

Original Research Article

A study of cutaneous manifestations in diabetes mellitus patients in tertiary care centre

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ABSTRACT

Background: Diabetes is the most common metabolic disorder with increased prevalence in developing countries like India. It affects almost all organs among which skin is affected by the acute metabolic derangements as well as by chronic degenerative complications. The aims were to study the pattern of cutaneous lesions in patients with diabetes mellitus and to determine the incidence of skin manifestations specific to and associated with diabetics.

Methods: Hundred cases of diabetes mellitus with cutaneous manifestations attending skin outpatient department and other patients admitted in medical wards were included in the study.

Results: The common skin disorders were cutaneous manifestations (67%), dermatosis more commonly associated with diabetes (36%), neuropathic and ischemic diabetic skin disease (11%).

Conclusions: Most common cutaneous manifestation was cutaneous infections followed by dermatosis more commonly associated with diabetes. Among cutaneous infections fungal infections were more common followed by bacterial infections. Cutaneous infections were more common in patients with poor glycaemic control and the association was found to be statistically significant.

Keywords: Diabetes, Cutaneous infections, Dermatitis

INTRODUCTION

Diabetes mellitus affects individuals of all ages and in all socio-economic segments of the population.¹ The International Diabetes Federation (IDF) estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to raise to 69.9 million by the year 2025.² Estimates by WHO suggest that the number of diabetic subjects would increase to 80 million by the year 2030 in India.¹ Skin lesions are frequently observed in diabetic patients and about 30% of diabetics have cutaneous disorders.³ The skin is affected

by the acute metabolic derangements and the chronic degenerative complications of diabetes. 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, neuron degeneration, and impaired host mechanisms.⁴ Only a few epidemiologic studies have been done on the prevalence of skin disorders in patients with diabetes mellitus.^{3,5} This study was designed to analyze the prevalence and pattern of skin disorders among diabetic patients from north coastal region of Andhra Pradesh.

METHODS

A convenient (non random) sample of 100 cases of type 1 and type 2 diabetes mellitus with cutaneous manifestations attending skin outpatient and inpatient department and other patients admitted in Great eastern medical school and hospital for period of 6 months from September 2018 to February 2019.

In the selected patients, a detailed history with particular reference to demographic details, family history of similar complaints and of DM, duration of DM treatment details, duration of various symptoms and evolution of lesions was taken. The patients were clinically examined in good light, for various cutaneous manifestations of DM such as skin lesions, nail changes, mucous membrane involvement. Relevant microbiological and histopathological investigations to confirm the diagnosis were carried out.

The data has been analyzed using chi square tested and represented in the form of percentages and significance shown in p value.

RESULTS

Age of the patients included in the study ranged between 21 and 78 years. The mean age of patients included in the study is 54.02 ± 12.02 years. Out of 100 patients included in the present study, 51% patients are male and 49% are female. Duration of diabetes of the patients included in the study ranged between 3 months and 20 years. In the present study 15% of the patients had diabetes for a duration of <1 year. Patients were divided based on the HbA1c levels into normal, good control, moderate control and poor control. 31% patients had poor control, 40% patients had moderate control, 14% had good control and 15% had normal levels. Hypertension was the most common systemic manifestation observed in 46 patients (46%).

Among 100 diabetic patients with cutaneous manifestations 51% patients had only one cutaneous manifestation, 35% patients had two cutaneous manifestations, 10% patients had three cutaneous manifestations and 4% patients had four cutaneous manifestations respectively. Among 100 patients with diabetes cutaneous infections were most common manifestations seen (67%) patients, rest of the patients had non-specific manifestations in (47%) patients. Dermatitis more commonly associated with diabetes is seen in (36%) patients, neuropathic and ischemic diabetic skin disease in (11%) patients, dermatosis associated with microangiopathy in (5%) patients, collagen disorders in (2%) patients and cutaneous reactions to therapy in (1%) patient. Out of 67 patients with cutaneous infections fungal infections were more common in 50 patients followed by bacterial infections in 13 patients and viral infections in 4 patients. Among 100 patients 36 patients had dermatosis associated with diabetes, acrochordon were seen in 11 patients, vitiligo in 6 patients, generalized

pruritus and acanthosis nigricans in 5 patients each, lichenplanus in 4 patients, psoriasis in 3 patients, alopecia areata and progressive pigmented purpura in 1 patient each. Among 100 patients 47 patients had nonspecific manifestations of diabetes. Of which eczema was seen in 12 patients, xerosis in 7 patients, melasma in 4 patients. Lichen simplex chronicus and miliaria rubra in 3 patients in each, idiopathic guttate hypomelanosis, seborrheic keratosis, dermatosis papulosa nigra, and chronic urticaria were seen in 2 patients each. pemphigus, scabies, polymorphic light reaction, keloid, keratolysis exfoliativa, post inflammatory hypo pigmentation, papular urticaria, syringoma, senile comedones, pamo plantar keratoderma were observed in one patient each.

Table 1: Pattern of cutaneous manifestations (n=100).

Dermatosis	No. of patients	%
Cutaneous infections (fungal, bacterial, viral & others)	67	67
Dermatosis associated with microangiopathy (diabetic dermopathy, bullae and rubeosis)	5	5
Neuropathic and ischemic diabetic skin disease (polyneuropathy, vascular diseases and ulcers)	11	11
Disorders of collagen (necrobiosis, granuloma annulare and scleroderma diabeticorum)	2	2
Dermatosis more commonly associated with diabetes (acrochordon, vitiligo, generalized pruritis, acanthosis)	36	36
Cutaneous reactions to therapy for diabetes	1	1
Nonspecific manifestations	47	47

One patient had one or more than one manifestations.

Table 2: Pattern of cutaneous infections.

Cutaneous infections	No. of patients	Percentage (%)
Bacterial	13	13
Fungal	50	50
Viral	4	4
Total	67	67



Figure 1: Multiple abscess.

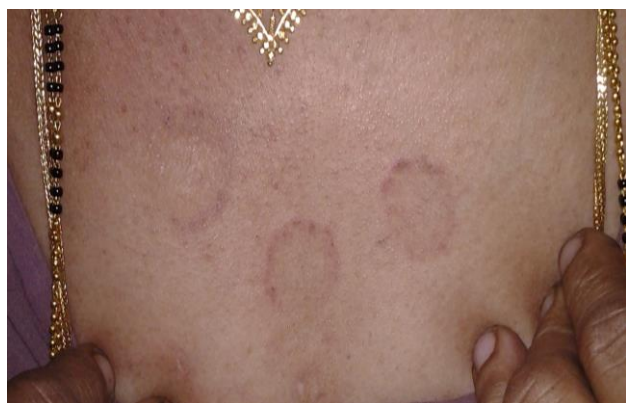


Figure 2: Tinea corporis.

Table 3: Comparison of cutaneous manifestations in controlled and uncontrolled diabetes.

Dermatosis	Controlled DM (<7%) n=29	Uncontrolled DM (>7%) n=71	P value
Cutaneous infections	25	42	<0.01
Dermatosis associated with microangiopathy	1	4	1.00
Neuropathic and ischemic diabetic skin disease	3	8	1.00
Disorders of collagen	0	2	1.00
Dermatosis more commonly associated with diabetes	8	28	0.529
Cutaneous reactions to therapy for diabetes	0	1	1.00
Nonspecific manifestations	10	37	0.258

Among 100 patients with cutaneous manifestations 29% patients had HbA1c <7% (good to moderate control) while 71% patients had HbA1c >7% i.e. poor control of diabetes. In the present study, when a comparison of pattern of cutaneous manifestations in controlled and uncontrolled groups was done, it was found that cutaneous infections, dermatosis associated with microangiopathy, neuropathic and ischemic diabetic skin disease, disorders of collagen, dermatosis more commonly associated with diabetes, cutaneous reactions to therapy for diabetes, nonspecific manifestations were more common in uncontrolled group which was meaningfully significant. The increased frequency of cutaneous infections in uncontrolled group was statistically significant ($p < 0.05$).

DISCUSSION

Cutaneous signs of diabetes mellitus are extremely valuable to the clinician. They generally appear after the primary disease has developed but may signal or appear coincidentally with its onset, or even precede diabetes by many years.

Nearly 85% patients were with in duration of <10 years of diabetes, which is almost similar to Bhat et al, Vahora et al, Wani et al a little higher than Goyal et al and Ahmed et al.^{7,9,12-14} Among the 100 diabetic patients with cutaneous manifestations, 29% patients had HbA1c levels <7 and 71% patients had HbA1c levels >7. These results were in contrast with the study conducted by Wani et al which showed that 70.58% patients are with controlled HbA1c levels and 29.4% patients are with uncontrolled HbA1c levels.¹³ Bhat et al showed that 55.56% patients are with uncontrolled HbA1c levels and 44.44% patients are with controlled HbA1c levels.¹⁴

Uncontrolled diabetes increases the risk of development of microangiopathy, related complications or sequelae and predisposes skin for various infections. Most common association found was hypertension followed by coronary artery disease and nephropathy. Similar results were observed in the studies conducted by Mahajan et al, Vahora et al and Bhat et al.^{9,11,14} Hypertension has been hypothesized to accelerate the process of microangiopathy in diabetics.¹⁶

Cutaneous infections were more common were most common manifestation followed by nonspecific manifestations of diabetes. This observation in present study is in accordance with various studies conducted by Mahajan et al, Chatterjee et al, Vahora et al, Verma et al and Pande et al.^{6,8-11}

High incidence of infections was due to the following factors:

- Hyper osmolality of the hyperglycaemic serum which causes diminished chemotaxis.
- There is impaired release of cytokines as a consequence of lack of insulin.
- Impaired phagocytosis may be due to diminished leucocyte response caused by thickening of capillary valves.
- Microangiopathy, atherosclerosis, micro aneurysms, increased mast cells in the upper dermis and elevated glucose levels.¹⁷

Infections were the most common dermatoses observed in 67% cases, of which fungal infections were most prevalent in 50% cases, followed by bacterial infections in 13% cases and viral infections in 4% cases. This is in accordance with other studies where infections were more common, as observed by Mahajan et al, Chatterjee et al, Verma et al and Pande et al.^{6,8,10,11} This may be

because most of our patients belonged to lower socio economic group residing in slum areas where hot and humid conditions, overcrowding and decreased resistance of the body predisposes the individuals for such infections.

Infections are usually common during early diabetes. This may be explained on the basis of decrease in the host defense mechanism, and decreased phagocytic activity, which is noticed immediately in uncontrolled diabetes and these changes do not require much longer time to develop unlike microangiopathy. The incidence of cutaneous infections was more in uncontrolled diabetics.

CONCLUSION

From the current hospital based convenient descriptive study, the conclusions were cutaneous infections mainly fungal were more commonly associated with diabetes. Among dermatosis more commonly associated with diabetes acrochordons was the most common manifestation. Cutaneous infections were more common in patients with poor glycaemic control and the association was found to be statistically significant. Cutaneous manifestations can heighten the suspicion of a physician regarding the diagnosis of diabetes. This further helps to prevent systemic derangements by early institution of appropriate treatment.

Proper skin care and long term control of blood glucose levels may reduce the risk of some of the skin lesions in diabetic subjects.

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REFERENCES

1. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes, estimates for the year 2000 and projection for 2030. *Diabetes Care*. 2004;27:1047-53.
2. Sicree R, Shaw J, Zimmet P. Diabetes and impaired glucose tolerance. In: Gan D, ed. *Diabetes atlas*. International diabetes federation. 3rd ed. Belgium: International Diabetes Federation; 2006: 15-103.
3. Romano G, Moretti G, Di Benedetto A, Giofre C, Di Cesare E, Russo G, et al. Skin lesions in diabetes mellitus: Prevalence and clinical correlations. *Diabetes Res Clin Pract*. 1998;39:101-6.
4. Bhat YJ, Gupta V, Kudyar RP. Cutaneous manifestations of diabetes mellitus. *Int J Diab Dev Ctries*. 2006;26:152-5.
5. Sasmaz S, Buyukbese MA, Cetinkaya A, Celik M, Arican O. The prevalence of skin disorders in type-2 diabetic patients. *Int J Dermatol*. 2005;3:1.
6. Verma GC, Jain SC, Shantanuvyas, Saluja M, Nyati A, Nehara HR, et al. Prevalence of Cutaneous Manifestations of Diabetes Mellitus. *IOSR J Dent Med Sci*. 2013;11(6):41-7.
7. Goyal A, Raina S, Kaushal SS, Mahajan V, Sharma NL. pattern of cutaneous manifestations in diabetes mellitus. *Indian J Dermatol*. 2010;55(1):39-41.
8. Chatterjee N, Chattopadhyay C, Sengupta N, Das C, Sarma N, Pal SK. An observational study of cutaneous manifestations in diabetes mellitus in a tertiary care Hospital of Eastern India. *Indian J Endocrinol Metab*. 2014;18(2):217-20.
9. Vahora R, Thakkar S, Marfatia Y. Skin, a mirror reflecting diabetes mellitus: A longitudinal study in a tertiary care hospital in Gujarat *Indian J Endocrinol Metab*. 2013;17(4):659-64.
10. Nigam PK, Pande S. Pattern of dermatoses in diabetics *Indian J Dermatol*. 2003;69(2):83-5.
11. Mahajan S, Koranne RV, Sharma SK. Cutaneous manifestation of diabetes melitus. *Indian J Dermatol Venereol Leprol*. 2003;69:105-8.
12. Ahmed K, Muhammad Z, Qayum I. Prevalence of cutaneous manifestations of diabetes mellitus. *J Ayub Med Coll Abbottabad*. 2009;21(2):76-9.
13. Wani MA, Hassan I, Bhat MH, Ahmed QM. Cutaneous Manifestations of Diabetes mellitus: A Hospital Based Study in Kashmir, India *Egyptian Dermatol Online J*. 2009;5(5):2.
14. Bhat YJ, Gupta V, Kudyar RP. Cutaneous manifestations of diabetes mellitus. *Int J Diabetes Developing Countries*. 2006;26(4):152-5.
15. Yosipovitch G, Hodak E, Vardi P, Shraga I, Karp M, Sprecher E, et al. The prevalence of cutaneous manifestations in IDDM patients and their association with diabetes risk factors and microvascular complications. *Diabetes Care*. 1998;21:506-9
16. Al-Mutari N, Zaki A, Sharma KA, Al-Sheltawi M. Cutaneous Manifestations in Diabetes Mellitus. *Med Princ Pract*. 2006;15:427-30.
17. Raghu TY, Vinayak V, Kanthraj GR, Girisha BS. Study of cutaneous manifestations Of Diabetes Mellitus. *Indian J Dermatol*. 2004;49(2):73-5.

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