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Review article

Common cutaneous disorders in the elderly

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ABSTRACT

Because of the growing trend toward populations, aging in many countries worldwide, there is an increased focus on geriatric dermatology. Although skin problems might sometimes seem minor compared with other major systemic diseases frequently seen in this age group, accurate diagnosis and proper management help reduce the morbidity and positively influence their life quality.

Because of various senile changes in skin, elderly people are predisposed to certain dermatological disorders. The most common cutaneous diseases that will be characterized in this article are broadly categorized into inflammatory dermatoses, cutaneous infections, vascular disorders, and neoplasms. Management of these cutaneous diseases in elderly population requires particular attention to their inherent physical and physiological weaknesses and associated complicated problems.

1. Physical and physiological changes in elderly skin

As a result of a combination of cumulative intrinsic and extrinsic aging, skin undergoes considerable changes. Intrinsic aging is a process of natural senescence, whereas extrinsic factors include UV-light exposure, smoking, and various environmental insults.

The epidermal turnover rate slows down with age, delaying reepithelialization time after injury. Older corneocytes accumulate, imparting a dull gray-white appearance and rough feeling to aging skin. Altered biosynthesis of stratum corneum lipids, including ceramides, triglycerides, and fatty acids, may lead to increased transepidermal water loss and defects in the permeability barrier.[1–3] Besides, decreased epidermal filaggrin formation reduces natural moisturizing factor of stratum corneum and its ability to maintain hydration.[1,4] Therefore, dryness of skin, or xerosis, is a common problem among the elderly. The altered barrier function also contributes to increased susceptibility to contact irritants or allergens,[5] which may be the cause of xerosis-induced pruritus.

The aging skin shows thinned epidermis and flattening of epidermal–dermal junction, which increase the incidence of skin tears from shearing and friction. With addition of decreased elastic content in dermis and vasculature, skin becomes easily bruised (senile purpura). The dermis has disordered, sparse collagen and elastin fibers, and there is a gradual decrease in nerve endings, microcirculation, and sweat glands, predisposing the elderly to increased risk of pressure ulcers, thermal injury, and longer healing time after injury or surgery.[6–8] Besides, impaired immune response, which is manifested by diminished inflammatory reaction, particularly cell-mediated immunity, may result in increased susceptibility to infection.[9]

2. Inflammatory dermatoses

Inflammatory dermatoses comprise a wide array of skin diseases, which account for most of the cutaneous problems in the elderly.

2.1. Pruritus

Pruritus is the most common dermatological complaint of the elderly population, with a prevalence as high as 29% in one study.[10] Chronic pritus (>6-week duration) is a distressing symptom of many cutaneous, systemic, or neuropsychiatric diseases.[11] Dermatological diseases causing pruritus in elderly patients, as shown in a study by

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Thaipisuttikul,[12] encompass xerosis, inflammatory eczematous disorders, lichen simplex chronicus, urticaria, and others, with xerosis being the most prevalent (almost 40% of all patients with pruritus). Pruritus may originate from diverse underlying systemic diseases or conditions, including iron deficiency anemia, thyroid disease, diabetes mellitus, cholestatic liver disease, renal dysfunction, drug reaction, and malignancy. Emotional or psychological stresses, such as depression and anxiety, may also be contributing factors to itching.[10] Nevertheless, in up to 30% of patients, pruritus remains idiopathic[13] and occurs more frequently and more severely with increasing age.[14]

Before initiating treatment, thorough skin examination, review of medication history, and careful diagnostic evaluation and identification of any underlying diseases should be conducted. A psychological evaluation may be necessary in some elderly patients with chronic pruritus. The underlying causes should be treated accordingly.

Emollients, particularly with additional antipruritic agents, such as menthol, camphor, phenol, or doxepin, can temporarily reduce pruritus.[15,16] Calamine, oatmeal bath, and chamomile preparations are also helpful in relieving itching. Oral antihistamines are often used, supplemented with short-term use of topical or systemic corticosteroids. Recently, innovative therapies have been developed targeting new neuronal mechanisms in the skin and brain.[17]

2.2. Xerosis and asteatotic eczema

Xerosis, or dryness of the skin, is the most common skin disorder in the elderly.[18] As previously mentioned, increased transepidermal water loss, reduced sebum and sweat production, and decreased natural moisturizing factor, all lead to skin dryness.[19] In addition, irregular alignment of corneocytes because of abnormal maturation and adhesion of keratinocytes results in rough and scaly skin.[20] Commonly seen on the lower legs, it is often accompanied by intense itching, excoriation, or inflammatory changes recognized as asteatotic eczema. Skin may show varying degrees of erythema, cracking, fissuring, or present with a “crazy paving” appearance. Extrinsic aggravating factors include low ambient humidity, excessive bathing (especially using harsh soaps or detergents), irritating clothing, and use of products containing alcohol or acetone. Diuretic drugs and cholesterol-lowering agents have also been shown to induce skin dryness.[1,21]

Treatment for xerosis consists of avoidance of aggravating factors and hydration of skin. Patients should be advised to bathe less frequently using a moderate-temperature bath, mild soaps, or soap substitutes. Application of bath oil helps form a thin film of oil on the body surface. Moisturizers need to be applied immediately after a bath. Optimal moisturizing products should have both occlusive and humectant properties.[22] Petrolatum, lanolin-based emollients, or moisturizers containing lactic acid or its salt are frequently suggested.[23] Short-term use of topical corticosteroids may be needed if inflammation or itch is severe.

2.3. Seborrheic dermatitis

Seborrheic dermatitis is commonly seen (but sometimes overlooked) in the elderly, especially those with neurological disorders, such as Parkinson’s disease, Alzheimer’s disease, or emotional stress.[24] Clinically, faint erythematous patches with greasy scales may be distributed mainly on areas rich in sebaceous glands, including scalp, eyebrows, glabella, paranasal fold, postauricular area, and intertriginous areas.[25] Malassezia yeast, a commensal flora on human skin, is implicated in its pathogenesis.[26] Abrupt appearance of seborrheic dermatitis has been reported to be associated with underlying medical disorders, especially in the elderly.[27] Seborrheic dermatitis of the scalp is usually treated with shampoos containing cytostatic agents (zinc pyrithione, selenium sulfide); keratolytics (salicylic acid); ketokonazole; or tar preparations. Mild topical corticosteroids, calcineurin inhibitors and antifungal creams are frequently used for treatment of seborrheic dermatitis of glabrous skin.

2.4. Nummular dermatitis

Nummular dermatitis, or discoid eczema, is characterized by pruritic oval- or coin-shaped plaques, which may weep or become crusted, scaly, or infected, and are often found on lower legs and forearms. A potassium hydroxide (KOH) examination may be helpful in making the differential diagnosis from tinea corporis. Nummular dermatitis is often associated with low humidity, xerosis, or emotional stress.[28]

Treatment of nummular dermatitis includes topical corticosteroids, topical calcineurin inhibitors, and emollients.[29] It usually responds slowly to treatment and runs a chronic course, which is often difficult to control even with potent topical corticosteroid preparations.[30]

2.5. Contact dermatitis

Contact dermatitis has been reported to occur in as high as 11% of the elderly population, and includes allergy-and irritant-type reactions.[22] Because of its reduced ability to mount delayed hypersensitivity reaction, the elderly skin shows relatively less vesiculation or inflammation and early appearance of scaling, hyperpigmentation, and lichenification.[31]

Certain antimicrobials (i.e., neomycin, nitrofurazone in topical medications); lanolin; parabens (in topical medications, cosmetics, or moisturizers); dyes; plants; balsams; rubber; and nickel are among the most common allergens,[31,32] whereas alkaline soaps, detergents, or cleaners are more likely the culprits in cases of irritant dermatitis.[33] Patch testing is useful in identifying the allergens. Treatment starts with avoidance of the causative agents or products if feasible. Emollients and mild corticosteroids usually suffice for irritant dermatitis, whereas allergic contact dermatitis often requires potent topical corticosteroids, oral antihistamines, or corticosteroids according to its severity.[34–36] It is less responsive to treatment and tends to run a more chronic course in elderly patients than in younger patients.[31]

2.6. Drug eruptions

Polypharmacy is common among the elderly population, which may lead to higher risk of cutaneous adverse drug reactions while also complicating the effort to pinpoint the culprit.[37] Drug reactions may take the form of almost any dermatological disease, with exanthema and urticaria being the most common reaction morphologically.[38] Drug exanthems are symmetric erythematous morbilliform maculopapular eruptions, often associated with pruritus. They typically occur within 1 week of initiation of a drug regimen and resolve within 2 weeks after discontinuation, although considerable variation exists.[39] Wheals and flare reaction are characteristic of urticaria and often vanish rapidly on discontinuation of medication. To make an accurate diagnosis, careful investigation of medication history, including over-the-counter or herbal drugs, should be carried out. Prompt and accurate diagnosis enables early withdrawal of the inducing drug, which is critical for the elderly who are generally more vulnerable to severe drug reactions.[40]

3. Cutaneous infection

Infectious skin diseases ranked first on the list of diagnostic categories of skin diseases according to a survey of dermatological outpatient services in Taiwan.[41] Bacterial and fungal infection may be more prevalent in Taiwan because of its humid and warm

climate. Tinea pedis and tinea unguium represent the most common fungal infections,[41] whereas the most common viral infection is herpes zoster.

3.1. Bacterial infection

The bacterial infections of skin in the elderly population may appear atypical in their symptoms and signs. The most common ones are cellulitis and infected ulcers in this age group.[42]

Cellulitis is a bacterial infection of the lower dermis and subcutaneous soft tissue, most often caused by *Staphylococcus aureus* or Group A beta-hemolytic streptococci, presenting with a tender sharply bordered erythematous warm edematous plaque, sometimes superimposed with vesicles, erosions, hemorrhage, abscess, or necrosis on the plaque, or accompanied by lymphangitis.[43] It often affects the lower legs, which usually follows interdigital fungal infection of the feet. The main differential diagnoses are deep vein thrombosis, allergic contact dermatitis, and stasis dermatitis.[44]

Routine skin swabs (from open lesions) or aspiration (from fluctuant lesions or bullae) should be sent for detection of causative pathogen and tested for antibacterial sensitivity. Initial management should be penicillinase-resistant penicillin, such as flucloxacillin or dicloxacillin for 10 days.[42] More severely ill patients, particularly those with medical disorders, such as diabetes mellitus, should be hospitalized and treated. Of note, there has been an alarming increase in the prevalence of methicillin-resistant *S. aureus* infection in the past decade, particularly in Taiwan.[43] In such cases, vancomycin, teicoplanin, linezolid, and quinupristin-dalfopristin are among the drugs of choices.[43,45] In addition, it is important that any abscess collections should be drained or debrided.

3.2. Fungal infections

Tinea pedis and tinea unguium are the most common cutaneous fungal infections in the elderly population. Intertrigo and paronychia related to *Candida* are also quite prevalent in this age group.

3.2.1. Tinea pedis

The most commom dermatophytes are *Trichophyton rubrum*, *Trichophyton mentagrophytes*, and *Epidermophyton floccosum*. Dermatophytes often serve as a primary source of dermatophytic infection that can spread to the nails (tinea unguium), groin (tinea cruris), trunk (tinea corporis), and hands (tinea manuum). They are three major clinical types: (1) interdigital, (2) moccasin, and (3) inflammatory/vesiculobullous.[46]

Diagnosis is confirmed with a KOH preparation (10–20%) and microscopic examination for hyphae. The specimen should be taken from dry scale, because macerated scale on the interdigital webs is often overgrown with bacteria producing antifungal substances. Fungal cultures are not sensitive but can be helpful if diagnosis of tinea pedis is still strongly suggested from clinical appearance in spite of negative KOH examination.

Treatment primarily involves the use of topical antifungal agents, which include imidazoles (i.e., clotrimazole, sulconizole) and allylamines (i.e., terbinafine, butenafine). Keratolytic agents (salicylic acid, lactic acid) should also be used to remove hyperkeratosis in moccasin-type tinea pedis. Twice-daily applications are required for 2–4 weeks, including more than 1 week after lesions have resolved.[30] Onychomycosis may be a source of reinfection of tinea pedis and should be treated as well.

The course of tinea pedis tends to be chronic and usually exacerbates in hot weather. Because it may also provide portal of entry for cellulitis or lymphangitis, taking preventive measures is very important, including use of personal shower shoes while bathing, thorough drying of feet after bathing, use of antifungal powder (powder containing miconazole or tolnaftate), or washing feet with benzoyl peroxide bar (i.e., panoxyl bar).[30] Intermittent application of antifungal agents once or twice a week also may be beneficial.

3.2.2. Onychomycosis

Onychomycosis (fungal nail infection) is most often (90%) caused by dermatophytes, so called tinea unguium. Its prevalence increases with age.[47]

There are three main clinical types according to the site of involvement: (1) distal and lateral subungual onychomycosis, (2) superficial white onychomycosis, and (3) proximal subungual onychomycosis. The distal and lateral subungual onychomycosis, the most common type, shows nail thickening, crumbling, discoloration, onycholysis, or subungual hyperkeratosis. It often involves the great toenails.

For KOH examination or fungal cultures, scraping of soft subungual debris should be taken from the nail bed and underside of the most proximally involved nail plate in distal/lateral type onychomycosis. Histopathology with periodic acid-schiff (PAS) stain of nail clippings is both a sensitive and the most reliable technique for diagnosis[30] but is likely to be negative in proximal subungual and superficial white onychomycosis.[46] It is essential to prove fungal infection and differentiate from other nail dystrophies before starting systemic treatment.

The most commonly used antifungal drugs are terbinafine and itraconazole. Terbinafine has superior mycological cure rates compared with iraconazole or fluconzole.[48,49] The dosage is 250 mg/d for 6 weeks for fingernails and 12–14 weeks for toenails. It has less potential for drug interaction and, therefore, is relatively safer for elderly patients compared with other azoles. However, it has low efficacy against other fungi.

To prevent relapse, follow-up treatment with topical antifungal agents may be beneficial. Patients should be advised to discard their old, moldy footwear; keep feet clean and dry; and use their own instruments for manicures or pedicures.

3.2.3. Cutaneous candidiasis

Cutaneous candidiasis occurs most commonly at moist occluded skin sites (intertrigo, angular cheilitis, genital candidiasis, oral thrush, balanitis or vulvitis, and others) and on nail apparatus (chronic paranychia). *Candida albicans* is frequently the pathogen. Predisposing factors include diabetes mellitus, obesity, systemic/topical glucocorticoids, broad-spectrum antibiotics, immunosuppressive drugs, and chronic debilitation. Often found in body folds, such as inframammary areas, groins, axillae, and intergluteal folds, intertrigo is characterized by well-marginated erythematous eroded patches with satellite pustules at the periphery.

Diagnosis is based on clinical findings and confirmed by direct microscopy or culture. KOH preparation shows sausage-like pseudohyphe and yeast forms. Topical antifungal treatment (nystatin, azole, or imidazole cream) is generally effective in the immunocompetent individuals, but oral antifungal agents (itraconazole, fluconazole, or ketonazole) are indicated for more resistant cases. The precipitating factors should be properly dealt with if possible. The affected areas need to be kept dry and protected from further maceration with greasy emollients.[44] Washing with benzoyl peroxide bar or daily use of miconazole powder may also be helpful.

Chronic paronychia is now considered chronic dermatitis of the periungual tissue,[50] often complicated by secondary *Candida*, *Pseudomonas aeruginosa*, or *S. aureus* infection. It is characterized by painful erythema, edema of the proximal and lateral nail folds, and deformity of the nail plate. Therefore, in addition to treatment for secondary infection, management should primarily be aimed at treating dermatitis with topical or intralesional corticosteroids. It is also important to reduce exposure to water or other irritants.

3.3. Viral infection

Herpes zoster, also known as shingles, is caused by varicella-zoster virus (VZV) and occurs more commonly in older individuals. After initial varicella infection, this virus may remain dormant for a long period of time in the ganglia of the sensory nerve root of the affected sites. Certain risks factors, most likely reduced cell-mediated immunity to VZV with advancing age, may reactivate VZV and result in herpes zoster.

Its associated prodromal pain can be misdiagnosed as other medical or surgical conditions, such as migraine, acute myocardial infarction, or acute abdomen, depending on the involved dermatomes. Crops of vesicles develop on an erythematous edematous base in a unilateral, dermatomal distribution. The site of predisposition is thoracic dermatomes (>50%), followed by trigeminal dermatome (10–20%). Nasociliary involvement of ophthalmic branch of the trigeminal nerve is often heralded by vesicles near the nose tip (Hutchinson's sign) and may result in uveitis, keratitis, or conjunctivitis. Acute pain can occur before and throughout the course of skin eruptions.

Antiviral therapy should be instituted within 72 hours of vesicular eruptions for immunocompromised patients or patients with severe acute pain. VZV is less sensitive to acyclovir treatment than herpes simplex virus (HSV), and higher doses are needed for treatment. Early implementation and adequate dosage of antiviral agents will accelerate the healing of skin lesions, reduce the acute pain, and prevent postherpetic neuralgia.[51] Dosage for acyclovir is 800 mg, five times a day for 7 days. Another commonly used drug is Valacyclovir, L-valine ester of acyclovir. It has better oral bioavailability, better efficacy, and simpler dosing regimen (1 gm, three times per day) than acyclovir.

Postherpetic neuralgia (PHN), which persists for weeks to years after skin lesions resolve, is particularly a problem for elderly patients. The duration and severity of PHN are related to age.[52] It is often associated with prodromal pain or acute pain during the first few days of vesicular eruptions.[52] Topical analgesic (indomethacin with ether); topical anesthetic (5% lidocaine gel or EMLA® (AstraZeneca)); oral analgesics; tricyclic antidepressants (amitriptyline, desipramine); gabapentin; or nerve blocks may be useful in managing PHN. Prevention by immunization with VZV vaccine is suggested for elderly or other populations with diminishing VZV-specific immunity.

4. Vascular disorders

Senile changes in skin vasculature show age-related decrease in vessel density and reduction of cutaneous blood flow. Decreased endothelial cell permeability and weakened ability to induce leukocyte adhesion contribute to compromised immune reaction.[53] With increased skin rigidity; decreased elasticity (because of loss of and biochemical change in collagen, elastin, and dermal ground substance); as well as impaired inflammatory responses, aging skin is rendered more susceptible to injury and is less capable of undergoing modification or repair in response.[54]

4.1. Stasis dermatitis and ulceration

Stasis dermatitis or ulceration results from venous insufficiency and venous hypertension related to valvular incompetence. Contributing factors include hereditary cause, prolonged standing, obesity, and deep vein thrombosis. Older patients, who often have vascular abnormality associated with various diseases, such as arteriosclerosis and diabetes mellitus, are more prone to this disorder.[55]

Stasis dermatitis, most common in the medial paramalleolar area, manifests as ill-defined dark erythema, dermatitis, variable scaling, varicose veins, and edema of feet and ankles. Chronic stage may show lichenification, hyperpigmentation, or lipodermatosclerosis. Excoriation or trauma to the fragile skin may result in painful, well-marginated ulcers, a debilitating disorder for elderly patients.

Treatment of stasis dermatitis includes the application of mild topical corticosteroid preparations, controlling edema, leg elevation, and compression dressings or stockings. Venous ulceration is often treated with astringent soaks (e.g., aluminum acetate solution or potassium permanganate solution soaks); debridement; or systemic antibiotics in the case of secondary infection.[55,56] Surgical treatment for varicose veins may be indicated.

4.2. Pressure ulcers

Pressure ulcers, also known as decubitus ulcers, or bedsores, are more commonly seen in elderly patients, especially those with long-term immobilization, sensory impairment, comorbidity, malnutrition, or circulatory disorders.[57] These risks factors should be thoroughly evaluated for the patients. Bony prominences, particularly on the lower portion of the body are the sites of predilection. Prolonged pressure on tissue leads to ischemia and further tissue damage. It should be noted that tissue damage starts from deep in the muscle–bone interface; hence, an apparently small ulcer may turn out to be a much deeper or more extensive ulcer after debridement. For better detection, evaluation with palpation is helpful. Management of pressure ulcers should include treating associated medical conditions; relief of pressure or friction (e.g., position/mobilization techniques, using pressure-reducing devices, and frequent repositioning); and wound care (including debridement, dressings, and control of bacterial infection).

5. Neoplasms

Both benign and malignant tumors are more frequently seen in elderly population. Common types of benign tumors include seborrheic keratosis, skin tags, solar lentigines, and cherry angioma. As to skin malignancy, nonmelanotic tumors, such as basal cell carcinoma, are the most common types in the elderly patients in Taiwan.

5.1. Benign tumors

Seborrheic keratosis is the most common type of benign tumors of epithelial origin. Usually seen after the age of 30 years, seborrheic keratosis presents as well-circumscribed tan to brownish papules or plaques with a greasy feel to its surface and often occurs on face, trunk, and upper extremities. For atypical or symptomatic lesions, curettage or punch biopsy may be needed to differentiate from Bowen's disease, basal cell carcinoma, or malignant melanoma.

A skin tag, also called acrochordons or soft fibroma, is a soft, skin-colored to brownish, round or pedunculated, fibroepithelial polyp. Increasingly common with aging, it often occurs on the neck and in the intertrigionous regions. Treatment includes removal with scissors, electrodessication, and cryotherapy.

Solar letigines manifest as pigmented macules on sun-exposed areas and are more common in fair-skinned people. They are indicators of sensitivity or excessive exposure to UV rays, and patients should be advised to take measures to reduce sun exposure. Atypical ones should be examined for the presence of lentigo maligna.

Cherry angiomas, also named senile angiomas, are bright red, dome-shaped papules, which are mainly distributed on the trunk

and are commonly found in the elderly. Treatment, chiefly by pulse dye laser, is usually not required unless for cosmetic reason.

5.2. Malignancy

The most common malignant tumor is basal cell carcinoma, which usually arises in the elderly. It typically presents as a pearly erythematous papule or plaque with rolled border and telangiectasia on the face and neck. Necrosis, ulceration with crusting, or pigmentation may occur. For lesions in the "danger zone" (central face, around the eyes, and postauricular sulcus), there is a major concern about deep invasion and extensive destruction of muscle and bone. Early removal with Mohs surgery (microscopically controlled surgery) is the best strategy for such cases. For small and shallow lesions, treatment options include topical 5-fluorouracil, imiquimod, excision, cryotherapy, electrodessication, or photodynamic therapy.

6. Conclusion

Although many common skin diseases occur in younger age groups, there are certain concerns pertaining to the elderly patients in the management of such diseases. The elderly may either have difficulty presenting the symptoms or tend to show atypical symptoms and signs, such as less noticeable fever and leukocytosis in infectious diseases. Those factors may delay or complicate an accurate diagnosis. Management of cutaneous disorders should take into account the patients physiological characteristics, medical comorbidity, polypharmacy, and social circumstances. Poor compliance with treatment caused by physical or mental disabilities (impaired vision/hearing, dementia, or immobility) is another problem for elderly patients. Simple regimens and mild topical preparations should be prescribed whenever possible for the purpose of better compliance and reduction of safety concerns. Patients, perhaps with the help of caregivers, also need to be reminded to apply the medications correctly and receive monitoring as needed.

With better knowledge of and more attention to dermatological problems in elderly patients, we have a greater chance to help relieve their discomfort, particularly annoying pruritus or pain, and promote their well-being.

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