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# Ayurvedic understanding of pathogenesis of Psoriasis in general

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## ABSTRACT

Psoriasis is an autoimmune, complex, multifactorial, non-infectious, chronic inflammatory relapsing skin disease characterized by erythematous plaques with silvery scales. Prevalence of the disease world-wide ranges from 0.09% to 11.4% of the total population. According to WHO, at least 100 million individuals suffer from psoriasis worldwide with a great negative impact on the quality of life. Immuno chemistry and auto immunity are well developed to explain changes in cell biology in case of psoriasis. Ayurveda has good success rate in the management of psoriasis. But to answer the query regarding pathogenesis of psoriasis as per ayurveda is not yet clear. Hence in the present paper an effort is made to understand the pathogenesis of psoriasis on par with current trends in psoriasis.

**Key words:** Psoriasis, Kushta, Ayurveda

## INTRODUCTION

Skin is the largest organ in the body and barrier between body's internal environment and the cosmos. As it provides physical permeability barrier, UV protection, sensation, wound repair and regeneration. In Ayurveda it is one among five *Gyanendriya*'s responsible for '*Sparsha Gyan*'. Psoriasis is an autoimmune non-infectious hyperproliferative chronic inflammatory relapsing skin disease characterized by well demarcated erythematous plaques with silvery scales<sup>[1]</sup> having prevalence range between 0.09% to 11.4% of the total population. According to WHO 100 million individuals suffer from psoriasis world-wide

with great negative impact on quality of life.<sup>[2]</sup> Psoriasis can affect all age groups, mainly the ages of 20 and 30 and between the ages 50 and 60.<sup>[3]</sup> In ayurveda classical text a separate chapter are mentioned as *Kushta Roga* with separate aetiology, pathogenesis and management.

Various skin disease comes under *Kushta* classified as 7 *Maha Kushta* and 11 *Kshudra Kushta*.<sup>[4]</sup> '*Kushtani Vapuhu Iti Kushta*'<sup>[4]</sup> means which makes skin disgraceful and ugly which destroys *Twak* and other *Dhatus* is called *Kushta*. Due to *Mithya Ahara*, *Vihara* and *Papa Karma*, *Tridosha Dusti*, *Rasa*, *Rakta*, *Mamsa*, *Lasika* and *Majja Dusti* takes place considered as *Saptha Dravya Sangraha*.<sup>[5]</sup> Person's life with psoriasis may trigger with reoccurrence, unpredictable and severity in one episode to another. In current scenario, food habits and daily life style of person due to busy schedule has been changed. With these persons mental health disturbed, it effects and leads to the psychological stress, depression as independent factor of psoriasis.

## OBJECTIVES

To understand the pathology of Psoriasis in Ayurveda with an integrated approach based on current dermato immunochemistry.

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## MATERIAL AND METHODS

### Etiology of Psoriasis/*Kushta*

#### Genetic Factors

Having a family member with the disease increases the risk factor. One of the parent has psoriasis, there is 10% chance of getting it. On other side if two parents with history risk is 50% clear.<sup>[6]</sup> There is an incidence was found much greater amongst 1<sup>st</sup> and 2<sup>nd</sup> degree relative of a patient with psoriasis.<sup>[7]</sup> Psoriasis has been associated with many human leukocyte antigen haplotypes (HLA), CW6 and 9 candidate loci have been identified by using linkage analysis and genome wide association study's.<sup>[8]</sup> Pre disposing polygene might affect the immune system or be involved in keratinocyte differentiation. There has also been a report of an association of psoriasis with variant alleles of lymphoid phosphatase PTPN22.<sup>[9]</sup>

#### *Kulaja Nidana*

*Kushta* is considered as *Adibala Pravrutavyadhi*<sup>[10]</sup> i.e., a hereditary disorder, if both mother and father are having *Kushta*, the offspring also may become victim of *Kushta* as it is *Rakta Pradoshaja Vikara*.

#### *Purvajanmakrita*

According to *Sushruta* if the person suffered from *Kushta* in his previous life and if he takes rebirth then he develops *Kushta* in his present life also.<sup>[11]</sup>

#### Diet

Diet plays a role in aetiology and pathogenesis of psoriasis like dairy products and fish items etc. it's observed that 60% of patients changing their dietary habits, low energy diets and vegetarian diets improved psoriasis symptoms in some studies.<sup>[12]</sup>

#### *Janmottarakalaja*

It is categorized in *Aharaja* - diet and dietetic pattern and *Viharaj* - improper physical, verbal and mental activities.

#### *Aharaja Nidana*

1. ***Atisevan***: Taking excessive *Guru*, *Snigdha Bhojana* like new formed rice, heavy for digestion foods, she

buffaloes milk, curd, fish, jaggery, food articles prepared by sugars and carbohydrate rich foods, this all produces *Dushti* in *Rasavaha Srotas* and *Mamsavaha Srotas*.<sup>[13]</sup> thus, can be consider *Atimatra Ahara* leads to *Amotpatti* which further leads to *Kushta* disease.

2. ***Vishamashana***: Taking food in improper time and improper quantity leads to *Vishama Agni* which makes it part in etiology in *Kushta*. In present day life people with busy schedule facing the problem due to no time to eat properly and healthy diet.
3. ***Ajirashana***: Intake of food in state of indigestion is *Ajirashana* causes *Agnimandhya* and *Malavaha Srotas Dushti* which ultimately leads to disease. According to *Acharya Charaka*, taking food in state of indigestion is best known to cause *Grahani Dushti*<sup>[14]</sup> leads to impairment in normal physiological function of *Grahani*, this pathology continuous for long time produces *Kushta Roga*.
4. ***Viruddha Ahara***: Like milk with fish i.e., *Samyoga Viruddha* disturbed the function of *Agni* and *Srotas* results in indigestion further leads to sour and acts like poison called *Amavisha*, *Tridosha* get triggered by this *Amavisha*. In case of *Srotas* effect the vitiation leads to *Srotas Dushti* i.e., malfunctioning of *Srotas* and form *Atipravritti*, *Sanga*, *Siragranthi* and *Vimarga Gaman Srotodusti* type.<sup>[15]</sup>
5. ***Mithyaahara***: There are certain codes of conducts of eating which when not followed are called *Mityaahara*. The codes of conduct of eating have been termed as *Ashta Aharavidhi Vishesh Ayatana* and *Dwadashaashanavidhi*. Over ruled these codes disturbs the *Agni* and produces *Ama* which in turn produces *Amavisha*.<sup>[16]</sup> so along with *Kushta* other disease occurs which can manifest due to *Ama*, *Amavisha* may coexist. like psoriasis, the coexistence of psoriatic arthritis, Crohn disease dermatogenic enteropathy have been reported.

#### *Viharaja Nidana*

Physical activities like suppressing the natural urges like *Chardi Vegadharana*, day sleep, sexual intercourse, excessive exposure to sunrays, hot and humid

environment, over exercise. *Sheetodaka Sevana* after *Shrma, Brama, Bhaya, Santapa* and also due to error in *Panchakarma* therapy's like *Sthambana* in *Raktarsha, Sneha Vyapat, Sthambana* in *Amatisara*.<sup>[17]</sup> Verbal sinful activities like abusing teacher, the factor brings out psychogenic stress which plays role in *Kushta. Chinta, Bhaya, Shoka* are *Vata Prakopaka* and *Swedovaha Srotodrushti Nidana*.<sup>[18]</sup>

### Psychological Factors

Psych cutaneous medicine impacts on the interaction between mind, brain and skin. The brain and skin originate from same germ layers i.e., the embryonic ectoderm and are under the influence of the same hormones and neurotransmitters.<sup>[19]</sup> Psychopathological nature tends to play an etiological role in development of skin disorders, psoriasis being a key disease in cluster of Psych cutaneous disorder. Seville reported consistent link between major stressful life events and disease manifestation.

### Immunological Factors

The skin is the front line of defense against insult and injury and contains many epidermal and immune elements that comprise the skin-associated lymphoid tissue (SALT). The reaction of these components to injury allows an effective cutaneous response to restore homeostasis. Psoriasis is the best-understood and most accessible human disease that is mediated by T cells and dendritic cells. Inflammatory myeloid dendritic cells release IL-23 and IL-12 to activate IL-17-producing T cells, Th1 cells, and Th22 cells to produce abundant psoriatic cytokines IL-17, IFN- $\gamma$ , TNF, and IL-22. These cytokines mediate effects on keratinocytes to amplify psoriatic inflammation.<sup>[20]</sup>

### Environmental Factors

Environment are important in manifestation of disease indicating several evidence have been implicated in initiation of disease process on exacerbation of pre-existing disease.<sup>[21]</sup> Factors like mechanical injury, chemical, UV, winter season due to the cold and dry weather and allergies to some food items.

### Vikaravighata Bhava<sup>[22]</sup>

*Avikarajanam*, reasons for *Vikaravighata Bhava* are there is no similarities between *Dosha Dushya* and

*Nidan* with respective to *Dravya, Guna, Karma* and *Prabhav*. As *Nidan* not capable of creating *Dhatu Shaithilyata* or *Khavaigunya*, leads to non-manifestation of disease. e.g. If one avoids the *Aharaj* and *Viharaj Kushta Nidana* or in other words if one follows diet and life style opposite to *Nidana, Doshas Dushyas* leads to non-manifestation of disease. *Chiren Vikaraja Jananam* (delayed manifestation of disease), *Nidana* as *Dushivisha* and *Chardi Vegdharana* in *Kushta*, there is *Anubandha* of *Nidana Visheshas* after long gap due to existence of similarities in *Kala* and *Doshas*, similar in genetic factor (*Kulaja Nidan*). On other hand if *Anubandha* between *Nidan, Dosha, Dushya* is very weak the disease occurs in *Alpabala* with less symptoms, *Vyabhichari Hetu* of *Kushta Roga* leads to a mild manifestation of disease.

### Vikaravighata Abhava<sup>[22]</sup>

*Vikarajanam*, Infection, immunological, environmental factors of *Kushta/psoriasis* has similarities in *Nidana, Dosha, Dushya* in respective of *Dravya, Guna, Karma, Prabhava* hence easy manifestation of disease occurs. *Sheeghra Vikara Jananam*, (early manifestation of disease) *Anubandha* in *Nidanadi* factors happens very fast as in case of consuming food during *Ajeerna Avasta* immediate *Tridosha Prakopa* takes place. *Mahati Vikara Jananam* (manifestation of severe disease) severity in *Dosha Prakopa* and four *Dushyas* leads to pre-existing *Dhatu Shaithilyata* and there by causes severe vitiation of *Dushyas*. This leads to manifestation of severity in *Kushta (Asadhya/Kashta Sadhya Vyadhi)* and may lead to complication. *Sarvalinga Yukta Vikara Jananam*, extensive *Dushya Vaishamyata* leads to manifestation of disease with all symptoms mentioned in classics. Hence the study of *Vikaravighatakara Bhava Abhava* should be useful to understand the pathogenesis of *Kushta*.

### Infection

Most compelling of these is infection with group A streptococci. Streptococcal throat infection precede outbreak of guttate psoriasis which can then lead to chronic plaque psoriasis.<sup>[23]</sup> Prescription drug use, smoking, chronic inflammation, immunogenic factors.



Wide range of injurious local stimuli including physical, electrical, surgical and infective insults have been recognised to elicit psoriatic lesion (Koebner phenomenon). HIV infection an also been associated with psoriasis.<sup>[24]</sup>

### Sansargaja Nidana

*Kushta* is considered as *Sansargaja Vyadhi* (communicable or infective disease).<sup>[25]</sup>

### Pathogenesis Psoriasis

It is characterized by hyperproliferation and abnormal keratinocyte. Lymphocyte infiltration mostly of T and various endothelial vascular changes in dermal layers. The epidermis is infiltrated by a large number of activated T cells, which appear to be capable of inducing keratinocyte proliferation. This is supported by histologic examination and immunohistochemical staining of psoriatic plaques revealing large population of T cells with in psoriatic lesions.<sup>[26]</sup>

Ramped up deregulated inflammatory process ensues with a large production of various cytokines (i.e., tumour necrosis factor- [TnF- $\alpha$ ], interferon -gamma, inerleukin-12]. Many of the clinical features of psoriasis are explained by the large production of such mediators. interestingly, elevated levels of TNF- $\alpha$  specifically are found to corelate with lures of psoriasis. Key findings in the affected skin of patients with psoriasis include vascular engorgement due to superficial blood vessel dilation and altered epidermal cell cycle. Epidermal hyperplasia leads to an accelerated cell turnover rate (from 23 days to 3-5 days), leading to improper cell maturation. Cells that normally lose their nuclei, a condition known as parakeratosis. In addition, tp parakeratosis, affected epidermal cells fail to release adequate levels of lipids, which normally cement adhesions of corneocytes. Subsequently, poorly adherent stratum corneum if formed leading to the flaking, scaly presentation of psoriasis lesion, the surface of which often resembles silver scales.<sup>[27]</sup>

### Similarities with oncopathogenesis

As cancer cells may produce abnormal amounts of growth factors (autocrine stimulation) or may

stimulate neighbouring cells to produce growth factors (paracrine stimulation). Alteration to the molecules involved in intracellular signalling can also contribute to the continual proliferation of cancer cells. Success of epidermal growth factor receptor (EGFR)- inhibitor in various cancers cells is an example. Mutation and proliferation of epidermal cells less than 23days to 3-5 days forms the abnormal growth of skin cells - there are various types of skin cancer as basal cell carcinoma, squamous cell and melanoma which forms similar pathogenesis in skin and cancer. Tnf- is an inflammatory cytokine produced by macrophages monocytes during acute inflammation. It is responsible for diverse range of signalling events with in cells leading to apoptosis or necrosis.<sup>[28]</sup>

### Samprapti of Kushta

The *Doshas* which gets vitiated due to the irrespective *Hetus* spreads throughout the body which in turn vitiates *Dhatus* in deeper site and manifests disease. *Saptha Dravya* called *Saptha Dushya Sangraha*, when disturbed lead to the genesis of *Kushta*.<sup>[29]</sup> There are three *Doshas* - *Vata*, *Pitta* and *Kapha* and four *Dushyas* - *Twak*, *Mamsa*, *Rakta* and *Lasika*. Due to the *Prabhava* of *Kushta* it spreads throughout the body, the dual part played by the *Nidana* that is simultaneous vitiation of *Tridoshas* and also *Shaithilyata* in the *Dhatus* such as *Twak*, *Rakta*, *Mamsa* and *Lasika*. Thus, vitiated *Tridoshas* gain momentum to vitiates *Shithila Dhatus* and hence the disease *Kushta* gets manifested.<sup>[30]</sup>

*Nidana Sevana*, *Doshaja* and *Karmaja Hetu*



*Tridosha Prakopa* by *Avarana* of *Vata*



*Twak*, *Rakta*, *Mamsa* and *Ambu Shaithilyata*



Vitiated *Vata* enters in *Tiryaka Sira* and further vitiation of *Doshas* occurs



These *Doshas* gets accumulated at the place of *Dhatu Shaithilyata*



*Dosha and Dushya Samurchhana*



*Kushtha*

Acharya Sushruta described that due to *Doshaja* and *Karmaja Hetus*, aggravation of *Pitta* and *Kapha* takes place which produce *Avarana* of *Vata* which inturn aggravates *Vata*. Vitiated *Vata* enters in the *Tiryaka Sira* with two other vitiated *Doshas* and their spread leads to further vitiation. After this it reaches to *Bahya Rogamarga* (*Tvak, Rakta, Mamsa, Lasika*) and spread throughout the body, producing *Mandala* at the gathering site of *Doshas*. If these *Doshas* are not treated properly. After that they enter into the deeper *Dhatus* of the body.<sup>[31]</sup> Thus than *Majja Dusti* takes place in case of not treated in early stage, creates complication like psoriatic arthritis as *Vatarakta* (*Bheda Avasta*).

## DISCUSSION

Dermatological disorders are considered as one of the most chronic disorders which is difficult to diagnose and to cure. Genetic, environmental, infections, behavioural dietic factors appear to play a role in pathogenesis of *Kushta* including psoriasis. Psoriasis involves the hyperproliferation of keratinocytes in epidermis. Findings in the affected skin of patients with psoriasis include vascular engorgement due to superficial blood vessel dilation and altered epidermal cell cycle. Epidermal hyperplasia leads to an accelerated cell turnover rate (from 23 days to 3-5 days).

*Vikaravighatakara Bhava* and *Vikaravighatakara Abhava* plays role in non-manifestation of disease and manifestation of disease respectively. This depends upon the *Prativisheshas* of *Nidana, Dosha, Dushya Visheshas* towards *Vikara Vighata Bhava* and *Abhava*. A factor which hinders the manifestation of disease in an individual is called *Vikara Vighata Bhava*. In the absence of *Vikara Vighata Bhava* manifestation of a disease is possible easily.

*Kapha* disturbance leads to immunological variations which favours the development of psoriasis. Due to *Pitta* disturbance, there is a development of

hyperproliferation of the keratinocytes in the epidermis. An increase in the epidermal cell turnover rate is because of vitiated *Vata*. Langerhans cells and myeloid dendritic cells are derived from bone marrow (*Majja Dhatu*), TNF  $\alpha$  (*Rakta Dhatu*) lymph node (*Lasika*) which play major role in the pathogenesis of psoriasis.

## CONCLUSION

Present review has mainly focused on different aspects of etiopathogenesis of psoriasis and *Kushta*. Person's life with psoriasis may trigger with reoccurrence, unpredictable and severity in one episode to another. Due to the effect of psoriasis in their visibility and ignorance by social public and health care providers, there is an embarrassment physical, mental and socio-economic to the patient. Which further leads to the mental stress and causes aggravates to pre-existing disease. In this way learning the pathology of disease psoriasis is possible with understanding pharmacological intervention in *Samprapti Vighatana* to improve the mental and physical health. In this way here an attempt is made to understand etiopathogenesis of *Kushta* and psoriasis with the help of *Vikaravighatakara Bhav* and *Abhav, Amadosha, Kleda, Tridosha, Dusti, Rasa, Rakta, Mamasa, Lasika* and *Majja Dusti*, along with dietetic, environmental, genetic and immunological factors which appears to play role in pathogenesis of *Kushta Roga* including psoriasis.

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