MAK HILL Publications International Journal of Tropical Medicine

Research Article
doi: 10.36478/makijtm.2021.4.53.56

A Study of Skin Manifestations in Patients with Diabetes Mellitus and their Correlation with Glycosylated Hemoglobin

[1]Ravipati Neelima, [2]K. Sumana and [3]Mohammed Imran Ali

[1-3]Department of Dermatology, Venereology and Leprology, Chalmeda Anand Rao Institute of Medical Science, Karimnagar, India

ABSTRACT

Males (61.7%) outnumbered females (38.3%) in this study. About 5% of the study subjects had type 1 diabetes mellitus and 95% had type 2 diabetes mellitus. The mean duration of type 1 diabetes mellitus was 47.2 years and type 2 diabetes mellitus was 26.83 years. 93.3% of the study subjects in this study were known diabetics and 6.7% of the cases were incidental cases detected during the time of examination of cutaneous manifestations. About 37.5% of the study subjects had diabetes since 1-5 years and 40% had since 5-10 years. About 40.6% of the study subjects had cutaneous infections, 32.6% had cutaneous manifestations which are not specific to diabetes mellitus. Strong to weak association of cutaneous manifestations to diabetes mellitus was present in 24.6% of the cases. About 21.7% of the patients in this study had fungal infections, 15.2% had bacterial infections and 3.6% had viral infections. Among the fungal infections, Candidal balanoposthitis, Candidal vulvovaginitis, Intertrigo, Onychomycosis, Tinea corporis, Tinea cruris and Tinea mannum were common. Herpes zoster was the common viral infection which was present in 2.9% of the patients and verruca vulgaris was present in 0.7% of the study subjects. In the cutaneous manifestations which had strong to weak association with diabetes mellitus, vitiligo, Diabetic dermopathy, Acanthosis nigricans, Lichenplanus, Xanthoma, Granuloma annualare, Kyrle's disease, Scleroderma of Buschke and Bullosis diabeticorum were present in this study. Leucocytoclastic vasculitis, Porokeratosis, Contact dermatitis, keloids and Lipodytsrophy were the other non specific manifestations. Majority of patients with cutaneous manifestations (80.5%) were seen in patients with fair to poor control of diabetes mellitus. There was a statistical significance (p=0.000) between cutaneous infections and glycosylated hemoglobin. About, 42.9% cutaneous infections, 20.0% with non specific lesions to DM and 47.1% with strong to weak associations with DM had poor glucose control. About 40.4% of the patients with cutaneous infections, 35.7% of patients with lesions not specific of diabetes mellitus and 48.4% of patients with strong to weak association of diabetes mellitus had diabetes since 5-10 years.

OPEN ACCESS

Key Words

Cutaneous manifestations, candidal balanoposthitis, vitiligo, diabetic dermopathy diabetes mellitus

Corresponding Author

Mohammed Imran Ali,
Department of Dermatology, Venereology and Leprology, Chalmeda Anand Rao Institute of Medical Science, Karimnagar, India

Author Designation

[1-3]Assistant Professor

Received: 30 July 2021
Accepted: 28 August 2021
Published: 15 September 2021

Citation: Ravipati Neelima, K. Sumana and Mohammed Imran Ali, 2021. A Study of Skin Manifestations in Patients with Diabetes Mellitus and their Correlation with Glycosylated Hemoglobin. Int. J. Trop. Med., 16: 53-56, doi: 10.36478/makijtm.2021.4.53.56

INTRODUCTION

Diabetes mellitus (DM) is a major lifestyle disorder, which is fast gaining the status of a potential epidemic in India and World. It is a most common endocrine disorder across the world. It is a heterogenous condition characterized by hyperglycemia as a consequence of defects in insulin secretion and variable degrees of insulin resistance[1]. Diabetes mellitus is an "Iceberg disease" affecting 422 million people worldwide and set to increase to 592 million by the year 2035. It is the commonest endocrine disease with every fifth diabetic in the world lives in India. Diabetes mellitus is an established risk factor for morbidity and mortality[2]. Diabetes Mellitus may be accompanied by other biochemical disturbances and the presence of progressive diabetic tissue damage with microvascular complications including retinopathy, neuropathy and nephropathy and macro vascular complications including cardiovascular, cerebrovascular and peripheral vascular diseases[3]. DM can be further characterized into type 1 Diabetes mellitus (T1DM) and type 2 Diabetes mellitus (T2DM). T1DM is a chronic immune mediated disease that is characterized by selective loss of insulin producing ß cells in the pancreatic islet. T2DM is characterized by reduced insulin signaling and/or insulin production with subsequent ß-cell dysfunction[4,5]. Involvement of skin is a key component in Diabetes mellitus. The data available shows that, skin disorders will be present in 79.2% of people with diabetes[4]. Skin is particularly important in diabetics because it does get involved in one way or other. The prevalence of cutaneous infections is more in DM type 2 whereas autoimmune conditions are commonly associated with DM type 1[5]. It has been observed that at least 43-66% of patients with diabetes mellitus have some type of cutaneous involvement during the course of their chronic disease, and 20-55% of these patients have uncontrolled diabetes. Uncontrolled diabetes increases the risk of development of microangiopathy and related complications[6]. There are many skin manifestations in DM, which may vary from trivial to life threatening but none of them are pathognomonic of the disease. Some cutaneous manifestations in diabetes mellitus are relatively specific "markers" of the condition, usually caused by the metabolic changes in diabetes or associated with endocrine disorders that cause diabetes. Other skin conditions develop as manifestations of chronic diabetic complications, particularly vascular changes and peripheral neuropathy. Skin infections are more common in people with poorly controlled diabetes, but not specific for the condition. Cutaneous side effects of drug treatment for diabetes may occur, although these are less common with current therapies[7]. The cutaneous manifestations include number of conditions which may be specific and much more common in people with diabetes than general population (e.g., necrobiosis lipoidica). The cause of many of these conditions remains obscure, although some may be related to the process of non enzymatic glycation of cutaneous structural proteins, particularly collagens or changes in microvascular structural proteins. A number of cutaneous conditions were previously thought to have an increased incidence in diabetes, but subsequent studies have not substantiated these links (e.g., generalized pruritus)[8]. The evidence that granuloma annulare is associated with diabetes is inconclusive[9-14]. Glycosylated (or glycated) hemoglobin (HbA1c) is a form of hemoglobin used primarily to identify the average plasma glucose concentration over prolonged periods of time. It is a parameter of checking blood glucose control in diabetics over the past 3 months. The reference range (that found in healthy persons), is about 5%-7%. A diabetic person with good glucose control has a Hb A1c level that is close to or within the reference range[10].

MATERIALS AND METHODS

A cross sectional study was conducted among the patients with diabetes mellitus attending the Department of DVL. About 120 patients attending the outpatient department during the study period constituted the study sample. The inclusion and exclusion criteria were as follows.

Inclusion Criteria:

- All confirmed (old and new) cases of Diabetes Mellitus with mucocutaneous manifestations irrespective of age, sex, duration of illness and associated diseases, willing to participate in the study.

Exclusion Criteria:

- Patients with chronic renal failure.
- Pregnancy.
- Retropositive Patients.
- Serum electrolyte abnormalities.
- Non complying patients who do not consent to participate in the study.

All the patients who were diagnosed to have Diabetes mellitus according to the revised ADA criteria were subjected for a detailed history with regards to the cutaneous complaints, duration, family history and treatment of diabetes mellitus were noted. All the patients were subjected for complete cutaneous and systemic examination under good lighting conditions. Relevant investigations including Fasting blood sugar (FBS), random blood sugar (RBS), post prandial blood sugar (PPBS), glycosylated hemoglobin (HbA1c) were done. Investigations like Gram's staining, Potassium hydroxide (KOH) mount, Wood's lamp, Skin biopsy and Tzanck smear were done in relevant cases to diagnose cutaneous manifestations associated with DM.

RESULTS AND DISCUSSIONS

The sex wise distribution of the study group had shown that, about 74 (61.7%) of the study subjects were males and 46 (38.3%) were females. This study had revealed that, about 6 (5%) of the study subjects had type 1 diabetes mellitus and 114 (95%) had type 2 diabetes mellitus. About 112 (93.3%) of the study subjects in this study were known diabetics and 8(6.7%) of them were incidental cases detected during the time of examination of cutaneous manifestations. Among 120 study subjects about10(8.3%) of the cases had family history of diabetes and 110(91.7%) of the cases had no family history of diabetes mellitus. About 106 (88.3%) of the cases had no systemic associations and 14 (11.7%) of the study subjects had systemic associations of diabetes mellitus in this study. Hypertension was the main comorbidity and present in 12(10%) of the study subjects, hypercholesterolemia was present in 7(5.8%) of the study group and hyper triglyceridemia was present in 6(5%) of the study subjects. Out of 56 (40.6%) of patients with cutaneous infections in the study subjects, 30 (21.7%) had fungal infections, 21(15.2%) had bacterial infections and 5(3.6%) had viral infections. The distribution of bacterial infections among 21 study subjects had shown that, about 6 (4.3%) of the study subjects had folliculitis, 6 (4.3%) had furuncle, 2(1.4%) each had erythrasma, pitted keratolysis, paronychia, cellulitis and 1(0.7%) had carbuncle. Among the cutaneous manifestations which were not specific to diabetes mellitus, 9(6.5%) had generalized xerosis, 6(4.3%) had Acrochordans, 3(2.2%) each had Psoriasis, Dermatosis papulosa nigra, Cherry angioma and Schamberg's Disease. About 2(1.4%) of the cases in this study had Seborrheic keratosis and Idiopathic guttate hypomelanosis. 1(0.7%) each of the cases had Hyperkeratotic eczema, Macular amyloidosis, Exfoliative dermatitis, Urticaria, Pityriasis rosea, Lichen simplex chronicus, Acquired ichthyosis, Polymorphic light eruptions, Melasma, Leucocytoclastic vasculitis, Porokeratosis, Contact dermatitis, Keloids and Lipodytsrophy. HBA1c was done of which 9(7.5%) of the study subjects had normal values, 15 (12.5%) had good control, 50(41.7%) had fair control and 46(38.3%) had poor control. Majority of the patients 71 (55.5%) with cutaneous manifestations had diabetes mellitus for a duration of 5 years and above and 57(44.5%) of patients had diabetes of <5years duration. About 21(40.4%) of the patients with cutaneous infections, 15(35.7%) with non specific lesions of diabetes mellitus and 15(48.4%) with strong to weak association of diabetes and 3(100%) cases with complications of DM had diabetes since 5-10 years. This difference in duration of diabetes mellitus was not statistically significant between the different types of lesions and cutaneous manifestations. This work is an attempt to study the various cutaneous manifestations of diabetes and its correlation with glycosylated haemoglobin. and prevent the related systemic complications of diabetes by early institution of appropriate treatment. The mean age of the subjects in the present study is 52.11 years. Majority of them are above 40 yrs, the range between 41-50 years constituting 37.5%, followed by 29.2% in the range of 51-60 years and 20.8% above the age of 60 years. Most of the patients with diabetes mellitus having cutaneous manifestations were males in this study (61.7%) and females accounted for 38.3%. About 95% of the cases with cutaneous manifestations in this study had type 2 DM. The mean duration of type 1 diabetes mellitus was 47.2 years and type 2 diabetes mellitus was 26.83 years. About 93.3% of the study subjects in this study were known diabetics. About 8.3% of the cases in this study had family history of diabetes. In the present study 56 patients had cutaneous infections out of which, fungal infections were seen in 30 (53.57%) patients which formed the majority. The fungal infections accounted for 21.7% of the total cases with cutaneous manifestations. Candidal balanoposthitis (5.1%), intertrigo (5.1%), onychomycosis (1.4%), tinea corporis (2.2%), tinea cruris (1.4%), candidal vulvovaginitis (0.7%),tinea pedis (1.7%), tinea mannum (0.7%), tinea versicolor (2.9%) were the common fungal infections noticed in this study. Herpes zoster was the common viral infection which was present in 2.9% of the patients and verruca vulgaris was present in 0.7% of the study subjects. The Acrochordans is often associated with impaired carbohydrate metabolism and may serve for identifying the patients as risk of getting diabetes mellitus. In the present study, 37% of patients had poor control, 43.5% had fair(moderate) control, 13% had good control and 9% had normal values. HbA1c levels done in 120 subjects revealed normal levels in 7.5% of the study group, 12.5% had good control, 41.7% had fair control and 38.3% had poor control. There is statistical significance (p-0.001) between cutaneous infections and HbA1c levels., with all the patients (100%) showing fair to poor control of diabetes. In the present study, about 40.4% of patients with cutaneous infections, 35.7% of patients with lesions not specific to diabetes mellitus and 48.4% with strong to weak association of diabetes had diabetes since 5-10 years. All the patients with complications of diabetes mellitus for 5-10 years had DM since 5-10 years. Chronicity of diabetes plays a big role in the cutaneous manifestations. As the duration of DM increases, there is non-enzymatic glycosylation of dermal collagen and mucopolysaccharides, leading to various cutaneous manifestations and complications.

CONCLUSION

This study had revealed that the cutaneous infections and other lesions commonly accompany diabetes mellitus. Poorly controlled sugar levels were the main

cause for most of the cutaneous manifestations as evident in this study. A good glycemic control reduces the incidence and severity of the cutaneous disorders. However, several non specific cutaneous disorders that occur in diabetic patients can increase the likelihood of exposure to infectious organisms and contact allergens, resulting in chronic and recurrent infections and eczemas, respectively. These further worsen the diabetic control of the patients. Thus, dermatologists play an important role in reducing the dermatologic morbidity, improvement of quality of life and management strategy of diabetic patients. Early detection of potentially grave or predisposing conditions and providing a comprehensive diabetic care to the patients is strongly advocated.

REFERENCES

1. In: Hand Book of Diabetes., 2010. Classification of Diabetes. 4th ed. Edn., Wiley-Blackwel, Pages: 14.
2. Karalliedde J., L. Gnudi., 2016. ADA. Standards of Medical Care in Diabetes-2011. Diabetes mellitus, a complex and heterogenous disease and the role of insulin resistance as a determinant of diabetic kidney disease. Nephrol Dial Transplant., 31: 206-213.
3. Gupta R.K., R. Gupta, S. Chaudhary, H. Bhatheja and Prashanth., 2015. Assessment of asymptomatic coronary heart disease in type 2 diabetics wsith Treadmill test and Framingham 10 year CHD risk scoring system. Journal of Cardiovascular disease research., 3: 131-137.
4. Donnelly, R., A.M. Emsile-Smith, I.D. Gardner and A.D. Morris., 2002. ABC of arterial and venous disease: Vascular complications of diabetes. BMJ, 320: 1062-1066.
5. Demirseren, D.D., S. Emre, G. Akoglu, D. Arpaci, A. Arman, A. Metin and B. Cakir, 2014. Relationship Between Skin Diseases and Extracutaneous Complications of Diabetes Mellitus: Clinical Analysis of 750 Patients. Am. J. Clin. Dermatol., 15: 65-70.
6. Lai C.F., 1992. Cutaneous manifestations in diabetes mellitus. Hong Kong Practitioner., 20: 60-66.
7. Bhat R. and K.K. Binod., 2008. Skin Manifestations of Internal Diseases. In: ADVL Text Book of Dermatology., In: Valia R.G. and R.V. Ameet, editors., (Eds.)., Bhalani Publishing House., Mumbai.,, 0 pp: 1369-1409.
8. Ferner, R.E., S.M. Huson, N. Thomas, C. Moss and H. Willshaw *et al.,* 2007. Guidelines for the diagnosis and management of individuals with neurofibromatosis 1. J. Med. Genet., 44: 81-88.
9. Neilly, J.B., A. Martin, N. Simpson and A.C. MacCuish, 1986. Pruritus in Diabetes Mellitus: Investigation of Prevalence and Correlation With Diabetes Control. Diabetes Care, 9: 273-275.
10. Andersen, B.L. and J. VERDICH, 1979. Granuloma annulare and diabetes mellitus. Clin. Exp. Dermatol., 4: 31-37.
11. Majeed N., F. Iqbal, Z. Iqbal and A. Mahboob., 2004. Frequency and association of cutaneous manifestations of Diabetes Mellitus with HbA1c. haikh Zayed Postgrad Med Inst., 18: 85-89.
12. Crael L.P., D. Bornett and R. Levine., 1994. "The history of diabetes". In: Chapter-1 In Joslins Diabetes Mellitus., Ronald E.K, C. Gordon and Weir (Eds)., (Eds.)., B.I. Waverly Pvt Ltd.,,New Delhi, 0 pp: 1-13.
13. Schadewaldt H., 1987. "History of Diabetes Mellitus" Chapter, In Diabetes its Medical and cultural history, Van Englehardt D. (Ed), Berlin. Springer Verlag., 43-100.
14. World Health Organization., 2016. Global status report on Diabetes. World Health Organization, Geneva., Vol.