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An Autoimmune Disease: Psoriasis



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Sethi Reeta*¹, Paul Yash¹, Wasil Preeti¹, Rathi Sudeep², Goyal Surinder³

¹ Lord Shiva College of Pharmacy, Sirsa (Haryana)

² Wockhardt Limited, Aurangabad (Maharashtra)

³ Vidya Sagar college of Pharmacy, Ahlupur (Punjab),
India.

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ABSTRACT

Psoriasis is a common inflammatory skin disease characterized by infiltration of inflammatory cells into the epidermis and altered keratinocyte differentiation psoriasis is the fourth most common skin disease in the United States about 2 in 100 people in America develop psoriasis of some stages of their life. It most commonly starts between the ages of 15 to 25. Possible factors and trigger causing psoriasis include emotional stress, systemic infection and intestinal upset various types of psoriasis have been reported such as plaque, pustular psoriasis, Nail psoriasis, erythrodermic psoriasis etc. Various regimens available for psoriasis such as topical agents, phototherapy, systemic agents which help to control the symptoms of psoriasis. About 75% of patients have mild to moderate psoriasis, amenable to topical treatment in lifetime controlling herbal remedies like aloe, cayenne, chamomile, fish oil, flaxseed oil, milk thistle, turmeric, glucosamine etc. are needed. Herbal remedies for the treatment of psoriasis disease to overcome side effect, antagonist effect and bioavailability of the drug.



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INTRODUCTION

Psoriasis is regarded as an autoimmune disease in which genetic and environmental factor has a significant role. The name of the disease is derived from a Greek word 'Psora' which means 'itch'. Psoriasis is a non-contagious, dry, inflammatory and ugly skin disorder, which can involve an entire system of person.¹ Psoriasis is a common skin condition which affects men and women of all ages. Skin is made up of millions of tiny skin cells. Normally, skin cells die and are replaced by new ones every three or four weeks. In Psoriasis, body begins upon the skin is raised patches. This is related to an immune response, which is the way in which body fights disease and heals wounds. In psoriasis, an immune system triggers a reaction even though there is no infection or wounds to heal. The reason why it does this are not completely understood but it is mostly caused by variations in your genes.² The most commonly affected sites are the scalp, tips of fingers and toes, palms, soles, glans, under the breasts and genitals, elbows, knees, shins, and sacrum.³ The severity of psoriasis varies greatly. In some people, it is mild with a few small patches that develop which are barely noticeable. In other words, there are many patches of varying size. In many people, the severity is somewhere between the two extremes. About 2 in 100 people in American develop psoriasis at some stage of their life. It can first develop at any stage, but it most commonly starts between the ages of 15 and 25. On large study also found that smokers have an increased risk of developing psoriasis compared to non-smokers. One theory for this is that toxins (poison) in cigarette smoke may affect part of the immune system involved with psoriasis.⁴ This review is a compilation of all aspects regarding psoriasis.

Types of psoriasis

It is chronic relapsing disease of the skin that may be classified into non-pustular and pustular types as follow:

Non-Pustular

- Psoriasis vulgaris is a most common form of psoriasis. It affects 80% to 90% people with psoriasis. **Plaque psoriasis** typically appears as raised areas of inflamed skin covered with silvery white skin. These areas are called **plaques**.



Fig. 1: Plaque Psoriasis

- **Psoriasis erythroderma** involves wide spread inflammation and exfoliation of skin over most of the body surface. It may be accompanied with severe itching, swelling and pain. It is often the result of an exacerbation of unstable plaque psoriasis, particularly following abrupt withdrawal of systemic treatment. This form of psoriasis can be fatal as the extreme inflammation and exfoliation disrupt the body's ability to regulate temperature and for the skin to perform barrier functions.⁵



Fig. 2: Psoriasis erythroderma

Pustular

Pustular psoriasis appears as raised bumps that are filled with non-infections pus. The skin, under and surrounding the pustules is red and tender. Pustular psoriasis can be localized

commonly to hand and feet or generalized with widespread patches occurring randomly or any part of body.⁶



Fig. 3: Pustular psoriasis

Others

Additional type of psoriasis include⁷

Guttate psoriasis is characterized by numerous small, scaly, red or pink, teardrop-shaped lesions. These spots of psoriasis appear all large area of the body, primarily the trunk, but also the limbs and scalp.



Fig. 4: Guttate psoriasis

Nail psoriasis produces a variety of changes in the appearance of finger and toe nails.



Fig. 5: Nail psoriasis

Psoriasis arthritis involves joint and connective tissue inflammation psoriatic arthritis can affect any joint, but is most common in the joints of fingers and toes. It can also affect the hips, knee and spine. About 10-15% of people who have psoriasis also have psoriatic arthritis.



Fig. 6: Psoriasis arthritis

Exacerbating factor and trigger of psoriasis:

The list of their items below has been identified by doctors as either triggers or condition which cause psoriasis to worsen.⁸⁻¹⁰

1. Rubbing and scratching
2. Skin injury from cuts, infection, burns
3. Too much sun exposure. Sun exposure can be helpful for psoriasis, sunburn can cause psoriasis to flare up for a small number of patients, less than 10 percent, sun exposure may worsen symptoms.
4. Medications: For some people, certain medications can make psoriasis worse. Some of these drugs include lithium, beta-blockers, anti-malarial drugs.
5. Emotional stress and anxiety.
6. Smoking and drinking alcohol
7. Hormonal changes the severity of psoriasis may rise with a change in hormone level brought about by puberty, menopause, and pregnancy.
8. Streptococcal infection of the throat and upper respiratory tract causes a type of plaque psoriasis.
9. HIV: In early stages of HIV, psoriasis can worsen.

DIAGNOSIS

The diagnosis of psoriasis is usually based on the appearance of the skin. There are no special blood tests or diagnostic procedures for psoriasis. Sometimes a skin biopsy or scraping may be needed to rule out other disorders and to confirm the diagnosis. Skin from a biopsy will show clubbed Retie pegs if positive for psoriasis. Another sign of psoriasis is that when the plaques are scraped, one can see pinpoint bleeding from the skin below. Diagnosis of psoriasis is made easily by clinical examination. Usually, no tests are required to diagnose psoriasis, but to rule out other complications blood tests, urine test and imaging studies are often performed. Sometimes the biopsy may be necessary to differentiate it from a fungal infection. Blood tests are done for the total count. ESR, RA factor, serum uric acid level, T-cells etc. leucocytosis and increased T-cells lymphocytes are often noted. The microscopic examination of the discharges or blister fluid shows only lymphocytes infiltration. Imaging studies like X-ray can help in diagnosing the case with joint pain.¹¹

TREATMENT

Treatment can be topical. Systemic agents should be used only when topical treatments are inadequate. Severe forms of psoriasis such as erythrodermic and generalized pustular psoriasis can be life-threatening and may require urgent treatment in hospital.¹²⁻¹³

Topical Agents

Corticosteroids

Topical corticosteroids are the cornerstone of treatment for the majority of patients with psoriasis particularly, those with limited disease. They are available in many strength and formulation, which allows for versatility of use. The mechanisms of action of corticosteroids include anti-inflammatory and vasoconstrictive effect. These effects are mediated through their binding to intracellular corticosteroids receptor and regulation of gene transcription of numerous gene particularly those that code of pro-inflammatory cytokines the potency ranking of topical steroids is based on their ability to produce vasoconstriction according to Stoughton corner classification system.¹⁴

Table-1: Efficacy of different classes of topical corticosteroids for the treatment of psoriasis

Sr.No.	Class of the topical steroids	Range of Efficacy	References
1	Super potent	58% - 92%	Banhard et al. ¹⁵ 1991 Spellman ¹⁶ 2003
2	Potent	68% - 74%	Savin ¹⁷ 1978 Lapaw ¹⁸ 1978
3	3,4 Mid-strength	68% - 72%	Olsen ¹⁹ 1996 Stein et al. ²⁰ 2001
4	5,6,7 (Least potent)	41%-83%	Pauporte et al. ²¹ 2004

Because of the lack of data for all 7 classes of topical steroids in this table, we have chosen to group the classes as shown above. Note that all but are of these trials were no longer than 4 weeks in duration. Low or mid-potency steroids are used for lesions on the face, neck, flexure and genitalia in preference to tar, salicylic acid, and anthralin which may act as irritants. Prolonged topical steroids use can cause skin atrophy, hair growth, and hypopigmentation.²²

Coal Tar

The benefits of coal tar have been known for many years. Coal tar should relieve the itchiness, swelling and some flaking. The FDA says a coal tar solution of between 1-5% has been proven as a safe product.²³ The mechanism of action of coal tar is not well understood. It is to suppress DNA synthesis by lessening the mitotic labeling index of keratinocytes.²⁴

Drawbacks include its strong smell, irritation, staining of clothes and potential for causing photosensitivity coal tar may increase the risk of lung cancer, skin cancer, patient with psoriasis who are treated with coal tar product applied to skin do not have increased risk of cancer.²⁵

Vitamin D Analogues

Calcipotriol, a synthetic vitamin D analogue, was first introduced in early 1990's in Europe to treat psoriasis and is now available in the United States. The mechanism of action of the Vitamin D analogues by their binding to vitamin D receptor which leads to both the inhibition of keratinocytes proliferation and enhancement of keratinocytes differential. Vitamin D helps to regulate calcium and phosphorous in the body and can also be produced by the skin when exposed to UVB light. Unlike topical steroids, skin atrophy or tolerance is not problem, but irritation may occur on application particularly on area like face.²⁶

Salicylic acid

It helps to remove scales and crusts (keratolytic). In a concentration of 2-10%, it is usually combined with coal tar, steroids, and dithranol. The mechanism of action is reduced keratinocyte to keratinocyte binding as well as reduce the pH of stratum corneum; these effects lead to reduce scaling and softening of psoriatic plaques. Salicylic acid decreased the efficacy of UVB phototherapy because a filtering effect and should not be used before UVB phototherapy.²⁷

Dithranol

It is an effective agent for treating thick plaques of psoriasis. It causes skin irritation and brownish discoloration of the skin. It is used as short contact therapy to avoid these side effects. In a concentration of 0.1-1%, it is applied once a day and washed off thoroughly after a contact period of 10 minutes to one hour. It may stain clothing.²⁸

Systemic treatment

Psoriasis which is resistant to topical treatment is treated by medications that are taken internally by pill or injection. This is called systemic treatment. Patients undergoing systemic treatment are required to have regular blood and liver function tests because of the toxicity of

the medication. Pregnancy must be avoided for the majority of these treatments. These main systemic treatments are methotrexate, cyclosporine, and retinoids.

Methotrexate

It is very popular anti-metabolic and effective agent for treating psoriasis. It is usually given in a weekly or occasionally fortnightly pulse of 15mg. A low dose of maintenance therapy may be continued for some time before the withdrawal of the drug. Methotrexate schedule, the drug is remarkably well tolerated. Common side effects include anorexia, nausea, and epigastric pain.²⁹⁻³⁰

Cyclosporine

It is an immunosuppressant – a medicine that suppresses your immune system. It has proved effective in the treatment of all types of psoriasis but as it stops your immune system from working normally, it can make you more at risk of infection. It also increases your chances of kidney disease and high blood pressure.³¹

Retinoids

These are a synthetic compound having vitamin A like cellular activities. A number of retinoids are available for the severe forms of acne or other disorder of keratinization. All the retinoid have potentially serious toxicities. Most important is the risk of birth defects. So, pregnant should never receive retinoids. Chapped lips and dryness of skin, nose, eye are the common side effects of retinoids.

Phototherapy

Phototherapy uses natural and artificial light to treat psoriasis.

Sunlight

Daily exposure to small amount of sunlight can improve symptoms, but too much can cause worsening of your condition and cause skin damage.

UVB phototherapy

This uses a wavelength of light that is invisible to human eyes – ultraviolet B light. The light shows the production of skin cells and is an effective treatment against plaque psoriasis. Treatment takes place at hospital under the supervision of a dermatologist³³

Psoralen plus ultraviolet A (PUVA) for this treatment, you will first be given a tablet called Psoralen. This makes your skin more sensitive to light. Your skin is then exposed to a wavelength of light called UVA. This light penetrates your skin more deeply the UVB light. This treatment may be used if you have severe psoriasis that has not responded to other treatment. Common side effects of treatment include nausea, headaches, itchiness.³⁴⁻³⁵

Combination light therapy

Combining phototherapy with other treatment often increase the effectiveness of phototherapy. Some doctor use UVB phototherapy in combination with coal tar, as the coal tar makes the skin more receptive to light. Combine UVB phototherapy with Dianthrol creams has also proved effective.

Table 2: Herbal Treatment for Psoriasis

Common Name	Scientific Name/ Forms	Active Ingredient	Scientific Evidence	Adverse effect	Herbal drug interaction
1) Aloe	Aloe vera (Topical / Tablet/ Capsule)	Anthraquinone Salicylic acid	Controlled clinical trial topical greater clearing off psoriasis	Diarrhea, Kidney inflammation	Anti-arrhythmic digoxin, hydrocortisone
2) Cayenne	Capsicum annum (Topical capsule/ infusion/ drink)	Capsaicin	Reduced scale and redness	Skin burning	ACE-inhibitor aspirin, sedatives
3) Chamomile	Matricaria recutita (Topical/ Tablet/ Capsule)	Chamazulene queritin	No studies	Allergic reaction, increased time to stop bleeding and clot	Anticoagulants, sedatives
4) Fish oil	N/A (Topical / Capsule Intravenous)	Omega-3 Fatty acid	Improved scale, Plaque thickness, and erythema, but not itch	Increased level of vitamin-A and D increased bleeding time	Anticoagulants anti- platelet agents
5) Flaxseed	Linum Usitatissimum (Capsule / Toical)	Omega-3 Unsaturated fatty acid	No Studies	Menstrual cycle abnormalities, constipation etc.	Anticoagulants rolaxifene etc.
6)Milk Thistle	Silybum mariannum (topical / capsule / infusion drink)	Flavonoids	No Studies	Diarrhea, altered liver function and GIT upset	Butyrophenones, Phenothiazine etc.
7) Glucosamine	NA (Intravenous / Intramuscular/ Capsule)	2 Amino-2 deoxyglucose	No Studies	Headache, by pain, affects insulin level, allergic reaction	Insulin and oral hypoglycemic agents
8) Turmeric	Curcuma longs (Capsule/ Tablet / Infusion drinks/ dietary modification)	Sesquiterpenes, Zingiberene, Curcuminoids	CCT: Reduction level in severity of psoriasis	Gall storms intestinal disorder	Anticoagulants cyclophosphamide, reserpine etc.

CONCLUSION

Today, psoriasis is recognized as the most prevalent autoimmune disease caused by inappropriate activation of the cellular immune system. Psoriasis has a significant impact not only the patient health but also on altering their everyday life. A review of alteration natural therapies provides some option for increasing safety and efficacy in the management of psoriasis. This review will surely prove to be an eye-opener for patients suffering from psoriasis as well as the medical practitioners, pharmacist, nurses and other people involved in the treatment of psoriasis and help them to understand the disease in the effective treatment of disease.

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