Cutaneous Fungal Infections in the Elderly

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KEYWORDS

• Elderly • Dermatophytosis • Candidal cutaneous infection • Pityrosporum infection

KEY POINTS

- Cutaneous fungal infections affect a large percentage of the elderly population due to skin exposure and metabolic changes in this population.
- Dermatophytes, a type of mold, have the ability to invade and multiply within keratinized tissue. They can cause tinea pedis, tinea corporis, tinea unguium, and tinea capitis.
- *Candida albicans* is a yeast and can cause clinical infection of the skin, mucous membranes, and nails. It is part of the normal skin flora in healthy individuals and only causes an infection when the normal commensal balance is disturbed.
- Conditions such as seborrheic dermatitis, pityrosporum folliculitis, and tinea versicolor are caused by another yeast, *Pityrosporum ovale.* This yeast also causes infections when the numbers of the yeast increase past a certain threshold.
- Antifungals should be prescribed and used with caution because of their interactions with many medications and potential side effects.

INTRODUCTION

The population more than the age of 65 years continues to increase each year. In 1900, the life expectancy from birth, in the United States, was 47 years, and those older than 65 years comprised only 4% of the population.[1] According to the United States census, there are currently 37.3 million senior citizens and by 2050 the number is expected to be 21% of the population.[2] This increase in numbers will lead to an increase in the prevalence of dermatoses. Cutaneous fungal infections are commonly seen in this population. Elderly skin has been exposed to ultraviolet light, smoking, and many other environmental factors throughout the years as well as the intrinsic

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degenerative and metabolic changes that make it more susceptible to infection. The epidermis becomes thinner and tears easily with mild friction, providing a port of entry for microorganisms.[3] Various dermatoses such as stasis dermatitis and psoriasis may be a port of entry for infectious agents in elderly patients with comorbidities such as diabetes and peripheral vascular disease.

Common cutaneous fungal infections can be divided into 3 broad categories based on the organisms that cause them: (1) the dermatophytes, a group of molds, cause tinea pedis, tinea corporis, tinea cruris, tinea unguium, and tinea capitis; (2) the yeast species, *Candida,* causes oral candidiasis, perlèche, intertrigo, erosio interdigitalis blastomycetica, vaginitis, balanitis, and chronic paronychia; (3) *Pityrosporum,* another yeast species, causes seborrheic dermatitis, tinea versicolor, and pityrosporum folliculitis. These pathogens cause superficial fungal infections, meaning they are limited to the stratum corneum, hair, and nails in most immunocompetent patients.

DERMATOPHYTOSIS

Dermatophytosis refers to superficial skin, hair, and nail infections caused by dermatophytes. There are 3 main genera of dermatophytes: *Microsporum, Trichophyton*, and *Epidermophyton. Trichophyton rubrum* is the most common cause of dermatophytosis worldwide.[4] These molds all have the ability to invade and multiply within keratinized tissue. They can also be subdivided into types based on their natural habitat: geophilic (earth loving), zoophilic (animal loving) and anthropophilic (man loving).

Tinea Pedis

Tinea pedis is a dermatophyte infection that localizes to the feet and interdigital spaces between the toes. It often starts in the fourth web space.[5] The use of occlusive footwear that creates a hot, humid environment for the pathogen and increased use of closed, moist public spaces such as pools, saunas, gyms, and areas of nursing homes have increased the incidence of tinea pedis. A pan-European survey of the elderly showed that there is a 9% increase in the prevalence of tinea pedis with each additional year of age.[6] *Tinea rubrum, Tinea mentogrophytes,* and *Epidermophyton floccosum* are the most common pathogens involved.[4] The infection is spread by walking barefoot on contaminated surfaces. Often, elderly patients are not able to visualize their feet because of poor vision or arthritis and do not even realize they have a fungal infection. They may think the occurrence of dry scaly skin is a part of the normal aging process and therefore may not bring it to the attention of the health care provider. There are 4 clinical variants of tinea pedis: (1) moccasin, (2) interdigital, (3) inflammatory (vesiculobullous), and (4) ulcerative.

The moccasin type presents as pruritic scaliness and mild erythema of the entire plantar surface and sides of the foot, thus creating a moccasin outline (**Fig. 1**). The most common causative agent is *T rubrum*.[7] This subtype of tinea pedis is frequently chronic and difficult to eradicate.[4] The patient may also present with unilateral hand involvement (tinea manuum), which is known as the 2 feet–1 hand syndrome.[8]

The interdigital type is the most common presentation of tinea pedis and starts off with scaling, erythema, and erosion of the interdigital skin of the feet. It is caused by *T rubrum*, and a coinfection or occlusion of the foot can lead to an overlying bacterial infection that is malodorous and pruritic. This is commonly known as athlete's foot.[9]

The inflammatory, or vesiculobullous, variant presents as vesicles and bullae on the instep and anterior plantar foot. It can be mistaken for palmoplantar pustular psoriasis or dyshidrotic eczema. The most common pathogen is *Tinea mentagrophytes* in adults.[10] This type of infection can cause vesicles and blisters on a patient's hand