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Original Article

Pattern of dermatological diseases in patients of diabetes mellitus

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Abstract

Objective To analyze the pattern of diabetic dermatoses in patients of diabetes mellitus.

Methods Five hundred consenting patients of diabetes mellitus attending the Outpatient Department of Dermatology and Endocrinology and the patients admitted in these departments were included in the study.

Results Among 500 patients, 62.2% (311) were males and 37.8% (189) were females. 475 (95%) patients were type 2 diabetics and 25 (5%) were type 1 diabetic. Cutaneous involvement was seen in 76.8% of patients with infections being the most common dermatoses seen in 221 (57.5%) of patient followed by skin tags (17.2%), acanthosis nigricans (10.9%), and generalized pruritus (9.4%).

Conclusion Skin involvement is quite common with varied manifestations in diabetes especially in type 2 diabetes and skin infections form a major chunk of dermatoses seen in diabetic patients.

Key words
Diabetes mellitus, cutaneous manifestations, infections, skin tags, acanthosis nigricans, generalized pruritus.

Introduction

Diabetes mellitus (DM) is the most common endocrine problem worldwide. It is a chronic disease and occurs either due to inherited and/or acquired deficiency of insulin or due to ineffective insulin production by the pancreas.[1] In the year 2000, 171 million people were affected with type 2 diabetes and about 366 million people are likely to be affected by 2030.[2] According to WHO, in India the number of diabetic patients would increase to 80 million by the year 2030.[2] In the present scenario its prevalence is increasing in general population due to sedentary lifestyle.

Diabetes is characterized by hyperglycemia and leads to long term systemic complications because of abnormalities in carbohydrate, lipid and protein metabolism.[3] It involves multiple organs including cardiovascular, renal, nervous system, blood vessels, eyes and skin. The incidence of cutaneous involvement in diabetes varies from 11.4 to 71%.[4] Acute metabolic derangements and chronic degenerative complications of diabetes are responsible for various dermatoses. Between type 1 and type 2 diabetics, the prevalence of cutaneous diseases does not differ but type 1 DM patients commonly present with autoimmune type cutaneous lesions and type 2 DM patients develop cutaneous infections more frequently.[5]

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The cutaneous manifestations of diabetes are classified into four major groups: 1) skin diseases with strong association with diabetes mellitus and others with less distinct association; 2) cutaneous infections; 3) dermatological disorders related to diabetic complications; and 4) skin conditions related to diabetic treatment.[6]

Thus, the present study was done to analyze the pattern of diabetic dermatoses in view of increasing prevalence of diabetes mellitus in the present scenario of sedentary life style in the general population.

Methods

Five hundred consenting patients of diabetes mellitus attending the Outpatient Department of Dermatology and Endocrinology and the patients admitted in these departments of Dayanand Medical College and Hospital, Ludhiana, were included in the study. Patients with iatrogenic diabetes due to steroids were excluded from the study. In each patient, a detailed history of diabetes was taken regarding the duration of diabetes, any symptoms suggestive of retinopathy, neuropathy, nephropathy, cardiac disease, any presence of co-morbidity, and the type of anti-diabetic treatment. These patients were screened for presence of any cutaneous involvement and detailed history was taken regarding the symptoms, its onset, duration, progression, any associated aggravating or relieving factors, and treatment modalities. Systemic examination of patients was done to look for any evidence of complications of diabetes along with thorough local cutaneous examination. To look for diabetic control, random blood sugar levels were done along with glycosylated hemoglobin and to rule out diabetic triopathy, serum creatinine, fundus examination was done. In patients with cutaneous involvement, appropriate investigations including skin biopsy were done, wherever required, to confirm the diagnosis.

Results

Among 500 patients, 311 (62.2%) were males and 189 (37.8%) were females. The male to female ratio was 1.64:1. The minimum age was 7 years and the maximum age was 90 years with a mean age of 54.49 ± 13.057 years. The youngest male patient was 7 years and female 17 years. The oldest male was 90 years and female 80 years. The maximum number of patients was in the age group 51-60 years (35%) followed by 61-70 years (22.6%). Type 2 diabetes was seen in 475 (95%) and type 1 in 25 (5%) of patients. 375 patients had diabetes duration of 1-10 years and 175 had more than 10 years of diabetes.

Of the total of 500 patients examined for cutaneous manifestations, 384 (76.8%) had some or the other form of dermatoses and 116 (23.2%) patients had no skin lesions. Cutaneous infections were the most common dermatoses seen in our study in 221 (57.5%) of patients.

Cutaneous fungal infections were the commonest and were seen in 131 (34.1%) cases, followed by bacterial 67 (17.4%), and viral 23 (6%) infections. Among fungal infections, the most common was found to be candidiasis 70 (53.4%), followed by dermatophytoses 58 (44.3%), (**Figure 1**). The most common candidal infection was found to be balanoposthitis in 27 cases, followed by intertrigo in 22 cases, paronychia in 11 cases, oral thrush in 9 cases, and vulvovaginitis in 1 case. Of the 67 patients having bacterial infections, the most common was furuncle in 41 (61.2%) cases, followed by folliculitis 11 (16.4%), cellulitis 7 (10.4%), carbuncle 5 (7.5%), and ecthyma 3 (4.5%), (**Figure 2**). Other dermatoses observed in our study are depicted in **Table 1**.

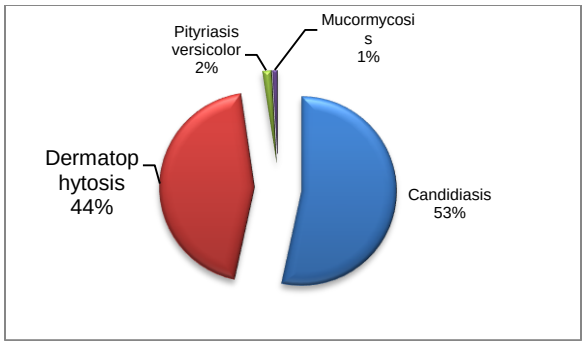

Figure 1 Frequency of different fungal infections.

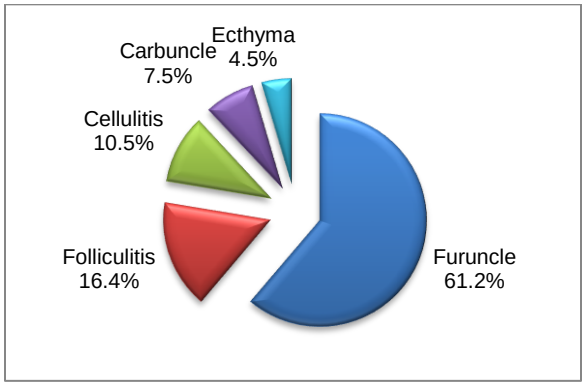

Figure 2 Frequency of different bacterial infections.

Table 1 Noninfectious dermatoses observed in diabetes mellitus (n=500).

Dermatoses	*N (%)*
Skin tags	66 (17.2)
Generalized pruritus	36 (9.4)
Pigmented purpuric dermatoses	11 (2.9)
Acanthosis nigricans	42 (10.9)
Lipodystrophy	2 (0.5)
Vitiligo	7 (1.8)
Lichen planus	18 (4.7)
Perforating collagenosis	5 (1.3)
Trophic ulcer	12 (3.1)
Eczemas	35 (9.1)
Diabetic bullae	3 (0.8)
Generalized pruritus	36 (9.4)
Xerosis	13 (3.4)
Amyloidosis	5 (1.3)
Nodular prurigo	3 (0.8)
Drug rash	8 (2.1)
Diabetic foot	9 (2.3)
Xanthelasma palpebrarum	7 (1.8)

Glycemic control was checked in all the patients and good control (HbA1C<7) was seen in 214 (42.8%) of patients, fair control (7-8) in 91 (18.2%) and poor control (>8) in 195 (39%) patients.

Table 2 Association with other systemic complications of diabetes.

Complications	*Cutaneous manifestations N (%)*	*No cutaneous manifestations N (%)* *
Coronary artery disease	50 (76.9)	15 (23.1)
Retinopathy	1 (5.6)	17 (94.4)
Nephropathy	27 (87.1)	4 (12.9)
Neurological	16 (100)	0 (0)
Hypertension	65 (67)	32 (33)
Total	159 (41.4)	68 (58.6)

* (p value = 0.247)

Systemic complications of diabetes mellitus

Type 2 DM was associated with increased risk of complications. Most of the complications occurring in diabetic patients were found to be in sixth decade, the most common complication was coronary artery disease, followed by nephropathy as depicted in **Table 2**.

Discussion

DM is a chronic clinical syndrome characterized by hyperglycemia due to absolute or relative insulin deficiency. It is classified into type 1 or insulin-dependent diabetes mellitus (IDDM) and type 2 or non-insulin dependent diabetes mellitus (NIDDM). Most of the cutaneous disorders are related to complications of diabetes like neuropathy (diabetic foot), microangiopathy (diabetic dermopathy), immunologic dysfunction (infections), insulin resistance (acanthosis nigricans), glycosylation of proteins (diabetic thick skin), and abnormal lipid metabolism (xanthoma).[3] Majority of the patients had diabetic duration of less than 10 years. Type 1 DM is seen usually in less than 30 years of age and has an abrupt onset, while type 2 diabetes occurs in middle aged and elderly and is gradual in onset.[7] The incidence of cutaneous involvement in diabetes varies from 11.4% to

71% in various studies.[4] In the present study, 76.8% of patient had cutaneous involvement. According to Chatterjee *et al*.[8] 73.9% of patients had skin lesions in their study. The most common dermatosis observed in the present study was cutaneous infections (57.5%) similar to the observations seen by Chatterjee *et al*.[8] (40.9%), Timshina *et al*.[9] (41.9%), Ghosh *et al*.[10] (51.7%) and Vahora *et al*.[11] (39.7%). In this study, cutaneous fungal infections were the most common seen in 131 (34.1%) cases, followed by bacterial infections seen in 67 (17.4%). Diabetic patients are at increased risk of infectious diseases with little documented evidence to support this. The increased incidence of infections in these patients could be due to peripheral vascular disease, diabetic neuropathy, abnormal microcirculation, hypohidrosis, decreased leucocyte adherence, delayed chemotaxis, and decreased phagocytosis.[12] In our study, most of the patients (66.5%) with cutaneous infections had uncontrolled diabetes.

Diabetic dermopathy (shin spots), although not pathognomic of DM, is considered as the most common dermatoses seen in diabetics affecting 7-70% of patients being more common in men over 50 years of age.[9] However, in this study, it was seen in only 11 (2.9%) of cases. A study conducted by Vahora *et al*.[11] showed similar results with diabetic dermopathy seen in 2.3% of cases.

Granuloma annulare is a necrobiotic disorder and its association diabetes and is not clear.[12] In the present study, granuloma annulare was observed in 3 (0.8%) cases. Timshina *et al*. reported granuloma annulare in 1.8% cases. Necrobiosis lipoidica (NL) is another necrobiotic disorder with lesions occurring mainly over legs but can involve other sites as well and is seen in 0.3-1.6% of diabetic patients.[9] In this study, necrobiosis lipoidica was seen in 1 (0.3%) case. In studies done by Nigam *et al*.[7], Chatterjee *et al*.[8] and Timshina *et al*.[9], necrobiosis lipoidica was reported in 0.5%, 0.20%, and 0.9% of cases, respectively.[7,8,9]

DM is not specifically associated with generalised pruritus.[12] Pruritus was observed in 4.5% of cases by Nigam *et al*.[4] in 15.2% of cases by Timshina *et al*.[9] and in 10% of cases by Mahajan *et al*.[13] In this study, pruritus was seen in 36 (9.4%) of cases.

Acrochordons (skin tags), a cutaneous marker of diabetes, were present in 66 (17.2%) of cases in our study. These were seen in 26.2% cases by Ragunatha *et al*. and in 13.3% cases by Vahora *et al*.[11,14] Acanthosis nigricans (AN), usually seen in insulin resistance, was seen in this study in 42 (10.9%) of cases. At higher concentrations insulin stimulate insulin like growth factor receptors on keratinocytes leading to epidermal cell proliferation. Lipodystrophy, another dermatoses occurring due to insulin resistance, was seen in 2 (0.5%) cases.

Vitiligo occurs in 1% to 7% of all diabetic patients and is associated with both type 1 and type 2 diabetes. In this study it was seen in 7 (1.8%) of cases. In patients with lichen planus, an increased incidence of abnormal insulin response to glucose challenge and diabetes mellitus has been claimed.[15] In the present study, lichen planus was seen in 18 (4.7%) of cases. Out of these, nine patients had cutaneous, 7 patients had oral, and 2 patients had genital lichen planus. Timshina *et al*.[9] and Vahora *et al*.[11] reported lichen planus in 4% cases each in their studies.

Diabetic foot can occur due to multifactorial pathogenetic mechanisms and is a serious complication. The contributing factors for its development include neuropathy and diabetic angiopathy, with neuropathy being the major factor. Diabetic foot was seen in 3 (0.8%) of

cases in this study and Ragunatha *et al*.[14] reported it in 0.2% of cases.

Psoriasis is associated with an increased incidence and prevalence of diabetes mellitus.[16] In this study, psoriasis was seen in 23 (6%) cases whereas incidence of psoriasis observed by Timshina *et al*.[9], Ghosh *et al*.[10] and Vahora *et al*.[11] was 2.2%, 3.3%, and 3.3%, respectively. This increased prevalence of psoriasis and diabetes could be a part of metabolic syndrome.

Conclusion

This study concludes that cutaneous infections were most commonly seen in patients with diabetes mellitus. Candidiasis and that too balanoposthitis was most common amongst fungal infections. Poor diabetic control as evidenced by HbA1c levels were associated with increased incidence of cutaneous infections. Diabetes mellitus as part of metabolic syndrome was seen in 23 cases with psoriasis. Cutaneous manifestations may be the first presenting sign or may precede the diagnosis of diabetes by many years hence identifying these cutaneous markers at the earliest can aid in diagnosis of diabetes.

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