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Original Article

Cutaneous manifestations in diabetes mellitus – A North Indian study

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ABSTRACT

Background: Diabetes mellitus (DM) is a common endocrine disorder which affects every organ system and the skin is no exception. Almost all patients of diabetes develop these cutaneous manifestations at some point of time. Objectives: Our purpose was to study the pattern of cutaneous manifestations in diabetes mellitus and their prevalence in controlled and uncontrolled diabetes. Materials and methods: Two hundred patients of diabetes mellitus that consecutively attended the outpatient department of dermatology or were admitted in the wards for any reason, having diabetes with skin complaints were included in the study. Results: The most frequent skin condition observed was infections, among which the most common were fungal infections (33.5%) followed by bacterial infections (12.5%). Among the non infectious skin lesions, acrochordons (8.5%) and acanthosis nigricans (8%) were the most frequently seen. Most of the diseases were more frequently seen in uncontrolled than in controlled diabetes. In 11% of patients, skin lesions preceded the diagnosis of diabetes. Most of the patients came with a single cutaneous manifestation (89%), but 11% of patients came with multiple skin conditions. Conclusion: Skin involvement is an important part of clinical manifestations of diabetes mellitus and may be the first sign of undiagnosed diabetes or uncontrolled metabolic state. Recognition of these specific and non specific cutaneous markers enables earlier diagnosis and treatment, which may ultimately improve the overall prognosis.

1. Introduction

Diabetes mellitus (DM) is the most common of all the endocrine diseases. It affects approximately 40.9 million people in India and around 350 million across the world.] Various studies have shown that about 30% of diabetic patients exhibit skin lesions.] In fact, in many patients, cutaneous manifestations precede the diagnosis of diabetes. In such cases these skin manifestations can be the first indicator of the disease and may lead to early diagnosis and treatment of diabetes mellitus.]

The skin diseases in diabetes mellitus may be specific like acanthosis nigricans, diabetic bullae, diabetic dermopathy and others or they may be nonspecific like acrochordons, generalized pruritus and infections.] The types of skin lesions associated with diabetes are well known but their frequency in the diabetic population and their association with the control of plasma glucose levels have not been studied as much. Thus we conducted a study to observe the pattern of cutaneous manifestations in diabetes mellitus and to compare their prevalence in controlled and uncontrolled diabetic patients.

Materials and methods:

The present study was performed at a tertiary care hospital during the period of December 2010 to April 2012. The study group comprised of two hundred patients of diabetes mellitus that consecutively attended the outpatient department of dermatology or were admitted in the wards for any reason, having diabetes with skin complaints. Institutional ethical committee clearance was obtained before the commencement of the study and informed consent was taken from all the patients. Information was recorded on a well structured proforma. Patients who were either known diabetics or cases suggestive of raised plasma glucose levels were investigated and if turned out to be diabetic (fasting blood sugar >126 mg/dl and post prandial blood sugar >200 mg/dl) were included in the study. A detailed history including skin complaints, past history, treatment history and family history of diabetes was taken from all the patients. Medical records were reviewed for information of duration, medications, and complications of diabetes. A detailed cutaneous and systemic examination was done. Cases were subjected to baseline investigations like complete blood count, urine examination and dilated fundus examination. Relevant investigations including glycosylated haemoglobin, renal function tests and serum lipid profile were carried out whenever necessary. Relevant microbiological investigations particularly KOH preparation was done where clinical diagnosis of cutaneous fungal/candidal infection was suspected. The data was collected into the computer and analyzed using the SPSS software.

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Results:

Among the 200 patients of diabetes mellitus of the study group, epidemiological data revealed that skin lesions were more common among males (56.5%) than in females (43.5%) as shown in Table 1. The mean age of the patients was 51.5 (+ 11.2) years. Majority of the patients were above 40 years of age (81.5%) with maximum patients seen in the age group of 40 to 60 years (63%). The mean duration of diabetes in these patients was 4.4 (+ 5.0) years. A total of 83.5% patients had diabetes for less than 10 years duration. Uncontrolled diabetes was seen in 67% of the patients.

Out of 200 patients, a total of 178 patients (89%) came with a single cutaneous finding while multiple cutaneous findings were seen in 22 (11%) patients. The most frequent skin conditions observed were infections (Table 2), among which the most common were dermatophytic and candidial infections (33.5%) followed by bacterial infections (12.5%). The viral infections which were less commonly observed mainly included herpes zoster (2.5%) and warts (1%). Among the non infectious skin lesions, skin tags (8.5%) and acanthosis nigricans (8%) were most frequently seen. This was followed by generalized pruritus (6.5%), urticaria (6%), xanthelasma (5.5%), lichen simplex chronicus (5.5%), lichen planus (5%), psoriasis (4%), foot ulcer (3.5%), while other skin lesions were rare.

Skin lesions led to the diagnosis of diabetes mellitus for the first time in 11% of the patients (Table 3). Among these recurrent and resistant fungal infections were the most common (6.5%).

The frequency of skin infections as well as most of the non infectious dermatoses was significantly higher among the poorly controlled patients than in those with good glycemic control (Table 4). The exceptions included xanthelasma which was seen in 13.6% of well controlled patients and only in 1.4% of poorly controlled patients. Similarly, lichen planus and herpes zoster were present in a higher frequency among the well controlled diabetics (6.1%) than the poorly controlled ones (0.7%).

Table 1: Demographic profile of patients

Characteristics	No.	Percentage
Total	200	100
Males	113	56.5
Females	87	43.5
Uncontrolled diabetes	134	67
Controlled diabetes	66	33
Age (yrs) (mean ± SD)	51.5 ± 11.2	
Duration of diabetes (yrs) (mean ± SD)	4.4 ± 5.0	

Table 2: Cutaneous manifestations of diabetes mellitus in 200 consecutive patients

Skin lesions	No.	Percentage (%)
Fungal infections	67	33.5
Bacterial infections	25	12.5
Skin tags	17	8.5
Acanthosis nigricans	16	8
Generalized pruritus	13	6.5
Urticaria	12	6
Xanthelasma	11	5.5
Lichen simplex chronicus	11	5.5
Lichen planus	10	5
Psoriasis	8	4
Foot ulcer	7	3.5
Herpes zoster	5	2.5
Genital pruritus	4	2
Vitiligo	3	1.5
Warts	2	1
Schamberg's disease	2	1
Gouty tophi	1	0.5
Pompholyx	1	0.5
Actinic keratoses	1	0.5
Purpura	1	0.5
Bulla on feet	1	0.5
Albinism	1	0.5
Varicose veins	1	0.5
Discoid lupus erythematosus	1	0.5
Post herpetic neuralgia	1	0.5

Table 3: Dermatoses present before the diagnosis of Diabetes Mellitus

Diagnosis	Dermatoses	Percentage (%)
Fungal infections	13	6.5
Bacterial infections	3	1.5
Urticaria	2	1
Lichen planus	2	1
Pruritus	2	1
Lichensimplex chronicus	1	0.5
Vitiligo	1	0.5
Foot ulcer	1	0.5
Total	22	11

Table 4: Cutaneous manifestations in controlled and uncontrolled diabetes

Skin condition	Uncontrolled diabetes (n=134)	Controlled diabetes (n=66)
Fungal infections	48 (35.8%)	19 (28.7%)
Bacterial infections	18 (13.2%)	7 (10.6%)
Skin tags	13 (9.5%)	4 (6.06%)
Acanthosis nigricans	10 (7.3%)	6 (9.1%)
Pruritus	12 (8.8%)	5 (7.5%)
Urticaria	7 (5.1%)	5 (7.5%)
Xanthelasma	2 (1.4%)	9 (13.6%)
Lichen simplex chronicus	7 (5.2%)	4 (6.1%)
Lichen planus	4 (2.9%)	6 (9.1%)
Foot ulcer	3 (2.2%)	4 (6.1%)
Herpes zoster	1 (0.7%)	4 (6.1%)

Discussion:

Diabetes mellitus is a metabolic disease which occurs due to abnormalities in carbohydrate, protein and fat metabolism resulting from defects in secretion of insulin and/or its action on the peripheral tissues. Cutaneous lesions in diabetic patients occur due to multiple factors which include abnormal metabolism, atherosclerosis, microangiopathy, neuronal degeneration and impaired host mechanisms.] The occurrence of diabetes mellitus is profoundly affected by age. In our study, most of the patients with skin lesions and diabetes mellitus presented in the age group of 41-60 years. This is in correlation with the studies conducted by Al-Mutairi et al, where most common age group was between 40 to 60 years and Mahajan et al where the most common age group was between 41 to 50 years. In our study a male predominance was seen which was also seen in a study by Vahora et al.

Out of 200 patients in our study, cutaneous manifestations led to the diagnosis of diabetes in 11% of the patients. Most of these manifestations were cutaneous infections. This was also seen in a study by Vahora et al in which cutaneous manifestations led to the diagnosis of diabetes in 21.67% of patients, out of which infections comprised 24.61%.

In our study, cutaneous infections were the most common dermatoses seen, present in 49.5% of the patients. Similar observations were made in studies by Goyal et al who noted cutaneous infections in diabetic patients in 31% cases. In our study, fungal infections were the most common among infections, seen in 33.5% cases, followed by bacterial infections in 12.5% and viral infections in 3.5% cases. Similarly, in a study by Timshina et al, majority of skin lesions observed were infections, with fungal infections being the most common (30.4%), followed by bacterial (16.5%) and viral (0.4%).

In our study, infections and most of the non-infectious dermatoses were seen in higher frequency among poorly controlled diabetes patients than in well controlled patients. This was also observed in a study by Romano et al. In diabetes, several aspects of immunity are altered. These comprise of polymorphonuclear leukocyte function, leukocyte adherence, chemotaxis and phagocytosis especially in conditions of hyperglycemia and ketosis. Such poor control of diabetes itself may be a cause or consequence of concurrent infections.

Among the non-infectious dermatoses, acrochordons and acanthosis nigricans were the most common manifestations in 8.5% and 8% respectively. Mahajan et al reported acrochordons in 11.6% and acanthosis nigricans in 3%. Both acrochordons and acanthosis nigricans are manifestations of insulin resistance and thus, in our study, was seen more frequently in uncontrolled diabetes (6.5% and 5%) than in controlled diabetes (2% and 3%).

Pruritus was observed in 8.5% of patients in our study. Among the 17 patients of pruritus, 13 cases were of generalized pruritus and four cases of genital pruritus. Among the four cases of genital pruritus, three cases were female with pruritus vulvae and one was male who presented with scrotal itching. Pruritus was observed in 10% cases by Mahajan et al, 15.2% by Timisha et al and 4.5% by Nigam et al. In the present study, xanthelasma palpebrum was found in 5.5% cases whereas Goyal et al reported a higher incidence of 10% in their study.

Lichen planus and vitiligo have been seen in association with abnormal glucose tolerance or frank diabetes mellitus in many other studies. In the present study, they were observed in 5% and 1.5% cases respectively.

Psoriasis has been reported to occur in increased frequency in diabetics in the past. Greenwood et al noted psoriasis in 2.4 % of diabetics and Aschner et al in 5.7%. In our study, psoriasis was observed in 4% of the patients.

Diabetic foot ulcer was seen in 3.5% cases in the present study and in 1.33% by Vahora et al. The Diabetic bulla was seen in our study in 0.5% cases similar to Raghunatha et al who observed diabetic bullae in 2.5% cases and Mahajan et al who saw it in 2% cases. Dermatoses like diabetic dermopathy, necrobiosis lipoidica and granuloma annulare with a strong association of diabetes mellitus were not seen in our study but have been found in many other studies.

Cutaneous manifestations due to treatment reactions were also not demonstrated in the present study while have been noted in different other studies.

In conclusion, our study shows that cutaneous manifestations of diabetes mellitus serve as external markers for impaired glycemic control. Thus, it is imperative to inquire about diabetes and to perform diagnostic testing in patients presenting with cutaneous manifestations. Health promotion and education and management strategies are probably needed to improve prognosis and quality of life of these patients.

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