence) or by skin biopsy.

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**Figure 2 –**  
*Candidiasis*  
manifested on  
this man's  
torso.



**Figure 3 –** Intertrigo frequently coexists with candidiasis. Both disorders are facilitated by prolonged occlusion with moisture and warmth in skin flexures.



**Figure 4 –** This reddish brown rash is erythrasma, which has a predilection for intertriginous areas.

Potassium hydroxide evaluation is the easiest and most cost-effective method for diagnosing cutaneous candidiasis. Culture from an intact pustule, skin biopsy tissue, or desquamated skin can help support the diagnosis.

Treat coexisting candidiasis and intertrigo with drying agents, such as nystatin powder and bacitracin/polymyxin B powder, and an antifungal agent such as ciclopirox, which has anti-inflammatory effects. Severe candidiasis can be treated with oral fluconazole, 200 mg/d for 3 days or 100 mg/d for 1 week; sometimes only 1 dose of fluconazole is needed to clear candidiasis.



**Figure 5 –** The white plaque on this patient's tongue can be easily removed to reveal underlying erythema. This finding is characteristic of thrush.

#### **Oral candidiasis**

Also known as thrush, oral candidiasis is not uncommon in elderly persons. It can be related to poor dentition or immunosuppression, particularly as a result of oral corticosteroid use. Thrush appears as white plaques that overlie areas of erythema on the buccal, palatal, or oropharyngeal mucosa (Figure 5). In most patients, the white film can be easily removed, which may reveal small ulcerations.

#### **Perlèche**

Candidal infection can also occur at the lateral angles of the mouth; it causes erosions and breakdown of the skin (Figure 6). Angular cheilitis, or perlèche, resembles the relationship between intertriginous candidiasis and intertrigo in that it is part infection and part inflammatory response to the impairment of epidermal integrity. A relat-



**Figure 6** – The erosions at the lateral angles of this patient’s mouth resulted from candidal infection.

ed condition is denture stomatitis, which presents as chronic mucosal erythema typically beneath the site of a denture.

**Erosio interdigitalis blastomycetica**

Maceration or scale between isolated web spaces of the fingers suggests erosio interdigitalis blastomycetica (interdigital candidiasis) (Figure 7). It most often occurs in the web space between the middle and ring fingers; sometimes the toes are affected. Erosio can spread and can be painful.

Long-term exposure to liquids and chronic maceration make those who do “wet work,” such as launderers, bartenders, dishwashers, and homemakers, particularly susceptible. Exposure of the skin to irritants and moisture over a long period leads to breakdown of the skin barrier with subsequent colonization and growth of *Candida*. Rings can help retain moisture in the web space.

Erosio interdigitalis blastomycetica is also one of the cutaneous manifestations of diabetes. Furthermore, the immunosuppressive effect of corticosteroids can aggravate the condition.

**Onychomycosis**

The prevalence of onychomycosis increases with age; it is less than 1% in persons younger than 19 years and rises to about 18% in those who are aged 60 to 79 years. The infection is more common in men than in women. Among the predisposing factors are diabetes mellitus, psoriasis, a family history of onychomycosis, use of immunosuppressive drugs, and peripheral vascular disease.

Onychomycosis is more than a cosmetic problem; it

can cause pain and limited mobility. Moreover, onychomycosis and tinea pedis are thought to be risk factors for recurrent cellulitis because they provide a portal of entry for bacterial pathogens. In persons with diabetes, onychomycosis can lead to secondary bacterial infections that can result in foot ulcers, recurrent cellulitis, ery-



**Figure 7** – Scale or maceration between isolated web spaces of the fingers suggests erosio interdigitalis blastomycetica (interdigital candidiasis) candidal infection.

sipelas, and gangrene.

Dermatophytes (most commonly, *Trichophyton rubrum*) cause onychomycosis, or tinea unguium. *Candida* and nondermatophyte molds are rarely implicated as causative agents.

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**Figure 8** – This thickened, friable, discolored toenail with subungual hyperkeratosis is characteristic of distal subungual onychomycosis.



**Figure 9** – Distal subungual onychomycosis can be pigmented.



**Figure 10** – The scaly plaques on the plantar surfaces of this patient's feet represent tinea pedis.

There are 4 types of onychomycosis. They are distal subungual onychomycosis, proximal subungual onychomycosis, white superficial onychomycosis, and candidal onychomycosis.

Distal subungual onychomycosis, which manifests as thickened and friable nails with associated discoloration and subungual hyperkeratosis, is the most prevalent type; it accounts for 75% to 85% of cases (Figure 8). Sometimes this disorder is pigmented (Figure 9).

The most sensitive and specific way to diagnose ony-

chomycosis is by periodic acid-Schiff (PAS) staining of a nail clipping. A definitive diagnosis is useful because psoriasis, lichen planus, and eczema can cause onychodystrophy that resembles onychomycosis. PAS staining cannot distinguish between the different types of dermatophytes; however, this distinction has little bearing on treatment.

Onychomycosis can be treated with oral terbinafine (250 mg/d for 3 months), itraconazole (400 mg/d for 1 week every 4 weeks, for 12 weeks), or fluconazole (400 mg weekly for 48 weeks). Shorter courses of oral antifungal therapy can be used if only fingernail onychomycosis is present, but the exact duration of such therapy has not yet been determined in large-scale clinical trials. Ciclopirox nail lacquer is another treatment option for onychomycosis.

Terbinafine is the most effective agent and has few drug interactions, but it is effective only against dermatophytes; the other agents are also effective against nondermatophytes. Topical application of urea 40% gel or cream, which breaks down keratin and softens the nail plate, may enhance penetration of topical antifungal drugs.

It can take up to 6 months to see the effect of these therapies on toenail onychomycosis. Combinations of treatments (eg, oral and topical or oral/topical and surgical) appear to be associated with enhanced cure rates. Patients should be advised to disinfect or discard old footwear, keep the feet dry and clean, and continue to use topical antifungal agents.

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**Figure 11** – An annular plaque with a rim of scaly erythema arose on this woman's back. Tinea corporis was diagnosed.



**Figure 12** – The polycyclic annuli on this patient's torso were suspected to be tinea corporis. A potassium hydroxide evaluation confirmed the diagnosis.

### Tinea pedis

Athlete's foot, or tinea pedis, is common in elderly persons. It manifests as maceration in the interdigital web folds and as scaly plaques on the plantar surfaces of the feet (Figure 10). A potassium hydroxide evaluation can establish the diagnosis. Tinea pedis is commonly associated with xerosis. It is best treated with a topical antifungal agent; treatment can be aided by a keratolytic such as lactic acid 12% cream.



**Figure 13** – This woman has allergic contact dermatitis of the hands, which resembles tinea manuum. A potassium hydroxide evaluation was necessary to make the diagnosis. Other diagnostic considerations include irritant contact dermatitis and palmar psoriasis.



**Figure 14** – Fungal folliculitis (Majocchi granulomas) developed after a topical corticosteroid was applied to treat a presumed contact dermatitis, which was actually tinea pedis.

### Tinea corporis

This occurs most often on the torso of elderly persons. Tinea corporis commonly appears as an annular plaque with a rim of scaly erythema (Figure 11). Occasionally, tinea corporis manifests with polycyclic annuli (Figure 12) or with nummular plaques, which mimic nummular dermatitis. The examination of a potassium hydroxide preparation can establish the diagnosis. Tinea corporis can be treated effectively with a topical antifungal agent.

### Tinea manuum

Tinea that occurs on the hands is referred to as tinea manuum. For unknown reasons, tinea often affects both feet but only 1 hand. Tinea manuum must be distinguished from allergic contact dermatitis of the hands, which it resembles (Figure 13); this can be done by examination of a potassium hydroxide preparation. Tinea manuum can be treated with a topical antifungal agent.

### Fungal folliculitis

A fungal folliculitis (Majocchi granulomas) (Figure 14) can occur if a superficial fungal infection is treated with topical corticosteroids. Fungal folliculitis is best treated with a short course of oral itraconazole or fluconazole. ❖

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