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Original research article

A Cross-Sectional Investigation to Determining the Prevalence of Dermatological Lesions in Diabetic Retinopathic Patients

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Abstract

Aim: The purpose of this study to determine the prevalence of dermatological lesions in patients with diabetic retinopathy.

Methods: This cross sectional study was done the Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India for 12 months, 80 patients with diabetic retinopathy having diabetes mellitus of at least 5 years duration, aged between 28-60 years, were included in this study. The dermatological examination was done by a dermatologist under proper day light and if needed, using hand held magnifying lens. Examination of the retina was done by an Ophthalmologist using indirect ophthalmoscopy of dilated fundus, fundus photo, fundus fluorescein angiography and optical coherence tomography of the macula.

Results: The mean age was 19.22(SD 5.02) years. The duration of diabetes mellitus in this group was 5 to 25 years with a mean duration of 10.77 years (SD 5.22). There was a slight female preponderance with 35 males (43.75%) and 45 females (56.25%) among the 80 patients. Of the 80 diabetic patients included in this study, 7(8.75%) had Very Mild Non Proliferative Diabetic Retinopathy (NPDR), 26(32.50%) had Mild NPDR, 30(37.50%) had Moderate NPDR, 10(12.50%) had Severe NPDR, 7(8.75%) had Proliferative Diabetic Retinopathy (PDR) and 35(43.75%) had Clinically Significant Macular Edema (CSME). 65 among 80 DR patients had different types of dermatological lesions, the prevalence being 81.25%. Dermatological lesions among poor glycemic control DM patients had a prevalence of 56.25% which was higher as compared to 37.50% among good glycemic control DM patients.

Conclusion: Prevalence of Dermatological lesions in Diabetic Retinopathy patients was 81.25%, the most common being Diabetic Dermopathy (shin spots) which was 43.75%.

Keywords: dermatological lesions, diabetic, diabetic retinopathy, etc

Introduction

Diabetes mellitus (DM) is a metabolic disease characterized by relative or absolute insulin deficiency. The metabolic abnormality in DM results in gross defect in protein, carbohydrate and fat metabolism.[1] Presently DM affects individuals of all ages and in all socio-economic segments of the population. The International Diabetes Federation (IDF) estimated 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] WHO suggests that the number of diabetic subjects would increase to 80 million by the year 2030 in India.[3] Skin lesions are frequently observed in diabetic patients and about 30% of diabetics have cutaneous disorders.[4] There are many proposed patho-mechanism for skin involvement in DM, which includes abnormal carbohydrate metabolism, other altered metabolic pathways, atherosclerosis, microangiopathy, neuron degeneration and impaired host immune mechanism.[5] Some studies revealed the correlation of skin manifestation of DM with microangiopathic complications.[6,7] However, a large-scale study in Indian population aiming at finding out the correlation of the skin manifestations with internal complication of DM is lacking till date.

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.[8,9] Cutaneous complications of DM provide a clue to the current and past metabolic status of the patient.[5] 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 responses reduction are all contributing factors to an increased susceptibility of infection.[10] Common cutaneous infections, staphylococcal infections, are more perilous and severe in patients with uncontrolled DM. Other types of infection include styes that cause tuberculosis of eyelid and also bacterial infection of the nails.[11] A fungus called Candida albicans is responsible for numerous fungal infections affecting diabetic patients; these infections are common in vaginal area and lips corners (angular cheilitis).[11] Candidiasis infection (moniliasis) can be considered as an early symptom of undiagnosed DM and localized candidiasis infection in the genital area of women has a strong relationship with DM.[12] Increasing the knowledge about cutaneous manifestations of DM can be associated with overall prognosis improvement of disease through the early diagnosis and treatment.[13] According to various studies, 30-82% of DM patients experience different types of cutaneous disorder during the chronic course of their disease.[6,14] Controlling the metabolism of the body may prevent some of these manifestations and also support the treatment.[15] On the other hand, many glycemic control medications also have skin side effects. People who have cutaneous manifestation related to DM, even without a history of DM, should be investigated for the possibility of the disease. Diabetes mellitus (DM) is a highly prevalent interdisciplinary disorder that needs many different specialties' attention; however, the importance of dermatologists' knowledge has not been highlighted regarding this issue. As a result, we aim to assess the prevalence and variety of DM skin and nail manifestations in an effort to further acquaint dermatologists and other clinicians with diabetic dermatologic manifestations.

Material and Methods

This cross sectional study was done the Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India for 12 months. after taking the approval of the protocol review committee and institutional ethics committee.

80 patients with diabetic retinopathy having diabetes mellitus of at least 5 years duration, aged between 28-60 years, were included in this study. Patients suffering from ophthalmological conditions like hypertensive retinopathy, vascular occlusion and advanced cataract that may affect the findings were excluded from the study.

A questionnaire, which is semi structured was used to collect the data. The dermatological examination was done by a dermatologist under proper day light and if needed, using hand held magnifying lens. Examination of the retina was done by an Ophthalmologist using indirect ophthalmoscopy of dilated fundus, fundus photo, fundus fluorescein angiography and optical

coherence tomography of the macula. Socio-demographic details of patients including name, age, sex, educational status and occupation, questions on diabetes mellitus like duration of diabetes, medications and associated conditions were included.
The collected data was entered in MS Excel software and was analysed using SPSS 24.0.

Results
80 patients who had DR were included in the study. The range of age was from 28 years to 60 years. The mean age was 19.22(SD 5.02) years. The duration of diabetes mellitus in this group was 5 to 25 years with a mean duration of 10.77 years (SD 5.22). There was a slight female preponderance with 35 males (43.75%) and 45 females (56.25%) among the 80 patients. (Table 1).

Table 1: Gender distribution diabetic retinopathy

Gender	Number of patients=80	Percentage
Male	35	43.75
Female	45	56.25

Of the 80 diabetic patients included in this study, 7(8.75%) had Very Mild Non Proliferative Diabetic Retinopathy (NPDR), 26(32.50%) had Mild NPDR, 30(37.50%) had Moderate NPDR, 10(12.50%) had Severe NPDR, 7(8.75%) had Proliferative Diabetic Retinopathy (PDR) and 35(43.75%) had Clinically Significant Macular Edema (CSME).

Table 2: Distribution of diabetic retinopathy

	Number of patients	Percentage
Very mild NPDR	7	8.75
Mild NPDR	26	32.50
Moderate	30	37.50
Severe	10	12.50
PDR	7	8.75
Csme	35	43.75

26 patients (325.50%) were on Oral hypoglycemic agents (OHA), 15(18.75%) were on Insulin and 39(48.75%) were on both OHA & Insulin.
65 among 80 DR patients had different types of dermatological lesions, the prevalence being 81.25%. Dermatological lesions among poor glycemic control DM patients had a prevalence of 56.25% which was higher as compared to 37.50% among good glycemic control DM patients.

Out of 65 patients, the most prevalent dermatological lesions noted were diabetic dermopathy, Xerosis, Idiopathic Guttate Hypomelanosis (IGH), Icthyosis, Intertrigo, Tinea Versicolor and Chronic Paronychia, while the less prevalent ones were Eczema, Melasma, Lichen Amyloidosis, Varicose vein, Fissure feet, Pigmented Purpuric Dermatosis (PPD), Dermatosis Papulosa Nigra (DPN), Sclerodactyly, Plain warts, Macular Amyloidosis, Cherry Aneurysm, Xanthelasma Palpebraraum, Photodermatitis, Skin tags, Onychomycosis, Onychogryphosis and Prurigo.

35(43.75%) patients had diabetic dermopathy, 24(30%) had Xerosis, 20(25%) had IGH, 17(21.25%) patients had Icthyosis, 5(6.25%) patients had Intertrigo, 4(5%) patients had Tinea Versicolor, 3(3.75%) patients had Chronic Paronychia and 3(3.75%) patients had Tinea Unguium.

3(3.75%) patients had Eczema, 2(2.50%) had Melasma, 2(2.50%) had Lichen Amyloidosis, 2(2.50%) had Varicose vein, 2(2.50%) had Fissure feet, 2(2.50%) had Pigmented Purpuric Dermatosis (PPD), 1(1.25%) had Dermatosis Papulosa Nigra (DPN), 1(1.25%) had Sclerodactyly, 1(1.25%) had Plain warts, 1(1.25%) had Macular Amyloidosis, 1(1.25%) had Cherry Aneurysm, 1(1.25%) had Xanthelasma Palpebrarum, 1(1.25%) had Photodermatitis, 1(1.25%) had Skin tags, 1(1.25%) had Onychomycosis, 1(1.25%) had Onychogryphosis and 1(1.25%) had Prurigo. Table 3 and 4 shows the gender distribution of Dermatological lesions among Diabetic Retinopathy patients.

Table 3: distribution of most prevalent Dermatological lesions among DR patients

Dermatological Lesions	Number of patients=80	Percentage
Diabetic dermopathy (shin spots)	35	43.75
Xerosis	24	30
IGH	20	25
Icthyosis	17	21.25
Intertrigo	5	6.25
Tinea Versicolor	4	5
Chronic Paronychia	3	3.75
Tinea Unguium	3	3.75

Table 4: Distribution of less prevalent Dermatological lesions among DR patients

Dermatological Lesions	Number of patients	Percentage
Eczema	3	3.75
Melasma	2	2.50
Lichen Amyloidosis	2	2.50
Varicose veins	2	2.50
Fissure feet	2	2.50
PPD	2	2.50
DPN	1	1.25
Sclerodactyly	1	1.25
Plain warts	1	1.25
Macular Amyloidosis	1	1.25
Cherry Aneurysm	1	1.25
Xanthelasma Palpebrarum	1	1.25
Photodermatitis	1	1.25
Skin tags	1	1.25
Onychomycosis	1	1.25
Onychogryphosis	1	1.25
Prurigo	1	1.25

Discussion

DM is a common condition. International Diabetes Federation (IDF) estimated 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.[16] Almost all diabetic patients eventually develop skin complications. Most of the time a patient is unaware that his skin condition is due to diabetes. So the exact data of prevalence of skin changes among the diabetic patients is difficult to obtain. Various studies reported 7.6% to 30%.[17]

Diabetes mellitus (DM) is a common endocrinopathy and assumes significance for its ability to adversely affect the various internal organs. It can also derail the immune system of the affected. Hence, it is not surprising for diabetes to affect skin (the largest organ) producing different lesions. At times, evaluation for skin lesions leads to diagnosis of underlying diabetes. In a known diabetic, skin changes may provide warning signals regarding systemic involvement. Poor glycemic control might lead on to prolonged hyperglycemia. Prolonged hyperglycemia causes microcirculation and glycosylation of proteins which in turn results in complications in various organ systems of the body. Kidney, retina, nerves, and skin are the most commonly affected which manifests as renal failure, retinopathy, neuropathy and Diabetic dermopathy.[18,19] In our study, Dermatological lesions among DR patients who had poor glycemic control had a prevalence of 56.25% which was higher as compared to 37.50% among good glycemic control DM patients.

Skin (Dermatological) disorders in DM can occur due to diabetic vascular abnormalities, cutaneous infections, treatment complications especially with Insulin, associated hyperlipidemia and other miscellaneous causes. Lesions like Diabetic dermopathy, erysipelas-like erythema, Diabetic rubeosis, leg ulcers and wet gangrene of the foot are due to vascular abnormalities. Non clostridial gas gangrene, candida albicans etc. are due to cutaneous infections. Insulin reactions can lead on to insulin lipodystrophy and associated hyperlipidemia can cause acanthosis nigricans, eruptive xanthomas and skin tags. Other manifestations like diabetic bullae, pruritis, waxy skin, scleroderma diabeticorum, vitiligo, lichen planus etc. are also noticed in DM.[20]

In our cross sectional study, 80 patients with DR were included, who all had suffered from type 2 DM for at least 5 years. 65 among 90 DR patients had different types of dermatological lesions, the prevalence being 81.25%., and the most Prevalent Dermatological lesion was 35(43.75%) patients had diabetic dermopathy, 24(30%) had Xerosis, 20(25%) had IGH, 17(21.25%) patients had Icthyosis, 5(6.25%) patients had Intertrigo, 4(5%) patients had Tinea Versicolor, 3(3.75%) patients had Chronic Paronychia and 3(3.75%) patients had Tinea Unguium.

George and Walton also reported that Diabetic dermopathy (diabetic shin spots) is the commonest skin condition that occurs in patients with DM.[21] A study conducted among 125 DM patients by Kalsy et al found that the most frequent skin lesions was diabetic dermopathy.[22] In another study done by Chatterjee et al among 490 Type 2 diabetics, infections, Xerosis, hair loss beneath the knees and diabetic dermopathy were the most frequent.[23] A thorough search of literature could not give any studies which investigated on the prevalence of diabetic dermatological lesions in DR patients. Though both DR and Dermatological lesions are considered to be the complications of DM, we could not demonstrate the exact nature of association between these two in our study and further studies are required to do so.

Conclusion

Prevalence of Dermatological lesions in Diabetic Retinopathy patients was 81.25%, the most common being Diabetic Dermopathy (shin spots) which was 43.75%.

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