Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2015; 3(8A):2786-2789 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublisher.com

Research Article

Skin manifestations of diabetes mellitus from dermatology OPD of a tertiary care Hospital of North India

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Abstract: Diabetes mellitus is the most common endocrine disorder, which can affect any age group and all segments of society. Its prevalence is rising very fast due to life style modifications and sedentary habits. Any organ can be involved in diabetes and skin involvement is very common. Cutaneous signs usually appear after diabetes is established, but sometimes these can appear before the diagnosis is being made and helps in suspecting and making diagnosis of diabetes. So this study is being conducted to evaluate the pattern of cutaneous manifestations in diabetics. 200 patients from dermatology outpatient department having diabetes were enrolled for this observational study and pattern of manifestations were noted after confirming the diagnosis of diabetes and taking informed consent of the patient. Though most of the patients were known cases of diabetes mellitus, but in 26 patients diagnosis of diabetes mellitus was made during the study due to strong suspicion of diabetes in certain skin conditions. Early recognition of these skin manifestations assists in early diagnosis and helps to lead toward appropriate treatment for diabetes mellitus patients. Early diagnosis also shares in preventing long-term complications. Infections (46%) emerged as commonest manifestation. Amongst non-infectious cause diabetic dermopathy was most common, followed by Xerosis. The mean HbA1C level among patients with infective lesions was 8.9 ± 1.2 in contrast to 7.0 ± 1.2 in case of non-infective lesions. So this study not only showed the prevalence of skin manifestations in diabetics, but also contributed to diagnosis of new diabetes patients.
Keywords: diabetes mellitus, diabetic dermopathy, prevalence, granuloma annulare, diagnosis, Skin manifestations

INTRODUCTION

Diabetes mellitus is a heterogeneous group of disorders characterized by chronic hyperglycemia due to disturbance in carbohydrate, protein and fat metabolism, which result from either a defect in insulin action or secretion or combination of the two. If we talk about endocrine disorders, Diabetes mellitus (DM) is there right on the top [1]. It can affect all age groups and all socio-economic segments of the population. DM is primarily of two types: Type 1 DM & Type 2 DM. According to Wild *et al*. the prevalence of diabetes is predicted to double globally from 171 million in 2000 to 366 million in 2030[2] with a maximum increase in India. The International Diabetes Federation (IDF) predicts the total number of diabetic subjects in India to reach 101.2 million by the year 2030 [3]. Thus India is one of the epicenters of diabetes epidemic. Skin involvement in diabetes mellitus is very common, and some form of cutaneous involvement has been found in 43%-66% diabetics [4,5]. Although overall prevalence is almost same in both IDDM & NIDDM, but former develop more of autoimmune type lesions while latter is associated with more cutaneous infections [6,7]. Though mechanism of most of the skin diseases in diabetes remains unknown but the pathogenesis of others is linked to abnormal carbohydrate metabolism, altered metabolic pathways, atherosclerosis, microangiopathy, neuron degeneration, and impaired host mechanism [8]. Cutaneous signs usually appear after diabetes is established, though in some patients they may precede the diagnosis by many years. There is no epidemiologic data related to skin disorders in diabetics reported from north India. This study is designed to analyze the pattern of skin disorders among diabetic patients from north Indian plains and also to help diagnosing new cases of diabetes on the basis of suspicion from characteristic skin lesions.

MATERIAL & METHODS

This observational study was conducted on 200 patients from Dermatology outpatient department coming with skin manifestations & was found to be diabetics. All patients satisfying the diagnostic criteria for diabetes as laid down by the International Expert

Committee on Diabetes were taken as cases [9]. A pre-established proforma, which was designed by authors, was used to collect the data. An informed written consent was obtained from all subjects. History, including demographic profile, type of diabetes, duration, complications and treatment modalities was noted. The patients were divided into groups on the basis of type of diabetes and duration of diabetes. Confirmation of the diagnosis of skin condition was made by all the relevant investigations, wherever needed. Descriptive statistical analysis was done. The Pearson's Correlation test was used to assess the relationship of duration of DM with skin manifestations. $P< 0.05$ was considered significant.

RESULTS

Total 200 patients were taken in the study. The age varied from 17 to 76 years, mean age being 46.3+/-6.7 years. 136 were males and 64 were females with Male: Female ratio was 2.12: 1. There were 186 (93%) patients of type 2 diabetes & 14 (7%) patients of type 1 diabetes. The duration of diabetes was 1-10 years in 112 patients. 62 patients had >10 years of diabetes and26 patients were newly diagnosed as diabetics. When HbA1C was done, it showed poor metabolic control with HbA1C>7 in 146 patients. Various types of skin manifestations observed are shown in Table 2, including certain characteristic ones like diabetic dermopathy and necrobiosis lipoidica diabeticorum. The commonest lesion detected overall, were infections 92 (46%). However, the pattern of lesions was different in Type 1 and Type 2 diabetics. Among non-infective manifestations, diabetic dermopathy was most common with 14.5%, Xerosis was present in 13.5%, while skin tags were found in 8% patients of DM.

Pearson's correlation test was used to search the relationship between skin lesions and duration of diabetes mellitus and it showed statistically significant positive correlation (p-value <0.005). 140 patients had one manifestation, 38 had 2 manifestations, while 22 patients had 3 manifestations at the time of presentation.

DISCUSSION

Skin manifestations of diabetes mellitus can occur prior to, with & after development of primary disease, but usually these appear several years after development of primary disease. Most documented studies have shown the incidence of cutaneous disorders associated with diabetes to be between 30% and 71%.Cutaneous signs of DM are extremely valuable to the clinician. For example, diabetic bullae, diabetic dermopathy, necrobiosis lipoidica diabeticorum, and the scleroderma-like syndrome of waxy skin with limited joint mobility can alert the physician to the diagnosis of diabetes [10, 11]. Eruptive xanthomas reflect the status of glucose and lipid metabolism.

Table-1: Cutaneous manifestations of diabetes

Skin lesions associated with IDDM	Necrobiosis lipoidica, Periungal telangiectasia, Diabetic bullae, Lichen planus, Vitiligo
Skin lesions associated with NIDDM	Diabetic thick skin, Acrochordons, diabetic dermopathy, yellow nails, Acanthosisnigricans, acquired perforating dermatosis, Calciphylaxis, Eruptive xanthoma, granuloma annulare
Infections	Candidal, dermatophytic, bacterial, and rare like mucormycosis and malignant externa.
Skin manifestations of diabetic complications	Microangiopathy, Macroangiopathy, Neuropathy
Skin reactions to treatment	Maculo popular eruptions, lichenoid reactions, urticaria, erythema multiforme, and erythema nodosum.

Mahajan *et al.*, reported cutaneous infections in 54.69% of diabetics in their study group[12]. In the present study, infections formed the largest group (46%). Diabetic dermopathy was present in 14.5 % patients while Xerosis was the third most common manifestation with 13.5%. Rao and Pai found that pruritus was the main presenting symptom and was noted in 60.23% patients in their series. In our series almost 69% of the patients presented pruritus as the primary symptom. Skin tags have been reported as 4^{th} common cutaneous presentation, which were present in 8% of patients. 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%).

In our study only 14 patients with type 1 diabetes mellitus were present. Fallacies are possible due to the lower number of type 1 subject in the present study. So it was not possible to comment on trend of cutaneous manifestations present in DM I patients.

Our study revealed positive correlation of skin lesions with disease duration. P value <0.04 showing positive correlation. 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%. This difference was statistically significant ($P< 0.001$).

The present study failed to show correlation between good glycemic control and skin lesions. However the mean HbA1C level was higher in patients with infective lesions (8.9 ± 1.2 in contrast to 7.0 ± 1.2). Different studies have different opinion about correlation of dermatological conditions and glycemic control; because an Indian study conducted in2008 showed no correlation while an Iranian study did.

Our study also helped in diagnosis of 26 new cases of diabetes, investigated on strong suspicion due to persistent skin manifestations. There is also a very interesting case of diagnosis of diabetes in a spouse of a patient with recurrent balanoposthitis, who had no history of extramarital relation and his repeated tests for diabetes were negative, when further investigated her spouse was found to have diabetes with candidal vaginal discharge. Other patient of giant granuloma annulare was also thought to and found to have diabetes. Other patients who were diagnosed during study were patients of persistent and severe fungal & bacterial infections, patients of Necrobiosis lipoidica, diabetic dermopathy, yellow nails, and Acanthosisnigricans. These patients were diagnosed during study and one good point about these patients was that most of them had HbA1C < 7. So patients were sent to medicine department for diabetic control to initiate treatment early and to prevent diabetic complications.

Limitations of the study

Ours is an observational study with a small number of patients. Classification of diabetes was done primarily on clinical grounds. Lastly, histopathological examinations were done in a very few patients especially for lesions with diagnostic ambiguity. (i.e not all lesions).

CONCLUSION

Cutaneous manifestations are very common with diabetes mellitus. Patients who are already suffering from multiple system involvement with DM are further compromised by skin manifestations. Skin manifestations are not only of cosmetic relevance, but further deteriorate the life quality, add therapeutic cost and also increase the agony of the diabetic patients. Patients with Type 2 diabetes are more prone to develop skin manifestations and duration of diabetes also plays direct role in increased incidence of skin involvement. Patients with poor diabetic control as evidenced by higher HbA1C levels were found to have higher risk of infections. Our study along with finding the pattern of the skin manifestations in diabetics also helped in diagnosing 26 new cases of diabetes based on clinical suspicion due to skin manifestations. So by early diagnosis patient's quality of life could be prevented from deterioration and long-term complications could also be prevented.

Table-2: Skin lesions

Types of skin lesions	Number
Infections	**92**
Diabetic dermopathy	29
Xerosis	27
Skin tags	16
Urticaria	09
Yellow Nails	08
Ichthyosis	08
Acanthosisnigricans	08
Vitiligo	06
Periungaltelangiectasias	06
Herpes labialis/Genitalis	05
Eruptive Xanthomas	05
Granuloma annulare	05
Photodermatitis	04
Oral lichen planus	04
Acquired perforating dermatosis.	04
Necrobiosis lipoidica diabeticorum	04
Leukoplakia	04
Lichenoid eruption	03
Plantar psoriasis	04
Rosacea	04
Macular amyloidosis	04
Nodular prurigo	04
Seborrheic keratosis	04
Scabies	02
Lipodystrophy	02
Xanthalasma	02
Alopecia	02
Keloid	02
Nevi	02
Diabetic bullae	02
Calciphylaxis	01

Table-3: Infections

Infection	Number
Fungal	**52**
Candida	28
Dermatophytic	24
Bacterial	**40**
Impetigo	04
Erythrasma	02
Folliculitis	26
Cellulitis	08

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Appendix

Proforma

- Name Age/Sex
- Address
- Date of examination
- History:
  - Presenting complaints
  - Duration of diabetes
  - Past history
  - Personal history
  - Family history
  - Treatment history
- Examination
- Pulse B P
- General physical examination
- 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
- Skin lesion
- Infective lesions-
  Culture sensitivity
- Non-infective
- Biopsy

Consent

This has been told to me that I have been made a part of an observational study conducted on Skin manifestations in diabetics in our area. I have been explained about this in my own language. I am ready to be part of this study and give my consent for my inclusion in this educational study

Signature of the patient