



Association of Dermatoses with Diabetes- A Case Control Study

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Abstract

Diabetes Mellitus (DM) is a metabolic disorder and fifth leading cause of mortality in the world. Diabetes mellitus affects many organ systems of the body including skin. Changes found in skin are largely parallel to those occurring in the internal organs.

Aim: The aim of our study was to determine the spectrum of dermatoses in diabetes mellitus.

Material and Methods: It is a case control study, conducted in the Outpatient Department of Dermatology and STD Department, of a tertiary care institute, for a period of six months. One hundred and thirty six diabetic patients and one hundred and thirty six healthy age and sex matched individuals were taken as controls.

Results: The male to female ratio was 1: 1.83. Type 2 DM was seen in 89.7% and type 1 DM in 10.3% of the patients. The mean age of the patients was 47.38 ± 10.23 . The maximum numbers of patients were in the age group of 51 to 60 years (32.36%). Among the cases Dermatoses were seen in 88.3% of the diabetics and cutaneous infections were the most common dermatoses followed by diabetic dermopathy and pruritus in diabetics.

Conclusion: Increased incidence of cutaneous infections mainly fungal and bacterial was noticed in majority of the uncontrolled diabetics.

Introduction

Diabetes mellitus is a chronic disease caused by inherited and/or acquired deficiency in production of insulin by the pancreas, or by ineffectiveness of the insulin produced.[1] The skin is one of the major organ systems involved in diabetes. Almost all diabetic patients eventually develop skin complications from the long-term effects of diabetes mellitus on the microcirculation and on skin collagen.[2] Skin being visible and accessible organ, internal changes can be picked early in the disease process. Changes found in skin are largely parallel to those occurring in the internal organs. Cutaneous signs of diabetes are manifestations of multiple factors like abnormal carbohydrate metabolism and other altered metabolic pathways, atherosclerosis, microangiopathy, neuronal

degeneration & impaired host immune mechanisms all play a role in pathogenesis.[3] Thus cutaneous findings may reflect the degree of long term control and may at some point be used as an indicator of metabolic control.[4] Also, in an otherwise apparently healthy individual, some of the muco-cutaneous manifestations may signal a need for an evaluation to determine the presence of diabetes. With increase in global burden of diabetes, morbidity due to cutaneous involvement is on the rise. Hence this clinical study is undertaken to determine the prevalence of muco-cutaneous manifestations among diabetic patients

Materials and methods

This case control study was conducted in the Outpatient Department of Dermatology and STD Department, of a tertiary care institute, conducted for a period of six months. One hundred and thirty six diabetic patients were included in the study group after obtaining their informed consent. Newly diagnosed cases as per American Diabetes Association criteria were also included. Immunodeficiency and gestational diabetes were excluded from the study. 136 non diabetic people without the family history of diabetes were matched for age and sex and were chosen as control after obtaining their informed consent. A detailed history was taken and complete cutaneous and systemic examination was done for both cases and control. Relevant investigations including KOH, skin biopsy were done for the confirmation of diagnosis in doubtful situation. The results were tabulated and analyzed using chi square test and Fischer's exact test.

Results

Among the 136 diabetic cases, 48 (35.3%) were female and 88(64.7%) were male. Male to female ratio was 1.83: 1. The age of the patients ranged from 12-82 years, with a mean age of 47.38 ± 10.23 . The maximum numbers of patients were in the age group of 51 to 60 years (32.36%). Type 2 DM was seen in 130 (95.6%) patients and 6 (4.4%) patients had type 1 DM.

Almost 105(77.2%) of the Diabetic patients in this study had muco-cutaneous manifestations [Illustration 1] whereas only 39(28.7%) among control had dermatoses [Illustration 2]. The increased incidence of dermatoses in diabetic cases was found to be extremely statistically significant compared to the control group ($P=0.0001$). In many instances multiple dermatological manifestation were encountered in the same patient with an average of 1.36 manifestations per patient. The numbers of patients showing 3 or more manifestations were 8 patients (7.6%), 2 manifestations were seen in 21 patients (20%) and only 1 manifestation was seen in 76 patients (72.4%). The most frequently observed dermatoses were cutaneous infections in both the cases (69, 50.7%) and controls (23, 16.9%).

The incidence of cutaneous infections in diabetic cases was found to be significantly higher as compared to the non-diabetic controls ($P<0.05$). Infections were more in patients with uncontrolled diabetic. Fungal infections (46, 33.8%) were the commonest infection observed among the study participants. Dermatophytoses(22, 16.7%) like tinea cruris, tinea corporis, tinea pedis in the order of frequency was the commonest fungal infection. Candidiasis was second most common fungal infections. Bacterial infections (19, 4%) were the second commonest infections in this study followed by herpes zoster (2, 1.5%).

Dermatoses secondary to cutaneous microangiopathy were significant among diabetic, with Diabetic Dermopathy being commonest and considered as one of the markers of diabetes and seen in 16(11.8%) patients among diabetics which is statistically significant compared to the control group. 14 patients presented with diabetic dermopathy on the shins of both legs and 2 patients presented around the knees, bilaterally.

The other cutaneous markers such as pruritus, acanthosis nigricans, and acrochordons were significantly associated with cases than control ($P<0.05$). Insulin lipodystrophy were seen in 4(2.9%) and one patient had fixed drug eruptions secondary to sulfonyleurea. Dermatoses in control group are shown in Illustration 2.

Discussions and conclusion

Diabetes is the most common endocrine disorder [5] which involves all the organ systems mainly blood vessels, eyes, kidneys, nervous system and the skin.[6] Though some cutaneous findings are secondary to the treatment, skin manifestations may

be the first indicator of underlying diabetic diathesis and some indicate a serious, even life threatening problem. Most documented studies have shown the incidence of cutaneous disorders associated with diabetes to be between 30 - 71%.[7,8,9] In this present study 77.2% of diabetic patients had one or more cutaneous manifestations as compared to only 28.7% of non-diabetic controls. The higher incidence of dermatoses in present study is due to presence of more patients with uncontrolled diabetic and longer duration of illness. Mahajan et al[10] reported cutaneous infections in 54.6% of diabetics in their study group. In the present study also, infections formed the largest group affecting 50.7% of cases. Cutaneous fungal infections were the most common and were seen in 33.8% (46) of the cases, followed by bacterial 14% (19) and viral 2.2% (3) cases which are similar to studies by Mahajan et al[10] and Timshina et al.[11]

The cutaneous signs primarily due to microangiopathy was seen in 20(14.7%) and diabetic dermopathy, the cutaneous marker was noticed in a significant (16, 11.8%) proportion of patients which is comparable to other studies.[10,12,13,14,15] On the other hand, rubeosis is more prominent in fair-skinned people and usually involves the face, neck, hands, and feet. Rubeosis has been reported in 3 - 59% of the diabetics.[5] In our study none had rubeosis and the lesser incidence of both these conditions in an Indian study can be attributed to dark-skinned individuals in the Indian subcontinent. Only 3 patients were noted to have diabetic bullae in the present work and all of them had it on the legs.

Generalized pruritus was seen in 13(9.6%) cases without any infective or metabolic etiology demonstrated. It was the commonest symptom seen in the present study. Pruritus was reported in 10% of the diabetics by Mahajan et al., [10] and in 4.5% by Nigam and Pande.[15] Granuloma annulare was seen in (2.9%) patients and 1(0.7%) in control. All the cases were of localized type. No cases of generalized granuloma annulare were seen during the study period. Mahajan et al[10] reported 1 case of Granuloma annulare of eruptive type (1%) but many Indian studies failed to demonstrate causal association between granuloma annulare and diabetes.[3,12,15]

In the present study vitiligo was seen in 4(2.9%) diabetes mellitus comparable to the study by sezai et al.[16] Acrochordons was reported among 0.8 - 11.3% patients in various studies[3,12] which is similar to our studies. Similarly acanthosis nigricans in seen 5.9% of the cases which is comparable to prior Indian reports.[3,12] Both acrochordons and acanthosis nigricans were significantly associated with cases than

control. Other dermatoses like Scleredema adutorum of Buschke, Eruptive Xanthoma, acquired perforating cutaneous disease, digital gangrene, Neuropathic ulcers and Necrobiosis lipidica diabetorum were observed in limited number of cases, the association between these diseases and diabetes could not be ascertained in this study.

1 - 5% of the patients taking sulfonylureas developed cutaneous reactions in various studies[3,5,12] but we observed less number of cutaneous adverse reactions in our study. Also insulin lipodystrophy was seen in few cases as there was less number of Type-1 diabetes enrolled in present study.

In conclusion, statistically significant increased frequency of diabetic dermopathy, acrochordons, pruritus, acanthosis nigricans were seen in diabetic than in non-diabetic in our study, which may be considered as the cutaneous markers of diabetes. Also increased incidence of cutaneous infections mainly fungal and bacterial was noticed in majority of the uncontrolled diabetics emphasizing the need for more aggressive management of diabetes mellitus.

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Illustrations

Illustration 1

Table 1

Dermatoses in Diabetic cases

Dermatoses	No. of patients	Percentage
INFECTIONS		
Bacterial	19	14
Viral	3	2.2
Fungal	46	33.8
Parasitic	1	0.7
SKIN CHANGES RELATED TO MICROANGIOPATHY		
Necrobiosis lipoidica diabetorum	1	0.7
Diabetic dermangiopathy,	16	11.8
Bullous eruption of diabetes,	3	2.2
SKIN CHANGES DUE TO NEUROPATHY		
Neuropathic ulcers (malperforans)	1	0.7
MACROVASCULAR INSUFFICIENCY		
Ischemic skin ulcers & digital gangrene	2	1.5
Erysipelas like erythema	1	0.7

OTHER SKIN DISEASES		
Granuloma annulare	4	2.9
Scleredema adultorum of Buschke	1	0.7
Eruptive Xanthoma	1	0.7
Perforating cutaneous disease of diabetes, Kyrles disease	1	0.7
Pruritus	13	9.56
Vitiligo	4	2.9
Acanthosis nigricans	8	5.9
Acrochodon	8	5.9
Xerosis	2	1.5
Seborrheic keratosis	2	1.5
DRUG REACTIONS	1	0.7
SKIN CHANGES DUE TO LIPODYSTROPHY		
Insulin injection sites lipodystrophy	4	2.9

Illustration 2

Table 2

Dermatoses in control group

Dermatoses	No. of patients	Percentage
Bacterial infections	5	3.7
Viral infections	2	1.5
Fungal infections	14	10.3
Parasitic infections	2	1.5
Granuloma annulare	1	0.7
Pruritus	9	6.6
Vitiligo	3	2.2
Acanthosis nigricans	1	0.7
Acrochodon	1	0.7
Xerosis	1	0.7

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