



ORIGINAL RESEARCH PAPER

Dermatology

PATTERN OF CUTANEOUS MANIFESTATIONS OF DIABETES MELLITUS

KEY WORDS: Diabetes Mellitus, Cutaneous Manifestations.

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ABSTRACT

BACKGROUND: Diabetes is most common endocrine disorder with increasing prevalence worldwide. Every organs system is affected by it albeit at different pace. This study was carried out with the aim of studying cutaneous manifestation of diabetes mellitus.

METHODS- 200 cases of diabetes mellitus with cutaneous manifestations attending out patient department of dermatology were included in the study.

RESULTS - The common skin disorders were cutaneous infections (53.5%), acanthosis nigricans (10.5%), generalized pruritus (10.5%), skintags (9.5%).

CONCLUSION - most common dermatological manifestations were cutaneous infections.

INTRODUCTION:

Diabetes is characterized by state of chronic hyperglycemia due to absolute or relative insulin deficiency. This state of hyperglycemia affects various organs system including cardiovascular, renal, nervous system, eye and skin¹. Skin manifestations in diabetes mellitus are common and expressed in numerous forms. According to various studies, 30-82% of persons with diabetes mellitus have some type of cutaneous involvement during the course of disease²⁻³. In general, type two DM patients tend to develop more frequent cutaneous infections, whereas type one DM patients develop more autoimmune type of cutaneous lesions⁴⁻⁵.

Hyperglycemia leads to nonenzymatic glycosylation (NEG) of various structural and regulatory proteins including collagen. NEG leads to formation of advanced glycosylation end products (AEG), which contribute to pathogenesis of disorders such as diabetic thick skin and limited joint mobility (LJM)⁶. The etiopathogenesis of systemic and cutaneous infections which are a significant cause of morbidity and mortality in DM is linked to derangements in immuno regulatory mechanism like diminish chemotaxis, phagocytosis and reduced cell mediated immunity⁷. Metabolic abnormalities like hyperinsulinemia seen in early type 2 DM, by virtue of its action on insulin like growth factors - I (IGF-1) receptor appears to mediate abnormal epidermal proliferation and phenotype of acanthosis nigricans⁸. In insulin deficient diabetic patients abnormal Lipoprotein lipase (LPL) activity resulting in defective lipid processing and can lead to massive hypertriglyceridemia manifesting in skin as eruptive xanthomas. Macro and microangiopathy contribute significantly to the cutaneous complications of diabetes. In addition, a loss of cutaneous sensory innervations occurs with diabetes. All the above factors in combination and loss of neuroinflammatory cell signaling plays a casual role in non-healing, lower extremity ulcers⁹. Cutaneous lesions in diabetes may be classified into four major groups:

1. Skin disease with strong to weak association with diabetes mellitus eg. necrobiosis lipidica, diabetic dermopathy, diabetic thick skin, acanthosis nigricans, granuloma annulare, diabetic bullae, skin tags, yellow nails, xanthomas, rubeosis faciae, xerosis etc.
2. Cutaneous infections - eg. fungal infections, bacterial infections, viral infections.
3. Cutaneous manifestations of complications of diabetes mellitus eg. neuropathy, diabetic feet ulcer, pigmented purpura etc.

4. Skin reactions due to diabetic treatment – eg. lipoatrophy, lipohypertrophy, erythema multiforme, photosensitivity, urticaria, pruritus, lichenoid reaction.

AIMS AND OBJECTIVES:

The aim of this study is to study dermatological manifestations of diabetes mellitus.

MATERIAL AND METHODS:

This study was carried out on 200 patients of diabetes mellitus with cutaneous manifestations attending out-patient department of Dermatology at Jawahar Lal Nehru, Medical College, Ajmer. Inclusion criteria for study were patient with raised fasting or postprandial blood sugar level as per diagnostic criteria for diabetes mellitus adopted by American Diabetes Association 2019 and those require treatment for diabetes mellitus both type 1 and type 2¹⁰. Those with gestational diabetes were excluded from the study. A detailed history including age, sex, occupation socio-economic status, clinical sign and symptoms, their duration, history of evolution and progression of lesion and its treatment, if any, were recorded. A thorough dermatological, general physical and systemic examination were done. All cutaneous and mucous lesions were recorded. Relevant laboratory investigation including complete blood count, blood sugar both fasting and postprandial, urine examination, liver and kidney function test, HbA1c, lipid profile, fundus examination by an ophthalmologist, KOH examination, gram staining of pus in selected cases were done.

Assessment of diabetic neuropathy was done on basis of criteria detailed by foster. Relevant microbiological and histopathological examination were carried out in selected cases to confirm clinical diagnosis.

RESULTS:

During the study 200 patients of diabetes mellitus with cutaneous manifestations were observed and following information were recorded. The mean age of patient in this study is 52.48 years (ranges from 3.5-80 years). Out of 200 patients there were 57% (114) male and 43% (86) were female patients with slight male preponderance. Male: female ratio was 1.32:1. Among 200 patients 76% (152) were from urban areas and 24% (48) were from rural areas. Out of 200 patients 36.5% (73) patients had positive family history of diabetes mellitus and 127 (63.5%) patients had no family history of

diabetes. Among 200 patients blood sugar level was controlled i.e HbA1c <7 in 13% (26 patients) and was uncontrolled i.e. HbA1c>7 in 87% (174) patients. Out of 200 patients 8% (16) patients were on insulin therapy and 92% (184) patients were on oral hypoglycemic drugs for control of their diabetes. Out of 200 patients 75.5% (151) patients had diabetes mellitus from 0-5 year duration, 17% (34) patients had diabetes mellitus from 6-10 year duration, 7.5% (15) patients had diabetes mellitus from more than 10 year duration.

Table - 1 Spectrum of diabetes associated cutaneous manifestations observed in study subjects.

Skin disease	No. of patients (%)
Dermatophytic fungal infection	23(11.5%)
Candidal infection	22(11%)
Generalized pruritus	21(10.5%)
Acanthosis nigricans	21(10.5%)
Skin Tags	19(9.5%)
Furunculosis (Boils)	18(9%)
Sclerosis of finger (finger pebbles)	18(9%)
Onychomycosis	14(7%)
Shin spot	14(7%)
Xanthelasma	14(7%)
Acquired ichthyosis	13(6.5%)
Rubeosis faciei	13(6.5%)
Urticaria	9(4.5%)
Seborrheic keratosis	9(4.5%)
Periocular melanosis	9(4.5%)
Photodermatitis	9(4.5%)
Folliculitis	8(4%)
Scleredema diabeticorum	8(4%)
Melasma	8(4%)
PIH (Post Inflammatory Hyperpigmentation)	8(4%)
Limited joint mobility	7(3.5%)
Diabetic foot ulcer	6(3%)
Lichen amyloidosis	5(2.5%)
Carbuncle	2(1%)
Eruptive xanthoma	2(1%)

Table-4 SPECIFIC DERMATOSIS ASSOCIATED WITH DIABETES MELLITUS (n=200)

Specific dermatosis	Rubeosis faciei	Necrobiosis lipoidica diabeticorum (NLD)	Granuloma annulare (G.A)	Lipohypertrophy	Total
No. of patients	13(6.5%)	3 (1.5%)	4(2%)	1(0.5%)	21 (10.5%)

DISCUSSION:

In our study there were 114 (57%) males and 86(43%) females. There was slight male predominance. Some studies have shown slight male preponderance¹¹ while others have shown female preponderance¹². According to WHO excess male diabetics observed in South East Asia¹³. Age of patients in our study ranged from 35 years to 80 years with mean age of presentation being 52.48 years. Minimum duration of diabetes mellitus with cutaneous presentation was one month and maximum duration was 25 years with average being 4.15 years. Out of 200 patients, 151 patients (75.5%) had diabetes mellitus of less than 5 year duration, 34 patients (17%) had diabetes since 6 to 10 years and only 10 patients had diabetes for more than 10 years. It shows that diabetes mellitus can be fairly recognized or suspected with skin presentation alone. Alteras and Saryat¹⁴ and dogra et al¹⁵ also reported that in majority of patients with diabetes mellitus, cutaneous manifestations significantly correlated with duration of diabetes. In their study duration of disease was less than 6 years in majority of patients. Blood sugar level was uncontrolled (HbA1c>7) in 87% (174) of patients, it was controlled (HbA1c<7), in only 13% (26) patients. As found by Yosipovitch G, et al¹⁶ and Sawhney et al¹⁷, skin manifestations were more common in patients who had uncontrolled diabetes. Uncontrolled diabetes increases risk of microan-

Lipohypertrophy	1(0.5%)
Diabetic bullae	1(0.5%)

Among all type of cutaneous manifestations associated with diabetes mellitus, fungal infection was commonest association with 32.5% (65) cases followed by bacterial infection 21% (42).

Table- 2 FUNGAL INFECTIONS (n=200)

Fungal infections	No. of patients (%)
Onychomycosis	14(7%)
Candidal balanoposthitis	11(5.5%)
Candidal vulvovaginitis	4(2%)
Candidal intertrigo	4(2%)
Tinea cruris	11(5.5%)
Tinea pedis	6(3%)
Tinea corporis	6(3%)
Pityriasis versicolor	6(3%)
Candidal paronychia	3(1.5%)
Total	65(32.5%)

Among the all 200 patients there were 32.5(65) patients who had fungal infection of which most common was onychomycosis 7% (14), candidal balanoposthitis 5.5% (11) and least common was candidal paronychia in 1.5% (3) patients.

Table- 3 BACTERIAL INFECTIONS (n=200)

Bacterial infections	No. of patients (%)
Furunculosis	18(9%)
Folliculitis	8(4%)
Erythrasma	5(2.5%)
Bacterial interigo	4(2%)
Cellulitis	3(1.5%)
Carbuncle	2(1%)
Impetigo	2(1%)
Total	42(21%)

Among all 200 patients most common bacterial infection was furunculosis comprising of 9% (18) cases and least common was carbuncle 1% (2) cases. Total 21% (42) cases were of bacterial infection.

giopathy and other complications. Out of 200 patients 76% (152) patients were from urban background and 24% (48) were from rural background. This is in accordance with the fact that urban people with sedentary life style, specific dietary habits, lack of exercise and physical work and obesity are more prone to develop diabetes mellitus. Out of 200 patients 73 (36.5%) had positive family history. This is testimonial to the fact that genetic factors do play a significant role in causation of this multi-factorial disease. Cutaneous infections were most common skin manifestations in our study being observed in 53.5% (107) patients, of which fungal infections were most prevalent being seen in 32.5% of cases, followed by bacterial infection in 21% cases. It was probably due to the fact that most of our patients belong to lower socio-economic status residing in hot humid climatic condition, poor personal hygiene living in over crowded slums. Perez et al² has shown that infections are most common cutaneous manifestations of diabetes mellitus. Other dermatosis associated with diabetes mellitus in our study were acanthosis nigricans 10.5% (21) cases, generalized pruritus 10.5% (21) cases, skin tags in 9.5% (19) cases, finger pebbles in 9% (18) cases, skin spots in 7% (14) cases, acquired ichthyosis 6.5% (13) cases, rubeosis faciei 6.5% (13) cases, xanthelasma 7% (14) cases, telogen effluvium 5% (10) cases. Diabetic foot ulcers due to neuropathy and microangiopathy

were present in 3% (6) cases. Specific dermatosis have shown association with diabetes mellitus in many studies like diabetic bullae, necrobiosis lipoidica, granuloma annulare. The above specific dermatosis were also present in our study respectively in 0.51% (1) case, 1.5% (3) 2% (4) cases. Similar results have been shown by Tariq Mahmood et al¹⁸ and Braverman IM¹⁹. These specific dermatosis were present in our study at frequency similar to other studies like Pandey et al²⁰. Amongst 200 patients few cases due to complications of therapy were also observed. Lipohypertrophy at injection site due to insulin was present in one case 0.5% (1) case, erythema multiforme like skin rash due to oral hypoglycemic drugs was seen in 0.5% (1) case. Few cases of photodermatitis like rash were also observed.

CONCLUSION:

Thus, a variety of cutaneous manifestations in diabetes mellitus have been observed in our study which helps to diagnose diabetes merely by careful inspection of skin. Skin manifestation of diabetes mellitus generally appear after systemic disease has developed but in few cases may predate or even appear concurrently with it.

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CONFLICT OF INTEREST: None declared

ETHICAL APPROVAL :

The study was approved by the institutional ethical committee.

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