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Understanding Diagnosis and Management of Psoriasis from Pages of History to Modern Era

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Objective To provide a current and informative description of psoriasis diagnosis and treatment from historical accounts to the present day. Methodology From the study's commencement until March 1, 2022, data were gathered from Embase, Web of Science, PubMed, and the Cochrane Library. The primary focus was on searching for pertinent meta-analyses, randomized controlled trials, systematic reviews, and observational studies regarding the diagnosis and treatment of psoriasis. Results and Conclusion Psoriasis is a long-term inflammatory disease affecting multiple systems, mostly affecting the skin and joints. The disease is recognized from ancient times. It may affect social functioning and interpersonal relationships of patients. Psoriasis is a systemic inflammatory disease that has several co-morbidities. The diagnosis is primarily clinical and a skin biopsy is seldom required. Depending on the severity of disease, appropriate treatment can be initiated including topical treatments like corticosteroids, topical retinoids, salicylic acid; phototherapy including UVB, PUVA along with systemic medications like oral retinoids, methotrexate, cyclosporine. Biologic Therapies are required for treatment for some patients who do not respond to above treatment. Systemic immunomodulatory drugs like Apremilast and JAK Inhibitors are also used. For most of the cases combined therapy along with life style modifications give promising results.

Keywords: Diagnosis; History; Psoriasis; Retinoids; UVB.

A lot of psoriasis sufferers go to their primary care physicians for the first assessment and therapy. Acknowledging psoriasis and its related medical and psychological conditions would enable prompt diagnosis and suitable treatment using safe and efficient topical treatments along with further medical and psychological interventions as required. Severe and unresponsive instances may need to be referred to a dermatologist for additional assessment and potential systemic treatment.

The history of psoriasis is a journey that spans thousands of years, revealing a gradual understanding of the condition's nature, causes, and treatment. References to psoriasis-like symptoms

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can be found in ancient civilizations, shedding light on how this enigmatic skin disorder has been perceived and managed throughout history.[1]

Evidence suggests that psoriasis has been recognized since ancient times. The earliest descriptions date back to the ancient Egyptians, who referred to a skin condition resembling psoriasis in their medical texts around 1500 BCE. The Greeks and Romans later coined the term "psoriasis" from the Greek word "psora," meaning "itch" or "itching eruption," highlighting the significant symptom of the condition.[2]

In the middle ages, the understanding of psoriasis was still limited, often lumped together with leprosy due to the visible skin abnormalities. It wasn't until the Renaissance period that physicians began to distinguish between various skin disorders, including psoriasis. Despite these efforts, the true nature of psoriasis remained elusive.[3]

Psoriasis research saw a sea change in the 19th century. With the advent of dermatology as a distinct medical field, scholars like Robert Willan and Louis-Michel Guillaume introduced classification systems for skin diseases, offering a more systematic approach to diagnosing and treating psoriasis. This period also saw the introduction of treatments like topical tar applications and sunlight exposure, laying the foundation for future therapies.[4]

Advancements in the understanding of immunology and genetics in the 20th century shed light on the underlying mechanisms of psoriasis. Researchers began to recognize the role of the immune system and the overactive T cells in driving the inflammation and excessive skin cell growth seen in psoriasis. The discovery of corticosteroids and the development of phototherapy techniques provided more effective treatment options.[5]

The late 20th century brought further breakthroughs, including the identification of genes associated with psoriasis susceptibility. The linkage between certain human leukocyte antigen (HLA) alleles and psoriasis risk was a pivotal discovery, emphasizing the genetic component of the disease. This understanding spurred research into the immune pathways involved in psoriasis, leading to the development of targeted biologic therapies in the 21st century.[6,7]

Biologic therapies marked a significant leap in psoriasis treatment. These medications specifically target key molecules in the immune response, such as tumor necrosis factor (TNF), interleukin-17 (IL-17), and interleukin-23 (IL-23). Biologics have shown remarkable efficacy in controlling psoriasis symptoms and improving patients' quality of life.

Throughout history, psoriasis has been accompanied by societal stigma due to its visible nature. Patients often faced misunderstanding and discrimination, adding to the burden of the condition. However, increased awareness and education efforts have helped combat these misconceptions and promote understanding.

In the present day, the multifaceted understanding of psoriasis encompasses its genetic, immune, and environmental components. With ongoing research, the hope is to develop even more targeted and effective treatments, possibly leading to a cure. The journey of unraveling psoriasis's complexities has shaped medical knowledge and patient care, and its history serves as a testament to the resilience and adaptability of medical science in the face of a challenging condition.[1,5]

Diagnostic key Points of Psoriasis

1. Red, Raised Patches: Psoriasis typically presents as red, raised patches covered with silvery-white scales.[8]
2. Symmetrical Distribution: Lesions often appear symmetrically on both sides of the body.
3. Common Sites: Common areas affected are elbows, knees, scalp, lower back, and nails.
4. Itching or Burning: Patients may experience itching, burning, or soreness at the affected sites.
5. Nail Changes: Nail pitting, discoloration, thickening, or separation from the nail bed may be present.[8]
6. Koebner Phenomenon: At the locations of skin trauma, such as cuts, burns, or scratches, new lesions may appear.[9]
7. Auspitz Sign: Gentle removal of scales reveals pinpoint bleeding spots (Auspitz sign) due to underlying blood vessel dilation.[10]
8. Variability in Severity: Psoriasis can vary widely in its severity, from mild to severe.
9. Chronic Course: It is a long-term illness that experiences remissions and flare-ups.
10. Genetic Predisposition: Family history of psoriasis increases the risk of developing the condition.
11. Psoriatic Arthritis: Some individuals with

psoriasis may also develop psoriatic arthritis, which affects joints.[11]

12. Candle Grease Sign. The candle grease sign in psoriasis involves scratching the patches with a sharp edge; if collected scales are greasy, it confirms the sign. This method helps diagnose psoriasis based on the greasy nature of the scales.[12]

Biomarkers associated with psoriasis, presented in bullet

1. Cytokines: higher than normal cytokine levels such as TNF-alpha, IL-17, and IL-23 are commonly observed in psoriasis patients.[13]
2. C-reactive Protein (CRP): Increased levels of CRP, an inflammation marker, can be found in psoriasis patients, especially in those with more severe forms.[14]
3. Interleukin-6 (IL-6):IL-6 levels are often elevated in psoriasis and can contribute to the systemic inflammation associated with the disease.[15]
4. Vascular Endothelial Growth Factor (VEGF): VEGF levels can be elevated in psoriasis, promoting angiogenesis (formation of new blood vessels) in affected skin.[16]
5. Keratinocyte Proliferation Markers: Biomarkers like Ki67, which indicate rapid cell division, are increased in psoriasis lesions due to the excessive growth of skin cells.[17]
6. S100 Proteins: Elevated levels of S100A8 and S100A9 proteins are found in psoriasis lesions, contributing to inflammation and immune response.[18]
7. Lipid Metabolism Markers: Dysregulation of lipid metabolism is associated with psoriasis, and markers like LXR, ABCA1, and apolipoproteins can be altered.[19]
8. Neutrophil Markers: Neutrophil-related biomarkers like neutrophil elastase are often elevated in psoriasis, contributing to tissue damage.[16]
9. T-cell Markers: Altered expression of T-cell markers such as CD3, CD4, and CD8 can be observed in psoriasis lesions, reflecting the involvement of T cells in the immune response.[13]
10. Epidermal Differentiation Markers: Abnormal expression of markers like involucrin and filaggrin in psoriatic skin indicates disrupted epidermal differentiation.[14]
11. Genetic Biomarkers: Certain genetic markers, such as HLA-Cw6, are associated with an increased risk of developing psoriasis.[19]

Differential Diagnosis of Psoriasis

1. Eczema (Atopic Dermatitis): Both eczema and psoriasis can cause red, itchy patches on the skin, but eczema often appears in the creases of the elbows and knees, while psoriasis can appear anywhere on the body.[20]
2. Seborrheic Dermatitis: This condition often affects the scalp, face, and chest. It can cause red, scaly patches that may be mistaken for psoriasis, but the distribution and appearance are usually different.[21]
3. Fungal Infections: Conditions like ringworm (tinea) can resemble psoriasis. Fungal infections may cause circular, red patches with a raised border and sometimes have central clearing.[22]
4. Lichen Planus: Lichen planus is an inflammatory condition that can cause purple, itchy, flat-topped bumps on the skin or mucous membranes. It might resemble psoriasis, especially when it affects the nails or mucous membranes.[21]
5. Pityriasis Rosea: This is a common skin condition that usually begins as a single large, scaly patch (herald patch) followed by smaller patches that form a pattern on the skin. It might be confused with psoriasis due to its appearance.[20]
6. Systemic Lupus Erythematosus (SLE): Although primarily a systemic autoimmune disease, SLE can present with skin manifestations that may resemble psoriasis. A dermatologist can help differentiate the two.[22]
7. Cutaneous T-cell Lymphoma (CTCL): This uncommon non-Hodgkin lymphoma type can initially appear as patches or plaques on the skin, resembling psoriasis. Close examination and additional tests are required to differentiate the two.[20]
8. Contact Dermatitis: Irritant or allergic contact dermatitis can cause red, itchy skin that may resemble psoriasis, but it's usually triggered by exposure to specific substances.[23]
9. Nummular Dermatitis: This condition presents with coin-shaped, itchy patches that can resemble psoriasis. The lesions are often more defined and may be mistaken for psoriatic plaques.
10. Pityriasis Rubra Pilaris: A rare skin disorder that can resemble psoriasis, characterized by red-orange scaling patches and plaques. It often affects the palms and soles.[24]

The management of psoriasis in modern medicine

Topical Treatments

Corticosteroids: These ointments or lotions that reduce inflammation reduces itching, redness, and inflammation.[25]

Calcineurin Inhibitors: Topical medications like tacrolimus and pimecrolimus can be used, especially in sensitive areas.

Topical Retinoids: These are derived from Vitamin A and help to slow down the growth of skin cells.[26]

Coal Tar: Coal tar products can help slow down the rapid growth of skin cells.[27]

Salicylic Acid: Used to remove the scales on the skin's surface.

Phototherapy (Light Therapy)

UVB Phototherapy: Controlled exposure to UVB light can aid in lowering inflammation and reducing the rate of skin cell development.

PUVA (Psoralen + UVA): Psoralen is a medication used in combination with UVA light exposure. It is effective but requires caution due to potential side effects.[28]

Systemic Medications

Oral Retinoids: Used for severe cases, oral retinoids like acitretin can help slow skin cell growth. Regular monitoring is essential due to potential side effects.[27]

Methotrexate: An immunosuppressant medication that can help slow cell growth.[29]

Cyclosporine: An immunosuppressant that can provide rapid relief but is generally used short-term due to potential side effects.

Biologic Therapies: These are advanced treatments that target specific parts of the immune system involved in psoriasis.[28]

Systemic Immunomodulatory Drugs

Apremilast: This oral medication helps to reduce inflammation and control the immune response.[27]

JAK Inhibitors: Janus kinase inhibitors are a newer class of medications that target specific immune responses involved in psoriasis.[27]

Combination Therapies

A combination of therapy may be beneficial for certain people, such as topical medications along with phototherapy or systemic medications.[25]

Lifestyle and Self-Care[26]

Moisturizing: Regular moisturizing helps alleviate dryness and itching.

Avoid Triggers: Identify and avoid triggers that exacerbate psoriasis, such as stress, certain medications, and infections.

Healthy Diet: Inflammation may be lessened by eating a healthy, balanced diet high in fruits, vegetables, and omega-3 fatty acids.

Stress Management: Stress can worsen psoriasis, so stress reduction techniques can be beneficial.

Recent advancements in management

Psoriasis was once thought to be limited to the skin, but after its pathophysiology was discovered, it became evident that the disease was more serious and that its co-morbidities needed to be addressed. Additionally, since psoriasis is now recognized as a full-fledged systemic dermatological disorder, its treatment needed to take a wider view.

Regarding therapy, psoralen, UV therapy is the most widely accepted, economical, and least harmful to the systemic psoriasis treatment. Topical and systemic treatments are also administered, with photo-chemotherapy serving as the primary therapeutic intervention.

The PUVA Sol was the mainstay of treatment and even of today it is most cost effective way of treatment for general public at large.

Due to photo-hazards and toxicity narrow band PUVA is considered more effective, less toxic and can be used even on covered and private parts &maintaining privacy of patients too.

Allopathic physicians as well as practitioners employed PUVA Sol and narrow band PUVA with effectiveness.

Corticosteroids are also considered as first line therapy but its topical and systemic adverse effect does not allow for its long duration used.[28]

The most efficient treatment for all types of psoriasis lesions is methotrexate, an antagonist of folic acid; nonetheless, it might cause hepatic and renal damage.[29] Also, iatrogenic effect, fetal anomaly, immune-deficiency, derangement of liver enzyme cannot be denied. Similarly cyclosporins are third generation in treatment of psoriasis. It mainly causes down regulation of cytokines very effectively and thus rapid clearance of lesions. Systemic retinoids, dapsone are the other treatment options.

Nowadays the biological agents are available which shows dramatic response in patients but they have seldom devoid of side

effects. They are all very expensive and beyond the approach of common man.

UVB Light Treatment for Psoriasis

Ultraviolet B (UVB) light, whether from sunlight or artificial sources, can improve psoriasis. However, excessive exposure can trigger the Koebner phenomenon and worsen the condition. UVB light can be administered in broad or narrow-band spectrums. Narrow-band UVB (around 311 nm) has proven superior to broad-band UVB in the management of psoriasis.[27]

Ingram Techniques

The Ingram technique combines a coal tar bath, UV light exposure, and application of anthralin paste to psoriatic plaques. These techniques can be effective in managing psoriasis.[26]

Systemic Treatments for Psoriasis

Systemic treatments include corticosteroids and methotrexate. Corticosteroids are used with caution due to the risk of pustular psoriasis rebound. Methotrexate, a folic acid antagonist, is a standard systemic treatment for psoriasis, affecting DNA synthesis and cell division. It's indicated for severe forms of psoriasis and requires careful consideration of patient history, liver/kidney health, and other factors.

Surgical intervention like tonsillectomy has shown positive results in treating streptococci pharyngeal colonization. Newer antibiotic approaches, like dicloxacillin combined with rifampin, have become more common than tonsillectomy.[30]

Local hyperthermia can help with psoriatic plaque clearance, but relapse tends to be swift. Microwave hyperthermia can lead to complications, including pain and tissue damage. Occlusive treatments involving surgical tape and dressings work well on their own or in combination.

It is crucial to focus on systemic treatment to avoid "rebound" or the onset of pustular psoriasis when stopping therapy. Corticosteroids are typically reserved for specific situations, such as impetigo herpetiformis, where rapid delivery with topical drugs isn't feasible.[31]

Methotrexate, a folic acid antagonist, is the standard treatment for various forms of psoriasis. It interferes with DNA synthesis by binding to dihydrofolic acid reductase, reducing cell division and inflammation. Psoriatic erythroderma, psoriatic arthritis, and severe forms of psoriasis are among the conditions for which methotrexate is indicated.[29]

Before using methotrexate, making ensuring there is no history of liver or kidney illness is crucial, given its potential toxicity. Factors like alcohol abuse, cirrhosis, pregnancy, and other health conditions should also be considered.

Ultra Violet Light

Sunlight benefits psoriasis but may cause skin burning and Koebner's phenomenon. Artificial UVB light produced by fluorescent bulbs offers effective treatment. Maximal effect is at minimal erythemogenic doses (MED). Sub-erythemogenic doses are slower in response. Testing assists in ensuring correct dose because skin type is not a reliable indicator of MED. Higher dosage is required for tanning response to be effective. Maintenance UVB phototherapy post-clearing extends remission.[25,27,32]

Studies on monochromators reveal inefficiency at 254, 280, and 290 nm and clearing at 296, 300, 304, and 313 nm. Better than broad-band UVB, narrow-band UVB has a peak at 311 nm. For a reaction, no erythemogenic doses are required. Rates are nearly PUVA treatment, at over 70%.

Ingram Technique

The Ingram Technique involves taking a daily bath using a coal tar solution mixed with warm water. Afterward, UV light exposure is done gradually every day. A paste containing anthralin is applied to the psoriatic patches, followed by sprinkling talcum powder and applying stockinette dressings. Updated versions of the technique now include SCAT.[26]

PUVA Therapy

PUVA therapy involves administering high-intensity UVA radiation, typically 2 hours after taking 8-methoxypsoralen (Oxsoralen-Ultra), usually twice a week. This treatment is very effective, even for severe psoriasis cases, often achieving clearance in around 20 to 25 sessions. However, ongoing maintenance therapy is necessary. UVB therapy may be used when more than 50% of the skin is afflicted. An alternative to oral psoralen-UVA is polyethylene sheet bath PUVA, wherein the patient is covered with conforming plastic sheeting and submerged in a psoralen solution. Protective eyewear is crucial due to the risk of cataracts from oral psoralen use. PUVA therapy raises the risk of melanoma

and squamous cell carcinoma, two types of skin cancer. Men who receive treatment without genital protection run a higher risk of developing squamous cell carcinomas on their genitalia, and arsenic exposure is a significant contributing factor. Although cancer risk relates to dosage, there's no definitive threshold for cumulative PUVA exposure predicting carcinogenic effects.[27,32,33]

Surgical Treatment

Surgical intervention like tonsillectomy has shown positive results in treating streptococci pharyngeal colonization. Newer antibiotic approaches, like dicloxacillin combined with rifampin, have become more common than tonsillectomy.[28]

Hyperthermia

Local hyperthermia can help with psoriatic plaque clearance, but relapse tends to be swift. Microwave hyperthermia can lead to complications, including pain and tissue damage.

Surgical tape or dressings used in occlusive therapy might be useful separately or in combination.[29]

Systemic Treatment

Corticosteroid

It is crucial to focus on systemic treatment to avoid "rebound" or the onset of psoriasis when stopping therapy. Corticosteroids are typically reserved for specific situations, such as impetigo herpetiformis, where rapid delivery with topical drugs isn't feasible.[29]

Methotrexate

A folic acid antagonist, is the standard treatment for various forms of psoriasis. It interferes with DNA synthesis by binding to dihydrofolic acid reductase, reducing cell division and inflammation. Psoriatic erythroderma, psoriatic arthritis, and severe forms of psoriasis are among the conditions for which methotrexate is indicated.[29]

Before using methotrexate, it's important to ensure no history of liver or kidney disease, given its potential toxicity. Factors like alcohol abuse, cirrhosis, pregnancy, and other health conditions should also be considered.

The need for liver biopsies is debatable; uncommon in rheumatoid arthritis patients receiving methotrexate medication; distinct in psoriasis patients on methotrexate because of increased risk of liver damage. Biopsy is recommended every 1.5 to 2.0 g up to 4.0 g after the initial 1.0 to 1.5 g biopsy. Afterward, at intervals of 1.0 to 1.5 g. Additional data may cause recommendations to alter. Therapy can be initiated with weekly blood counts and monthly liver enzyme tests. The need for biopsies may decrease if amino-terminal procollagen III peptide is monitored.

There are many different treatment strategies available. The authors recommend either a single subcutaneous injection, a single oral dose, or three divided oral doses per week. Weekly doses can be as low as 5 mg and as high as 50 mg; most people only need 15 to 30 mg. Oral absorption varies beyond 25 mg; subcutaneous injections are recommended. Midweek doses carry a significant toxicity risk; therefore, should be avoided. An ulcer could be a sign of midweek dosage. To reduce adverse effects, use 1 to 4 mg of folic acid orally each day; if overdosed, use leukovorin.

Cyclosporin

Benefits of cyclosporin for psoriatic illness may result from a decrease in pro-inflammatory epidermal cytokines. The micro-emulsion version of neonil is now more widely available and conventional. Doses of 2 to 5 mg/kg/day usually cause psoriasis to clear up quickly. Unfortunately, the improvement is short-lived, requiring a change to alternative therapies. Renal problems are rare during treatments that last up to six months, but doses must be modified in accordance with blood pressure and serum creatinine levels, which must be measured. If a baseline creatinine climbs by one third, dose reduction is frequently used.[32,33]

Retinoids

Treatment using the fragrant retinoid ethylester, known as etretinate, is effective for numerous psoriasis patients, especially those with pustular disease. Acitretin, which has a longer half-life, has replaced etretinate due to its benefits. It is very highly advised not to drink alcohol while taking acitretin since this can cause it to change into etretinate. 13-C-retinoic acid and a mix of retinoic acids and photo-chemotherapy can also be beneficial for certain pustular psoriasis patients. It's crucial to remember that these medications are strong teratogens, and that therapy may become more difficult if triglyceride levels are raised. Retinoids in conjunction with photochemotherapy

have been shown to effectively cure chronic plaque psoriasis and lower the total amount of light required.[32]

Dapsone

Dapsone is primarily used to treat pustular psoriasis, such as palmoplantar pustulosis. It is a secondary or tertiary therapy option with minimal efficacy even in these circumstances.[34]

Biological Agents

Numerous biological agents are accessible, capable of eliciting striking responses in certain psoriasis patients, but they come at a high cost. Three of these inhibit TNF-a: etanercept, a fusion protein made of the human TNF type II receptor and the Fc region of IgG1; infliximab, a chimeric monoclonal antibody that requires IV infusion; and adalimumab, a fully human IgG1 monoclonal antibody against TNF-a. Alefacept is a fusion protein that inhibits T-cell activation and promotes the death of pathogenic T-cells. It is composed of the Fe region of IgG1 and the exterior domain of IFA-3. The humanized monoclonal antibody efulizumab inhibits T-cell activation, binding, and migration by targeting the CD11a region of LFA-1.[32,35]

Etanercept offers a favorable balance between safety and effectiveness. Response rates are more favorable with a 12-week induction therapy at doses of 50 mg twice a week. Typically, maintenance therapy involves a dosage of 50 mg per week. While regular lab monitoring isn't necessary, it might be advisable to conduct a PPD test before starting treatment. Infliximab exhibits quicker action compared to other available treatments and results in higher response rates, but its usage is limited due to potential serious side effects and the risk of neutralizing antibodies development.

Diet

Conditions like rheumatoid arthritis, inflammatory bowel disease, psoriasis, and asthma have been shown to benefit from the anti-inflammatory qualities of fish oils rich in n-3 polyunsaturated fatty acids. Both n-3 and n-6 polyunsaturated fatty acids impact different cytokines such as IL-1, IL-6, and TNF. Various herbal remedies have also been employed, but their outcomes vary. Several of these remedies are not very palatable, and their effectiveness doesn't match up well against pharmaceutical treatments.[36]

Oral Antimicrobial Therapy

It is commonly known that guttate psoriasis and streptococcal pharyngitis are related. Super-antigen-releasing bacteria such as Staphylococcus aureus and streptococci release exotoxins, leading to extensive activation of T-cells. Administering oral antibiotic treatment is crucial for psoriasis patients infected with these microorganisms. The effectiveness of antimicrobial agents in treating other forms of psoriasis remains uncertain. Supplementation with oral bile acids has demonstrated an improvement in psoriasis, possibly due to its influence on the gut's microflora and endotoxins. Limited numbers of psoriasis patients have shown efficacy when treated with oral ketoconazole, itraconazole, and other antibiotics.[36]

CONCLUSION

The treatment of psoriasis is very much reflected since ancient time even in Ebrus papyrus and all the ancient scholars have given some or other treatment and there is sequential and chronological development in its treatment.[37]

As far as the treatment is concerned both topical and systemic treatment are given and the photo chemotherapy is given as mainstay of treatment of psoriasis in which psoralen, UV therapy is most acceptable, cost effective and have least systemic adverse effect.

The initiation of proper treatment can be contingent upon the severity of the disease. Treatment options include topical medications such as corticosteroids, topical retinoids, and salicylic acid; phototherapy such as UVB and PUVA; and systemic medications such as methotrexate, cyclosporine, and oral retinoids. For some patients, biologic therapies are necessary when other treatments are not effective. JAK inhibitors and apremilast are examples of systemic immunomodulatory medications that are also used. The majority of cases show promising results when combination therapy and lifestyle modifications are implemented.

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All authors confirm responsibility for review conception and design, data collection, analysis, interpretation and manuscript preparation.

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Data supporting the findings are available within the manuscript.

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