

Cutaneous Manifestations of Type-II Diabetes Mellitus

Ghulam Hussain Baloch, Noor Mohammad Memon, Bikha Ram Devrajani, Pervez Iqbal and Nasreen Khalid Thebo

ABSTRACT

OBJECTIVE: To study the cutaneous manifestations in type-II diabetic patients in our tertiary care setup.

SETTING: This study was carried out in Medicine Department, Liaquat University Hospital Jamshoro/ Hyderabad, Sindh – Pakistan; from January to December 2005.

METHODS: Diabetic patients who had skin problems were selected for the study with convenience sampling technique. Then questionnaires were filled for collection of the data.

RESULTS: In this study, 72% diabetics had skin infections, whereas 28% patients had non infectious lesions. Fungal infections were the most commonest (50%), followed by 14.4% bacterial infections and viral infections (7.77%). Among fungal infections, *Candida albicans* was commonest (22.2%). The non infectious lesions were skin tags (8.8%), xanthomas (6.6%), and pruritis (6.6%).

KEY WORDS: Diabetes mellitus. Cutaneous manifestations. Infection. Bacteria.

INTRODUCTION

Long standing diabetes can lead to permanent and irreversible functional changes in body cells and thus lead to various complications.¹ The World Health Organization (WHO) estimates the global burden of diabetes to be 299 million cases by the year 2025.² The skin is the largest organ of the body. It is readily available for inspection and scientific study in case of every disease. It is particularly important in diabetics because it essentially does get involved in one way or the other.³ Dysregulation of glucose, insulin and lipids leads directly to physical signs in skin of patients with diabetes mellitus. Chronically elevated blood glucose leads to non-enzymatic glycosylation (NEG) of cutaneous proteins, which eventually leads to irreversible advanced glycosylation end products (AGEs).⁴ The epidemiologic statistics of skin diseases provide us information about prevalence, age and sex differences in affected groups and their regional distribution. The disease can result in complications affecting all systems of the body, including the skin.⁵ Cutaneous manifestations of diabetes mellitus can be classified in following categories:

1. Skin lesion due to diabetic abnormalities;
 - a. Diabetic microangiopathy
 - b. Erysipelas like erythema dermopathy
 - c. Wet gangrene of foot (DM shine spots)
 - d. Diabetic rubeosis
 - e. Diabetic dermopathy
 - f. Large vessel disease
2. Diabetic neuropathy

- a. The diabetic foot
3. Cutaneous infectious in Diabetic Mellitus
 - a. Non clostridial gas gangrene
 - b. *Candida albicans*
4. Insulin resistance and acanthosis nigricans
5. Various skin disorders associated with Diabetic Mellitus.
 - a. Necrobiosis lipoidica
 - b. Disseminated waxy skin granuloma annulare.
 - c. Diabetic Bullae of Diabetic Mellitus
 - d. Pruritis
 - e. Stiff joints and waxy skin
 - f. Scleroderma of Diabetic Mellitus
 - g. Vitiligo
 - h. Lichen planus
 - i. Hemochromatosis
 - j. Erythematous xanthomas
 - k. Finger pebbles
 - l. Skin tags
 - m. Local insulin reactions
 - n. Insulin lipodystrophy
 - o. Reactive perforating collagenosis (folliculitis)

Although diabetes is very common in Pakistan⁷, systematic surveys of the cutaneous manifestations in diabetic patients are lacking. Therefore, the aim of this study was to explore this problem in our own setup.

PATIENTS AND METHODS:

We studied 90 type-II diabetic patients with mucosal and skin lesions. All these patients were subjected to complete systemic enquiries, dermatological examina-

tion, systemic examination and systemic investigations, and were selected. A pre-designed proforma including age, sex, duration of diabetes, control of diabetes, type of lesion, distribution of skin lesion, history of previous drug therapy, involvement of toe-web, nails, soles, mouth and vagina (in females patients) was administered to patients for data collection. Specimens of skin scrapping, nail scrapping, high vaginal swab and oral swab were collected. All diabetic type-II patients with skin lesion were included in the study while type-I diabetic patients, patients with diabetes less than five years duration and the type-II diabetic patients without skin lesion were excluded.

RESULTS

Ninety type-II diabetic patients; 50 males and 40 females with cutaneous manifestations were included in the study. The demographic data of the patients are shown in **Table I**. Cutaneous manifestations were further evaluated into infectious and non-infectious skin lesions. Of 90 patients, infectious skin lesion was found in 65 patients and non-infectious in 25 patients (**Table II**). Frequency of fungal infections was found the highest. Fungal culture media showed type of fungus isolated on culture and also on electron microscopy (**Table III**). Frequency of tineaungium and candida albicans was found higher (22.2%). In all these patients, mean fasting blood sugar was 180mg±20 SD and duration of diabetes was 10 years±1.6 SD. These data show that cutaneous manifestations are closely related to uncontrolled diabetes of long duration.

**TABLE I:
DEMOGRAPHIC PROFILE OF PATIENTS**

Total diabetic patients	90
Males	50
Females	40
Type 2 diabetics on oral drugs	70
Type 2 diabetics on insulin	20
Age range	40-80 years
Mean age	60 ±6.5SD years
Mean fasting blood sugar	180 ±20SD mg%
Mean duration of type 2 diabetics	10±1.6SD years
Mean blood cholesterol	200±20 mg%

**TABLE II:
SKIN MANIFESTATIONS IN STUDY POPULATION**

Lesion	Diabetic (n=90)	
	Number of Cases	Percentage
Fungal	45	50
Bacterial	13	14.44
Viral	7	7.77
Non-infective skin lesion	25	27.77

**TABLE III:
PATTERN OF INFECTIVE AND NON-INFECTIVE SKIN LESIONS**

Lesion	n=90	
	Number of Cases	Percentage
Infective		
a. Bacterial		
Staphylococcus aureus	6	6.6
Streptococcus	2	2.2
Pseudomonas and proteus	5	5.6
b. Viral		
	7	7.8
c. Fungal		
Microsporom gypsum	3	3.3
Tineaungium	20	22.2
Tineaepedis	9	10
Candida albicans	20	22.2
Trichophyton rubrum	2	2.2
Tinea corporis	3	3.3
Non-infective		
Skin tags	8	8.8
Xanthomas	6	6.6
Pruiritis	6	6.6
Pigmentation on face	2	2.2
Lip dystrophy	2	2.2
Necrobiosis	1	1.1

DISCUSSION

Diabetes is a disease of multiple complications. Skin manifestations including various infective and non-infective lesions are common. Various studies are done in this regard by dermatologists and others. This study was done with the help of a dermatologist and Department of Microbiology, Sindh University, Jamshoro, to study infective and non-infective skin lesions in diabetic patients. In this study, 72% diabetic patients had infective lesions whereas 28% non-infective lesions. Among the diabetics who had infective lesion fungal infection was found in highest percentage i.e. 50% of the studied patients whereas 14.4% patients had various bacterial infections including gram negative bacterium (proteus and pseudomonas) 6.6%. Rest of bacterial invasions isolated from diabetic wound were staphylococcus, streptococcus and anaerobic making ratio of 4%, 2% and 1% respectively. Among viral infections herpes zoster accounted 5.5% and herpes simplex 2% in studied diabetic patients. Percentage of tineaunguim and candida albicans both were found higher (22.2%) followed by Tineaepedis (10%), microsporom gypsum (3.3%), tinea corporis (3.3%) and trichophyton rubrum (2.2%). Non-infective skin lesions accounted 28% in studied patients. Among these, skin tags were present in 8.8%, xanthomas in 6.6%, and unexplained pruritis in 6.6% cases. Other skin lesions found in this study were pigmentation on face (2.2%), lip dystrophy (2.2%) and necrobiosis (1.1%). Same results are found by Najdaw F, et al.⁸ In their retrospective study, they found eczema/dermatitis was the commonest skin disorder seen in 25.9% of cases followed by pruritis without skin lesion 15.1%, viral infection 14.7% (mostly herpes zoster), fungal infection 13.8% and bacterial infection 10.3%. In their study, they found bacterial infection as the commonest skin disorder in patients with diabetes 62.5%, followed by fungal infection 50%. Another study conducted by Foss NT, et al, found highest number of dermatoptosis 82.6%, actinic degeneration 66.7%, pyoderma 5%, cutaneous tumor 3%, necrobiosis 1%, and diabetic dermopathy 1.2%.⁹ Results of other study done by Naheed T, et al, found that 56% cases had bacterial infection, 48% had candidal infec-

tion and 21.4% had fungal infection.¹⁰ Among non-infective lesions acanthosis nigricans were present in 16.7% cases, xanthoma in 8.8%, skin tags 21.1%, vitiligo in 6.7% and pruritis in 46.7% cases.

CONCLUSION

This study shows higher frequency of skin lesions in diabetic patients, especially fungal infections in our setup. Poor glycemic control increases the susceptibility of skin infections. Health promotion and education to control glycemia can do much to reduce the risk of these disorders.

REFERENCES

1. Powers AC. Diabetes Mellitus. In: Kasper DL, Braunwald E, Fauci AS, Hauser SL, Longo DL, Jameson JL (eds). Harrison's principles of internal medicine. New York: McGraw-Hill, 2005; 2152-3.
2. Khatib P, Oussama MN. Guidelines for the prevention, management and care of diabetes mellitus. EMRO Technical Publications Series; 32, 2006:1.
3. Dogra S, Kumar B. Epidemiology of fungal infections, a study from Northern India. *Pediatr Dermatol.* 2003;20:470.
4. Goldin A, Beckman JA, Schmidt AM, Creager MA. Advanced glycation end products: sparking the development of diabetic vascular injury. *Circulation.* 2006;114(6):597-605.
5. Henseler T, Christopher ST. Onychomycosis. *J Am Acad Dermatol.* 1995; 32: 982-6.
6. Al-Mutairi N, Zaki A, Sharma AK, Al-Sheltawi M. Cutaneous manifestations of diabetes mellitus. Study from Farwaniya hospital, Kuwait. *Med Princ Pract.* 2006;15(6):427-30.
7. Wahid Z, Kanjee A. Cutaneous manifestations of diabetes mellitus. *J Pak Med Assoc.* 1998; 48(10): 304-5.
8. Najdawi F, Fa'ouri M. Frequency and types of skin disorders and associated diabetes mellitus in elderly Jordanians. *East Mediterr Health J.* 2002; 8:574-8.
9. Foss NT, Polon DP, Takada MH, Foss-Freitas MC, Foss MC. Skin lesions in diabetic patients.

Rev Saude Publica. 2005; 39:677-82

10. Naheed T, Akbar N, Akbar N, Shahzad M, Jamil S, Ali T. Skin manifestation amongst diabetic pa-

tients admitted in Medical Ward for various other medical problems. Pak J Med Sci. 2002; 18(4): 291-6.



AUTHOR AFFILIATION:

Dr. Ghulam Hussain Baloch

Senior Lecturer, Department of Medicine
Liaquat University of Medical and Health Sciences
(LUMHS) Jamshoro, Sindh - Pakistan.

Dr. Noor Mohammad Memon

Professor, Department of Medicine
LUMHS Jamshoro, Sindh - Pakistan.

Dr. Bikha Ram Devrajani

Assistant Professor, Department of Medicine
LUMHS Jamshoro, Sindh - Pakistan.

Dr. Pervez Iqbal

Dermatologist
Liaquat University Hospital Hyderabad, Sindh - Pakistan.

Dr. Nasreen Khalid Thebo

Department of Microbiology
University of Sindh Jamshoro, Sindh - Pakistan.