

Original Article

An observational study of cutaneous manifestations in diabetes mellitus in a tertiary care Hospital of Eastern India

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ABSTRACT

Background: Diabetes mellitus and its impact on the human body have been extensively dissected over the years. However, skin which is the largest organ in the body, has received minimum attention. Therefore, this study was designed to analyze the prevalence and pattern of skin disorders among diabetic patients from Eastern region of India. **Materials and Methods:** This is an observational study, conducted in the General Medicine and Endocrinology departments of a Medical College and Hospital in Eastern India. The data were collected prospectively and systematically in a pre-established proforma designed by us, where clinical findings along with investigations were recorded. **Results:** Six hundred and eighty (680) diabetic patients were examined, there were (64.8%) male and (35.1%) were female, of them 95.3% were Type 2 diabetics while 4.7% were Type 1. Five hundred and three patients (503) out of six hundred and eighty. i.e. 73.9% were found to have skin lesions. Thirteen (13) (41%) Type1 diabetics demonstrated skin lesions commonest being diabetic xerosis, infections and diabetic hand. Among Type2 diabetics 490(75.61%) showed skin lesions. Here infections, xerosis, hair loss beneath the knees, diabetic dermopathy were the most frequent. Majority of patients (67%) had combination of more than one type of skin lesion. There was statistically significant correlation of skin lesions with duration of diabetes, however similar correlation could not be demonstrated regarding metabolic control. **Conclusion:** Involvement of skin is inevitable and multifarious in diabetes mellitus. Higher prevalence is seen in Type 2 diabetic population. The duration of diabetes is positively correlated with lesions and infective dermatologic manifestations were associated with higher HbA1C values.

Key words: Diabetes mellitus, Eastern India, skin lesions

INTRODUCTION

Diabetes mellitus (DM) is the most common endocrine disorder characterized by hyperglycemia.^[1] Global estimate of type 2 diabetics in the year 2030 is likely to be 552 million. The International Diabetes Federation (IDF) documents the total number of diabetic subjects to be

around 61.3 million in India and this is further set to raise to 101.2 million by the year 2030.^[2] While all other complications of diabetes have been extensively studied, the aspect of dermatological complications is relatively unexplored. There no epidemiologic data related to skin disorders in diabetics reported from Eastern India. This study was designed to analyze the prevalence and pattern of skin disorders among diabetic patients from this region.

Aims

- To evaluate the prevalence of skin manifestations in patients with diabetes mellitus
- To analyze pattern of skin disorders among diabetic patients from this region of Eastern India.

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MATERIALS AND METHODS

This observational study was conducted with patients in the Departments of General Medicine and Endocrinology of a Medical College and Hospital in Eastern India from December 2010 to December 2012. All patients satisfying the diagnostic criteria for diabetes as laid down by the International Expert Committee on Diabetes^[3] were taken as cases both from outdoor (first OPD visit) and indoor settings. The data were collected prospectively and systematically in a pre-established proforma (designed by the authors) after an informed written consent was obtained from all subjects. History, including age, sex, type of diabetes, duration, complications and treatment modalities were noted. The patients were divided into groups according to type of diabetes mellitus, its duration and degree of metabolic control. All the patients underwent a thorough clinical examination including ophthalmoscopy and detailed dermatological evaluation by a dermatologist. Blood and urine biochemistry, and basic radiology were performed (chest X ray, USG abdomen). Type of DM was elucidated by clinical profile and fasting C peptide level, though this approach is fallacious in certain cases but antibody testing was not feasible in our hospital set up due to infrastructural handicaps. Electromyography and nerve conduction studies as well as spot urine albumin creatinine ratio were performed as part of diabetic work up where deemed necessary on clinical suspicion. Essential microbiological and histopathological investigations of cutaneous lesions were carried out to assess dermatological involvement. Descriptive statistical analysis was done using the SPSS software version 15, The Pearson's Correlation test was used to assess the relationship of duration of DM with duration. $P < 0.05$ was considered significant.

RESULTS

Six hundred and eighty (680) patients were found to be diabetic. The age varied from 14 to 80 years, mean age being 46.3 ± 6.7 years. Four forty one (64.8%) were male and 239 (35.1%) were female. 503 (73.9%) patients out of 680 manifested cutaneous lesions. Of these 330 (65.6%) were male and 173 (34.3%) were female (M: F = 1.9:1) [Table 1]. There were six forty eight (648) Type 2 diabetics and thirty two (32) Type 1. The duration of diabetes was 1-10 years in 290 patients. Two hundred and one (201) had >10 years of diabetes. 12 patients were newly diagnosed as diabetics. HbA1C was >7 in 504 patients of whom 343 had skin lesions. However of the 176 patients who had good diabetic control 160 had skin lesions. Various types of skin manifestations observed are shown in Table including certain characteristic ones like acquired ichthyosis and

necrobiosis lipoidica diabetorum [Figures 1 and 2]. The commonest lesion detected overall, were infections (206 i.e., 40.9%). However, the pattern of lesions was different in Type 1 and Type 2 diabetics. Thirteen patients out of the thirty two (41%) Type 1 diabetics demonstrated skin lesions, the commonest being diabetic xerosis, infections and diabetic hand. In Type 2 diabetics 490 (75.61%) showed skin lesions. Here infections, xerosis, hair loss beneath the knees and diabetic dermopathy were the most frequent. Majority of patients (67%) had combination of more than one type of skin lesions. Relationship between skin lesions and duration of diabetes mellitus was searched using the Pearson's correlation test and it showed statistically significant positive correlation. There was poor correlation between metabolic control and dermatological manifestations of diabetes utilizing the Fischer's Exact Test with the P value being 0.42. However the mean HbA1C level among patients with infective lesions was 8.7 ± 1.4 in contrast to 7.2 ± 1.3 in case of non-infective lesions.

DISCUSSION

Cutaneous signs of diabetes mellitus generally appear after the primary disease has developed but may appear coincidentally with its onset, or even precede diabetes by many years. Although the mechanism for many diabetes-associated skin conditions remains unknown, the pathogenesis of others is linked to abnormal carbohydrate metabolism, other altered metabolic pathways, atherosclerosis, microangiopathy,

Table 1: Distribution of different lesions in diabetic patients

Infectious skin lesions 206	
Fungal infection (total)	111
Candidiasis	81
Tinea	30
Bacterial infection (total)	95
Impetigo contagiosa	44
Boils	26
Erythrasma	12
Folliculitis	13
Noninfectious skin lesions (total) 493	
Xerosis	174
Dermopathy	64
Loss of hair over legs	135
Thickening of skin	20
Vitiligo	12
Acanthosis nigricans	20
Hyperpigmentation	17
Lichen planus	3
Lipodystrophy	4
Macular amyloidosis	4
Nodular prurigo	4
Diabetic bullae	2
Necrobiosis lipoidica	1
Xanthoma	4
Skin tag	15
Diabetic hand	14



Figure 1: Acquired ichthyosis



Figure 2: Necrobiosis lipoidica

neuron degeneration, and impaired host mechanisms.^[4] Association of at least 30% of patients with diabetes mellitus with some type of cutaneous involvement was observed during the course of their chronic disease.^[5,6] Most documented studies have shown the incidence of cutaneous disorders associated with diabetes to be between 30% and 71%.^[5-8] In this present study 73.9% of diabetic patients had one or more cutaneous manifestations. Cutaneous manifestations of diabetes are classified into four categories: 1. Skin lesions with strong-to-weak association with diabetes (necrobiosis lipoidica, diabetic dermopathy, diabetic bullae, yellow skin, eruptive xanthomas, perforating disorders, acanthosis nigricans, oral leucoplakia, lichen planus), 2. infections (bacterial, fungal), 3. cutaneous manifestations of diabetic complications (microangiopathy, macroangiopathy, neuropathy), and 4. skin reactions to diabetic treatment (sulphonylureas or insulin).^[6] Mahajan *et al.*, reported cutaneous infections in 54.69% of diabetics in their study group.^[8] In the present study, infections formed the largest group (40.9%). Xerosis was the second most common manifestation (34.4%). Most surprisingly loss of hair over the shin was observed in 26.6% of cases, the underlying pathogenesis have been attributed to macroangiopathy and peripheral vascular disease.^[9] Rao and Pai found that pruritus was the main presenting symptom and was noted in 60.23% patients in their series.^[10] In our series almost 50% of the patients presented pruritus as the primary symptom. Diabetic dermopathy (12.7%) has been reported as 4th common cutaneous presentation. Diabetic dermopathy is the most common cutaneous marker of diabetes mellitus presenting as single or multiple well-demarcated brown atrophic macules, predominantly on the shins. Diabetic dermopathy and diabetic retinopathy are both considered by some authors as manifestations of diabetic microangiopathy. Retinopathy was found to be more common (50%) in patients with dermangiopathy than in those without it (6.2%).^[11,12]

Thirty two patients with type 1 diabetes mellitus were observed in the present work. Skin lesions were noted in 41% cases which are lesser than that documented by Pavlovic *et al.*, (68%). Fallacies are possible due to the lower number of type 1 subject in the present study.^[13] The overall prevalence of lesions were found to be higher in type 2 diabetics (75.6% vs 41%) 6 which corroborates with other studies where prevalence ranges from 61.2% to 85.4%.^[6,14,15]

Our study revealed positive correlation of skin lesions with disease duration. According to a study from Saudi Arabia, for those patients having diabetes of less than 5 years' duration, the incidence of skin manifestations was 80.6%; for those having diabetes for more than 5 years, the incidence was 98%.^[16] This difference was statistically significant ($P < 0.001$). The skin manifestations that had a statistically significant difference ($P < 0.05$) in prevalence between the two durational groups were gangrene, diabetic dermopathy, paresthesia, diabetic feet, diabetic bullae and fungal infections.

The present study failed to show correlation between good metabolic control and skin lesions. However the mean HbA1C level was higher in patients with infective lesions (8.7 ± 1.4 in contrast to 7.2 ± 1.3).

Opinion is divided regarding this issue. According to an Indian study in 2008,^[17] no correlation was demonstrated between glucose control and dermatologic manifestations. But an Iranian study^[18] as well as a study by Rayfield^[19] showed definite relationship between foot ulcers and fungal infections with HbA1C levels. Limitations of our study Ours is an observational study with a modest number of patients. Classification of diabetes was done primarily on clinical grounds, as investigations like antibody testing could not be performed due to resource constraints. Lastly, histopathological examinations were done at the discretion

of our consultant dermatologist, especially for lesions with diagnostic ambiguity. (i.e not all lesions). A total of 43 lesions were biopsied.

CONCLUSION

Dermatologic manifestation is a highly prevalent complication of diabetes mellitus which affects quality of life and adds to the heavy burden of therapeutic costs. It is found more frequently among Type 2 diabetics and increasing duration of diabetes increases the possibility of skin involvement. Impaired diabetic control as evidenced by higher HbA1C levels was found among patients with infections. However, prospective long term studies with larger number of subjects are needed to explore these issues further.

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PROFORMA

Name
Age
Sex
Address
Date of admission/ examination
History
Presenting complaints
Duration of diabetes
Past history
Personal history
Family history
Treatment history
Examination
Pulse
B P
General Survey
Skin

Systemic Examination
Ophthalmoscopy
Investigations
FBS
PPBS
HbA1C
Fasting C peptide level
Urine RE/ME
Lipids
ECG
CXR PA view
USG Abdomen
Spot urine creatinine
EMG NCV
Skin lesion infective lesions- culture sensitivity
Non-infective- biopsy