Cutaneous Manifestations of Diabetes Mellitus

Study from Farwaniya Hospital, Kuwait

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Key Words

Diabetes mellitus · Cutaneous manifestations

Abstract

Objective: To study the prevalence of cutaneous disorders in patients with diabetes mellitus. **Subjects and Methods:** All diabetic patients attending the Department of Dermatology, Al-Farwaniya Hospital, Kuwait, and diabetic in-patients with skin disorders were examined over a period of 18 months from March 2004 to August 2005. A total of 106 diabetic patients displaying 1 or more dermatological manifestations were identified and thoroughly examined for any skin disorder. The diabetic profile of the patients was obtained from medical records. **Results:** Of the 106 patients, 69 had only 1 cutaneous manifestation, 27 had 2, 6 had 3 and 4 had 4. Infections (68.0%) were the major cutaneous manifestations with fungal infection occurring in 41 patients followed by bacteria in 27. The second most common presenting symptom was pruritus. Hypertension (74%) was the most common systemic complication, and most of the diabetic patients who developed cutaneous manifestations were in the 40- to 60-year age group. **Conclusions:** The data show that infections were the most common cutaneous manifestation and hypertension the most common systemic complication.

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Introduction

Diabetes mellitus (DM) is the most common endocrine disorder [1]. The cutaneous manifestations of DM are well known and considered as common, as observed in 30–71% of diabetic patients [1, 2]. The exact pathogenesis of most of these dermatoses is unknown. It is reasonable to assume that vessel and connective tissue alterations as well as the impairment of the immune system and other associated metabolic changes caused by diabetes play an important role. DM is common in Kuwait; about 15% of the adult Kuwaiti population has type 2 diabetes [3] and the prevalence of type 1 diabetes is 269.9 per 100,000 Kuwaiti children [4]. Although diabetes is common in Kuwait, systematic surveys of the cutaneous manifestations in diabetic patients are lacking. Therefore the aim of our study was to evaluate the frequency of skin manifestations in these patients with diabetes.

Subjects and Methods

The study was conducted in the Department of Dermatology, Al-Farwaniya Hospital, Kuwait. The protocol for this study was approved by the hospital's Ethics Committee. All diabetic patients attending the Dermatology Out-Patient Clinic and diabetic in-patients with skin problems were examined over a period of 18 months from March 2004 to August 2005. A diagnosis of diabetes was made using uniform criteria: symptoms of diabetes plus random blood glucose concentration ≥ 11.1 mmol/l (200 mg/dl) or fasting plasma glucose ≥ 7.0 mmol/l (126 mg/dl) or 2-hour plasma

Table 1. General profile of 106 diabetic patients

Parameter	Observations
<i>Sex distribution</i>	
Male:female	68:38
Total	106
<i>Age distribution of patients</i>	
>0–20 years	5 (4.7%)
>20–40 years	33 (31.1%)
>40–60 years	45 (42.5%)
>60–80 years	23 (21.7%)
Total	106
<i>Type of diabetes</i>	
Type 1	13
Type 2	93
Total	106
<i>Duration of diabetes</i>	
<5 years	22
>5–10 years	25
>10 years	59
Total	106

glucose ≥ 11.1 mmol/l (200 mg/dl) during an oral glucose tolerance test. In the absence of unequivocal hyperglycaemia and acute metabolic decompensation, these criteria were confirmed by repeat testing on a different day. Informed consent was obtained from the patients. The patients who were diagnosed as having DM following investigation of dermatological manifestations were also included in the study. Each subject underwent a thorough dermatological examination.

A working classification of cutaneous manifestations of DM into four groups was adopted [1], and an attempt was made to place the observed skin lesions into one of these four categories: (a) cutaneous conditions with strong associations with DM; (b) skin manifestations related to infectious origins; (c) skin manifestations related to complications of DM, and (d) skin lesions related to treatment of DM. Medical records of these patients were reviewed for information regarding duration of diabetes, daily medications, complications of diabetes such as retinopathy and neuropathy, fasting triglycerides, cholesterol levels and renal function. Relevant microbiological and histopathological investigations were carried out to confirm the clinical diagnosis on all the patients with cutaneous manifestations.

Results

The general profile of the patients is given in table 1. Of the 106 patients, the majority (42.5%) were between 40 and 60 years of age. Among patients presenting with skin complaints, there were more type 2 diabetics (93 pa-

Table 2. Cutaneous manifestations of DM in the patients

Cutaneous manifestations	Cases	Percentage
<i>Cutaneous conditions with strong associations with DM</i>		
Diabetic dermopathy	6	5.7
Diabetic thick skin	1	1
Necrobiosis lipoidica	1	1
Rubeosis faciei	11	10.4
Acanthosis nigricans	5	4.7
Diabetic bullae	2	1.9
Xanthomas	7	6.6
Scleredema adultorum	1	1
Pruritus	52	49
Acrochordons	11	10.4
Vitiligo	3	2.8
Granuloma annulare	2	2
Lichen planus	5	4.7
Acquired perforating dermatoses	2	2
Total	109	
<i>Cutaneous conditions related to infectious origins</i>		
Fungal	41	38.7
Bacterial	27	25.5
Viral	3	3
Total	71	
<i>Cutaneous conditions related to complications of DM</i>		
Diabetic neuropathy	10	9.4
Diabetic ulcer	2	2
Total	12	
<i>Cutaneous conditions related to treatment of DM</i>		
Sulphonylurea-related skin lesions	3	3
Insulin lipo-atrophy	3	3
Insulin-allergic reactions	1	1
Total	7	

tients) than type 1 (13). Of the 106 patients, 88 (83%) were known diabetics and 18 (17%) were diagnosed as diabetics in the skin Out-Patient Department after investigation. Fifty-nine of the 88 patients have diabetes of over a 10-year duration.

Cutaneous manifestations according to the four groups are given in table 2. Pruritus was the most common in 52 patients, followed by fungal (41) and bacterial (27) infections. Sixty-nine patients (65%) had only 1 manifestation, 27 (25.5%) had 2, 6 (5.7%) had 3 and 4 (3.8%) had 4. Types of fungal, bacterial and viral infections are given in table 3. Tinea pedis was the most common fungal infection while folliculitis was the most common bacterial infection. Three patients had recurrent herpes simplex. Cutaneous infections were found to be more common during the first 5 years of diabetes (46

Table 3. Type of infection seen among diabetic patients

Type of infection	Cases	Percentage
<i>Fungal infections</i>		
Tinea corporis	5	7
Tinea cruris	4	5.6
Tinea pedis	15	21
Tinea unguium	2	2.8
Paronychia	3	4.2
Candidal vulvovaginitis	7	9.9
Candidal balanoposthitis	1	1.4
Candidal intertrigo	4	5.6
Subtotal	41	57.7
<i>Bacterial infections</i>		
Folliculitis	14	19.7
Impetigo (bullous)	2	2.8
Furunculosis	1	1.4
Carbuncle	2	2.8
Cellulitis	4	5.6
Infectious eczematoid dermatitis	1	1.4
Erythrasma	3	4.2
Subtotal	27	38
<i>Viral infections</i>		
Herpes simplex	3	4.2
Subtotal	3	4.2

Table 4. Diabetic complications/associations in 61 patients

Complications	Cases
Retinopathy	7
Nephropathy	2
Neuropathy	18
Hyperlipidemias	10
Hypertension	44
Coronary artery disease	4
Peripheral vascular disease	3
Total	88

The total number exceeds the number of patients (61) because many showed more than 1 complication/association.

patients). Of the 7 patients with xanthomas, 3 had an eruptive variant and in addition had hypertriglyceridaemia.

The systemic complications and associations of DM with cutaneous manifestations are shown in table 4.

Many of the patients had more than 1 underlying systemic complication. Hypertension was observed in 44 patients.

Discussion

Similar to a previous study [5], male patients outnumbered female patients (table 1) in our study, but not in another study [6] in which there were more female patients.

The majority of our patients were in the 40- to 60-year age group, an observation also noted by other researchers [5, 6]. The relative increase in the incidence of cutaneous involvement with age in diabetic patients may be attributed merely to the long duration of diabetes in these patients.

The majority of patients in this study had type 2 DM, as has been noted in other studies [5, 6], apparently reflecting the general distribution pattern of type 1 and type 2 DM cases in world populations [1, 5]. No difference in the prevalence of cutaneous disorders between type 1 and type 2 DM patients has been noted [1, 5].

Among the cutaneous disorders observed in our DM patients, infections comprised the largest group affecting 67% of the cases, similar to previous reports [5, 6]. It is well known that diabetic patients are susceptible to infections probably due to hyperglycaemia and defects in polymorphonuclear leucocyte function [7]. Surprisingly, viral infections in diabetic patients have not been reported in previous studies as observed in our study where 3 diabetic patients showed recurrent herpes simplex. It is difficult to say whether it is an incidental observation or whether compromised resistance of the diabetic state is somehow responsible for precipitating the recurrences.

Pruritus was the second most common manifestation among our diabetic patients and was seen in 49% of patients in the present study. Similar observations have been reported [6], including a review that questions the relationship between generalized itching and DM [8]. However, we believe that generalized itching, at least in some DM cases, cannot be readily explained by any other cause except by the underlying DM.

The 5.7% of patients with diabetic dermopathy observed in this study falls within the range of previous reports of 3.5–9.37% [5, 6]. While a comprehensive review on the subject considers diabetic dermopathy to be the most common manifestation in DM [1], we did not observe it to be so common.

The 1% of patients with necrobiosis lipoidica observed in this study is similar to that reported by Nigam and Pande [5] although Mahajan et al. [6] did not make a similar observation. It is generally well known that necrobiosis lipoidica is not common in diabetic patients with a reported incidence of 0.3–1.6% [1]. Dermatoses associated with an increased incidence of DM, like vitiligo, lichen planus and acquired perforating dermatoses detected in the present study, have been reported previously [1].

An attempt was made to note the underlying systemic complications attributed to DM in our patients. Hypertension (44 patients) was identified as the one systemic feature most common in our diabetic patients showing

cutaneous involvement consistent with the previous report of Mahajan et al. [6] which also included retinopathy among others. Hypertension has been hypothesized to accelerate the process of micro-angiopathy in diabetics [6].

Conclusion

Most of the diabetic patients who developed cutaneous manifestations were in the 40- to 60-year age group, and infections were the single largest type of involvement while the most common systemic complication of diabetes was hypertension.

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