

A cross sectional study of cutaneous manifestations in patients with diabetes mellitus at tertiary care hospital.

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Abstract

Introduction: Diabetes mellitus is a chronic, metabolic disease affecting 9.3% of total world population. Diabetes is the most common endocrinal disorder affecting the human population. Skin is affected by metabolic derangements of diabetes. This study helps to explore the cutaneous manifestations of diabetes.

Aim: To evaluate the pattern of cutaneous manifestations and its association with types of diabetes mellitus.

Methods: A cross sectional study was done from 1st April, 2021– 30th September, 2021 in the Department of dermatology at tertiary care center and total 140 cases were enrolled. A detailed history, cutaneous examination and a thorough systemic examination was done.

Weight, height was measured and BMI was calculated in each patient. Hemo gram, blood sugar level, Liver function tests, Renal function tests, Urine examination were done in all patients and other necessary investigation as and when required.

Results: In Our study most common age group was 41-50 yrs (33%) and male: female ratio was 1.1:1. Type I

DM was present in 7 (5%) and Type II DM was in 133 (95%). Type 1 diabetes most common seen in 11-40 years age group while type 2 diabetes were seen in 41-70 years. In our study, 13 (8.7%) patients were obese while 56 (40.3%) were overweight.

Cutaneous infections were the most common manifestations seen in 109 (77.4%) patients, out of which 84 (60%) had fungal infection, 21 (14.2%) had bacterial infection and 4 (3.2%) had viral infection. Dermatitis (40%) was common fungal infection, furunculosis (5.1%) and folliculitis (3%) were common bacterial infection while herpes zoster (2%) was common viral infection.

Conclusion: Cutaneous manifestations were found more frequently among Type 2 diabetics than type 1 diabetes. Infections were commonest finding in all patients of diabetics.

Other commonly seen dermatoses were xerosis, skin tags, acanthosis nigricans, diabetic dermopathy, seborrheic keratosis and diabetic foot.

Keywords: Diabetes mellitus, cutaneous infections, metabolic disturbance, diabetic dermopathy.

Introduction

Diabetes mellitus (DM) is the most common endocrine disorder. It exhibits a variety of multi system complications involving the blood vessels, skin, eye, kidney, and the nervous system during the disease progression. Ab normal carbohydrate metabolism, other altered metabolic pathways, atherosclerosis, micro Angiopathy, neuron degeneration, and impaired host Mechanisms all play roles in development of cutaneous manifestations¹. Such kind of studies helps in early diagnosis and treatment which ultimately leads to reduction in morbidity associated with diabetes.

Materials and methods

Source of data

Patients having diabetes mellitus came for dermatological consultation in OPD at tertiary care hospital.

Method of study

Data was collected from 1st April, 2021 to 30th September 2021 in the Department of Dermatology, Venereology and Leprosy at tertiary care centre. A total of 140 cases were enrolled during a period of 6 months.

Inclusion Criteria

- Patients willing to give informed valid consent.
- All diabetic patients with cutaneous changes.

Exclusion criteria

- Gestational diabetes and drug induced diabetes.
- Patients with prediabetes.

A detailed history pertaining to the demographic data, cutaneous complaints, history of diabetes and its treatment were noted. A detailed cutaneous examination and thorough systemic examination was done. Weight, height was measured and BMI was calculated in each patient. Complete blood count, Random blood sugar, fasting blood sugar, post prandial blood sugar, Liver

function tests, Renal function tests, Urine examination were done in all patients and other necessary investigation as and when required. All details were recorded in semi structured Proforma, clinical photographs were taken and assessment was done by SPSS software.

Results and discussion

In our study, most common age group observed was 41-50 yrs. (33%) followed by 51-60 yrs. (26.7%) [table 1]. In study done by Phulari YJ et al², majority of participants (49.5%) were in the age group of 41 to 60 years. Out of 140 cases, 74 (53.2%) were male while 66 (46.7%) were female.

The male to female ratio was 1.1:1. In our study, 5% cases had type 1 diabetes and 95% cases had type 2 diabetes. According to study done by Bhardwaj N et al³, Type 1 diabetes mellitus was in 5% and type 2 diabetes mellitus was in 95% cases.

In our study, 13 (8.4%) patients were obese (BMI>30) while 56 (40.3%) were overweight (BMI 25-29.9). Obesity is among the various risk factors for development of type 2 diabetes. Among the type 2 diabetic cases, 13 (8.4%) were obese (0.7%) patient were underweight, 69 (49%) patients were with normal weight, 56 (40.3%) were overweight [Table 2]. In study done by Bhardwaj N et al³. 12.5% type 2 DM patients were obese. As one patient can have more than one dermatosis, total 259 manifestations were there in 140 cases.

43% manifestations were due to gross metabolic changes, 13.5% manifestations were due to chronic degenerative changes and 0.7% manifestations were due to therapeutic complications of DM, while 43% miscellaneous manifestations have unknown pathophysiology [Table 3]. In study done by Baidya A, et al⁴. 56.6% manifestations were due to gross metabolic changes, 36.6% manifestations were due to degeneration with

vascular changes, 1.5% mani festations due to therapeutic complications of DM.

Manifestations due to gross metabolic changes

Among 140 cases, 111 patients having cutaneous manifestations due to gross metabolic changes, total 109 (77.4%) cases were of cutaneous infections and 2(1.5%) cases were of xanthomatosis [Table 4].

In study done by Phulari YJ et al² 61% had infectious manifestations. In study done by Baidya A. et al⁴, 6.6% cases were of xanthelasma palpebrarum with type 2 DM.

In our study, among 140 cases enrolled, 109(77.4%) cases had infections. Out of which, cutaneous fungal infections were seen in 84 (60%), bacterial infections were seen in 21 (14.2%) and viral infections were seen in 4 (3.2%) of the patients.

In study of Phulari YJ et al², 61% had infectious manifestation out of which 39.5% had fungal infection, 20.5% had bacterial and 1% had viral infections. In Sanad et al study⁵, 40% had infectious manifestations. Among these cases, 22% had fungal infections, 16% had bacterial infections and 2% had viral infections [Table 5].

In our study out of 84 cases of fungal infections, dermatophytic infections were seen in 34 (40%) cases followed by candidial infections in 24 (29%) cases.

In candidial infections intertrigo was seen in 6(8%) cases, candidial balanoposthitis in 5 (7%) cases while in dermatophytic infections tinea corporis is in 11(13%) cases and tinea cruris in 8 (10%) cases.

In Bhardwaj N et al³ study, dermatophytosis was seen in 19.6% patients. In study done by Kadam MN et al⁶, 8 % patients had candidal intertrigo, 5% patients had balanoposthitis. In study done by Verma et al⁷, demodectic fissures, a hallmark of candidial balanoposthitis can be explained by the accumulation of advanced glycation end products (AGEs) in the skin.

AGEs content is increased by inadequate glycemic control in diabetics.

Among bacterial infections most common manifestation was furunculosis seen in 5.1% cases followed by folliculitis in 3% cases. In Bhardwaj N et al³ study, bacterial infection was seen in 8.8% patients in which furunculosis was seen in 4.8% patients and folliculitis observed in 0.7% patients.

Among viral infections herpes zoster was the most common infection (2%).

Manifestations due to degenerative changes

In our study, 35(25%) cases had cutaneous changes associated with degenerative changes. Among them diabetic dermopathy was most commonly seen in 15 (10.6%) cases [Table 6].

Miscellaneous manifestations (Frequently observed in diabetes but have unknown pathophysiology)

Non-infectious dermatological conditions were more commonly seen in type 2 diabetics than type 1 like skin tags (17.4%), xerosis (14.2%), acanthosis nigricans (13.5%), psoriasis (4.8%).

acquired ichthyosis (3.2%), vitiligo (3.2%), lichen planus (3.2%), perforating dermatoses (2.3%), granuloma annulare (1.3%) [Table 7].

In study of Bhardwaj et al³, xerosis in 10.3%, acanthosis nigricans in 4.2%, psoriasis in 4.5%, vitiligo in 2% cases, lichen planus in 1%, perforating dermatoses in 1.6%, granuloma annulare in 0.6% cases.

Manifestations due to insulin therapy

In our study, we found complications related to therapy in 2 (1.4%) patients on insulin therapy having type 2 diabetes [Table 8]. In Bhardwaj N et al³.

study cutaneous manifestation due to insulin therapy was seen in 2 (0.5%) patients.

Figures and Tables

Table 1: Age distribution (n=140)

Age (years)	Type 1 dm	Type 2 dm	Total (%)
11-20	2 (1.4%)	0 (0%)	2 (1.4%)
21-30	1 (0.7%)	2 (1.4%)	3 (2.7%)
31-40	1 (0.7%)	13 (9.3%)	14 (10%)
41-50	2 (1.4%)	44 (32%)	46 (33%)
51-60	1 (0.7%)	36 (26%)	37 (26.7%)
61-70	0(0%)	32 (23%)	32(23%)
71-80	0 (0%)	5(3.5%)	5 (3.5%)
81-90	0 (0%)	1 (0.7%)	1 (1%)
Total	7 (5%)	133 (95%)	140 (100%)

Table 2: Body Mass index(n=140)

	BMI (kg/m ²)	Type 1 DM	Type 2 DM	Total (%)
Underweight	<18.5	1 (0.7%)	1 (0.7%)	2 (1.4%)
Normal	18.5-24.9	5 (3.5%)	64 (46.1%)	69 (49%)
Overweight	25-29.9	1 (0.7%)	55 (39.7%)	56 (40.3%)
Obese	>30	0 (0%)	13(8.4%)	13 (8.4%)
	Total	7 (5%)	133 (95%)	140 (100%)

Table 3: Spectrum of cutaneous mani festations associa ted ith DM (n=259).

Sprectum of cutaneous mani festations	No. Of mani festations	Percentage
Due to gross metabolic disturbance	111	43%
Miscellaneous (Frequently observed in diabetes but have unknown patho physiology)	111	43%
Due to chronic degenerative changes	35	13.5%
Complications of diabetic therapy	2	0.7%
Total	259	100%

Table 4: Cutaneous manifestations due to gross metabolic disturbance(n=111)

Cutaneous manifestations	Type 1 DM	Type 2 DM	Total (%)
Cutaneous infections	5 (3.3%)	104 (74.1%)	109 (77.4%)
Xanthomatosis	0 (0%)	2 (1.5%)	2 (1.5%)
Total	5 (3.3%)	106 (75.6%)	111 (79%)

Table 5: Types of cutaneous infections(n=109)

Type of infection	Type 1 dm	Type 2 dm	Total (%)
Fungal infections	3 (2.6%)	81 (57.4%)	84 (60%)
Bacterial infections	1 (0.7%)	20 (13.5%)	21(14.2%)
Viral infections	0 (0%)	4 (3.2%)	4 (3.2%)

Total	4 (3.2%)	105 (74.1%)	109 (77.4%)
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Table 6: Cutaneous manifestations due to chronic degenerative changes(n=35)

Cutaneous manifestations	Type 1 dm	Type 2 dm	Total (%)
Diabetic dermopathy	0 (0%)	15 (10.6%)	15 (10.6%)
Diabetic foot, ulcer and gangrene	0 (0%)	6 (4.2%)	6 (4.2%)
Callosity	0 (0%)	6 (4.5%)	6 (4.5%)
Diabetic scler edema	1 (0.7%)	2(1.4%)	3 (1.6%)
Pigmented purpuric dermatosis	0 (0%)	2 (1.4%)	2 (1.3%)
Diabetic bullae	0 (0%)	2 (1.4%)	2 (1.3%)
Diabetic rubeosis	0 (0%)	1 (0.7%)	1 (0.6%)
Total	1 (0.7%)	34 (24%)	35 (25%)

Table 7: Miscellaneous manifestations (Frequently observed in diabetes but have unknown pathophysiology) (n=111).

Cutaneous manifestations	Type 1 dm	Type 2 dm	Total (%)
Skin tags	1 (0.7%)	24 (16.8%)	25 (17.4%)
Xerosis	1 (0.7%)	19 (13.3%)	20 (14.2%)
Acanthosis nigricans	1 (0.7%)	19 (13.2%)	20 (13.5%)
Diabetic thick skin	0 (0%)	10 (7.4%)	10 (8%)
Pruritus	1 (0.7%)	9 (6.7%)	10 (7%)
Psoriasis	0 (0%)	6 (4.5%)	6 (4.8%)
Acquired ichthyosis	1 (0.7%)	4 (2.9%)	5 (3.2%)
Vitiligo	1 (0.7%)	3 (2.6%)	4 (3.2%)
Lichen planus	0 (0%)	4 (3.2%)	4 (3.2%)
Perforating dermatosis	0 (0%)	3 (2.3%)	3 (2.3%)
Necrobiosis lipoidica	0 (0%)	2 (1.3%)	2 (1.3%)
Granuloma annulare	0 (0%)	2 (1.3%)	2 (1.3%)
Total	6 (4.2%)	105 (75.4%)	111 (79.6%)

Table 8: Cutaneous complications of diabetic therapy(n=2)

Cutaneous manifestation	Type 1 dm	Type 2 dm	Total (%)
Lipoatrophy	0 (0%)	1 (0.7%)	1 (0.7%)
Lipo hypertrophy	0 (0%)	1 (0.7%)	1 (0.7%)
Induration with Abscess	0 (0%)	0 (0%)	0 (0%)
Total	0 (0%)	2 (1.4%)	2 (1.4%)

Conclusion

Infectious conditions such as dermatophytosis and candidiasis were common cutaneous manifestations associated with both type1 and type2 diabetes mellitus. Non-infectious dermatoses like, pruritus, xerosis, skin

tags, acanthosis nigricans, diabetic dermopathy, diabetic thick skin, seborrheic keratosis, and diabetic foot were more commonly associated with type 2 than type 1 diabetes. Middle aged type 2 diabetes patients with long

history were more prone to develop various cutaneous manifestations.

Figure 1: Clinical images



Figure 2: Furunculosis Acanthosis nigricans with skin tags.



Figure 3: Acquired ichthyosis



Figure 4: Insulin injection induced lipoatrophy

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