

PSORIASIS - WHAT'S NEW? SHORT SYNOPSIS

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Summary

Psoriasis vulgaris is one of the most common forms of psoriasis. This is a chronic, autoimmune, immunologically mediated skin condition. Genetic and environmental factors are involved in the pathogenesis of the disease, and recent studies demonstrate that histone mutations play an important role in the occurrence of inflammation, T cell differentiation and keratinocyte proliferation, thus reaching the conclusion that understanding the molecular mechanism could lead to the development of new therapeutic targets [1].

From a clinical point of view, the lesion is described as a well-defined erythematous plaque, covered by whitish-pearl scales that detach easily [2]. We will present the case of a 47-year-old patient who, from a histopathological point of view, presents all the characteristic changes for psoriasis vulgaris.

Key words: psoriasis vulgaris, environmental factors, genetic factors.

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Introduction

Until 1841, when von Hebra identified psoriasis as a separate entity, this condition was considered a variant of leprosy [3].

Psoriasis is a systemic, immune-mediated, chronic inflammatory condition that can occur at any age. The lesion is more frequently located in the extension areas such as the elbow, knee, lumbar region, interfacial groove, scalp. Normally, epidermal cells have a turnover of 28 days, but in patients with psoriasis the turnover is 3-4 days.

From the histopathological point of view, the following can be identified: parakeratosis, accu-

mulations of neutrophils in the stratum corneum (Munro abscesses), aggregates of neutrophils in the spinous layer (Kogoj pustules), areas of hypo- and hypergranulosis, retiform hyperplasia of the epidermis, dilated capillaries and predominantly lymphocytic perivascular inflammatory infiltrate appear in the papillary dermis [4].

Genetic and environmental factors are involved in the occurrence of psoriasis, and the interaction between these factors is called epigenetic factors.

The pathological mechanism is complex, but primarily it involves the interaction between the innate and the acquired immune system. The

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main cytokines that mediate the interaction between T lymphocytes, dendritic cells, macrophages and keratinocytes are TNF- α (tumor necrosis factor- α), IL-17 (interleukin-17) and IL-23 (interleukin-23). The genes that code for these pro-inflammatory proteins are more active in people with psoriasis.

Also, mutations in the genes that encode the proteins of the major histocompatibility complex (MHC), especially HLA-C, are associated with an increased risk of psoriasis.

At the same time, mutations in the genes that regulate the keratinization process are involved in the development of psoriatic lesions. The most important genes described are: *KRT* (Keratin), keratin is a structural protein with a protective skin barrier role; *TGM1* (Transglutaminase1), this gene is useful for the formation of the stratum corneum; *FLG* (Filaggrin) has a role in the formation of the protective lipid layer of the skin; *KLF4* (Kruppel-like factor 4) this gene is involved in cell differentiation.

Recent studies have demonstrated that histone phosphorylation and acetylation play a role in the pathogenesis of psoriasis. Histones are important structural proteins of chromatin, they were first described by the American researcher Alfred Thomas Mahan in 1884. Depending on the content in arginine or lysine, five types of histones are known: H1, H2A, H2B, H3 and H4. Their molecular weight varies between 11 and 23 kD. The association between histones and DNA provides the condensed form of chromatin. A group of eight histone proteins together with a segment of DNA make up the fundamental structural unit of the chromosome, namely the nucleosome [5].

Case Report

We present the case of a 47-year-old patient who is admitted to the Dermatology Department of the Brăila County Emergency Clinical Hospital, in 2025.

On clinical examination, the patient presents multiple erythematous lesions covered with pearly whitish scales (Fig. 1) that come off easily located on the trunk and on the upper and lower limbs.

It is decided to perform a punch biopsy. Following the macroscopic examination, a 0.7 cm fragment of integument is described, after which it is processed according to the protocol.

At the microscopic examination (Fig.2) from the level of the epidermis to the level of the dermis, the following changes are described: hyperkeratosis with parakeratosis, aggregates of neutrophils at the level of the stratum corneum (Munro microabscesses), accumulations of neutrophils in the spinous layer (Kogoj pustules), focal hypogranulosis, retiform hyperplasia of the epidermis, ectatized blood vessels at the level of the papillary dermis and chronic perivascular inflammatory infiltrate. The histopathological features are compatible with psoriasis vulgaris. The patient was informed about the histopathological results, she is currently under methotrexate therapy. She signed the informed consent regarding the publication of the data.

Discussions

Environmental factors that play an important role in the onset and progression of the disease are: stress, because it influences the immune system, various bacterial or viral infections, smoking because it affects the immune system, long-term exposure to cold affects the skin's protective barrier, while exposure to the sun seems to have a beneficial effect on the immune system. Studies describe the fact that some drugs such as: beta-blockers, non-steroidal anti-inflammatory drugs and angiotensin-converting enzyme inhibitors can lead to psoriasis or cause exacerbation of the disease [6-8]. The Koebner phenomenon describes the appearance of psoriatic lesions in areas of skin damage caused by tattoos, cuts or burns. This suggests that mechanical stress can activate immune pathways.

Neutrophils are cells of the immune system that play an important role in innate immunity. Their accumulation in the stratum corneum of the epidermis is a marker for psoriasis, but the mechanism that leads to their accumulation at this level still remains unclear. The presence of neutrophils at this level stimulates inflammation, abnormal proliferation of keratinocytes, alters vascular permeability and thus increases the accumulation of Th17 lymphocytes at this level.

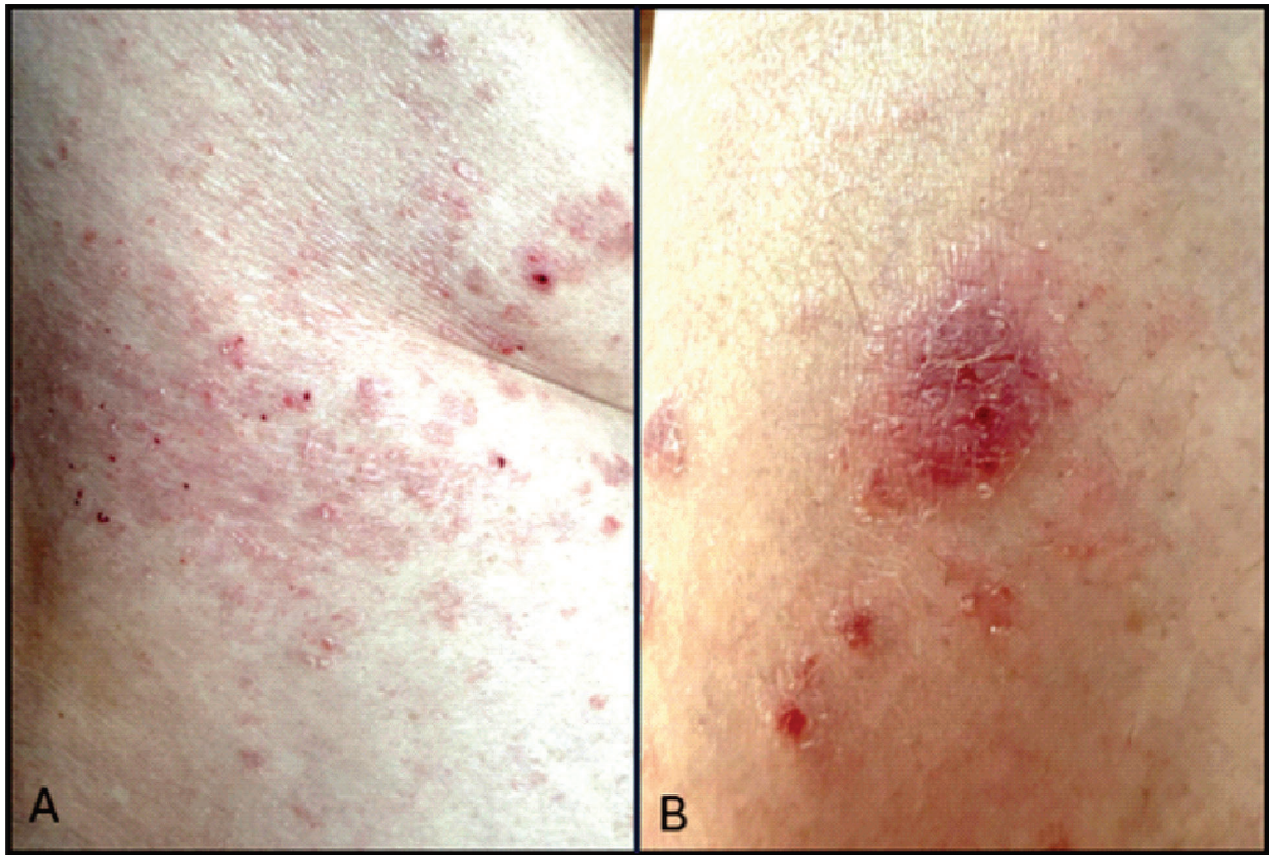


Figure 1. A. Multiple erythematous lesions. B. Central, well-demarcated erythematous lesion covered by whitish-pearlescent crust.

The migration of neutrophils to the inflammatory process is controlled by a cascade of events. They express adhesion molecules on their surface that facilitate their transport, but also release a series of enzymes such as serine protease neutrophil elastase that facilitate migration at the level of the cytoskeleton.

In addition to these enzymes, neutrophils secrete leukocyte proteinase inhibitor, and studies state that patients with psoriasis have elevated levels of leukocyte proteinase inhibitor [9,20,21] Psoriasis is considered a T cell-mediated condition, especially Th1 and Th17. They play an important role in the pathogenesis of the disease, modulating the inflammatory process through the production of cytokines. Th17 cells are activated by dendritic cells via IL-23 and produce IL-17A, IL-17F and IL-22. These cytokines stimulate keratinocytes, causing epidermal hyperplasia and chronic inflammation. IL-17 plays an essen-

tial role in neutrophil migration in psoriatic lesions. The IL-23/Th17 axis represents an important therapeutic target, as drugs that inhibit IL-23 (eg, guselkumab, risankizumab) or IL-17 (eg, secukinumab, ixekizumab) have significant efficacy [9,10,22].

Currently, little is known about the role of B lymphocytes in psoriasis, but recent studies suggest that they contribute to the pathogenesis of the disease [3]. B lymphocytes act as antigen-presenting cells and produce cytokines that modulate immune responses. A subset of B cells known as regulatory B cells (B regs) produce IL-10, an anti-inflammatory cytokine that can suppress excessive immune activation, but studies show that patients with psoriasis have low levels of regulatory B lymphocytes.

In psoriasis, the genetic component plays an important role, and studies describe more than 60 susceptible loci with psoriasis, most of which

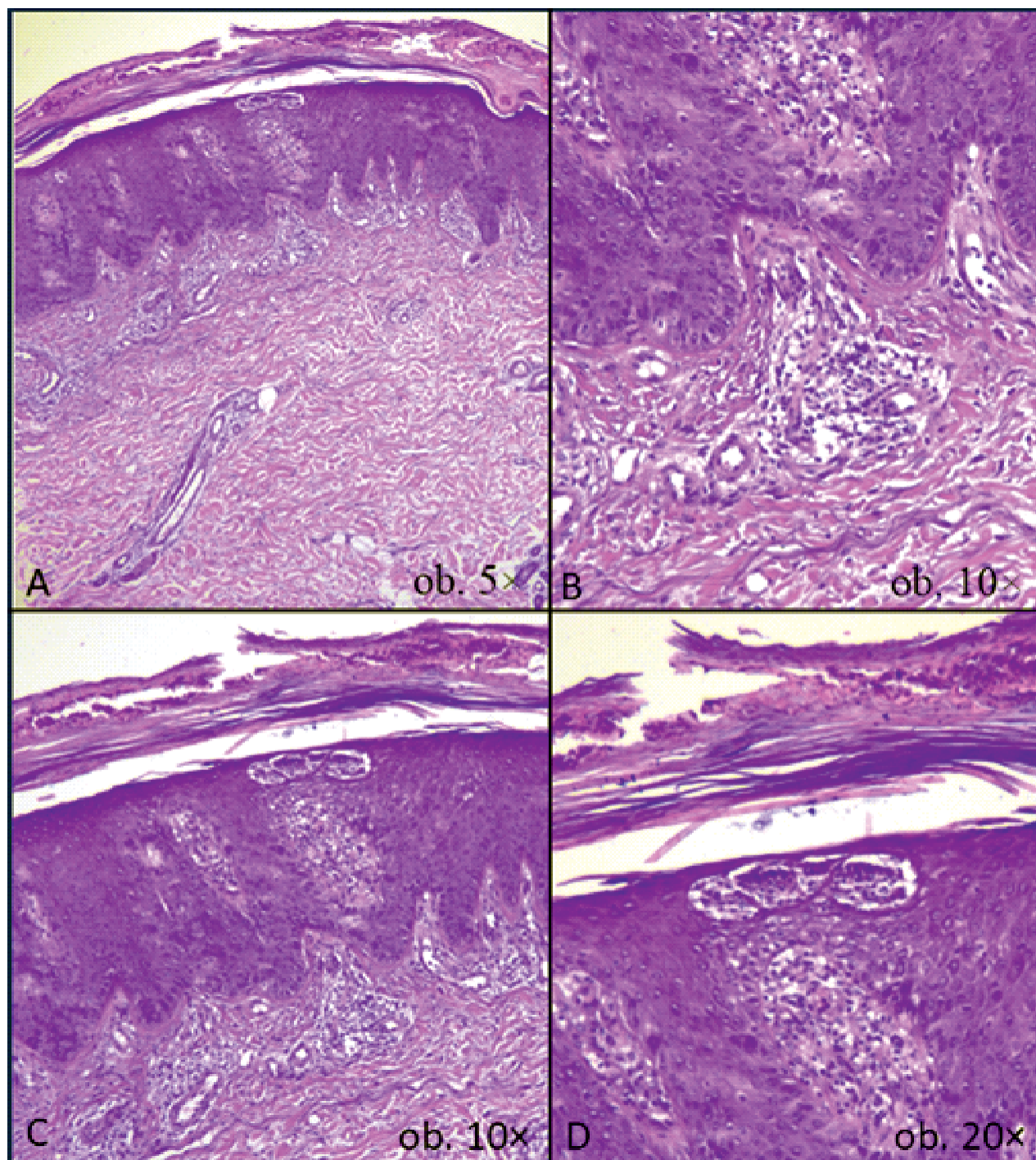


Figure 2. Microscopic appearance of psoriasis vulgaris.

A. Hyperkeratosis and parakeratosis.

B. Ectasia blood vessels and chronic inflammatory infiltrate in the papillary dermis.

C, D. Munro abscess and Kogoj pustule.

have a role in regulating immunity. The PSORS1 locus on chromosome 6p is most significantly associated with *HLA-C*06:02* representing the most important genetic risk factor [11].

This allele is associated with early-onset psoriasis and more severe disease phenotypes. Mutations in the genes encoding the IL-23 receptor (IL-23R), TNF- α , and NF κ B pathways represent other genetic factors that affect the immune response.

According to the data reported in the specialized literature, the maximum incidence is observed in patients aged between 20-30 years and 50-60 years respectively [3].

It represents a recurring chronic condition that requires long-term treatment. The therapeutic attitude varies according to the severity of the disease and associated comorbidities.

Psoriasis represents a significant health problem because approximately 30% of patients are at risk of developing psoriatic arthritis [12].

Studies show that psoriasis also leads to cardiovascular complications, such as hypertension and myocardial infarction, depression, inflammatory bowel disease, diabetes, and chronic kidney disease [10,11,13,14].

Clinically, psoriasis is classified into four types: plaque psoriasis, gouty psoriasis, pustular psoriasis and erythematous psoriasis, of which plaque psoriasis is the most common [8]. Depending on the severity of the disease, patients with psoriasis are classified into two categories: mild psoriasis vulgaris and moderate/severe psoriasis vulgaris.

At the same time, psoriasis also has an important impact on the quality of life because some patients develop emotional and psychological problems due to visible lesions on the skin, which leads to social avoidance and isolation. Significant costs for long-term treatment are another important consideration as they can be a stressor for affected individuals and their families.

Heredity plays an important role in the occurrence of psoriasis. Almost 30% of patients with psoriasis have a first-degree relative with the condition, which suggests that genetic factors

have an important impact in the pathogenesis of the disease.

From a histopathological point of view, the presence of Munro micro-abscesses and Kogoj spongiform pustules is pathognomonic for psoriasis vulgaris.

In the absence of microscopic features, it is necessary to make a differential diagnosis with other conditions.

There are three forms of seborrheic dermatitis: acute, subacute and chronic. From a histological point of view, the subacute and chronic forms are difficult to differentiate from the appearance of psoriasis because they present similar microscopic aspects: psoriasiform hyperplasia, ectasis vascular spaces and perivascular lymphocytic inflammatory infiltrate at the level of the papillary dermis [16].

Pityriasis rosea is a viral exanthema, caused by human herpesvirus 6 and human herpesvirus 7. The lesion is self-limited, located mainly on the trunk and more frequently affects young patients.

From the histopathological point of view, the following are described: foci of parakeratosis, focal hypogranulosis, moderate acanthosis at the level of the epidermis, at the level of the papillary dermis, extravasated erythrocytes and perivascular lymphocytic inflammatory infiltrate [17].

At the histopathological examination, chronic lichen simplex shows areas of parakeratosis, acanthosis with bulbous epidermal ridges, hypergranulosis and chronic perivascular inflammatory infiltrate at the level of the papillary dermis, unlike the psoriasis lesion, in which the characteristic is hypogranulosis [18].

Another condition that, from a histopathological point of view, presents a lesion similar to that of psoriasis is pityriasis rubra pilaris. It is an idiopathic condition that can rapidly progress to erythroderma. From a histopathological point of view, it presents: hyperkeratosis and parakeratosis, retiform hyperplasia of the epidermis, perivascular and perifollicular lymphocytic inflammatory infiltrate, ectasiad capillaries at the level of the papillary dermis [19].

Conclusions

In conclusion, psoriasis is determined by a complex interaction between genetic pre-disposition and environmental factors. Mutations in the genes that regulate the keratinization process can lead to skin conditions such as atopic dermatitis, psoriasis, and other keratinization disorders. Environmental factors act together with genetic factors, and their identification and

management can help control the disease and reduce acute episodes [23].

Understanding immune mechanisms and tailoring treatment strategies is critical to improving patient outcomes.

Currently, biological therapies represent the gold standard for the treatment of patients with psoriasis, but the association of various comorbidities and high costs are real challenges.

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Conflict of interest
NONE DECLARED

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