

Does sensitive skin represent a skin condition or manifestations of other disorders?

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Abstract

Sensitive skin or cutaneous sensory syndrome is defined as a skin condition that is hypersensitive to stimuli, presented with itching, irritant, erythema, and dryness. However, is it associated with more than impairment of epidermal functions, psychological stress and topical medication or products? We think that it can be a skin condition or manifestation of other cutaneous or extracutaneous disorders. In this paper, we brief relation of sensitive skin syndrome with cutaneous and extracutaneous disorders, clinically, and pathophysiologically.

KEY WORDS

Sensitive skin, skin condition, systemic disorder

Editor,

Sensitive skin or cutaneous sensory syndrome is defined as a skin condition that is hypersensitive to stimuli, which normally do not cause problems in normal subjects.¹ Although this definition has been widely accepted for years, a line of evidence suggests that sensitive skin could be manifestations and/or condition of a variety of disorders, associated with not only impairment of epidermal functions (elevated transepidermal water loss rates, reductions in the stratum corneum hydration, increased skin pH levels, and so on), psychological stress, neuroimmunological dysfunction, but also other cutaneous, and extracutaneous disorders. Here, we brief relation of sensitive skin syndrome with cutaneous and extracutaneous disorders.

1 | SENSITIVE SKIN CAN BE A CUTANEOUS MANIFESTATION OF SKIN DISORDERS

Epidemiological studies have demonstrated a higher prevalence of sensitive skin in subjects with certain cutaneous disorders, such as atopic dermatitis(AD), psoriasis, acne, rosacea, and seborrheic

dermatitis.^{2,3} For example, subjects who claimed sensitive skin were 5 times likely to report skin allergies,⁴ while prevalence of sensitive skin in patients with rosacea can be as high as 100%.⁵ Likewise, over 40% of psoriatic patients experience symptoms and signs of sensitive skin, such as itchy, hot/burning, tender, and cramping.⁶ The odds of having sensitive skin is 3.7 times greater in psoriatic patients than in the controls.² Similarly, odds of having sensitive skin are 2.5 times greater in patients with acne.² To distinguish sensitive skin from them is sometimes difficult. When a patient complains of sensitive skin presented with skin lesion or symptom, a diagnosis of dermatosis should be considered at first. If the complaint of unpleasant sensation cannot be explained by lesions attributable to any dermatosis, a diagnosis of sensitive skin or sensitive skin syndrome could be made.

In addition to dermatoses, medications, such as topical or systemic retinoid and glucocorticoids can also induce symptoms and signs of sensitive skin. Additionally, sensitive skin can result from adverse reactions to skin care products.^{7,8} Taken together, evidence indicates that sensitive skin could represent manifestations of cutaneous disorders and of treatment to skin disease. Skin disorders associated with sensitive skin are summarized in Table 1.

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2 | IN ADDITION TO CUTANEOUS DISORDERS, CERTAIN EXTRACUTANEOUS DISORDERS ARE ALSO ASSOCIATED WITH SENSITIVE SKIN

For instance, subjects with insulin resistance and hyperglycemia can suffer from sensitive skin syndrome, likely due to a defective epidermal permeability barrier⁹ and impaired peripheral sympathetic nervous system.¹⁰ Likewise, diabetic patients can experience skin sensory symptoms, such as itching, stinging, and flushing, possibly due to peripheral neuropathy and angiopathy.¹¹ Obesity is another exemplar of an association between sensitive skin and systemic

condition. The common comorbidities of obesity include itching and burning,¹² which are linked to the fragile skin structure and epidermal dysfunction.¹³ In obesity, face roughness was higher than non-obesity, the water content was lower, and significant facial redness accompanied by increased skin blood flow was also observed, all of them were correlated to systemic inflammation, serum insulin, and leptin.¹⁴

Some disorders, such as hyperalgesia, with damage of cutaneous C-fibers, can increase sensitivity to stimuli because of a reduction in pain threshold.¹⁵ Symptoms of sensitive skin, especially itching, are also common in some autoimmune connective tissue diseases, including dermatomyositis, systemic lupus erythematosus, Sjogren

TABLE 1 Association of sensitive skin symptoms with cutaneous and extracutaneous disorders

Disorders	Epidemiology/Symptom	References
Atopic dermatitis	a history of childhood AD was more frequent in sensitive skin patient (OR: 1.6)	Misery et al, 2009 ²
	56% of sensitive skin subjects reports a concomitant atopic condition	Richters RJ et al, 2017 ³
	more self-reported skin allergies in AD patients(OR: 5.0)	Farage MA,2008 ⁴
	Itching after exposure to heat, wind, and low humidity	Bonchak JG et al, 2018 ²⁷
Psoriasis	1.5% of sensitive skin patient have psoriasis, greater sensitive skin in psoriasis people (OR: 3.7)	Misery et al, 2009 ²
	skin pain, itchy, unpleasant, aching, sensitive, hot/burning, tender and cramping in psoriasis patient	Patruno C et al, 2015 ⁶
Rosacea	1.5% of sensitive skin patient have rosacea	Misery et al, 2009 ²
	100% French rosacea patients complained having very sensitive skin	Misery L et al, 2005 ⁵
	78.2% Germany and Russian rosacea patients presented with sensitive skin	Tan J et al, 2016 ²⁸
	flushing, erythema, intolerance to stimuli	Misery L et al, 2011 ²⁹
	sensitive to burning and stinging	van Zuuren EJ, 2017 ³⁰
Acne	2.5% of sensitive skin patient have acne;	Misery et al, 2009 ²
	Odds of sensitive skin in acne patients is 2.5 times greater	
	itching, dryness, and desquamation related to treatment	Yee KC et al, 1994 ³¹
Adverse reactions to skin care products	branded skin care products can cause severe adverse cutaneous reactions	Li Z et al, 2018 ⁷
Hyperglycemia and insulin resistance	sensitive skin syndrome	Sulk M et al, 2012 ²³
	reduced permeability barrier function of the skin	Aoki M et al, 2019 ⁹ ; Han SH et al, 2017 ¹⁰
Obesity	surface roughness was higher by 70%	Mori S et al, 2017 ¹⁴
	redness accompanied by a 34% increase in face skin blood flow	
	diminished skin barrier function and overheated in obese children	Nino M et al, 2012 ¹³
	dry skin and itching	Brown J et al, 2004 ³²
Neuropathy	decreased heat pain threshold and the presence of hyperalgesia	Huet F et al, 2018 ¹¹
	dry skin	Tominaga M et al, 2007 ³³
Sjogren's syndrome	dryness and skin inflammation	Katayama I et al, 2018 ²⁶
	Itching in 59% of patients	Yahya A et al, 2019 ¹⁶
Systemic lupus erythematosus	Itching in 61% of patients	Yahya A et al, 2019 ¹⁶
Dermatomyositis	Itching in 83% of patients	Yahya A et al, 2019 ¹⁶
Systemic sclerosis	Itching in 22% of patients	Yahya A et al, 2019 ¹⁶
Mixed connective tissue disease	Itching in 60% of patients	Yahya A et al, 2019 ¹⁶

Abbreviation: OR, odds ratio.

syndrome, systemic sclerosis, as well as mixed connective tissue disease.¹⁶ Collectively, sensitive skin can also be a phenomenon of extracutaneous disorders.

REGARDING THE MECHANISMS BY WHICH SENSITIVE SKIN DEVELOPS IN SOME CUTANEOUS AND EXTRA CUTANEOUS DISORDERS, IT IS NOT CLEAR YET. HOWEVER, EVIDENCE SUGGEST SEVERAL POSSIBLE MECHANISMS.

Firstly, the development of sensitive skin is associated with epidermal dysfunction, which commonly exists in inflammatory dermatoses, diabetes, obesity, and autoimmune connective tissue disease.^{10,14,17,18} Secondly, some symptoms of sensitive skin syndrome, including itching, stinging, and flushing, could be due to the damage of C-fibers in some disorders, such as diabetic peripheral neuropathy.¹¹ There are also numerous neuromediators involved in the pathogenesis of itch in dry skin, like nerve growth factor (NGF), muscarinic acetylcholine receptors, opiates, serine proteases such as tryptase and their respective proteinase-activating receptor 2 (PAR2).¹⁹ Non-neuronal transient receptor potential (TRP) channels also play a central role in the perception and pathophysiology of sensitive skin because they can be activated by heterogeneous physical, chemical, or thermal stimuli, which in parallel act as triggers of sensitive skin.²⁰ On the other hand, transient receptor potential vanilloid 1 (TRPV1) is involved in inflammatory dermatoses like psoriasiform inflammation,²¹ and some autoimmune diseases.²² Moreover, dysfunction of cutaneous TRPV 2, 3, and 4 expression was observed in rosacea.²³ Thirdly, in addition to pro-inflammatory cytokines, TRPV,²⁴ hyperglycemia,²⁵ and hypoidrotic in AD and Sjogren syndrome²⁶ can also contribute to skin inflammatory reaction. Finally, increased skin blood flow, redness, and flushing resulting from small vessel dysfunction of sensitive skin are also observed in obesity¹⁴ and diabetic patients.¹⁰

In conclusion, above evidence strongly suggests that sensitive skin could represent cutaneous manifestations of various cutaneous and extracutaneous disorders. Therefore, caution should be taken when subjects display sensitive skin because a variety of cutaneous and extracutaneous disorders can accompanied with sensitive skin. For example, screening for insulin resistance and serum glucose is recommend to obese sensitive skin subjects, autoimmune antibody test is recommend to female subjects.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

CONFLICT OF INTEREST

Authors declare no conflict of interests for this article.

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