An Overview of Psoriasis: The Etiology, Common Triggers, and Current Treatment Options

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Program Overview:

To provide participants with an understanding of the etiology, common triggers, and current treatment options for psoriasis.

OBJECTIVES:

After completing this program, participants will be able to:

- Understand the etiology of psoriasis.
- Describe the five types of psoriasis and common signs and symptoms of the disease.
- Explain typical outbreak triggers experienced by patients with psoriasis.
- Discuss current treatment options based on the severity of psoriasis.
The Etiology of Psoriasis

Psoriasis is a chronic autoimmune disease that primarily affects the integumentary system. In the United States, psoriasis is the most prevalent autoimmune diseases, impacting approximately 7.5 million Americans, or 2 – 3% of the population.\(^1\) Although psoriasis can occur at any age, the mean age of onset for the first occurrence is between 15 – 20 years, with a second peak at 55 – 60 years.\(^2\) While the exact causes of psoriasis are unknown, the disease occurs when an abnormal immune response leads to hyperproliferation of immature cells of the dermis and epidermis, altered cellular differentiation, and inflammation. The immune response associated with psoriasis is T-cell mediated.\(^3\)

T-cells are lymphocytes, or white blood cells, that play a key role in cell-mediated immunity. T-cells are distinct from other lymphocytes due to the presence of the T-cell receptors that act to recognize specific antigens. In psoriasis, helper T-cells direct B-cells and other type of lymphocytes to produce auto-antibodies that attack the body’s own skin cells. Activated T-cells move into the skin and release cytokines that cause inflammation, direct the skin cells to reproduce at an accelerated rate, and activate additional T-cells in a cascade cycle.\(^4\)

In normal physiology, shedding of the epidermis occurs every 26 to 30 days. With psoriasis, the shedding of the epidermis is decreased to every 3 to 4 days due to the rapid cellular proliferation. The hyperproliferation does not allow for cell maturation or differentiation of skin cells, which results in a thickened epidermis and plaque formation. Due to the increased cellular metabolism caused by the rapid growth of skin cells, capillary dilation and increased vascularization of the skin occurs, leading to erythema.\(^3\)

Genetic variations are known to contribute to the development of psoriasis. Approximately 10% of the population carries genes that may cause a predisposition to the
disease. However, only 2 – 3% of the population develops psoriasis, likely because of a combination of environmental and genetic triggers that are required for the disease to manifest. As many as seven major susceptibility genetic loci have been linked to psoriasis. The same DNA variations that are associated with psoriasis are also found in other pervasive autoimmune diseases, including type I diabetes mellitus, Grave’s disease, celiac disease, and rheumatoid arthritis. This indicates that these autoimmune diseases likely share the same genetic etiology.

Psoriasis is linked to a number of comorbidities and adverse health outcomes. Up to 30% of those who have psoriasis are also diagnosed with psoriatic arthritis, a potentially disabling disease that most often affects the joints of the hands, feet, knees, ankles, and spine. Individuals who have more severe cases of psoriasis also have an increased risk of cardiovascular disease and related conditions, such as hypertension, as well as a 62% increase in the risk of developing diabetes. The incidence of chronic obstructive pulmonary disease (COPD) is also significantly higher in those individuals who have psoriasis, independent of other risk factors. Numerous other conditions, including depression, obesity, lymphoma, multiple sclerosis, and Chron’s disease have a higher frequency rate in those who have psoriasis.

**Types of Psoriasis**

Psoriasis presents as a papulosquamous disease with variable morphology, distribution, severity, and course. The five types of psoriasis include plaque (psoriasis vulgaris), guttate, inverse (flexural), pustular, and erythrodermic. The different types of psoriasis may be localized or widespread and may range in severity from mild to severe. Psoriasis may manifest on any part of the skin, including the scalp, eyelids, ears, mouth and lips, nails, hands and feet, and genitals. Typically, only one type of psoriasis will appear at a time. After an outbreak has cleared, either the same or a different type of psoriasis can appear when triggered. However, it is possible for
different types of psoriasis to be present at the same time. The course of psoriasis is characterized by periods of exacerbations and remissions with wide inconsistencies in the length of time of exacerbations and remissions.\textsuperscript{1-3}

Plaque psoriasis (psoriasis vulgaris) is the most prevalent form of the disease, affecting approximately 80\% of individuals with psoriasis.\textsuperscript{1} It commonly occurs on the elbows, knees, scalp, and lower back, as well as at sites of trauma. The lesions of plaque psoriasis are characterized by well-demarcated round or oval plaques. Initially, the lesions are erythematous macules or papules that enlarge, extend peripherally, and form larger inflammatory plaques ranging from one to several centimeters in diameter. The plaques appear scaly, thick, silvery, and erythematous, and are surrounded by normal skin. The scales are usually loosely cohesive and removal may cause small bleeding points, known as the Auspitz sign. The amount of scaling in plaque psoriasis can vary widely among individuals and at various sites on the same individual.

Guttate psoriasis is the second most common form of the disease. It impacts about 10\% of those with psoriasis. In children and young adults, guttate psoriasis often occurs as the initial outbreak of psoriasis. The lesions have a rapid onset and are small, tear-shaped papules that typically present on the trunk and extremities. The lesions are less thick than those of plaque psoriasis. The number of lesions can range from less than 10 to over 100. An initial outbreak of guttate psoriasis is often associated with a recent streptococcal respiratory or throat infection.\textsuperscript{1-2,4}

Inverse (flexural) psoriasis involves lesions that develop in the axilla, groin, or folds of the skin. This type of psoriasis is more prevalent in obese and overweight individuals and those with deep skin folds. The lesions of inverse psoriasis are large, shiny, smooth, and have a deep red color. Inverse psoriasis lacks the scales associated with plaque psoriasis.\textsuperscript{1-2}
Pustular psoriasis is characterized by white blisters of noninfectious pus surrounded by reddened skin. There are three distinct forms of pustular psoriasis, including von Zumbusch, palmoplantar pustulosis, and acropustulosis (acrodermatitis continua of Hallopeau). Von Zumbusch psoriasis has a rapid onset that begins with reddened, painful patches of skin over large areas of the body, followed quickly by the development of the pustules. Within 24 to 48 hours, the pustules will dry and peel and a new eruption of pustules will form. The cycle may continue for days or weeks. Von Zumbusch psoriasis is usually accompanied by fever, chills, dehydration, and muscle weakness and often requires hospitalization for treatment. Palmoplantar pustulosis is characterized by pustules that develop on the palms of the hands and soles of the feet. The pustules appear in a speckled pattern throughout reddened plaques, then turn brown, and crust over. Acropustulosis is a rare form of psoriasis in which the lesions are located on the ends of the fingers or toes. The lesions are extremely painful and cause deformity of the nails, and in some cases, bone changes.¹

Erythrodermic psoriasis is the least common form of psoriasis and it affects 1 – 2% of individuals that have psoriasis. It is characterized by widespread red, scaling lesions located over the majority of the body surface. Severe itching and pain often accompany this form of psoriasis, with the scaling occurring in large sections of skin rather than the smaller scales associated with plaque psoriasis. Erythrodermic psoriasis can manifest as a result of the progression of chronic plaque psoriasis, the onset of von Zumbusch psoriasis, or it may evolve due to unstable psoriasis that is caused by infection, medications, or the abrupt withdrawal of corticosteroids. This form of psoriasis impairs the thermoregulatory function of the skin and it can lead to hypothermia, high output cardiac failure, and metabolic changes. Erythrodermic psoriasis can be life-threatening and requires immediate treatment.¹³
Psoriasis Triggers

There are numerous triggers that are associated with psoriasis outbreaks. Psoriasis triggers are highly individualized and can vary from person to person. Established triggers of psoriasis include certain types of infections, skin injuries, stress, and the use of specific medications. Although there is a lack of empirical evidence, it is widely believed that allergies, diet, weather, smoking, and alcohol use may also be psoriasis triggers.\(^1\),\(^5\)

Several types of infections are known to be psoriasis triggers. Streptococcal infections of the respiratory system, such as streptococcal pharyngitis or sinusitis, often serve as a trigger for guttate psoriasis. Inverse psoriasis is sometimes associated with candida albicans (thrush) and other fungal infections of the skin.\(^1\) Human immunodeficiency virus (HIV) infection can also be a psoriasis trigger, as well as a rare form of the human papillomavirus (HPV), known as EV-HPV.\(^5\),\(^10\)

Mechanical, ultraviolet, and chemical injuries of the skin can serve as triggers of psoriasis outbreaks.\(^11\) The degree of skin injury that leads to a psoriasis outbreak can include a mild abrasion and the pressure and friction created by shaving. The skin injury does not need to be severe to cause an outbreak. The link between psoriasis outbreaks and skin injuries is known as the Koebner phenomenon. Approximately 50% of those diagnosed with psoriasis experience the Koebner phenomenon.\(^12\)

Psychological stress is a well-established trigger of psoriasis. Stress not only contributes to the onset of psoriasis, but it may increase the length of time of exacerbations. Because of the significant impact that psoriasis can have on quality of life, the disease process itself may also cause psychological stress that, in turn, perpetuates the cycle of psoriasis outbreaks.\(^2\) It is
important that individuals with psoriasis learn relaxation techniques and other methods of stress reduction.

The use of certain medications can lead to the onset of psoriasis outbreaks. Lithium causes psoriasis outbreaks in approximately 50% of those with psoriasis who take the medication. Anti-malarial medications, including plaquenil, quinacrine, chloroquine, and hydroxychloroquine, can trigger psoriasis usually 2 – 3 weeks after the drug is taken. Hydroxychloroquine has the lowest incidence of side effects in individuals with psoriasis. Inderal, a beta blocker, is also known to aggravate psoriasis, as well as quinidine, an antiarrhythmic agent. Other types of beta blockers, as well as angiotensin-converting enzyme inhibitors, may also serve as triggers for individuals with psoriasis. Indomethacin, a non-steroidal anti-inflammatory (NSAID) drug, can exacerbate and worsen psoriasis. However, other types of NSAIDs are not known to impact individuals with psoriasis and may actually improve the condition in some cases. Overuse and sudden discontinuation of corticosteroids is associated with severe flare-ups of psoriasis. Other medications that cause a rash as a side effect of the medication can trigger the Koebner phenomenon.5

**Psoriasis Treatment Options**

Psoriasis treatment options are often based on the severity of the psoriasis. Individuals with psoriasis on less than 3% of the body are considered to have a mild case. Psoriasis on 3-10% of the body surface is moderate and greater than 10% is a severe case. Although these severity categories are useful for considering treatment options, the impact of the psoriasis on quality of life must also be taken into account. For example, a person may have a mild case of palmoplantar pustulosis that limits his or her ability to perform daily activities and may require more aggressive treatment options. Typically, however, mild to moderate cases of psoriasis can
be treated with topical and complementary alternative therapies. Moderate to severe psoriasis treatment options may involve a combination of topical treatments, complementary alternative treatments, phototherapy, and systemic medications.

Topical treatments for psoriasis include over-the-counter (OTC) medications, prescription steroids, and prescription non-steroids. In OTC topical medications, salicylic acid and tar are the two active ingredients approved by the Federal Drug Administration (FDA) for the treatment of psoriasis. Salicylic acid helps to soften and remove the psoriatic plaques and scales. Tar, both coal and wood, can slow the proliferation of skin cells and reduce inflammation. In the treatment of inverse psoriasis, the OTC liquid medication, Castederm, can dry out the lesions and aide in healing. The use of moisturizers is also important in reducing the redness and itching associated with psoriasis, as well as healing the skin. OTC anti-itch medications, such as calamine, camphor, diphenhydramine hydrochloride, benzocaine, menthol, and hydrocortisone (a low potency topical corticosteroid), can alleviate the itching and irritation of mild psoriasis.

Topical steroid medications are the most frequently used treatment for psoriasis in the United States.\(^1\) Corticosteroids act to reduce the inflammatory response, thereby decreasing psoriatic lesions and increasing the time of remission. Topical corticosteroids are available in ointments, creams, lotions, and gels and the formulation that is most effective will depend on the type and location of psoriasis. The potency of corticosteroids ranges from low to ultra-high, with the potential of adverse effects increasing with the potency. If an individual with psoriasis is treated with a dosage or potency that is too high, corticosteroids can trigger an exacerbation or worsening of psoriasis. The treatment goal of topical corticosteroid therapy is to find the lowest potency and dose that is effective. Corticosteroids dosages should be tapered to avoid flare-ups of psoriasis.\(^11\)
There are numerous non-steroidal prescription topical treatments used in psoriasis. Many of the non-steroidal topical treatments act by decreasing the proliferation of skin cells and reducing skin inflammation. Dovenx (calcipotriene) is a synthetic vitamin D3, while Vectical (calcitriol) is a natural form of Vitamin D3. Tazorec (tazarotene) is a topical retinoid, a vitamin A derivative that also reduces skin cell production. Zithranol-RR (anthralin) is a synthetic version of chrysarobin, a substance found in the bark of the South American araroba tree. This substance also acts to slow skin cell growth.

There are a variety of phototherapy treatments available for individuals with psoriasis. The use of lasers allows for targeted phototherapy that can more effectively limit the treatment areas to the location of psoriatic lesions. Excimer and pulsed dye lasers are two lasers approved by the FDA for treating chronic, localized plaques in mild to moderate psoriasis. Ultraviolet light B (UVB) phototherapy has been successfully used in treating psoriasis for more than 75 years. Narrow-band UVB is preferred over broad-band UVB due to the increased effectiveness and fewer treatments required. Exposure to natural sunlight, which contains both UVB and ultraviolet light A (UVA) rays, may also be recommended. However, because the use of certain topical medications can increase the risk of sunburn, it is important that individuals using these medications or other types of light therapy concurrently proceed with caution or avoid natural sunlight. The light-sensitizing medication psoralen may be prescribed to allow the UVA rays in natural sunlight to effectively treat psoriasis. This process is known as PUVA. PUVA treatment is most useful in treating stable plaque psoriasis, guttate psoriasis, and palmoplantar pustulosis. The use of tanning beds and sun lamps are not recommended treatments of psoriasis due to the increased risk of skin damage, skin cancer, and premature aging.
The use of systemic medications in the treatment of psoriasis are usually reserved for moderate to severe cases of psoriasis or individuals who cannot tolerate or do not respond to topical medications or phototherapy. Acitretin (soriatane), an oral retinoid; cyclosporine, an immunosuppressant; and methotrexate, a disease-modifying anti-rheumatic drug (DMARD) are approved by the FDA for the treatment of psoriasis. There are also various systemic medications that are prescribed for off-label treatment of psoriasis, including Hydrea (hydroxyurea), isotretinoin, mycophenolate mofetil, sulfasalazine, and 6-thioguanine.¹

Biologic medications are usually given by injection or infusion and differ from other systemic medications in that they target a specific part of the immune system that plays a role in psoriasis. The T-cell blocker, Amevive (alefacept), blocks the activation of T-cells. Tumor necrosis factor-alpha (TNF-alpha) blockers, including Enbrel (etanercept), Humira (adalimumab), Remicade (infliximab), and Simponi (golimumab), block TNF-alpha, a type of cytokine that is responsible for inflammation in psoriasis. Similarly, Stelara (ustekinumab) targets the cytokines interleukin 12 (IL 12) and interleukin 23 (IL 23).¹

There is a general lack of empirical evidence to support the use of complementary and alternative treatments in psoriasis. However, the use of these treatments are becoming more common and many individuals with psoriasis have reported a decrease in symptoms and increase in length of remission from using various complementary and alternative treatments. Complementary and alternative treatments may include homeopathy, naturopathy, traditional Chinese medicine, Ayurvedic medicine, stress reduction techniques, such as yoga and meditation, dietary supplements and herbal medications, and dietary changes.

**Conclusion**
Psoriasis is a chronic, autoimmune disease that affects the integumentary system. It is the most prevalent autoimmune disease in the United States. The exact cause of psoriasis is unknown, but it is generally thought that a combination of genetic factors and environmental triggers lead to the onset of the disease. Plaque, guttate, inverse, pustular, and erythrodermic are the five types of psoriasis. Established triggers of the disease include certain types of infections, skin injuries, stress, and the use of specific medications. Psoriasis treatments options depend on the severity of disease, as well as the impact on the quality of life, and may include topical treatments, systemic medications, phototherapy, and complementary alternative treatments.
References


