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Original Article

The correlation between comorbid factors and xerosis cutis in elderly

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Abstract

Background Xerosis cutis is a common skin condition in the elderly which can affect the quality of life. Impaired epidermal barrier function in xerosis cutis results in sensitive skin which is susceptible to irritants, allergens, and pathogens. Xerosis cutis may be an indicator of an individual's health status as it may occur in people with systemic diseases. This study was a retrospective study that aimed to analyze the relationship between comorbid factors with xerosis cutis in the elderly.

Methods The inclusion criteria for this study were patients diagnosed with xerosis cutis aged more than 60 years at Dermatology and Venereology Outpatient Clinic Dr. Soetomo General Academic Hospital Surabaya for a period of 2 years.

Results There were 87 xerosis cutis patients out of 299 elderly patients (29.10%) who came to the Dermatology and Venereology Outpatient Clinic at Dr. Soetomo General Academic Hospital Surabaya over a period of 2 years. Pearson Chi-square statistical analysis of the correlation between hypertension and diabetes mellitus with the occurrence of xerosis cutis resulted in p values of 0.000 and 0.001, respectively.

Conclusion This study showed that there was a significant correlation between hypertension and diabetes mellitus with the occurrence of xerosis cutis.

Key words
Xerosis cutis; Comorbid factors; Elderly; Sensitive skin; Healthy lifestyle.

Introduction

Xerosis cutis is a dry skin condition, which commonly occurs in the elderly. The etiology of xerosis cutis is multifactorial. Intrinsic skin changes in the elderly, including an increase in skin pH, decreased turnover of the stratum corneum, decreased stratum corneum hydration, decreased activity of the sebaceous glands and sweat glands, and increased transepidermal water loss (TEWL) are thought to play a role in the occurrence of xerosis cutis. It is often seen in several chronic systemic diseases, such as diabetes mellitus, kidney disorders, liver disorders, and the use of drugs such as statins or diuretics. Xerosis cutis in the elderly not only causes discomfort but also itching and soreness.

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Patients usually experience itching or pruritus. Moreover, the skin may also feel tight, painful, or burning, and it may lead to skin infections, which interfere the individual's quality of life.[1-4]

The aging of the population occurred exponentially worldwide. The elderly population is supposed to outnumber young people in 2050. This phenomenon will cause many health problems in the elderly, including skin disorders. Xerosis cutis is one of the most common skin disorders in the elderly, with the prevalence worldwide estimated at 29-85%.[4-6] A study by Legiawati *et al.* showed that xerosis cutis was the top 5 most common diseases in the elderly, with the incidence being 6.27% of 2343 patients who came to Dermatology and Venereology Outpatient Clinic dr. Cipto Mangunkusumo General Hospital, Jakarta, Indonesia during 6 years period.[7]

There were some comorbid factors in xerosis cutis. A study by Mekic *et al.* showed that atopic dermatitis was correlated with the occurrence of xerosis cutis. The probability of generalized dry skin was 7 times higher in patients having atopic dermatitis as a comorbid factor (Odds Ratio/OR 7.04; 95% Confidence Interval/CI 5.92-8.37), while the probability of localized dry skin was 2.5 times higher in patients who suffered from atopic dermatitis (OR 2.44; 95% CI 1.85–3.25). Patients with a history of pruritus had a greater probability of developing xerosis cutis (OR 1.26; 95% CI 1.14-1.39).[6]

This study was a retrospective study, that aimed to analyze the relationship between comorbid factors with xerosis cutis in the elderly. Xerosis cutis is expected to be a marker of individual general condition.

Methods

This study was a retrospective study, that aimed to analyze the relationship between comorbid factors with xerosis cutis in the elderly. The population of this study was patients aged more than 60 years in Dermatology and Venereology Outpatient Clinic Dr. Soetomo General Academic Hospital Surabaya. The inclusion criteria for this study were patients diagnosed with xerosis cutis aged more than 60 years at Dermatology and Venereology Outpatient Clinic Dr. Soetomo General Academic Hospital Surabaya. The sampling technique in this study was total sampling over a period of 2 years. The data will be analyzed statistically using SPSS software. The ethical clearance was approved by Ethical Committee Dr. Soetomo General Academic Hospital, Surabaya, Indonesia (No. 0552/LOE/301.4.2/VIII/2021).

Results

There were 87 xerosis cutis patients out of 299 elderly patients (29.10%) who came to the Dermatology and Venereology Outpatient Clinic at Dr. Soetomo General Academic Hospital Surabaya over a period of 2 years. Xerosis cutis patients in the elderly consisted of 45 male patients (51.72%) and 42 female patients (48.28%). Fifty-three people (60.92%) aged 66-74 years, which is the largest age group who suffered from xerosis cutis. Nineteen patients (21.84%) had comorbid factors, such as hypertension, diabetes mellitus, renal dysfunction, and atopic disease **(Table 1)**.

Table 1 Subject characteristics.

Subject characteristics	*Total*
Gender	
Men	45 (51.72%)
Women	42 (48.28%)
Age group	
55-65 years old	9 (10.34%)
66-74 years old	53 (60.92%)
75-90 years old	25 (28.74%)
Comorbid factors	
Hypertension	5 (5.75%)
Diabetes mellitus	4 (4.60%)
Renal dysfunction	1 (1.15%)
Atopic disease	9 (10.34%)

Table 2 Chief complaints of xerosis cutis patients in the elderly.

Chief complaint	*Total*
Itchy	80 (91.96%)
Dry skin	29 (33.33%)
Cracked skin	1 (1.15%)
Skin rash	5 (5.75%)
Rough skin	1 (1.15%)
Burning sensation	2 (2.30%)
Blister	2 (2.30%)
Boil	1 (1.15%)

*1 subject may have more than 1 chief complaint.

Table 3 Cross tabulation of comorbid factors and the occurrence of xerosis cutis in elderly.

Comorbid factors		*Xerosis cutis*		*p value*
		Yes	*No*	
Hypertension	Yes	5	49	0.000*
	No	82	163	
Diabetes mellitus	Yes	4	43	0.001*
	No	83	169	
Renal dysfunction	Yes	1	1	0.498**
	No	86	211	
Atopic disease	Yes	9	33	0.238**
	No	78	179	

*Pearson Chi-square analysis.
**Fisher's exact test.

The most common chief complaint in this study was itchy sensation in 80 subjects (91.96%), followed by dry skin in 29 subjects (33.33%) **(Table 2)**. Pearson Chi-square statistical analysis of the correlation between hypertension and diabetes mellitus with the occurrence of xerosis cutis resulted in p values of 0.000 and 0.001, respectively. Fisher's exact test of correlation between renal dysfunction and atopic disease with the occurrence of xerosis cutis resulted in p values of 0.498 and 0.238 **(Table 3)**. These results showed significant correlations between hypertension and diabetes mellitus with the occurrence of xerosis cutis, but no correlation between renal dysfunction and atopic disease with the occurrence of xerosis cutis.

Fifty-eight out of 87 xerosis cutis patients (66.67%) got antihistamine. The most topical therapy given to xerosis cutis patients was moisturizer as much as 65.52%. The type of moisturizers given were lotions for 46 patients (52.87%); creams for 10 patients (11.49%), and ointments for as many as 1 patient (1.15%). Five patients (5.75%) received topical antibiotics because of secondary infection **(Table 4)**.

Table 4 Management of xerosis cutis in elderly.

Management	Total
Systemic treatment	
Antihistamine	58 (66.67%)
Topical treatment	
Corticosteroid	47 (54.02%)
Antibiotic	5 (5.75%)
Moisturizer	57 (65.52%)

*1 subject may have more than 1 medication.

Discussion

Degenerative and metabolic changes in the skin during the aging process make the skin of elderly patients more susceptible to various conditions. Sun exposure is the most important factor in skin aging. Systemic diseases, hygiene factors, climate, smoking habits, alcohol consumption, air pollution, and poor nutrition, also affect the skin condition of elderly patients. In contrast to young patients, mild physical or psychosocial stress can trigger the onset of acute illness in elderly patients.[4,7,8]

Skin changes in the elderly can occur due to intrinsic and extrinsic factors. Clinical changes in intrinsic skin aging occur in the non-sun-exposed area. Changes in intrinsic skin aging mainly occur due to reduced skin barrier function, slowed epidermal cell turnover, and reduced vascularity in the skin layer, that lead to skin atrophy. Reduction of keratinocytes, fibroblasts, collagen, elastic fibers, mast cells, and macrophages in the dermis layer, as well as flattening of the dermal-epidermal junction, also occur in skin aging. The number of hair follicles and sebum production, as well as the ability of the stratum corneum to bind the water decrease in the elderly. Stratum corneum of the epidermal layer, which consists of corneocytes and intercellular substances changed in elderly skin.

Intercellular lipids are required for the production of the intercellular lamellar bilayer (sphingolipids, free sterols, phospholipids), to retain water and prevent water loss in the elderly. The amount of lipid in the stratum corneum decreases at the age above 75 years and may cause impaired skin barrier function. These mechanisms cause the elderly skin to be drier than the younger people and more vulnerable to external environmental factors, such as soap, detergent, or other irritant agents. Additionally, dryness of the skin may cause subsequent scratching due to itchy sensation, which can lead to secondary infection.[1,8,9]

Xerosis cutis in the elderly has multifactorial etiologic. Not only intrinsic changes in the skin, but some medications such as diuretics, several systemic diseases such as hypothyroidism, or overuse of heaters or air conditioners may also contribute to the occurrence of xerosis cutis.[8,9]

Hypertension was the most common comorbid factor in this study, which was found in 54 out of 299 elderly patients (18.06%) who came to the Dermatology and Venereology Outpatient Clinic Dr. Soetomo General Academic Hospital Surabaya for a period of 2 years. Hypertension and hyperlipidemia may decrease blood circulation, which increases the risk of xerosis cutis, facilitate the pathogens to enter into broken skin and increase the risk of skin infection.[5]

In this study, diabetes mellitus was the second most common comorbid factor that was found in 47 out of 299 elderly patients (15.27%) who came to the Dermatology and Venereology Outpatient Clinic Dr. Soetomo General Academic Hospital Surabaya for a period of 2 years. Xerosis cutis may be caused by poor microcirculation, peripheral vascular disease, peripheral neuropathy, abnormal persistent cohesion between corneocytes, increasing transit time of corneocytes in the stratum corneum, and altered skin barrier function in diabetes mellitus. Xerosis cutis often causes itching, which is one of the diagnostic hallmarks of diabetes mellitus.[5,10]

There were some patients with xerosis cutis in this study who suffered from atopic disease and renal impairment, although there was no significant correlation. Dialysis procedure in renal failure may cause an imbalance of electrolytes, proinflammatory cytokine release, and uremic condition, which in the end may lead to xerosis cutis and pruritus. In atopic disease, especially atopic dermatitis, xerosis cutis is one of the minor diagnosis criteria.[5,10]

The major aim of treatment for xerosis cutis is repairing the stratum corneum and maintaining the moisture content of the skin. The management of xerosis cutis consists of environmental and behavioral changes, as well as using the emollients. Pruritus in the elderly is primarily caused by xerosis cutis, therefore treating xerosis cutis may decrease the itch-scratch cycle and decrease the risk of complications.[4,11]

The use of lukewarm water instead of hot water when bathing, the short duration of bathing, as well as drying the skin by gently patting, need to be educated to the patient to keep the skin moist. The use of topical products that have risk as allergens or irritants should be avoided in the elderly. The mild surfactant soap and fragrance-less soap are recommended for the elderly.[4,9,12]

The use of appropriate emollients immediately after bathing and gently drying the skin, can be given as therapy and prevention of xerosis cutis. Dry skin is caused by epidermal lipids composition changing and increasing TEWL, which leads to skin barrier damage and pruritus with continuous itch-scratch cycle. Moisturizers

containing ceramides, cholesterol, and fatty acids, have similar characteristics to physiological skin lipids, which hydrate the stratum corneum, improve the skin barrier, and relieve pruritus. The composition of urea, polidocanol, menthol, or palmitoylethanolamide in emollients can act as antipruritic by inhibiting the itch pathway.[9,12]

In this study, 66.67% of patients got antihistamines. Pruritus is the most common chief complaint in xerosis cutis, as shown in this study. Antihistamine is one of the managements for pruritus to prevent secondary infection or other lesions caused by the itch-scratch cycle. Oral H1 antihistamines act by blocking H1 receptors on C afferent nerve fibers and inhibiting the release of mediators from mast cells when given in high doses. H1 antihistamines are systemic drugs used as the first line of treatment in patients with pruritus because it is relatively safe, easy to obtain, and inexpensive. But first-generation antihistamines, such as diphenhydramine, chlorpheniramine, and hydroxyzine, have a sedative effect because they can penetrate the blood-brain barrier. In addition, first-generation antihistamines can cause anticholinergic effects, dry mouth, diplopia, visual field disturbances, and urinary tract disorders, which can cause discomfort for patients, especially the elderly. Second-generation antihistamines, such as fexofenadine, cetirizine, levocetirizine, loratadine, rupatadine, and ebastine, are more recommended for the elderly because they have less sedative and anticholinergic effects, fewer drug interactions, and require lower doses than the first-generation options.[12,13]

The most common topical therapy given to xerosis cutis patients was moisturizers, which consist of lotions for 52.87% of patients; creams for 11.49% of patients; and ointment for 1 patient. Moisturizers play an important role in the management of xerosis cutis. Xerosis cutis patients should use barrier repair moisturizer and emollient that may soften and smooth the skin by filling the space between corneocytes. Many emollients have barrier repair, humectant, and occlusive properties that are better when used in combination of them. An occlusive emollient effectively decreases TEWL level, but it may give a greasy feeling that is usually unacceptable to patients. Humectants can attract water from the atmosphere, but they may attract water from the deeper layer of the skin. For these reasons, the emollient used in xerosis cutis is recommended to be given in combination.[11,14]

The choice of moisturizer types for xerosis cutis depends on the individual's skin condition. Lotion or water-in-oil formula or lipophilic cream is used on dry skin because the basic cream can prevent water loss and increase skin hydration. Formulas containing more oil or fat are recommended for scale removal but are not suitable for prolonged use. Basic formulas with higher water content are recommended for acute inflamed skin conditions. The drier the skin, the more lipid content is needed in the formula.[14]

Conclusion

There was a significant correlation between hypertension and diabetes mellitus with the occurrence of xerosis cutis in elderly, but no correlation was found between renal dysfunction and atopic disease with the occurrence of xerosis cutis. Xerosis cutis causes morbidity in the elderly, especially when associated with comorbid factors. Therefore, prevention of xerosis cutis, the most common skin condition, through health education and promotion in the elderly regarding skin health is very important.

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