Original Research Article

Prevalence and patterns of cutaneous lesions in diabetes mellitus in Kallakurchi district

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Abstract

Introduction: Diabetes mellitus affects individuals of all ages and socioeconomic statuses. Skin is affected by acute metabolic derangements as well as by chronic degenerative complications of diabetes. Long-term DM duration causes permanent and irreversible functional changes and damage to body cells, and therefore, it leads to problems arising from biochemical, structural, and functional anomalies. Cutaneous complications of DM provide a clue to the current and past metabolic status of the patient Cutaneous infections occur in 20- 50% of patients and are often along with moderate blood glucose control. Microvascular circulatory disorders, peripheral vascular diseases, peripheral neuropathy, and immune response reduction are all contributing factors to an increased susceptibility of infection.

Aim of the study: To evaluate the prevalence of skin manifestations in patients with diabetes mellitus and to analyze the prevalence and pattern of skin disorders among diabetic patients.

Materials and methods: This Cross-sectional study was conducted in the Department of Medicine, Government Headquarters Hospital, Kallakurichi, Tamil Nadu between June 2019 – March 2020 (10 months). 600 patients visited in diabetic OPD were included. After investigations, patients with abnormal blood glucose levels were taken for study. Fundus and routine blood, stool, and urine examinations were carried out in all the patients. Blood sugar estimation was done by the alkaline copper reduction method. Scrapping and direct KOH examination and culture for fungus in sabouraud's agar and gram staining and culture of the pus were done to identify the type of bacterial organism in selected cases. Histopathological examination of the skin sections was carried out wherever necessary to confirm the diagnosis.

Results: On observing the pattern of skin lesions in DM patients, the occurrence of Fungal infections was the most common (17%) followed by Bacterial infection (12.5%), Diabetic foot (12.5%), Pruritis (12.5%), and Perforating Dermatosis (6.3%) were the other common skin lesions in Diabetes. The type of diabetes was not having a significant association with any of the common skin lesions in diabetes in this study (P value>0.05). The reason for this observation in this study was due to the selection of the cases. There were only 3 cases of type I diabetes mellitus patients with skin lesions because children were excluded where Type I diabetes more common.

Conclusion: Diabetes mellitus with fungal infections are significantly associated with diabetes complications like CAD, Metabolic syndrome, Diabetic retinopathy, Diabetic nephropathy, and peripheral vascular diseases. Diabetes mellitus with Diabetic Foot is significantly associated with Diabetic Retinopathy.

Key words

Cutaneous manifestations, Diabetes mellitus, Pattern, The prevalence.

Introduction

Diabetes mellitus (DM) is a worldwide problem and the most common endocrine disorder. Its prevalence is increasing in the present scenario of a sedentary lifestyle in the general population [1]. Abnormalities of insulin and elevated blood glucose level lead to metabolic, vascular, neurological, and immunological abnormalities [2]. Affected organs include the cardiovascular, renal, and nervous systems, eyes, and skin. The skin is affected by both the acute metabolic derangements and the chronic degenerative complications of diabetes [3]. 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, micro angiopathy, neuron degeneration, and impaired host mechanisms [4]. The association of certain skin diseases with DM has been fairly well recognized with an incidence rate ranging from 11.4 to 71% [5]. A heterogeneous group of disorders characterized by variable degrees of insulin resistance, impaired insulin secretion, and increased glucose production preceded by a period of abnormal glucose homeostasis, classified as impaired fasting glucose (IFG) or impaired glucose tolerance (IGT) [6]. Numerous skin lesions are associated with either type 1 or type 2 diabetes mellitus, specific chronic complications of the disease, use of antibiotic drugs, and certain endocrine and metabolic disorders that cause secondary diabetes mellitus. Varies cutaneous manifestations are significantly associated with diabetes compared to control groups [7]. There is no strict classification of skin lesions related to diabetes mellitus, therefore grouping them under the following headings will give us an idea about various types of skin lesions occurring in diabetes [8].

Materials and methods

This cross-sectional study was conducted in the Department of Medicine, Government Headquarters Hospital, Kallakurichi, Tamil Nadu from June 2019 – March 2020 (10 months). 600 patients visited in diabetic OPD were included. After investigations, patients with abnormal blood glucose levels were taken for study. Fundus and routine blood stool, and urine examinations were carried out in all the patients.

Inclusion criteria: Patients admitted as IP in any of the Departments during the above period with diabetes.

Exclusion criteria: Age less than 12 yrs.

Six hundred diabetic patients attending the diabetic clinic, medical OPD. A detailed history and clinical examination, especially

for the presence of cutaneous lesions, was carried out during the period from June 2019 – March 2020 (10 months). After investigations, patients with abnormal blood glucose levels were taken for study. Fundus and routine blood stool, and urine examinations were carried out in all the patients. Blood sugar estimation was done by the alkaline copper reduction method. Scrapping and direct KOH examination and culture for fungus in sabouraud's agar and gram staining and culture of the pus were done to identify the type of bacterial organism in selected cases. Histopathological examination of the skin sections was carried out wherever necessary to confirm the diagnosis.

Statistical analysis

Records of the patients' age, sex, fasting blood sugar, body mass index, and duration of diabetes were documented. An evaluation of the skin disease was made clinically after the detailed examination. Data were analyzed using a statistical package for social sciences version 21. Data cleaning was carried out and errors corrected. Quantitative variables were summarized using means and standard deviation while frequencies and proportions were used for qualitative variables. The student's *t*-test was used to test statistical significance for continuous variables while the association between alopecia and hair care practices was tested using the Chi-square test. The level of statistical significance was at $P \leq 0.05$.

Results

The prevalence was 7.61%. Of the 300 diabetic patients, 51 had skin lesions. So the prevalence of skin lesions in diabetes mellitus was 17%. This is much higher than the prevalence of skin lesions in the general population. Of the 300 diabetic patients 149 were male (49.6%) and 151 were female (51.4%). Type I diabetes mellitus was 16 (5.3%) and type II diabetes mellitus was 244 (81.3%) and 40 were unclassified (13.3%).

Of the 112 diabetics with skin lesions the associated complications were analyzed. 20 (17.9%) had to have CAD.20 (17.9%) had metabolic syndrome.24 (21.4%) of them had diabetic retinopathy. 15 (13.4%) had to have diabetic nephropathy. 15 (13.4) had diabetic peripheral vascular diseases and 27(24.1%) of them had to have diabetic neuropathy. The BSL as a risk factor for individual diabetic complications was analyzed. Fasting BSL >176 had statistically significant correlation with all the types of complications like CAD (P-value 0.001) (**Table - 1, 2, 3**). Metabolic syndrome (P-value 0.015), Diabetic retinopathy (P-value 0.0001), Diabetic nephropathy(P-value 0.003), Peripheral vascular diseases(P-value 0.045), and Diabetic neuropathy (P-value 0.017), in the same way the postprandial BSL >269 also had the significant association with all the above said complications (**Table - 4, 5**). Postprandial value was a more statistically significant correlation than the Fasting BSL value. The common presentations of the skin lesions observed in the study were further considered for the analysis of the association of the risk factors for the skin lesions in diabetics. Age > 50 was significantly associated with pruritus (P-value 0.025) and diabetic foot P-value 0.46) (**Table - 6**).

Table – 1: Distributions of BS values and age.

	BSL Fasting	**BSL PP**	**Age**
Minimum	128	167	19
Maximum	388	506	71
Mean	182.91	286.33	49.7
Median	176	269	49.5
Standard deviation	47.187	66.134	13.19

Table – 2: DM complications.

Complication	Frequency	Percentage
CAD	20	17.9
MET.SYN	20	17.9
DIA.RETINO	24	21.4
DIA.NEPHRO	15	13.4
PVD	15	13.4
D.NEURO	27	24.1

Table – 3: Risk factors for DM complications.

	Present	Absent	Odd ratio	Chi-square	P- value
CAD	17	40	7.367	11.333	0.001
MET.SYN	15	42	3.571	5.666	0.015
D.RETINOPATHY	22	35	16.657	20.139	0.0001
D.NEPHROPATHY	13	44	7.83	8.869	0.003
PVD	11	46	3.049	3.89	0.045
D.NEUROPATHY	19	38	2.938	5.4	0.017

FBS>176 was significantly associated with all the complications.

Table – 4: PP>269 and complications.

	Present	Absent	Odd ratio	Chi-square	P-value
CAD	18	39	12.231	14.899	0.0001
MET.SYN	18	39	12.231	14.899	0.0001
D.RETINOPATHY	22	35	16.657	20.319	0.0001
D.NEPHROPATHY	14	43	17.581	12.482	0.0001
PVD	12	45	4.662	5.871	0.014
D.NEUROPATHY	22	35	6.286	13.319	0.0001

PP > 269 was significantly associated with all the skin lesions.

Table – 5: Pattern of skin lesions.

Skin diseases	Frequency	Percentage
Pruritus	14	12.5
Diabetic dermopathy	3	2.7
Necrobiosis diabetic Lipoidicoram	2	1.8
Granuloma annulare	1	0.9
Diabetic bullae	3	2.7
Scleroderma like Syndrome	4	3.6
Diabetic foot	14	12.5
Fungal infection	19	17
Bacterial infection	14	12.5
Xanthoma	2	1.8
Insulin lipodystrophy	3	2.7
Changes in nail	6	5.4
Perforating dermatosis	7	6.3
Vitiligo	3	2.7

Lichen planus	4	3.6
Bullous pemphigoids	1	0.9
Dermatitis herfatiformis	2	1.8
Psoarisis	3	2.7
Eczema	7	6.3
Total	112	100

Table – 6: Risk factors analysis for skin lesions in DM.

	Present	Absent	Odd ratio	Chi-square	P-value
Pruritis	3	52	0.241	4.905	0.025
Diabetic foot	10	45	2.944	3.89	0.046
Bact. infection	5	50	0.533	1.148	0.217
Fungal Infection	7	48	0.547	1.377	0.179
Dermatosis	3	50	0.764	0.117	0.521

Table – 7: DM type and skin lesions.

Skin lesion	Type of DM	Present	Absent	Odd ratio	Chi-square	P-value
Pruritis	TYPE I	0	3	1.147	0.44	0.667
	TYPE II	14	95			
Diabetic foot	TYPE II	0	3		0.44	0.667
	TYPE II	14	95			
Bact. infection	TYPE I	1	2	3.692	1.223	0.373
	TYPE II	13	96			
Fungal Infection	TYPE I	1	2	2.528	0.586	0.431
	TYPE II	18	91			
Perf. dermatosis	TYPE I	1	2	8.583	3.859	0.178
	TYPE II	6	103			

Discussion

The prevalence is 7.61%. Of the 300 diabetic patients, 51 had skin lesions. So the prevalence of skin lesions in diabetes mellitus is 17%. This is much higher than the prevalence of skin lesions in the general population. Of the 300 diabetic patients 149 were male (49.6%) and 151 were female (51.4%) [9]. Type I diabetes mellitus was 16 (5.3%) and type II diabetes mellitus was 244 (81.3%) and 40 were unclassified (13.3%). The BSL as a risk factor for individual diabetic complications was analyzed [10]. Fasting BSL >176 have a statistically significant correlation with all the types of complications like CAD (P-value 0.001), Metabolic syndrome (P-value 0.015), Diabetic retinopathy (P-value 0.0001), Diabetic nephropathy (P-value 0.003), Peripheral vascular diseases (P-value 0.045), and Diabetic neuropathy (P-value 0.017), in the same way, the postprandial BSL >269.also had the significant association with all the above said complications [11]. Postprandial value was a more statistically significant correlation than the Fasting BSL value. On observing the pattern of skin lesions in DM patients, the occurrence of Fungal infections is the most common (17%) followed by Bacterial infection (12.5%), Diabetic foot (12.5%), Pruritis (12.5%), and Perforating Dermatosis (6.3%) are the other common skin lesions in Diabetics [12]. The common presentations of the skin lesions observed in the study were further considered for the analysis of the association of the risk factors for the skin lesions in diabetics. Age > 50 was significantly associated with pruritis (P-value

0.025) and diabetic foot P- value 0.46). The Association of the sex with patterns of the skin lesions was analyzed [13]. Sex is not having a significant association with any of the common skin lesions. The type of diabetes is not having a significant association with any of the common skin lesions in diabetics in this study (P value>0.05). The reason for this observation in this study was due to the selection of the cases [14]. There were only 3 cases of type I diabetes mellitus patients with skin lesions because children were excluded where Type I diabetes more common. Fasting BSL>176 is significantly associated with Diabetic foot (P-value 0.001. In the same way, postprandial >269 is also significantly associated with diabetic Foot (P-value 0.001) [15]. The Association of Diabetic complications in cases of skin lesions with diabetics were analyzed. CAD is significantly associated with fungal infection (P-value 0.016). Metabolic syndrome is also significantly associated with fungal infection (P-value 0.016). Diabetic retinopathy is significantly associated with Diabetic Foot(P value0.011) and fungal infection (P-value 0.006) [17]. Diabetic nephropathy is significantly associated with fungal infection (P-value 0.04) [18]. Peripheral vascular diseases are also significantly associated with fungal infection (P-value 0.48) [19]. Diabetic neuropathy is significantly associated with pruritis (P-value 0.016). From the above observation it is evident that fungal infections are significantly associated with CAD, Metabolic syndrome, Diabetic retinopathy, PVD (P-value <0.05) [20].

Conclusion

Diabetes mellitus with fungal infections are significantly associated with diabetes complications like CAD, Metabolic syndrome, Diabetic retinopathy, Diabetic nephropathy, and peripheral vascular diseases. Diabetes mellitus with Diabetic Foot is significantly associated with Diabetic Retinopathy. Diabetes mellitus with pruritus is significantly associated with Diabetic Neuropathy. The age >50 with the occurrence of skin lesions especially for pruritis and diabetic foot are common.

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