

Cutaneous manifestations in diabetes mellitus: An observational study

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Abstract

Introduction: Diabetes mellitus (DM) can be complicated by a variety of cutaneous manifestations. Good metabolic control may prevent some of these manifestations and may support cure. It is important to recognise them earliest either treat them appropriately or refer the patient to a dermatologist or diabetologist. Skin is affected by the acute metabolic derangements as well as by chronic degenerative complications of diabetes.

Aim: To evaluate the prevalence of skin manifestations in patients with diabetes mellitus and analyse the pattern.

Material and Methods: This observational study was done in Tata Main Hospital. 200 consecutive subjects of either sex diagnosed with diabetes were screened for dermatological problems.

Results: Out of 200 patients screened 60 patients (30%) had cutaneous manifestations. The common skin manifestations were dermatitis/pruritus in (28.3%), fungal infection in (25.0%), bacterial infection in (31.7%) patients, diabetic dermopathy, skin tags and acanthosis nigricans in (5%) each.

Conclusion: Cutaneous manifestations are a common occurrence with diabetes mellitus. Every middle-aged person with skin infections should be screened for diabetes mellitus.

Keywords: Cutaneous manifestations, Diabetes mellitus

Introduction

Type 2 DM is a heterogeneous group of disorders characterized by variable degrees of insulin resistance, impaired insulin secretion, and increased glucose production. Distinct genetic and metabolic defects in insulin action and or secretion give rise to the phenotype of hyperglycaemia in type 2 DM. Type 2 DM is preceded by a period of abnormal glucose homeostasis classified as impaired fasting glucose (IFG) or impaired glucose tolerance (IGT). It is estimated that it will affect 300 million people worldwide by 2025.¹ According to The International Diabetes Federation (IDF) there are 40.9 million diabetics in India and is set to rise to 69.9 million by the year 2025². Chronic hyperglycaemia resulting in production of advanced glycosylated end products (AGE) is for most of the complications of diabetes³. Abnormalities of insulin and elevated blood glucose level

lead to involvement of multiple organ systems including cardiovascular, renal, nervous system, eyes and skin.^{2 4}

Diabetes is the most common endocrine disorder affecting various organ system including skin. More than one third of diabetic patients have some type of dermatologic manifestations during their chronic disease⁵.

Abnormal carbohydrate metabolism, atherosclerosis, microangiopathy, neuron degeneration and impaired host mechanism all play roles in the pathogenesis of cutaneous complication. The prevalence of cutaneous infections is more in DM Type 2 whereas autoimmune conditions are commonly associated with DM type 1⁶. There are many skin manifestations in DM, which vary from trivial to life threatening but none of them are pathognomonic of the disease⁶. Proper treatment of skin manifestation is important for control of diabetes mellitus and while treating the skin manifestations, control of diabetes is very important. Cutaneous signs of diabetes mellitus are extremely valuable to the clinician as some of them can alert the physician to the diagnosis of diabetes and reflect the status of glycaemic control and lipid metabolism. Non-infectious as well as infectious diseases have been described as dermatologic manifestations of diabetes mellitus. Pruritus, necrobiosis lipoidica, scleredema adutorum of Buschke, and granuloma annulare are examples of frequent non-infectious skin diseases. Bacterial and fungal skin infections are more frequent in people with diabetes.⁷ Mucocutaneous infections are commonly associated with DM which leads to various skin complications like fungal infections (Balanoposthitis, Tinea infections, Paronychia, Oral and genital candidiasis), bacterial infections (Folliculitis, Furuncles, Cellulitis, Ecthyma). There are few studies available in India which has studied the cutaneous manifestations of

diabetes manifestations of diabetes mellitus, hence we took up this subject in our hospital⁸.

Objective of the study

This study was conducted to learn about demographic characteristics of subjects with diabetes having cutaneous manifestations and to note the clinical patterns of dermatological manifestations of DM.

Materials and methods

This observational study was done in Tata Main Hospital. 200 consecutive subjects of either sex diagnosed with diabetes were screened for dermatological problems. Patients who had skin changes resulting from known causes or disease other than diabetes mellitus and subjects with acute complications of diabetes were excluded. History taking, general and systemic examination including examination of skin, hairs and nails were done. The blood sugar level, HbA1c, serum creatinine, urine albumin creatinine ratio was noted. Other mentioned complications like neuropathy, retinopathy and nephropathy were noted. After screening patients were send to Dermatology OPD for specific dermatological diagnosis. Descriptive statistics were presented in the form of mean, standard deviation and range for data on continuous variables. Categorical measurements are presented in percent numbers (%).

Results

Out of 200 patients screened 60 patients (33.3%) had cutaneous manifestations. The majority 55 (92%) of patients was having type 2 diabetes mellitus and only 5 (8%) patients were suffering from type 1 diabetes mellitus (Table 1). The duration of the diabetes ranged from 3 to 20 years (mean duration of diabetes 7.5 years) (Table 2). In diabetic patients with cutaneous manifestations, hypertension was present in 36.76%, nephropathy in 5.88%, neuropathy in 4.41%, and retinopathy in 6.61%

cases. Out of 60 patients with cutaneous manifestations, 29.41% had uncontrolled and 70.58% had controlled glycosylated haemoglobin (Hb1c) level. In our study among cutaneous manifestations (Table 3) dermatitis/pruritus was found in 17 (28.3%), fungal infection in 15 (25.0%), bacterial infection in 19(31.7%) patients, diabetic dermopathy, skin tags and acanthosis nigricans in 3 (5%) each. Images for skin manifestations are provided below.

Table 1: Type of Diabetes with sex distribution

| Type of diabetes | Male | Female | Total |
|------------------|------------|------------|------------|
| type 1 | 2 (3.3%) | 3 (5.0%) | 5 (8.3%) |
| type 2 | 30 (50 %) | 25 (41.7%) | 55 (91.7%) |
| total | 32 (53.3%) | 28 (46.7%) | 60 (100%) |

Table 2: Duration of diabetes

| | N | Minimum | Maximum | Mean | Std. Deviation |
|----------------------|----|---------|---------|---------|----------------|
| Age | 60 | 46.00 | 82.00 | 63.9833 | 8.91103 |
| Duration of diabetes | 60 | 3.00 | 20.00 | 7.5667 | 3.38174 |

Table 3: Dermatological manifestations

| Type of skin manifestation | No of patients |
|----------------------------|----------------|
| Dermatitis/pruritus | 17 (28.3%) |
| Fungal infection | 15 (25.0%) |
| Skin tag | 3 (5.0%) |
| Bacterial infection | 19 (31.7%) |
| Diabetic dermopathy | 3 (5.0%) |
| Acanthosis nigricans | 3 (5%) |

Discussion

Skin disorders in DM are most of the times a mirror of the underlying disease process and they may be the first expression of the disease. In our study involving 200 patients with DM, 60 patients (33%) were affected with cutaneous manifestations. The prevalence of skin manifestations in DM varies from one study to other, but majority has described the prevalence from 50 to 80%⁸. The low prevalence of skin manifestations in our study can be explained on the basis that majority of our patients (70.5 %) had controlled blood sugar and glycosylated haemoglobin. In our study of diabetic subjects who had skin manifestations, the percentage of type 1 DM cases was 8% and that of Type 2 DM was 92%. The mean age of affected people was 64 with the lowest age of 46 and highest being 82 years, which is like other studies⁹ who observed majority of their patients i.e. 86% were above 40 years of age. The mean duration of DM with patients was 7.5 years with minimum of 3 years and maximum of 20 years. Our study indicate that prevalence of DM rises steeply with age. The relative increase in the incidence of cutaneous involvement with age in diabetic patients may be attributed to the age-related skin changes compounded by effects of long duration of diabetes. Out of 60 cases studied, 32 were males (53 %) and 28 were females (47%), ratio being 1.14:1. Incidence of cutaneous infection in DM varies from one series to another. However, every investigator found chances of skin infection to be much more common in uncontrolled diabetics than the controlled one. In a study Paron et al.,¹⁰ skin infections occurred in 20% to 50% cases of poorly controlled diabetes, most commonly in type 2 diabetics. A similar study by Wahid et al.¹¹ demonstrated cutaneous infections in 49% of all diabetic patients. In our study, infective dermatological changes were found in 56.7% of

all cases and were mostly associated with poor glycaemic control. Bacterial infections mainly of staphylococcal and streptococcal infections (recurrent boils, paronychia) constituted 52.7% (17 cases) of all infections in both types of DM. Candidiasis in the form of intertrigo, paronychia, candidal vulvovaginitis and balanoposthitis constituted 20 % of all infections. Different form of dermatophytosis (including toe nail onychomycosis) constituted 28% of all infections. In our study generalised pruritus was observed in 28.3% of cases, other study has also found similar results¹² but as per literature it is doubtful if diabetes mellitus per se should be regarded as a cause of generalized or localized pruritus, other than pruritus vulvae. Skin tags often associated with obesity were observed in 26% of type 2 DM as stated by Kahana et al.¹³ Our study showed that incidence of skin tags in diabetes was 5 % (3 cases) and mostly associated with obesity, acanthosis nigricans and type 2 DM.

Conclusion

Long-term effects of DM on the microcirculation and dermal collagen eventually result in skin disorders in majority of the diabetic patients. They can increase the likelihood of exposure to infectious organisms and contact allergens, resulting in chronic and recurrent infections and eczemas. A good glycaemic control reduces the incidence and severity of cutaneous disorders, as observed in the present study. Dermatologists play an important role in reducing the dermatologic morbidity, improvement of quality of life, and management strategy of diabetic patients. Every middle-aged person with skin infections should be screened for diabetes mellitus.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent form. In the form, the patient's have given their consent for the images and other clinical information

to be reported in the journal. They understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Legend Figure



Figure 1: Dermatitis/ Pruritus



Figure 2: Tinea



Figure 3: Bacterial Infection



Figure 4: Dermopathy



Figure 5: Acanthosis Nigricans



Figure 6: Skin Tag