Section: Dermatology

Research

A CLINICAL STUDY OF MUCOCUTANEOUS MANIFESTATIONS IN PATIENTS WITH DIABETES MELLITUS IN A TERTIARY CENTER

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Abstract

Background: The present study was undertaken to know the spectrum of cutaneous manifestations in diabetes mellitus. **Materials and Methods:** A total of 200 patients of diabetes mellitus with cutaneous manifestations were studied. The observations and results were tabulated and graphically represented; their significance was discussed after reviewing the available literature. **Result:** Majority belonged to the 5th decade (31%) and 4th decade (25%) respectively. Males constituted 60% of the cases and male to female ratio was1.5:1. Hypertension was the most commonly associated systemic illness (40%) followed by Ischemic heart disease (14%) and dyslipidemia (10%). Among the various cutaneous manifestations observed, cutaneous infections were the most frequently observed type of dermatoses, accounting for 65% of all cases, followed by dermatoses more frequently associated with diabetes (56%), non-specific manifestations (43%), and neuropathic and ischemic diabetic skin disease (12%), due to microangiopathy (6%), metabolic disorders (2%) and cutaneous reactions to diabetic therapy (1%). **Conclusion:** Early identification of lesions is crucial for diagnosis and proper therapy of diabetes mellitus. Thus, dermatologists play a significant role in preventing dermatologic morbidity and thereby enhancing the quality of life in patients with diabetes.

INTRODUCTION

Diabetes mellitus, a chronic metabolic disease defined by increased blood glucose levels over time leads to progressive damage in most tissues and organs including the heart, blood vessels, eyes, kidneys, skin, and nerves.[1,2,3] It affects 8.3% of the population and is the most prevalent endocrine illness in the world. Given the general population's current sedentary lifestyle, its prevalence is rising. Globally, there were 171 million people with DM Type II in 2000, and there will probably be 366 million by 2030. According to the International Diabetes Federation (IDF), India currently has 40.9 million people with diabetes, with that figure expected to rise to 69.9 million by the year 2025. There is a complete or nearly complete lack of insulin in type 1 diabetes mellitus.[4,5,6,7,8,9] Variable levels of insulin resistance, hampered insulin secretion, and elevated glucose production are the hallmarks of type 2 diabetes mellitus. During the course of their condition, at least 30% of people with diabetes experience some form of cutaneous involvement.[10,11,12,13,14] The acute metabolic disturbances and the long-term degenerative effects of diabetes both have an impact on the skin. Although the pathophysiology of many diabetes-related skin diseases is still unknown, others have been connected to atherosclerosis, microangiopathy, neuronal degeneration, aberrant glucose metabolism, other altered metabolic pathways, and weakened host defences.[15,16,17,18,19] People with Type 1 DM and Type 2 DM appear to have a similar prevalence of cutaneous disorders, but Type 2 DM patients experience more skin infections, while Type 1 DM patients experience more autoimmune-like cutaneous lesions.[20,21,22,23,24] To evaluate the connection between skin and diabetes, several investigations have been carried out. This study explores the emerging signs of the disease as medical understanding about it advances, in addition to the association between skin and diabetes.[25,26,27,28,29]

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MATERIALS AND METHODS

The study consisted of 200 cases of type 1 and type 2 diabetes mellitus with cutaneous manifestations attending Dermatology OPD and Diabetic OPD at a tertiary care centre for a period of 18 months.

Inclusion Criteria

- Patients willing to give informed valid consent.
- Known diabetic patients with cutaneous manifestations attending skin & VD outpatient department.
- New diagnosed case of diabetes mellitus by appropriate investigation in patients with suggestive cutaneous manifestations.

Exclusion Criteria

- Patients not willing to participate in the study.
- Gestational diabetes and drug induced diabetes will be excluded.

Outpatients in the dermatology, venereology, andleprology departments participated in a cross-sectional research study. Patients who had already been diagnosed with diabetes mellitus and who presented with skin symptoms were included in the study, as did patients whose skin complaints were suggestive of diabetes mellitus and who were found to have the condition when they were evaluated. Valid informed written consent in vernacular language was obtained, as well as a properly filled out "Participant Information Sheet" and "Participant Informed Consent Form." For the purpose of gathering the baseline data, a pre-structured proforma was utilised. It was observed that a complete history was obtained, including information about the dermographic data, cutaneous complaints, the duration of diabetes, the family history, as well as the type of treatment and the duration of treatment. In addition to a comprehensive physical and systemic examinationa detailed cutaneous examination was performed to assess the involvement, morphology, and type of cutaneous lesions. All of the patients underwent a complete blood count, random blood sugar, fasting blood sugar, post prandial blood sugar, HbA1c, liver function tests, renal function tests, urine examinations, and any other relevant investigations as needed and when they arose. Excel from Microsoft Office was used for both the collection and analysis of the data.

RESULTS

In the present study, peak prevalence was seen in the age group of 51-60 years that is 31%. The youngest patient was 10 years old and eldest was 87 years old [Table 1].

There was male preponderance in this study. Male to female ratio was 1.5:1 [Table 2].

In the present study, 41% of the patients had diabetes for duration of 1-5 years and 27% for 6-10 years [Table 3].

Majority of the patients in our study had Type II diabetes (96%), while Type I diabetes was seen in 4% of the patients [Table 4].

A positive family history of Diabetes was obtained in 28% patients, while 72% patients gave a negative family history [Table 5].

Majority of the patients had random blood sugar levels in the range of 140- 200mg/dl (45%) followed by 35% patients with levels >200mg/dl [Table 6].

Majority of the patients (60%) had a poor control of diabetes with HbA1c levels >8%, followed by 24% who had a moderate control of diabetes [Table 7].

Out of the 200 patients, 60% had associated systemic illnesses, while 40% did not have any other associated systemic illness [Table 8].

The most prevalent related systemic condition was hypertension, which was seen in 40% percent of patients, followed by ischemic heart disease (14%), and dyslipidemia (10% percent). There were some people who suffered from more than one related systemic ailment [Table 9].

As was demonstrated earlier, cutaneous infections were the most frequently observed type of dermatosis, accounting for 65% of all cases. This was followed by dermatoses more frequently associated with diabetes (56%), non-specific manifestations (43%), and neuropathic and ischemic diabetic skin disease (12%), due to microangiopathy (6%), metabolic disorders (2%) and cutaneous reactions to diabetic therapy (1%). Certain patients presented with multiple types of cutaneous manifestations [Table 10].

Amongst the 130 patients with cutaneous infections, majority had fungal infections (40%), followed by bacterial infections (20%) and viral infections (5%) [Table 11].

40 diabetic patients had bacterial infections, the most common of which was furunculosis, which affected 20 patients (10%), followed by folliculitis, which affected 6 patients (3%), cellulitis, which affected 4 patients (2%), abscess, which affected 2 patients (1%), carbuncle, which affected 2 patients (1%), and ecthyma gangrenosum, which affected 2 patients (1%). [Table 12].

Eighty of the patients who were studied had fungal infections, the most common of which was tinea corporis, which was observed in 36 patients (18%), followed by tinea cruris, which was observed in 30 patients (15%). Other fungal infections included candidial intertrigo, onychomycosis, Pityriasis versicolor, and two cases each (1%) of candidial balanoposthitis, candidial vulvovaginitis, and chronic Some individuals had more than one fungal infection at the time of their presentation [Table 13].

As shown in the above table, out of the 10 patients with viral infections, 4 (2%) patients had verruca vulgaris and 6 patients (3%) were diagnosed to have herpes zoster [Table 14].

Out of the 200 patients studied, 12 patients presented with dermatoses due to microangiopathy, of which 10 patients (5%) had diabetic dermopathy and 2 patients (1%) had diabetic bullae [Table 15].

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[Table 16] demonstrates that twenty-four individuals exhibited symptoms of neuropathic and ischemic diabetic skin illness. 8 patients, or 4%, were diagnosed with peripheral vascular disease, 8 patients, or 4%, were diagnosed with diabetic foot ulcers, and 8 patients, or 4%, were diagnosed with fissure feet [Table 16].

Out of the 200 diabetic patients, 4 patients (2%) presented with xanthelasma palpebrerum [Table 17].

The table above lists the dermatoses that are most frequently linked to diabetes out of the numerous dermatoses examined in 200 DM patients. The majority of patients (40 patients, 20%) had generalised pruritus, followed by 20 cases of acrochordons, 12 cases of psoriasis, 10 cases each of vitiligo and acanthosis nigricans, 4 cases of progressive pigmented purpura and perforating folliculitis, 6 cases of lichen planus, and 2 cases each of macular amyloidosis, cherry angiomas, and alopecia universalis.Some of the patients had more than one type of dermatoses. Numerous dermatoses that are frequently linked to DM were seen in some of the patients [Table 18].

Of the 160 patients on anti-diabetic treatment, only two patient presented with acute urticaria secondary to insulin therapy [Table 19].

Eczema was the most prevalent non-specific manifestation seen in 32 patients (16%), followed by seborrheic keratoses in 12 patients (6%), DPN in 10 patients (5%), pemphigus, contact dermatitis, drug reactions, and scabies in 4, and sebaceous cyst, polymorphous light eruption, keloid, parapsoriasis, seborrheic dermatitis, melasma, senile comedones and lichen simplex chronicus. More than one non specific cutaneous manifestations were seen in some patients. [Table 20].

Table 1: Age distribution

Age (years)	No. of cases	Percentage (%)
10-20	4	2
21-30	4	2
31-40	16	8
41-50	50	25
51-60	62	31
61-70	48	24
71-80	8	4
>80	8	4
Total	200	100

Table 2:Sex distribution

Sex	No. of cases	Percentage (%)
Male	120	60
Female	80	40
Total	200	100

Table 3: Duration of Diabetes Mellitus

Duration (years)	No. of cases	Percentage (%)
<1	30	15
1-5	82	41
6-10	54	27
>10	34	17
Total	200	100

Table 4: Type of Diabetes Mellitus

Type	No. of cases	Percentage (%)
Type I	8	4
Type II	192	96
Total	200	100

Table 5: Family history

Family history	No. of patients	Percentage (%)
With family history	56	28
Without family history	144	72
Total	200	100

Table 6: Random blood sugar levels

RBS(mg/dl)	No. of cases	Percentage (%)
70-140	40	20
140-200	90	45
>200	70	35
Total	200	100

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Table 7: HbA1c levels

HbA1c (%)	No. of cases	Percentage (%)
4.7-6.4	12	6
6.5-7	20	10
7.1-8	48	24
>8	120	60
Total	200	100

Table 8: Associated systemic illnesses

Associated systemic illness	No. of cases	Percentage (%)
Present	120	60
Absent	80	40
Total	200	100

Table 9: Systemic illnesses

Associated illnesses	No. of cases
Hypertension	80
Ischemic heart disease	28
Dyslipidemia	20
Chronic renal failure	10
Hypothyroidism	10
Bronchial asthma	4
Epilepsy	4
Chronic myeloproliferative disorder	2

Table 10: Pattern of cutaneous manifestations

Dermatoses	No. of cases	%
Cutaneous infections	130	65
Dermatoses associated with microangiopathy	12	6
Neuropathic and ischemic diabetic skin disease	24	12
Metabolic diseases	4	2
Disorders of collagen	0	0
Dermatoses more commonly associated with diabetes	112	56
Cutaneous reactions to therapy for diabetes	2	1
Non-specific manifestations	86	43

Table 11: Cutaneous infections

Cutaneous infections	No. of cases
Bacterial	40
Fungal	80
Viral	10
Total	130

Table 12: Bacterial infections

Bacterial infection	No. of cases
Furunculosis	20
Folliculitis	6
Cellulitis	6
Abscess	4
Carbuncle	2
Ecthyma gangrenosum	2

Table 13: Fungal infections

Fungal infection	No. of cases
Tinea cruris	30
Tinea corporis	36
Candidial intertrigo	8
Onychomycosis	6
Pityriasis versicolor	6
Candidial balanoposthitis	2
Candidial vulvovaginitis	2
Chronic paronychia	2

Table 14: Viral infections

Viral infection	No.of cases
Verruca vulgaris	4
Herpes zoster	6

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Table 15: Dermatoses associated with microangiopathy

Dermatoses	No.of cases
Diabetic dermopathy	10
Diabetic bullae	2
Total	12

Table 16: Neuropathic and ischemic diabetic skin disease

DERMATOSES	No. of cases
Peripheral vascular disease	8
Diabetic foot ulcers	8
Fissure feet	8
Total	24

Table 17: Metabolic conditions

DERMATOSES	No. of cases
Xanthelasma palpebrerum	4
Total	4

Table 18: Dermatoses commonly associated with DM

Dermatoses	No. of cases
Generalized pruritus	40
Acrochordons	20
Psoriasis	12
Vitiligo	10
Acanthosis nigricans	10
Progressive pigmented purpura	4
Perforating foliculitis	4
Lichen planus	6
Cherry angiomas	2
Macular amyloidosis	2
Alopecia universalis	2

Table 19: Cutaneous reactions to therapy for diabetes

Mode of treatment	No. of cases
Insulin	2
Oral hypoglycemic agents	0
Total	2

Table 20: Non-specific manifestations

Dermatoses	No. of cases
Eczema	32
Seborrheic keratoses	12
Dermatosis papulosa nigra	10
Pemphigus	4
Contact dermatitis	4
Drug reactions	4
Scabies	4
Sebaceous cyst	2
Polymorphous light eruption	2
Keloid	2
Parapsoriasis	2
Seborrheic dermatitis	2
Melasma	2
Senile comedones	2
Lichen simplex chronicus	2

DISCUSSION

Age Distribution: The majority of the 200 patients with DM who had cutaneous signs in the current study, 31% and 25%, respectively, were in their fifth and fourth decades. In the first, second, third, sixth, seventh, and eighth decades, the frequencies of patients with cutaneous symptoms are 2%, 2%, 8%, 24%, 4%, and 4%, respectively.[30,31,32,33]

Distribution by Gender: In the current study, men with diabetes were more likely than women to experience cutaneous symptoms (60% vs. 40%). The same findings from a study by Goyal et al. found that males outnumbered girls 54% to 46%.

Diabetes Duration: In the current study, 41% of the patients had the disease for one to five years, 27% for six to ten years, 17% for more than ten years, and 15% for less than a year.

Diabetes Mellitus Subtype: Type 2 diabetes mellitus, as opposed to type 1 diabetes mellitus, was more frequently seen (96%) than type 1 diabetes mellitus (4%). Type 1 diabetes mellitus was found in 20 (5.3%) of the study group's participants, while type 2 diabetes mellitus was found in 357 (94.7%),

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according to Bhardwaj N et al. According to a study by Chatterjee et al., there were 32 Type 1 and 648 Type 2 diabetes among the 680 patients.

Family History: 56 patients (28%) reported having a positive family history of diabetes mellitus, while 144 patients (72%), reported having a negative family history. 99 (24.75%) diabetic patients were found in Girisha and Viswanathan's study to have a positive family history of the disease.

Random blood sugar readings: The majority of the patients (45%) had random blood sugar readings between 140 and 200 mg/dl, whereas 70 patients (35%) had readings above 200 mg/dl.

HbA1c values: Of the 200 diabetic patients who had cutaneous symptoms, 48 patients (24%) had a moderate level of DM control, with HbA1c values between 7.1% and 8%, while 120 patients (60%) had a poor level of DM control, with HbA1c values >8%.

Association with Systemic illnesses: Of the 200 patients, 120 (60%) had other conditions that were also present, such as hypertension in 80 patients (40%) and ischemic heart disease in 28 patients (14%) and dyslipidemia in 20 patients (10%). Bhat et al. (46.46%) observed similar frequencies, with hypertension being the most prevalent related systemic illness.[34,35,36]

Pattern of cutaneous manifestations: In the current study, infections were the most prevalent dermatoses among the different dermatological manifestations (65%), followed by dermatoses more frequently associated with diabetes (56%), non-specific cutaneous manifestations (43%), and neuropathic and ischemic diabetic skin disease (12%), due to microangiopathy (6%), metabolic diseases (2%) and cutaneous reactions to therapy for diabetes (1%).

Cutaneous infections: Fungal infections, which were the most prevalent dermatoses (65%), were followed by bacterial infections, which were 20% more common, and viral infections, which were 5% more common.

Infections caused by bacteria: According to [Table 12], of the 40 patients evaluated who had bacterial infections, 20 (10%) had furunculosis, whereas 6 (3%) had folliculitis and cellulitis.

4 individuals (2%) got an abscess each. Carbuncles and ecthyma gangrenosum each accounted for two cases (1% each).

Fungal infections: As shown in [Table 13], the majority of the 80 patients with fungal infections (36 individuals had tinea corporis and 30 had tinea cruris) had dermatophytoses.

The other candidial infections seen included candidal vulvovaginitis in two individuals, candidal balanoposthitis in two patients, and candidal intertrigo in eight patients. After doing the necessary diagnostics, the patient with candidial balanoposthitis was later found to have diabetes. There were 2 people with chronic paronychia and 6 people with onychomycosis. Numerous patients showed signs of multiple fungus infections.

Viral infections: Ten of the 200 patients in the study developed viral infections, as shown in [Table 14], of which 6 (3%) had herpes zoster and 4 (2%) had verruca vulgaris. In the study by Girisha and Viswanathan, 11 patients (2.75%) had viral infections, with herpes zoster occurring in 1 patient (0.25%) and herpes progenitalis in 1 patient (0.25%). While one patient had varicella and 8 (2% of the patients) had verruca vulgaris.

Microangiopathy-related dermatoses: In the current study, 12 patients (8%) had microangiopathy-related dermatoses, of which 10 patients (5%) had diabetic dermopathy and 2 patients (1%) had diabetes bullae. In comparison to 17.8% in Indian patients, the majority of western research found a high frequency of diabetic dermopathy (50%). A study by Bhardwaj N. et al. found that 36 (9.5%) patients had diabetic dermopathy, while a study by Sanad et al. found that 7% of patients had the condition.[37,38]

As shown in Table 16, of the 24 patients with neuropathic and ischemic diabetic skin disease, 8 patients also had peripheral vascular disease, 8 patients also had diabetic foot ulcers, and 8 patients also had fissure feet.

According to estimates, 15% of people with DM will experience lower extremity ulcers.

Diabetic skin and metabolic disorders: In the current investigation, 4 patients were noted to have metabolic conditions. Xanthelasma palpebrerum was seen in all cases (2%). One case of eruptive xanthoma in type 1 DM and four cases (6.6%) of xanthelasma palpebrarum in type 2 DM were found in the study by Baidya A. et al.

Collagen disorders: No diabetic patients were found in our investigation who had collagen disorders.

Dermatoses more commonly associated with diabetes: According to Table 18, among the various dermatoses studied generalised pruritus was the most the most common seen in 40 patients (20%), followed by acrochordons in 20 patients (10%), psoriasis in 12 patients (6%), and vitiligo and acanthosis nigricans in 10 patients (5% each). Each of four patients (2%) had progressive pigmented purpura and perforating folliculitis. Six patients (3%) exhibited lichen planus. Macular amyloidosis, cherry angioma, and alopecia were all documented in 2 cases (1%) each. 16 (4.2%) patients had acanthosis nigricans, according to a research by Bhardwaj N. et al. While the Goyal et al. investigation revealed that 8% of diabetes patients had acanthosis nigricans.[39]

Cutaneous reactions to diabetes treatment: In the current study, we saw two patients (or 1% of the 160 patients receiving treatment) who developed acute urticaria as a result of receiving insulin. Insulin responses are less common when recombinant, highly pure insulin is used. The use of human insulin in the current investigation may have resulted in a lower prevalence of insulin responses.

Non-specific manifestations: According to Table 20, out of the 86 patients who had non-specific manifestations, 32 had eczema (16%), 12 had seborrheic keratosis (6%) and 10 had dermatosis

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papulosa nigra (5%) in addition to 4 each having pemphigus, contact dermatitis, drug reactions, and scabies (2%) each. Sebaceous cysts, polymorphous light eruptions, keloid, parapsoriasis, seborrheic dermatitis, melasma, senile comedones, and lichen simplex chronicus were other non-specific symptoms that were seen in 2 individuals each (1%).

CONCLUSION

The present study was undertaken to know the spectrum of cutaneous manifestations in diabetes mellitus. Diabetes type 2 patients are more likely to have this condition, and the longer a patient has had diabetes, the greater the likelihood that their skin may be affected. Infections were the most common cutaneous symptoms seen in diabetics, followed by dermatoses, which are the most common skin conditions linked to diabetes. In spite of the fact that cutaneous disorders almost always appear after diabetes has been identified as the cause of a patient's health problems, these symptoms can sometimes be the first to manifest themselves and can aid in the early detection of the disease. This contributes further to the prevention of systemic derangements by allowing for the early implementation of suitable treatment. It is possible for diabetic patients to lower their chance of developing some skin lesions by taking good care of their skin and maintaining tight control over their blood glucose levels over time. Therefore, dermatologists have the potential to play a significant role in the prevention of dermatologic morbidity, the enhancement of diabetic patients' quality of life, and the administration of treatment strategies.

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