Characteristics of the ageing skin, xerosis cutis and its complications

A. GÖRÖG*, A. BÁNVÖLGYI and P. HOLLÓ

Department of Dermatology, Venereology and Dermatooncology, Faculty of Medicine Semmelweis University, Budapest, Hungary

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ABSTRACT

People in the developed countries are living longer. Geriatric dermatology is playing an increasingly important role as chances of developing skin-related problems increase with their ageing. Skin ageing is induced by two main processes: intrinsic and extrinsic. Extrinsic ageing is caused by environmental factors such as sun exposure, smoking, alcohol consumption, air pollution, and poor nutrition. Intrinsic ageing reflects the genetic background and depends on time. The aged skin is characterised by the appearance of dryness, atrophy, wrinkles, pigmented lesions, patchy hypopigmentation, and elastosis. This article provides an overview of skin ageing processes and common conditions found in the elderly persons such as xerosis, pruritus, and eczema.

KEYWORDS

ageing, dermatology, eczema, itching, skin, xerosis

INTRODUCTION

Today most people can expect to live into their sixties and beyond. Every country in the world is experiencing growth in both the size and the proportion of older persons in the population [1]. As the life expectancy is greatly increased, the population pyramid is described with a rectangular shape [2].

The ageing causes many physiological changes in the skin. According to the WHO classification, old age from the age of 75, but also ageing beyond the age of 60, causes a number of fundamental changes in the skin, the dermatological implications of which are significant and widespread [3, 4].

Skin conditions affect up to 70% of the geriatric population. Among the commonest are those that are caused by or present as dry, itchy skin. Xerotic or asteatotic eczema is the most common kind of eczema experienced in the elderly [5].

Characteristics of the ageing skin

Skin ageing is affected by a combination of intrinsic and extrinsic factors. The features of the ageing skin can be easily diagnosed clinically. Intrinsic ageing is a fundamentally unsustainable process, its speed depends on individual factors, mainly genetic factors. It affects the skin of the entire body, including sun-protected sites. It is primarily characterised by atrophy, as both the number of cells that make up the skin and the amount and quality of the extracellular matrix decrease [4].

Along with these, the amount and the conduction of blood vessels and nerves that supply the skin deteriorate or decrease. The signs of intrinsic ageing begin at around 50–60 years of age. Women develop these signs earlier due to a decrease in the protective effects of oestrogen hormones during menopause.

The most important of the extrinsic factors is UV radiation caused by sunlight, which is responsible for light-induced ageing, i.e. photoageing [3]. In addition, the effects of harmful
factors caused by air pollution have recently received increasing attention, but the role of smoking, alcohol consumption, or malnutrition is also an important factor in skin ageing [6, 7].

Together, intrinsic and extrinsic factors lead to skin atrophy and quality deterioration, and these effects also affect all three layers of the skin, the epidermis, dermis, and subcutaneous tissue (Fig. 1). Due to the thinning of the epithelium and the smoothing of the papillae of the dermo-epidermal junction, the vulnerability of the skin increases. A decrease in the number of Langerhans cells in the epithelium leads to a weakening of the immune defence. The turnover of epithelial cells can drop to its half, which adversely affects exfoliation. The number of hair follicles, sebaceous and sweat glands is also shrinking, which leads to a lower lipid content of the skin. Lipid hypoproduction of the skin results in xerotic conditions, the rate of transepidermal water loss increases, leading to dry skin (xerosis cutis) and consequent pruritus (pruritus senile), which, in addition to the closely related eczema, is the leading dermatological complaint in elderly people [8].

**Xerosis cutis**

Xerosis is common skin condition in the elderly characterised by dry, pruritic, scratched, exfoliated skin, but it is not a part of normal ageing. It appears most often on the legs and trunk but can be present all over the body. Xerosis in older adults is multifactorial: intrinsic changes in keratinisation and lipid content, use of diuretics and similar medications, systemic conditions, hypothyroidism, medications, and overuse of heaters or air conditioners can all contribute [9].

In the elderly skin, the rate of keratinocyte renewal slows down, their number may decrease due to this and to increased apoptosis [10]. As the stratum corneum formed by keratinocytes is an essential element of the skin barrier function, its weakening leads to increased water loss in addition to decreased protective functions. This effect is also amplified by the decrease in the number and function of the sebaceous glands, and as a consequence we have to reckon with the weakening of the lipid layer, of another key element of the barrier and watertight layer [10]. These factors lead to dehydration of the skin, resulting in increased vulnerability and marked itching. Along with the gradual degeneration of the innervation of the skin and the decrease in the number of sweat glands, the heat balance and cold tolerance deteriorates. Dry skin further increases the vulnerability, and subsequent scratching due to eczema and itching can lead to the formation of secondary lesions, i.e. excoriations, erosions [11] (Fig. 2).

**Pruritus (itching)**

Pruritus senile, or itching in old age, is the most common skin ageing disorder. Studies have shown that its incidence can vary between 11 and 78% [12–14]. Additional causes of pruritus may include various comorbidities, such as renal failure, cholestasis, systemic infections, diabetes mellitus, liver failure, malignancies, or certain haematological disorders, all of which may play a leading role in the development of pruritus [15, 16].

In addition, pruritus can occur as a side effect of many drugs, primarily but not exclusively, triggered by recently introduced drugs. Chronic itching significantly impairs quality of life. In untreated cases, increased scratching and permanent impairment of barrier function may lead to eczema, which may lead to increased itching and pain, and in severe cases, local or even systemic infections.

The basis of the treatment is the elimination or prevention of dry skin, which is based on the use of appropriate

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**Fig. 1.** Xerosis cutis with exfoliation along with translucent blood vessels and broom veins, indicate chronic venous insufficiency and skin atrophy common by elderly

**Fig. 2.** Pruritic, dry, atrophic skin with consequent secondary pointed and linear excoriations
moisturising and emollient creams and ointments. Here, in general, conventional body lotions must contain ointments with higher amounts of lipids, and it may be advantageous if they also have a positive effect on the balance of the skin microbiome, which is already characteristic of many newer dermocosmetics.

Among the magistral recipes, petroleum jelly and paraffin-based preparations have an excellent lubricating effect. Mixing them with a softer, more easily absorbed cream, they become suitable for the everyday usage as a lipid-rich moisturiser, and the therapeutic cost of which is significantly lower than of the well-known factory dermocosmetics.

Lubrication of skin prone to dehydration daily or even several times, especially in some hard-to-reach areas of the body (e.g., the back), can be difficult for the patient and should therefore be an important and essential part of patient care.

It is also key to use the right bath to replace the lipid layer of the skin, this is at least as important as the use of moisturisers and emollients.

The search for the cause of pruritus usually requires a step-by-step assessment involving careful anamnesis taking as well as physical examination and laboratory tests. Few evidence-based treatments for pruritus are available. Topical therapy, oral histamine H(1) receptor antagonists, and phototherapy with UV radiation can target pruritus elicitation in the skin, whereas antiepileptic drugs, antidepressants, and opioid receptor antagonists can block signal processing in the CNS [17].

**Xerotic eczema (asteatotic dermatitis, eczema craquelé)**

Asteatotic eczema is a form of dermatitis that occur when the skin becomes abnormally dry, itchy, and scratched. This is the most common kind of eczema experienced in the elderly. It can appear as dry, erythematous, inflamed, scaly and excoriated plaques commonly on the lower legs as well as on arms or trunk, where later fissures can develop (Fig. 3). The fissured skin shows a polygonal pattern.

It is more common and more severe in the winter months, especially in areas where indoor humidity is decreased be heating [18].

In more severe cases, when eczema has developed, in addition to treating dry skin it is recommended to use topical steroids for a shorter period of time. Whenever possible, the use of low-to medium potency (group I-II) topical corticosteroids is recommended to avoid further progression of pre-existing senile atrophy, and only in cases that are highly resistant to therapy is the application of high-to ultra-high potency topical corticosteroids (group III-IV) recommended.

Systemic antihistamines may be used to reduce pruritus, of which second-generation antihistamines are recommended because of the lower penetration across the blood-brain barrier [5]. They do not cause drowsiness or dizziness and thus do not increase the risk of falling. Systemic corticosteroid therapy should only be used in cases of very severe itching that are resistant to other therapies and to minimise side effects only at low to moderate doses for short periods of time.

Phototherapy (e.g., narrowband UVB) is an excellent method of reducing itching and should be used two to three times a week for 2 months. The disadvantage is that due to the size and structure of the phototherapy cabin bedside treatment is not applicable. The patient must stand continuously for 2–5 min during treatment, which further limits the applicability of light therapy in this particular patient population. In severe pruritus due to renal insufficiency, in addition to systemic gabapentin, light therapy is the effective procedure if the underlying disease cannot be cured [19]. If eczema symptoms are present and become widespread, they can easily become over-infected, in which case, in addition to local disinfectants, systemic antibiotic treatment may be required.

**CONCLUSIONS**

Management of dermatologic disorders in the elderly is often insufficient, due to the special needs and the numerous co-morbidities that influence the choice of therapy. Skin integrity in the elderly is compromised, and safety concerns are increased with the long-term use of any medication...
prescribed. Elderly people also need to be more closely monitored because of increased fragility of the skin and the physical limitations that may hinder compliance with prescribed medications [20].

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