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Different types, pathogenesis and cytokine network of Psoriasis

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Abstract

Psoriasis is an autoimmune and dermatological disease characterized by high differentiation of keratinocyte cells, which are found in 5% of the skin. In the pathogenesis of psoriasis, functional changes in the HLA-Cw susceptibility allele and dendritic cells, which play an important role in cytokine secretion, helper T cells and keratinocytes are involved. With the alteration of this susceptibility allele, psoriasis is categorized in 7 different phenotypes, according to the sites of involvement. The treatment of the disease is possible in different ways such as topical, systemic and phototherapy. In this review proceeding, we will focus on different types and pathogenesis of psoriasis.

Introduction

Psoriasis (psoriasis) is an autoimmune dermatological disease characterized by T cells-mediated hyperproliferation of keratinocyte cells, which form the outermost layer of the skin, and the migration of CD8+ cells, which are inflammatory T cells, to the epidermis. Although it is a disease that can be seen at any age, it is more common in individuals between the ages of 15-30 [1].

Psoriasis occurs in two types. The first is type 1 psoriasis, which has a family history, occurs before age 40, is based on a genetic basis, and is associated with the HLA-Cw gene. Approximately two-thirds of current psoriasis patients are associated with the HLA-Cw allele. Type 2 psoriasis, on the other hand, is not genetically based, does not have a family history, and is not associated with the HLA-Cw gene, usually appearing before the age of 40 [1].

Results

Psoriasis can have different morphologies and involvement in different parts of the body [1].

1. Plaque type
2. Guttate type
3. Inverted type
4. Pustular type
5. Erythrodermic type
6. Nail type
7. Psoriatic arthritis

Plaque Type Psoriasis

It is the most common type of psoriasis. It is also known as Psoriasis vulgaris. Approximately 90% of patients have the chronic plaque type. It is usually located in the extensors of the extremities [2].

It shows involvement in the knees, elbows, scalp, trunk, belly and back. Psoratic lesions are generally observed in a punctate structure. The classic manifestation of scaly pruritus is its limited, sharply defined, erythematous, silvery color. Although these plaques are small and oval, they can merge and form larger lesions over time. These spots are characterized by oval large scales. Bleeding is seen in these spots after a while [2].

Reverse Psoriasis

It is also known as inverse psoriasis, inverse psoriasis, intertriginous, and flexural. The areas where this type of psoriasis is involved in the body are generally the genital areas, under the breasts, armpits, inguinal folds, and body folds. Psoriatic lesions are generally better circumscribed than plaque psoriasis and include rashes in the form of mild, thin scaly erythematous patches [3].

Guttat Type Psoriasis

Small but scaly erythematous papules are observed in guttate psoriasis. One of the main factors in the formation of this type of disease is streptococcal throat infection. Approximately two-thirds of small scattered papules, which usually occur during adolescence, turn into plaque-type lesions in the future. These rashes are also called drop-like papillae [4].

Erythrodermic Psoriasis

Erythrodermic psoriasis is a type of acute type and rare psoriasis that requires immediate intervention, which occurs when almost the entire body surface is inflamed and erythematous. It is seen in approximately 1%-3% of existing psoriasis patients. It starts with large rashes on the skin. In the later stages of the disease, these large rashes are replaced by dryness, scaling, dandruff and dry rashes [5].

Pustular Psoriasis

The papules in pustular psoriasis are tiny and consist of non-infectious tissue. It is one of the rare and deadly types of psoriasis. It is examined in two types: generalized and localized according to the area where they show involvement. In generalized pustular psoriasis, the entire body is covered with pus but non-infectious vesicles. In localized pustular psoriasis, rashes of approximately 2 mm in width occur on the skin, and these rashes have the potential to recur [6].

Nail Psoriasis

Nail involvement is seen in approximately 80% of individuals with psoriasis. These involvements, which can be to the fingernails and toenails, are usually more common in the fingernails. Involvement usually occurs in the nail bed or nail matrix. As a result of involvement, it may result in functional changes such as a color change in nails, subungual hyperkeratosis, onychoz, tissue formation under the skin, subnail hemorrhages, color changes/whitening of the nail plate and separation of the nail from the skin [7].

Psoriatic Arthritis

Psoriasis with joint involvement is also known as psoriatic arthritis. Joint involvement is seen in approximately 20% of psoriasis patients. It can also be considered as an inflammatory form of arthritis disease. It usually occurs in joint areas such as hips, knees, and elbows [8].

Pathogenesis of Psoriasis

There are 4 main risk factors for the formation of psoriasis.

1. Enlargement of papillary capillaries
2. Inflammation caused by migration of polymorphonuclear leukocytes to the epidermis layer
3. Hyperproliferation of keratinocyte cells forming the epidermis layer
4. Keratinocyte cells lose their granular structure and undergo an epidermal change

Functional changes in the HLA-Cw6 allele, which is one of the human leukocyte antigens, is one of the main gene changes in the formation of psoriasis. Psoriasis is the only chronic and inflammatory disease characterized by HLA-C. Identification of the phenotypic change in this allele resulted from detailed genetic mapping of the MHC

class I molecule. PSORS1 locus, located on the 6th chromosome of individuals with psoriasis, is known as the susceptibility locus that is effective in the formation of the disease [9].

Cytokine in Psoriasis

IFN- γ and TNF- α can form central cytokines in the pathogenesis of psoriasis. Along with dendritic cells, keratinocyte cells can also produce cytokines. However, IFN- γ and TNF- α also produce many cytokines and chemokines by stimulating keratinocyte cells. For example; they encourage the production of IL6, IL7, IL8, IL12, IL15, IL18, and growth factors from interferons [10].

Considering the lesions in psoriasis, there are major cytokine producers. Chief among these are dendritic cells (DC), CD4+, CD8+, keratinocytes, and helper T cells (Th1) [10].

For example, IL-15 can be produced by both keratinocyte cells and dendritic cells. In addition, CD8+ and CD4+ cells can also produce IFN- γ . IL7, IL12, and IL15 cytokines play a role in the development of CD8+ cells. The IL12 cytokine released from dendritic cells works synergistically while providing the homeostatic balance of CD4+ and CD8+ cells, and contributing to the development of dendritic cells again [10].

Discussion

The main risk factors in the formation of psoriasis are hyperproliferation of keratinocyte cells and functional changes in the HLA susceptibility gene. Psoriasis is observed in almost every part of the body, in different phenotypes, and in different involvement areas. In addition to the risk factors involved in the formation of the disease, cytokines released from keratinocyte cells, dendritic cells, and helper T cells play a major role. The use of drugs that suppress the immune system in the treatment of psoriasis is available, but it is not common. Future studies should progress by focusing on photodynamic therapy methods as well as topical drug treatments used in psoriasis.

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