

**Review Article****SKIN INFECTIONS IN DIABETES MELLITUS (DM) –A REVIEW****Gill Dimpal^{1*}, Mahto Raja Ram²**¹MD Scholar, ²Assistant Professor, Dept. of Kayachikitsa, All India Institute of Ayurveda, New Delhi, India.**ABSTRACT**

Diabetes Mellitus is the most common endocrine disorder and a various condition characterized by hyperglycemia as a consequence of defects in insulin secretion and variable degrees of insulin resistance. An estimated number of people with diabetes as projected to rise from 171 million in 2000 and 366 million in 2030. Skin disorders are present in 79.5% of patients with DM. Skin disorders, usually neglected and frequently under diagnosed among diabetic patients, are common complications and a broad spectrum of disorders in both type-1 and type-2 DM like *Prameha pidikas* are *Sharavika, Kachchapika, Jalini, Vidradhi Vinata, Alaji, Masurika, Sarshapika, Putrini* and *Savidarika*, Dry skin, Fungal infection, Skin Tags, Ulcers, Diabetic foot etc. which can lead to major complication and revolve around multifactorial factor besides hyperglycemia and advanced glycation end products. Diabetics skin infections are correlate in the Ayurvedic literature describe of *Prameha pidikas* so that *Prameha* just described before the *Kustha*. Both the diseases are correlated with *Kleda dusti*. Therefore, the aim of this study is to perform a literature review to evaluate the various skin infections in DM patients. Ayurvedic classics as described many, *Churnas, Guggulus, Gandhka yoga, Lohas, Kashayas, Leha, Ghritas Tailas, Lepas*, etc. Herbal drugs -*Vrana Shodhana* and *Ropana* (Healing Agents) and *Rakatmokshana* for use in various Skin infections. The few of these herbal drugs have antifungal and anti bacterial action. The role of *Ausadhi* (Herbal Medicines), *Ahara* (dietary regimen) and *Vihara* (lifestyle) are equally or even more important to control blood sugar level as well as to prevent complications of this disease.

KEYWORDS: Diabetes mellitus, *Prameha pidikas*, Skin infections, *Ausadhi*.**INTRODUCTION**

Diabetes Mellitus is chronic non-communicable disease causing an increase in blood glucose levels due to an ineffectiveness of secreted insulin. It is a potential epidemic in India with more than 62 million diabetic individuals and around 177 million people worldwide with the number likely to double by 2030.^[1] The most common site of infection in diabetic patients are the skin and urinary infection. Several literatures suggest a strongly positive correlation between hyperglycemia and skin infection. Patient with DM are more predisposed to skin infection such as folliculitis and subcutaneous abscesses etc. These infections may appear during the course of the disease or may be the first sign of DM presentation and can also be more severe in these populations. Recent studies on diabetic patient have observed on increased incidence (50-70%) of skin infection, Sensory Neuropathy, Atheroscleratic vascular disease and Hyperglycemia all predispose patient with diabetes to skin and soft tissue infection such infections can affect any skin surface but most commonly involve the feet. Ayurvedic System of Medicine clearly defines *Prameha* and its line of

treatment. *Prameha* is a *Santarpanjanya kaphaja vyadhi*, in which improper functioning of *Agni* leads to a tendency to increase *Kleda* and the vitiation of fluid *Dhatuj* ultimately increase blood sugar levels. If the disease is not treated properly, this will leads to *Madhumeha* & further complications like *Pidikas*. *Pidikas* in due course will become *Dusta vranas*. In patients of *Madhumeha*, foot ulcers are more common and they occur as a result of a variety of factors.

***Prameha Samprapti*^[2]**

The *Kapha* vitiates *Meda, Mamsa*, and the *Shareeraja kleda* present in *Basti* and result in *Prameha*. This along with *Pitta* causes *Pittaja* type and along with *Vayu* causes decrease in *Dhatu*s and causes *Vataja* type of *Prameha*. The *Doshas* involved in *Prameha roga* are *Vata, Pitta* and *Kapha*. The *Dushyas* are *Rasa, Rakta, Meda, Mamsa, Kleda, Vasa, Lasika, Majja, Ojas* and *Shukra*.

The *Samprapti ghatakas* are as follows***Udbhava stana:*** *Medovaha srotas****Sanchara:*** *Rasayanis (mutra vahinis)*

Ashraya: *Mutra vaha srotas*

Avayava: *Basti*

Srotas: *Medovaha, Mutravaha and Udakavaha*

Sthanic dosha: *Kledak kapha, Pachaka pitta, and Apana vayu and Vyana vayu*

Samanya dushyas: *Meda, Mamsa, Shareera kleda, Rakta, Vasa, Lasika, Majja & Ojas*

Physiopathology (Modern View)

Extensive research has already been undertaken to study the pathogenesis of immune dysfunction in diabetes mellitus phagocytic mechanisms like leukocyte chemotaxis and impaired during hyperglycemia and diabetic acidosis. According to same studies, an increased glycation /glucose in dm patient is associated with decreased secretion of interleukin-1 and interleukin-6 by mononuclear cells and monocytes. Certain studies performed have shown that when the HbA1c (glycated hemoglobin) is less than 8 % the proliferative function of CD4T- lymphocytes and their antigen response impaired. Overall, a compromised and disequilibrium immune system presents the skin of hyperglycemic individual to microbial invasion by both infection and non- infection microorganisms.^[3]

Aetio-pathogenesis of Prameha pidika

From the *Pramehakaraka Nidana sevana*, *Kapha prakopa* will occur in the body. The *Prakupita kapha* causes *Shithilata* in body, as it is having similar properties of *Meda*, it vitiates the *Medas* the vitiated *Kapha* and *Medas* further vitiates the *Mamsa* and *Kleda*. *Vikrita Kapha* and *Pitta* along with vitiated *Mamsa* causes *Prameha pidikas* in the body. The *Kapha* vitiated by etiological factors exceeds its quantity and develops specific power to manifest the process of the disease, i.e., *Prameha*. The specific properties of *Medas* are heaviness, sweetness etc, and those of *Kapha* are coldness, heaviness etc. Thus both these elements have identical properties. The vitiated *Kapha* along with vitiated *Medas* gets mixed with the muscle tissue and causes *Prameha pidikas*. Vitiating of *Tawak, Rakta, Mansa* and *Lasika* they are the main *Dushya* of *Kustha* and in *Prameha* also four this *Dhatu* are ultimately skin infection. After *Prameha roga* manifestation occurs in the body, the 3 vitiating *Doshas*, spreads in the tissues with excessive fat and fatty tissue in the patients suffering from *Prameha* produces ten types of *Prameha pidikas*. *Acharya Charaka* explains about the *Sampapti* of *Madhumeha* and *Prameha pidikas* very clearly. The ten *Prameha pidikas* are *Sharavika, Kachchapika, Jalini, Vidradhi Vinata, Alaji, Masurika, Sarshapika, Putrini and Savidarika*.^[4] *Brihatatryis* have described *Prameha pidika* as a major complication of *Prameha*.

Skin Infections in DM- An Modern View

Bacterial Infections

Several kinds of bacterial infections occur in people with diabetes mellitus.

- Infection of the hair follicles (Folliculitis)
- Carbuncles (*Mansha pidika*) – (deep infection of the skin and the tissue)
- Styes (infection of the glands of the eyelid)
- Boils
- Infection around the nails
- Cause –staphylococcus bacteria
- **Pyodermas** : Skin infection are more common in people suffering from diabetes due to decreased immunity and disturbed blood supply. ^[5]

Fungal Infections

A yeast – like fungus called candida albicans is responsible for many of the fungal infections affecting people with diabetes. These fungus Infections itchy red rashes, often surrounded by tiny blisters and scales. These infection most often occur in warm, moist folds of the skin. Three common fungal infections are –Jock itch, athletes foot and ringworm. Ringworm can appear on the feet, groin, trunk, scalp and nails.^[6]

Fungal infection of Nails

Nails that are infected with a fungus may become discolored (yellowish –brown), thick and brittle and may separate from the bed of the nail. The dark moist and warm environment of shoes can increase fungal growth. Fungal nail infection are difficult to treat.

Skin spots (Diabetic dermopathy)

This condition is marked by circular, reddish or light brown patches that usually appear on the shins or other bony part of the body. Around 39% of those with type2 DM develop diabetic dermopathy. This condition is caused by nerve and blood vessels damage.

Skin Tags

Skin tags are soft skin –colored growths that hang from the skin. skin tags favor areas such as the underarms, neck, under the breasts and the folds of the groin, the can uncontrolled blood sugar levels.

Diabetic Gangrene

Gengrene diabetorum is an untreated foot infection that causes lack of oxygen to the feet. it is located on the toes and heel.^[7]

Vitiligo

Vitiligo, a skin problem more commonly associated with type1 DM than type2 DM, affects skin colouration. The special cells that make pigment (the substance that controls skin colour) are destroyed,

resulting in patches of discolour skin. Vitiligo often affects the chest and abdomen but may be found on the face around the mouth, nostrils and eyes.^[8]

Diabetic Ulcer

The diabetic ulcer is round, deep difficult to heal, most often occurs on the feet and at the base of the thumb. An estimated 15 % of people with diabetes experience foot ulcer.^[9]

Acanthosis Nigricans

This condition is marked by darkened band of velvety skin specially in the folds near the groin, back of the neck or armpits. Lesions can be a sign of prediabetes. Acanthosis Nigricans occurs in as many as 74% of obese people with diabetes.

Diabetic skin sclerosis

Scleroderma like syndrome is part of the "Diabetic Hand syndrome; affects about 1/3 of patients with insulin- dependent diabetes and clinically acrosclerosis in systemic progressive scleroderma. The condition provokes a localized thickening and tightness of the skin of finger or toes. Scleroderma diabeticorum is erythema and occurs in up to 15 % of people with diabetes.

Treatment

Basically two type are of treatment modality are used in DM skin infection

Sodhan- 1. *Bahya (Lep, Parisek, Pichu, Mlahar)* & 2. *Abhyantar (Ghreetpana, Vaman, Virechna).*

Shamana -It consists of triangular approach.

- *Ausadhi* (Herbal Medicines)
- *Ahara* (Healthy Diet)
- *Vihara* (Regular exercise & Yoga)
- Blood sugar monitoring

Herbal Medicine ^[10]

It is evident that *Kapha Dosa* is predominant in *Prameha* and the *Dusya Meda* is of same nature. In *Ayurveda* for the treatment of *Prameha*, drugs having *Tikta, Katu* and *Kasaya Rasa* have been recommended.

- *Bhunimbadi Churna* (Chakradatta 4/19-20)
- *Kaishore Guggulu* (Chakra. D.23/48)
- *Amrita Guggulu* (Chakra.D.23/56)
- *Punarnavaamrita Guggulu* (Chakra.D.23/63)
- *Phalatrikadi Kwath* (Chakra.D.35/22)
- *Twakdosahar Udvartana* (Chakra.D.36/34)
- *Saptavinshati Guggulu* (Chakra.D.46/18)
- *Vidangadi yoga* (Chakra.D.50/82)
- *Pancha Nimba Churna* (Chakra.D.50/82)
- *Panchatikta Ghrita Guggulu* (Chakra.D.50/119)
- *Marichyadi Taila*

- *Jatyadi Taila*
- *Shalsaradi Leha* (Chakra.D.35/58)
- *Gandhak Yoga* (B.R.38/10)
- *Sarivadi Loha*(B.R.38/12)
- *Somraaji Ghrita* (B.R.38/12)
- *Kakodumber lep* etc.

Ahara & Vihara ^[11]

Pathya

First of all "Nidana Parivarjana" is very ingrainedly advocated in all classics for the management of disease.

- Intake of old harvested cereals, barley (*Yava*), sorghum (*Jowar*), whole wheat Atta, *Karela*, Green leafy vegetables, Garlic (*Lasuna*), Turmeric (*Haridra*), Aloe (*Kumari*), and fruits like Guava, Oranges, Indian Blackberry (*Jamun*) etc.
- Reduce intake of rice, food rich in carbohydrate and fried food.
- Regular practice of *Yoga-Surya Namaskar, Yogamudasana, Vajrasana, Mandookasana, Utthita Trikonasana* and meditation etc.

Apathya

- Sugarcane juice, jaggery, sugar, milk products.
- Sedentary lifestyle.
- Sleeping in the day time and excessive sleeping
- Alcohol
- Cold drinks, ice cream, burger -pizza and other fast food etc.

The role of *Ahara* (dietary regimen), *Ausadhi* and *Vihara* (lifestyle) are equally or even more important to control blood sugar level as well as to prevent complications of this disease.

CONCLUSION

Diabetic skin infections are found to be very difficult to treat because of spreading in nature. Usually they are well controlled by achieving systemic treatment for control of hyper glycemia. A complete homeostasis of *Tridosha* and control on their involvement of *Dhatus* and *Upadhatus* has to be ascertained and treated accordingly. *Ayurvedic* classics as described many *Churnas, Guggulus, Kashayas, Lohas, Gandhaka Yoga, Leha, Ghritas Tailas, & Lepas*, etc. Herbal drugs -*Vrana Shodhana* and *Ropana* (Healing Agents) and *Rakatkoshana* for use in various Skin infections. The few of these herbal drugs have Antifungal and Anti bacterial action.

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