International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

A Clinical Study of Mucocutaneous Manifestation in Diabetic Patients

Rajendra Kumar Verma[1], Ishwar Chouhan[1], Priyanka Mehra[2], Dinesh Kumar Barolia[3]

[1]Department of Medicine, J.L.N. Medical College, Ajmer, Rajasthan.
[2]Department of Ophthalmology, J.L.N. Medical College, Ajmer, Rajasthan.
[3]Dept of General Surgery, R.N.T. Medical College, M.B.Govt. Hospital, Udaipur, Rajasthan, India.

Corresponding Author: Rajendra Kumar Verma

Received: 14/04/2016 *Revised: 28/04/2016* *Accepted: 30/04/2016*

ABSTRACT

Diabetes mellitus is a chronic disease which leads to various mucocutaneous diseases.
Aims and objectives:

1. To study mucocutaneous manifestation of diabetes mellitus.
2. To compare mucocutaneous manifestation in controlled and uncontrolled diabetes mellitus.

Design of study: this prospective study was carried out on 200 patients with diabetes mellitus in Department of Medicine, Jawahar Lal Nehru Medical College and Hospital, Ajmer, Rajasthan.
Results: Out of 200 patients diabetic foot ulcers were present in 3% (6) cases, diabetic bullae, necrobiosis lipoidica diabeticorum, granuloma annulare respectively in 0.5% (1) case,1.5% (3) cases, 2%(4) cases, 2.5% (5) alopecia areata, 2.5% (5) Lichen amyloidosis, 1.5% (3) macular amyloidosis, 1.5% (3) vitiligo 1% (2) carbuncle, 1% (2) eruptive xanthomas, SLE in 0.5% (1) cases, systemic sclerosis in 1% (2) cases, localized sclerosis Morphea in 1% (2) cases, psoriasis in 1.5% (3) cases , Lichen planus in 2% (4) cases, yellow palms in 0.5% (1) case and pterygium unguis inversus in 0.5% (1) case.

Key words: Cutaneous, Diabetes mellitus, Mucocutaneous, Hyperglycemia.

INTRODUCTION

Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia and is a worldwide problem. Its prevalence is increasing day by day due to sedentary life style. Diabetes is characterized by a state of chronic hyperglycemia due to relative or complete deficiency of insulin which affecting glucose, fat and protein metabolism. This elevated blood glucose level leads to various metabolic, vascular, neurological and immunological abnormalities. [1] Diabetes is broadly classified into two types: Type 1 diabetes mellitus [previously called as IDDM (Insulin dependent diabetes mellitus)]. Type 2 diabetes mellitus (previously called as NIDDM (non-insulin dependent diabetes mellitus). In type 1 diabetes (insulin-dependent DM) an insufficiency of insulin occurs through a gradual, immune mediated destruction of β islet cells in the pancreas, marked by autoantibodies. In type 2 diabetes (formerly non-insulin-dependent DM) chronic hyperglycemia occurs mainly through end-organ insulin resistance followed by a progressive decrease in pancreatic insulin release associated with ageing. [2] Diabetes mellitus affects individuals of all ages and in all socio-economic segments of the population. Global presence of type 2 diabetics in the year 2000 was 171 million which is likely to be 366 million in the year 2030. [3] 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 rise to 69.9 million by the year 2025. [4] Affected organs include cardiovascular, renal, nervous system, eyes and skin. Skin is affected by both acute metabolic derangement and chronic degenerative complication of diabetes. Although mechanism for many skin condition associated with diabetes remain unknown, the pathogenesis of other are linked to abnormal carbohydrate metabolism, microangiopathy, atherosclerosis, impaired host defense mechanism, neuronal degeneration and some other altered metabolic pathways. [5] The attachment of glucose to protein may result in a profound effect on structure and function of that protein and account for clinical manifestation of disease. It has been suggested that increased cross linking of collagen in diabetic patient is responsible for thicker skin. [6,7] Advanced glycosylation end products are probably responsible for yellowing of skin and nails. Increased viscosity of blood due to stiff red blood cell membranes result in engorgement of post capillary venules in the papillary dermis detected as erythema of face (Rubeosis faciei) and periungual erythema. [8] Studies show that degree of cutaneous advanced glycosylation end products (AGES) correlates strongly with retinopathy, nephropathy and other micro vascular complication of diabetes. [9] Association of certain skin disease with diabetes like diabetic thick skin, cutaneous infection (bacterial candidal, dermatophytic, and viral), diabetic dermopathy, generalized pruritus, xanthelasma, skin tags, acanthosis nigricans, lichen planus, vitiligo, diabetic bullae, necrobiosis lipoidica, erythrasma, granuloma annulare are fairly well recognized with diabetes mellitus. [10,11] Complication of diabetes like diabetic neuropathy, ischemic ulcer diabetic foot ulcer and complication of treatment like insulin allergy, lipoatrophy or lipohypertrophy are also well recognized as cutaneous manifestation. [12]

Table 1: Pattern of dermatosis.

Skin Disease	No. of patient (%)
Dermatophytic fungal infection	23 (11.5%)
Candidal infection	22 (11%)
Generalized pruritus	21 (10.5%)
Acanthosis nigricans	21 (10.5%)
Skin tags	19 (9.5%)
Furunculosis (Boils)	18 (9%)
Sclerosis of finger (finger pebbles)	18 (9%)
Onychomycosis	14 (7%)
Shin spot	14 (7%)
Xanthelasma	14 (7%)
Acquired ichthyosis	13 (6.5%)
Rubeosis faciei	13 (6.5%)
Urticaria	9 (4.5%)
Seborrheic keratosis	9 (4.5%)
Periocular melanosis (POM)	9 (4.5%)
Photodermatitis	9 (4.5%)
Folliculitis	8 (4%)
Scleredema diabeticorum	8 (4%)
Melasma	8 (4%)
PIH (Post Inflammatory Hyperpigmentation)	8 (4%)
Limited joint mobility	7 (3.5%)
Diabetic foot ulcer	6 (3%)
Lichen amyloidosis	5 (2.5%)
Carbuncle	2 (1%)
Eruptive xanthoma	2 (1%)
Lipohypertrophy	1 (0.5%)
Diabetic bullae	1 (0.5%)

Table 2: Disorder of pigmentation (n=200).

Disorder of pigmentation	No. of patient (%)
Periocular melanosis (POM)	9 (4.5%)
Melasma	8 (4%)
PIH (Post inflammatory hyper pigmentation)	8 (4%)
IGHM (Idiopathic guttate hypomelanosis)	7 (3.5%)
PPD (Pigmented purpuric dermatosis)	5 (2.5%)
Vitiligo	3 (1.5%)
Yellow palms	1 (0.5%)
Addisonian pigmentation of face and hands	1 (0.5%)
Total	**42 (21%)**

DISCUSSION

The clinical study for mucocutaneous manifestation in diabetes mellitus was carried out on all patients of diabetes mellitus attending the outpatient and inpatient, Department of Medicine, Jawahar Lal Nehru Hospital, Ajmer. Two hundred patients were registered under this study. Out of 200 patients there were 57% (114) were male and 43% (86) were female. The male: female ratio was 1.32:1. There was slight male preponderance but this difference was not significant. Some studies have shown slight male preponderance and some others shown slight female preponderance. [9] Age of patients ranged from 21 year to 80 years. Average (mean) age of presentation with mucocutaneous manifestation was 53.69 years.

Out of 200 patients majority were belonged to 5th, 6th and 7th decade of life, 23.5% in 5th decade, 31% patient in 6th decade, 19.5% patient in 7th decade of life with maximum patient belonged the 41-60 years age group 109 (54.5%) patients. Chhabra SN in his study had observed that maximum case was belonged to 41-60 year age group (56.8%) similar to our study. [13]

Average age of duration of diabetes presented with mucocutaneous manifestation was 4.15 years, minimum duration of diabetes mellitus observed was only one month to maximum duration of diabetes mellitus observed 25 years. Majority of patient had <5 years of duration of diabetes mellitus at the time of presentation of mucocutaneous manifestation, patient with <5 years duration were 75.5%, 6-10 years duration were 17% and >10 years duration were 7.5% patients. It shows that diabetes mellitus can fairly recognize or suspected with mucocutaneous manifestation alone. Alteras and Saryat and Dogra et al. also reported that in majority of patient with diabetes mellitus, mucocutaneous manifestation significantly correlated with duration of diabetes mellitus ($P<0.05$), in their study duration of disease was less than 6 years in majority of patients. [14,15]

Out of all 200 patients average fasting blood sugar level was 139.43 mg/dl, average postprandial blood sugar level was 220.69mg/dl. Out of all 200 patients 8% (16) patient was on insulin for control of their blood sugar level and 92% (184) patient were on oral hypoglycemic drugs. In spite of treatment in all patients, blood sugar level was uncontrolled in 87% patients; it was controlled only in 13% (26) patient with mucocutaneous manifestations. As found by Yosipovitch et al. and Sawhney et al. skin manifestation were more common in patient who had uncontrolled diabetes. Uncontrolled diabetes increases risk of development of microangiopathy and related complications. [11,16]

Out of all 200 patients 76% (152) patients were from urban background and 24% (48) patients were from rural background this was due to because diabetes mellitus affects mainly urban population with sedentary life style, specific dietary habits, lack of exercise and more obesity.

Out of all 200 patients majority were graduate and matric, it shows diabetes mellitus affect adult population who is more literate and do less hard work like official works, business rather than illiterate people who resides in villages and work hard, has less obesity and other risk factors responsible for diabetes mellitus. Sedentary life style, stressful life, excessive intake of alcohol, high saturated fat intake, low dietary fiber, obesity are important risk factor for diabetes mellitus are more prevalent in urban population and literate population. Out of all 200 patients 36.5% (73) patients had positive family history. Out of 200 patients hypertension was observed in 35% (70) patients, diabetic retinopathy was observed in 21.5% (43) patient, diabetic nephropathy was observed in 6.5% (13) patients, hypothyroidism was observed in 12% (24) patients and hyperthyroidism was observed in 1.5% (3) patients. It shows high prevalence of systemic complication associated with diabetes mellitus. Similar high percentage (55.5%) of systemic complication associated in patient of mucocutaneous manifestation with diabetes also shown by Shemer et al. [17]

Among all 200 patients most common mucocutaneous manifestations of diabetes mellitus observed were fungal infections in 32.5% (65) cases and bacterial infections 21% (42) cases. It was probably due to overcrowding areas in Ajmer, poor personal hygiene and humid climatic conditions. Similar to our study Mahajan et al., Nawaf Al-Mutairi, Perez et al. has shown that infections are most common mucocutaneous manifestation associated with diabetes mellitus. [5,18,19] Other dermatoses associated with diabetes mellitus observed in our study were acanthosis nigricans 10.5% (21) cases, generalized pruritus 10.5% (21) cases, skin tags

(acrochordon) in 9.5% (19) cases, finger pebbles (sclerosis of finger) in 9% (18) cases, shin spots (Diabetic dermopathy) in 7% (14) cases. Acquired ichthyosis 6.5% (13) cases, rubeosisfaciei6.5% (13), xanthelasma 7% (14) cases, telogen effluvium 5% (10) cases, seborrheic keratosis, Periocular melanosis (POM), photodermatitis, urticaria each were present 4.5% (9) cases, Scleredema diabeticorum, melasma, post inflammatory hyper pigmentation each was observed in 4% (8) cases, limited joint mobility of finger joints was observed in 3.5% (7) cases. Yasmin Bhat, RP Kudyar et al., and Paron, Lambert et al. has shown all above associations with diabetes in their studies similar to our study. [9,20]

Out of 200 patients diabetic foot ulcers due to neuropathy and microangiopathy were present in 3% (6) cases. Specific dermatosis shown association with diabetes mellitus in many studies likes diabetic bullae, necrobiosis lipoidica diabeticorum, granuloma annulare were present in our study respectively in 0.5% (1) case,1.5% (3) cases, 2%(4) cases. Similar results have been shown by Tariq Mahmood et al. [21]

Out of 200 patients 2.5% had alopecia areata, 2.5% had Lichen amyloidosis, 1.5% had macular amyloidosis, 1.5% had vitiligo 1% had carbuncle and 1% had eruptive xanthomas. These manifestation also observed in some other studies like Nigam and Pandey. [22]

Out of 200 cases some uncommon diseases were present in our study with insignificant frequency like SLE in 0.5%(1) cases, systemic sclerosis in 1% (2) cases, localized sclerosis Morphea in 1% (2) cases, psoriasis in 1.5% (3) cases , Lichen planus in 2%(4) cases, yellow palms in 0.5% (1) case and pterygium unguis inversus in 0.5% (1) case.

Among all 200 cases, cases due to reaction of treatment of diabetes mellitus were observed in a few cases. Lipohypertrophy at injection site due to insulin was present in one case (0.5%), erythema multiforme like rash due to oral hypoglycemic drugs was present in one case (0.5%) and a few cases of photodermatitis were observed in our study. Among all 200 cases vesiculobullous disorder were present in 4 cases out which 2 cases (1%) were of pemphigus, 1(0.5%) case was of dermatitis herpetiformis and 1(0.5%) case of was dermatomyositis.

Thus a variety of mucocutaneous manifestations in diabetes had been observed in our study which helps to diagnose diabetes mellitus merely by careful inspection of skin.

RESULTS AND CONCLUSION

The study revealed following conclusions:

- Most commonly affected age group was 41-60 year age group 54.5% (109) patients.
- Male: Female ratio was 1.32:1; slight male preponderance is common in south East Asia according to WHO.
- Most commonly affected religious group of was Hindu's affected in 73% (146) cases followed by Muslims in 18% (36) cases, Sikh in 5.5% (11) cases and Christian were least affected with 3.5% (7) cases.
- 181 (90.5%) patient were married, 6% (12) patients were unmarried, 3% (6) were widow and 0.5% (1) was divorcee.
- Urban patient (76% (152) were more commonly affected as compared to rural patients affected in 24% (48) cases.
- 38.5% (77) patients were graduate, 25.5% patients were matric while only 12.5% (25) patients were illiterate.
- Family history of diabetes was positive in 36.5% (73) patients.
- Average (mean) fasting blood sugar level was 139.43 mg/dl while average (mean) postprandial blood sugar level was 220.69mg/dl.
- Average duration of diabetes was 4.15 years which shows that mucocutaneous manifestation are more common in diabetes with longer duration.
- Diabetes was controlled in 13% (26) patients and was uncontrolled in 87% (174) patients which shows that mucocutaneous

manifestation are more common in patients with uncontrolled diabetes mellitus.

• Hypertension was most common systemic association of diabetes with muco-cutuneous manifestation in 35% (70) patients.

• Fungal infections were most common mucocutaneous manifestation of diabetes mellitus in 32.5% (65) cases followed by bacterial infections (pyodermas) in 21% (42) cases.

• Most common fungal infections in diabetes was infection with dermatophytes (11.5%) followed by candidal infections (11%), onychomycosis (7%) and pityriasis versicolor in 3% cases.

• Most common bacterial infection was furunculosis (multiple boils) followed by folliculitis, erythrasma and intertrigo.

• Paresthesia was most common neurological manifestation of diabetes mellitus.

• Most common connective tissue disorder due to non-enzymatic glycosylation of collagen was sclerosis of finger (finger pebbles) in 9% (18) cases, Scleredema diabeticorum 4% (8 cases) and limited joint mobility in 3.5% (7) cases.

• Among disorder of keratinization most common disorder was acanthosis nigricans in 10.5% (21) cases, acquired ichthyosis in 6.5% (13), palmoplantar keratoderma PPKD in 4.5% (9) cases.

• Most papulosquamous disorder observed were shin spots in 7% (14) cases and xerosis in 4% (8) cases.

• Xanthelasma was most common metabolic disorder present in 7% (14) cases.

• Among the disorder of pigmentation, periocular melanosis (POM) in 4.5% (9) cases, melasma and post inflammatory hyperpigmentation each in 4% (8) cases were important mucocutaneous manifestation observed in our study.

• Telogen effluvium 5% (10 cases) and nail dystrophy in 4% (8) cases were most common hair and nail disorders presented respectively in our study.

• Among the benign skin conditions skin tag (acrochordon) 9.5%, seborrheic keratosis 4.5%, cherry angiomas (4.5%), freckles (4%) and DPN (3.5%) were important manifestation presented.

• Rubeosis faciei (6.5%), necrobiosis lipoidica diabeticorum (1.55), granuloma annulare (2%) were important specific dermatosis associated with diabetes.

• Diabetic foot ulcer (3%) and diabetic bullae (0.5%) were important mucocutaneous manifestation presented due to complication of diabetes mellitus.

• Generalized pruritus was present in (10.5%) patients and urticaria was present in (4.5%) cases.

• Among the dermatosis due to complication of treatment of diabetes mellitus, lipohypertrophy was present in 1(0.5%) case and EM like rash was present in 1 (0.5%) case.

• Thus there are diverse mucocutaneous manifestations of diabetes mellitus of which some are specific and some are non-specific.

• Careful examination of these disorders may be helpful in early diagnosis of diabetes mellitus.

REFERENCES

1. Jennifer, John E. Diabetes mellitus In: Irvin MF, Arthur Z, Klaus W, Austen KF, Goldsmith LA, Katz SI, editors. Dermatology in General Medicine 6th Ed. McGraw Hill. Medical Publishing Division: New York; 2003, P. 1651-61.
2. Andrea A.Kalus, Andy J.Chien, John E. Olerud. Diabetes Mellitus and other endocrine diseases. In : Klaus Wolff, Lowell A. Goldsmith, Stephen L.Katz, Barbara A. Gilchrest, Amy S Paller, David J. Leffell eds. Fitzpatricks Dermatology In General Medicine 7th ed. New York MC Graw Hill. 2008:1461
3. 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
4. Sicree R, Shaw J, Zimmet P. Diabetes and impaired glucose tolerance. In: Gan D, editor. Diabetes atlas. International diabetes federation. 3 rded. Belgium:

International Diabetes Federation; 2006. p. 15-103
5. Mahajan S, Koranne RV, Sharma SK. Cutaneous manifestation of diabetes mellitus. Indian J Dermatol Venerol Leprol 2003; 69:105-8.
6. Brownlee M, Vlassara H, Kooney A et al. Aminoguanidine prevents diabetes induced arterial wall protein cross linking. Science 1986;232:1629-32
7. Delbridge L, Ellis CS, Robertson K, Lequesne LP. Non-enzymatic glycosylation of keratin from the stratum corneum of the diabetic foot. Br. J Dermatol 1985; 112:547-54.
8. Otsuji S, Kamada T. Biophysical changes in the erythrocyte membrane in diabetes mellitus. RinshoByori 1982; 30:888-97.
9. Bhat YJ, Gupta V, Kudyar RP. Cutaneous manifestation of diabetes mellitus. Int J DiabDevCtries 2006; 26:152-5.
10. Greenwood AM. A study of skin in 500 diabetics. JAMA 1927; 89:774-9.
11. Yosipovitch G, Hodak E, Vardi P, Shraga I, Karp M, Sprecher E. et al. The prevalence of cutaneous manifestation in IDDM patients and their association with diabetes risk factors and microvascular complication. Diabetes care 1998; 21:506-9.
12. Ferringer T, Miller F III. Cutaneous manifestations of diabetes mellitus. Dermatol Clin 2002; 20:483-92.
13. Chhobra SN. Cutaneous manifestation in diabetes mellitus. Thesis submitted to Delhi University in 1978.
14. Alteras I, Saryt E. Prevalence of pathogenic fungi in the toe webs and the nails of diabetic patients. Mycopathologia 1979; 67:157-9.
15. Dogra S, Kumar B, Bhansali A, Chakrabarty A. Epedemiology of onydromycosis in patients with diabetes mellitus in India. Int J Dermatol 2002; 41:647-51.
16. Sawhney MP, Tutakne MP, Rajpathak SD. Clinical study of diabetic angiopathy. Indian J Dermatol Venerol Leprol 1996; 56:18-21.
17. Shemer A et al: Diabetic dermopathy and internal complications in diabetes mellitus. Int J Dermatol 37:113, 1998.
18. Nawaf Al-Mutairi. Skin diseases seen in diabetes mellitus. Bull Kuwait Inst Med Spec 2006; 5:30-39.
19. Perez MI, Kohn SR. Cutaneous manifestations of diabetes mellitus. J Am AcadDermatol 1994; 30:519-31.
20. Paron NG, Lambert PW. Cutaneous manifestations of diabetes mellitus. Prim Care 2000; 27:371-83.
21. Mahmood T, Ul-Bari A, Agha H. Cutaneous manifestation of diabetes mellitus. J Pak AssocDermatol 2005; 15:227-32.
22. Nigam PK, Pande S. Pattern of dermatosis in diabetes. Indian J Dermatol Venerol Leprol 2003; 69:83-5.

How to cite this article: Verma RK, Chouhan I, Mehra P et al. A clinical study of mucocutaneous manifestation in diabetic patients. Int J Health Sci Res. 2016; 6(5):33-38.

****