

Diabetic Dermopathy (Shin Spots) and Diabetic Retinopathy - Are They Associated?

Niya Babu¹, Nima Teresa Andrew², Mercy Paul³, Chakkalackal Varkey Anthrayose⁴, Anchitha Meenu Rajeev⁵, Rakendu Puthiyedath⁶, Amitha Sunny⁷, Sreelakshmi K.T. Arun⁸

^{1, 4, 5, 6, 7, 8} Department of Ophthalmology, Jubilee Mission Medical College & Research Institute, Thrissur, Kerala, India. ^{2, 3} Department of Dermatology, Jubilee Mission Medical College & Research Institute, Thrissur, Kerala, India.

ABSTRACT

BACKGROUND

Diabetes mellitus (DM) is a major cause of avoidable blindness in the developing and the developed countries. Diabetic patients have 25 times more chance of becoming blind than the non-diabetics.¹ According to the WHO, the number of people in India affected with Diabetes Mellitus in the year 2000 was 31.7 million which is estimated to rise to 79.4 million by 2030, which would be higher than any other country in the world. 75 percent of all Type 2 diabetics and almost all Type 1 diabetics are expected to develop diabetic retinopathy (DR) over a period of time.² Diabetic dermatopathy or shin spots are the commonest dermatological manifestation in patients with Diabetes Mellitus. It is also known as pigmented pretibial patches, spotted leg syndrome or diabetic dermangiopathy.³ Both diabetic retinopathy and dermatopathy are manifestations of diabetic microangiopathy. We wanted to study the association between diabetic retinopathy and diabetic dermatopathy.

METHODS

182 patients (between 40 - 70 years of age) having diabetes mellitus for at least five years were included in the study and were examined for retinal changes and skin changes. The study period was six months.

RESULTS

Of the 182 diabetic patients included in this study, 106 (58.2 %) had diabetic retinopathy. Shin spots were seen in 158 cases (86.8 %). 100 (94.3 %) cases with diabetic retinopathy had shin spots. The mean duration of diabetes mellitus in patients with diabetic retinopathy was 11.85 years and it was 8.16 years in those without diabetic retinopathy. The mean duration of diabetes mellitus in patients with shin spots was 14.88 years and it was 10.70 years in those without shin spots.

CONCLUSIONS

There is significant association between diabetic retinopathy and diabetic dermatopathy.

KEYWORDS

Diabetic Retinopathy, Shin Spots, Diabetic Dermopathy

Corresponding Author:

*Dr. Chakkalackal Varkey Anthrayose,
Department of Ophthalmology,
Jubilee Mission Medical College &
Research Institute, Thrissur,
Kerala, India.*

E-mail: drandrews@jmmc.ac.in

DOI: 10.18410/jebmh/2020/575

How to Cite This Article:

*Babu N, Andrew NT, Paul M, et al.
Diabetic dermatopathy (shin spots) and
diabetic retinopathy - are they
associated? J Evid Based Med Healthc
2020; 7(48), 2806-2810. DOI:
10.18410/jebmh/2020/575*

*Submission 10-07-2020,
Peer Review 17-07-2020,
Acceptance 12-10-2020,
Published 30-11-2020.*

*Copyright © 2020 Niya Babu et al. This
is an open access article distributed
under Creative Commons Attribution
License [Attribution 4.0 International
(CC BY 4.0)]*

BACKGROUND

Diabetes mellitus belongs to a group of metabolic diseases characterized by hyperglycaemia and changes in the metabolism of fats and proteins. This syndrome affects approximately 4 % of the world population and is on its way to emerge to an alarming epidemic level.⁴ India is all set to emerge as the diabetic capital of the world. Most of the patients come under the Non-Insulin-Dependent Diabetes Mellitus (NIDDM) or type 2 diabetes category. Insulin Dependent Diabetes Mellitus (IDDM) or type 1 diabetes contributes to only about 10 - 15 % of the total diabetic population.⁵

Chronic hyperglycaemia leads to vascular and non-vascular complications. The vascular complications could be micro vascular which includes retinopathy, neuropathy, dermopathy and nephropathy and macro vascular which includes coronary artery disease, peripheral artery disease, and cerebrovascular disease. Nonvascular complications of diabetes mellitus include infection and skin and joint lesions.⁵

ETDRS (Early Treatment Diabetic Retinopathy Study) has classified NPDR (Non-Proliferative Diabetic Retinopathy) into mild, moderate, severe and very severe and PDR into early PDR and high-risk PDR. Proliferative Diabetic Retinopathy (PDR) is characterized by the presence of neovascularisation in the retina. New vessels may be present on the optic nerve head (New Vessels at Disc - NVD) and also can be seen along the course of the major vascular arcades in the retina (New Vessels Elsewhere - NVE).

Diabetic dermopathy is the most common dermatological manifestation that occurs in patients with diabetes mellitus. This condition was first reported in 1964 by Melin, who described it as small, circumscribed, brownish atrophic skin lesions occurring on the lower extremities.⁶ The term diabetic dermopathy was coined by Binkley in 1965.⁷ A minimum number of four shin spots is characteristic of diabetes.⁸ Patients never complain of pain or itching associated with this skin manifestation of diabetes.³

Many published studies have looked into the association between development of retinopathy, neuropathy and nephropathy in diabetes patients. But there are only a few published studies that have evaluated the association between diabetic retinopathy and dermopathy. Some studies reported an association and some others found no statistically significant association between the two.^{5,9-11}

The purpose of this study was to investigate the association of diabetic retinopathy and diabetic dermopathy if any and also analyse other factors associated with diabetic retinopathy and dermopathy.

METHODS

A cross sectional study was conducted among 182 patients with type 2 diabetes mellitus for a period of minimum five years, aged between 40 - 70 years, attending the Department of Ophthalmology in a tertiary centre of Kerala, for a period of six months, September 2019 to February

2019. Patients with diabetes mellitus > 5 years attending the Ophthalmology Outpatient Department either for routine eye evaluation or for any eye complaints that do not alter the inclusion criteria of the study were included with their prior consent. Patients suffering from other ophthalmological conditions like hypertensive retinopathy, vascular occlusion and advanced cataract and dermatological conditions like lichen planus that may affect the results of the study were excluded from the study. The patients were first seen in the Ophthalmology Department and then referred to the Dermatology Department for evaluation of shin spots.

A semi-structured questionnaire was used to collect the data from the participants of the study. Detailed examination of both anterior and posterior segment was undertaken by an ophthalmologist. Anterior segment examination was done using torch light illumination as well as slit lamp bio microscopy. Examination of the posterior segment was done using + 90D lens on slit lamp, indirect ophthalmoscopy of dilated fundus and Fundus Fluorescein Angiography (FFA) whenever required and the skin examination was done by a dermatologist under proper day light and using hand lens, whenever needed. The same ophthalmologist and dermatologist examined all the participants throughout the study to avoid inter-observer bias.

Numerical variables were represented as mean and standard deviation and categorical variables were expressed as frequency and percentages. McNemar's test was used to compare the independent variables-diabetic dermopathy and retinopathy whereas chi square test was used to compare the risk factors for development of both diabetic retinopathy and dermopathy. Independent two sample t-test was applied for analysis of duration of diabetes mellitus and diabetic retinopathy.

The details of participants of the study collected includes the demographic details like name, age, sex, questions on diabetes mellitus like duration of diabetes, medications, number and type (oral, insulin, or both) and associated conditions were included. Details of other co morbidities like hypertension and dyslipidaemia was also collected and noted. Any history of other ophthalmic conditions if present to the patient's knowledge was enquired and documented. Also history of any skin diseases was specifically asked for, in the questionnaire and documented.

The collected data was entered in MS Excel software and was analysed using SPSS ver. 25.

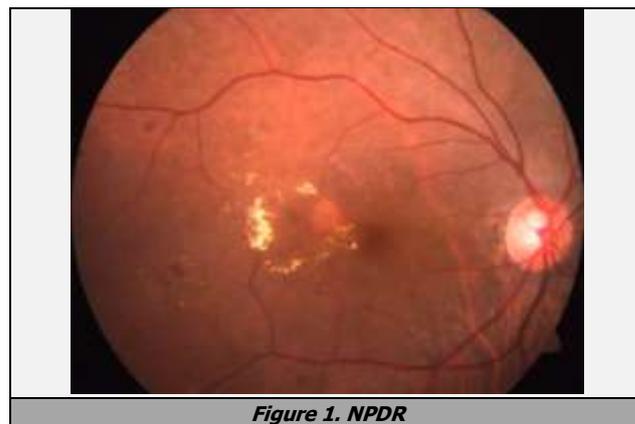


Figure 1. NPDR



Figure 2. Shin Spots

RESULTS

A total number of 182 patients was included in the study. The age groups of the study participants ranged from 41 years to 70 years (Figure 2). The mean age of the study population was 57.40 years (SD 8.18). The duration of diabetes mellitus in this group was 5 to 40 years with a mean duration of 10.31 years (SD 5.22). Of the total patients in the study 110 patients (60.4 %) had systemic hypertension.

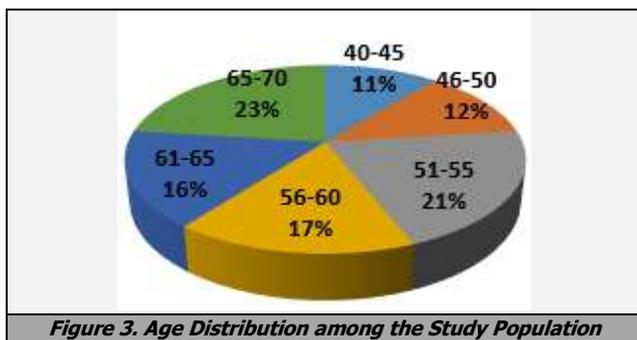


Figure 3. Age Distribution among the Study Population

There were 70 males (38.5 %) and 112 females (61.5 %) in total among the study participants. 35.7 % patients were on Oral Hypoglycaemic Agents (OHA), 23.1 % on insulin and 38.5 % on both OHA and insulin and 2.7 % patients were not taking any form of medications for blood sugar control. In the study conducted by us, retinopathy was diagnosed in 106 (58.2 %) patients. Of these, 100 patients (94.3) had NPDR and 6 patients (5.6 %) had PDR. Also 28 (15.4 %) patients had Diabetic Macular Edema (DME). 100 (94.3 %) out of 106 patients with diabetic retinopathy had shin spots. It was also observed that 58 (76.3 %) patients without diabetic retinopathy had shin spots (Table 1).

DR	Shin Spots		Total
	Yes	No	
Yes	100 (94.3 %)	6 (5.7 %)	106 (100.0 %)
No	58 (76.3 %)	18 (23.7 %)	76 (100.0 %)
Total	158 (86.8 %)	24 (13.2 %)	182 (100.0 %)

Table 1. Showing Association between DR and Shin Spots

The mean duration of diabetes mellitus in patients with diabetic retinopathy was 11.85 years and it was 8.16 years in those without diabetic retinopathy. It was observed that

diabetic retinopathy was seen earlier than (11.85 years) diabetic dermopathy (14.88 years) during the course of diabetes mellitus in our study population.

Chi-square test was used to find out if the duration of diabetes mellitus was associated with the development of diabetic retinopathy and a statistically significant association was found between the two. (Chi-square = 16.348, p = 0.0001). (Table 2)

The mean duration of diabetes mellitus in patients with shin spots was 14.88 years and it was 10.70 years in those without shin spots. This difference is statistically significant; t-test was done, and p value was found to be 0.002.

DM Duration (Years)	DR	
	Yes	No
5 - 15	80	74
16 - 25	24	2
26 - 35	2	0
Total	106	76

Table 2. Showing Duration of DM and Development of DR

65 patients were on oral hypoglycaemic agents, 42 patients on insulin, and 70 patients on both OHA and insulin. 5 patients were not on any of these medications for blood sugar control. 28 (43.1 %) patients who were on OHA, 22 (52.4 %) patients on insulin and 56 (80 %) patients on both OHA and insulin developed diabetic retinopathy.

51 (78.5 %) out of 65 patients on OHA, 40 (95.2 %) out of 42 patients on insulin and 66 (94.3 %) out of 70 patients on OHA and insulin developed shin spots or diabetic dermopathy.

Systemic hypertension was present along with diabetes mellitus in 46 (25.27 %) patients of this study population and in 43.40 % patients with diabetic retinopathy. No association of hypertension with diabetic retinopathy found in these cases. (Chi-square = 2.612 p value = 0.106). 66 (36.3 %) patients in the study had dyslipidaemia and 116 (63.7 %) patients did not have dyslipidaemia.

The other ocular findings that were observed include senile cataract, was present in both eyes in 88 cases (48.4 %). 39 patients (21.4 %) were pseudophakic in both eyes. 21 patients (11.54 %) had one eye cataract and other pseudophakia. Dyslipidaemia was found in 66 (36.3 %) patients.

DISCUSSION

A total number of 182 patients was included in the study of which all of the participants had type 2 diabetic mellitus for a minimum duration of 5 years. All study participants were examined in detail by an ophthalmologist and were then sent to a dermatologist to look for diabetic dermopathy (shin spots). The same ophthalmologist and dermatologist examined the entire study group during the course of the study to avoid inter observer bias. There are only a very few reports available regarding this topic in literature.

Age group of patients who were enrolled in the study ranged from 40 - 70 years with a mean age of 57.40 + / - 8.180 years. There were 70 males and 112 females in the group.

There was no association between gender and development of diabetic retinopathy or shin spots found in this study. A similar study conducted by Abdollahi A et al also had similar findings with regard to gender and its association with development of diabetic retinopathy.¹²

Mean duration of diabetes mellitus in patients in the study was 10.31 + / - 5.221 years and development of retinopathy was significantly associated with duration of the illness.

158 subjects had shin spots in the study which included 102 men and 56 females. Available references also agree with the same, that is prevalence of diabetic dermatopathy is more in males.^{5,13} Data was compared to find out association between duration of diabetes mellitus and development of shin spots if any, but no significant association was found in our study ($p = 0.103$). This was contradictory to studies conducted elsewhere where there was significant association between duration of diabetes mellitus and development of shin spots.^{5,9,14,15} Also comparison was done to find out association between duration of diabetes mellitus and development of diabetic retinopathy, which was found to be statistically significant^{16,17} in the study conducted by us. Two similar studies conducted by Bansal et al and Maglia SF et al also concluded that duration of diabetes mellitus is associated with development of diabetic retinopathy which was in agreement with the current study.

In our study 58.2 % patients had diabetic retinopathy out of which 100 patients (94.3) had Non Proliferative Diabetic Retinopathy (NPDR) and 6 patients (5.6 %) had Proliferative Diabetic Retinopathy (PDR). Also 28 (15.4 %) patients had DME. Also, it was observed that there was a direct association between duration of diabetes mellitus and development of DME. Mirhoseini et al also conducted a similar study comparing association of diabetic dermatopathy with nephropathy and retinopathy in patients with type 2 diabetes mellitus which also showed a similar result of maximum patients with NPDR. However, the study conducted by Mirhoseini et al did not specify the patients with diabetic macular oedema.⁵

100 (94.3 %) patients with diabetic retinopathy had diabetic dermatopathy also known as shin spots. Also 58 (76.3 %) patients without diabetic retinopathy had shin spots. Analysis of this data was done using the McNemar test for independent variables and it was found to be statistically significant stating that there is association between development of diabetic retinopathy and shin spots. But it was also seen that people without diabetic retinopathy also developed shin spots. This is in accordance with similar studies which also agreed dermatopathy and retinopathy had significant association in diabetes mellitus.^{5,12}

35.7 % patients were on oral hypoglycaemic agents, 23.1 % on insulin and 38.5 % on both OHA and insulin and 2.7 % patients were not taking any form of medications for blood sugar control.

65 patients were on oral hypoglycaemic agents (OHA), 42 patients on insulin, and 70 patients on both OHA and insulin. 5 patients were not on any of these medications for diabetes mellitus. 28 (43.1 %) patients who were on OHA, 22 (52.4 %) patients on insulin and 56 (80 %) patients on both OHA and insulin developed diabetic retinopathy.

51 (78.5 %) out of 65 patients on OHA, 40 (95.2 %) out of 42 patients on insulin and 66 (94.3 %) out of 70 patients on both OHA and insulin developed shin spots or diabetic dermatopathy.

143 patients (78.6 %) in the study had undergone cataract surgery and 48.4 % had cataract. There has been proved association between cataract and diabetes in different studies previously. Patients with diabetes mellitus have proved to have a faster progression of cataract especially with uncontrolled blood sugar levels. Study conducted by Raman R et al also shows that there is significant association between development of cataract and diabetes mellitus.^{18,19}

CONCLUSIONS

This study clearly shows that diabetic retinopathy and diabetic dermatopathy (shin spots) are strongly associated with each other. However, it was also noticed that patients without diabetic retinopathy also had shin spots even though the percentage was less compared to the other group. Also, it was observed that development of diabetic retinopathy is directly related with duration of the disease i.e., longer the duration of diabetes mellitus greater is the chance of having diabetic retinopathy.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

Financial or other competing interests: None.

Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

REFERENCES

- [1] Public Health Focus: Prevention of Blindness Associated with Diabetic Retinopathy [cited 2020 May 2]. <https://www.cdc.gov/mmwr/preview/mmwrhtml/00019889.htm>
- [2] Gadkari SS, Maskati QB, Nayak BK. Prevalence of diabetic retinopathy in India: The All India Ophthalmological Society Diabetic Retinopathy Eye Screening Study 2014. *Indian J Ophthalmol* 2016;64(1):38-44. <http://www.ijo.in/article.asp?issn=0301-4738;year=2016;volume=64;issue=1;spage=38;epage=44;aulast=Gadkari>
- [3] Recent insights on diabetic dermatopathy ~ fulltext [cited 2020 May 2]. <https://benthamopen.com/FULLTEXT/TODJ-13-8/>
- [4] King H, Aubert RE, Herman WH. Global burden of diabetes, 1995-2025: prevalence, numerical estimates, and projections. *Diabetes Care* 1998;21(9):1414-1431.
- [5] Mirhoseini M, Saleh N, Momeni A, et al. A study on the association of diabetic dermatopathy with nephropathy and retinopathy in patients with type 2 diabetes mellitus. *J Nephropathol* 2016;5(4):139-143.

- [6] Melin H. An atrophic circumscribed skin lesion in the lower extremities of diabetics. *Acta Med Scand* 1964;176(Suppl 423):1-75.
- [7] Binkley GW. Dermopathy in the diabetic syndrome. *Arch Dermatol* 1965;92(6):625-634.
- [8] Ngo BT, Hayes KD, DiMiao DJ, et al. Manifestations of cutaneous diabetic microangiopathy. *Am J Clin Dermatol* 2005;6(4):225-237.
- [9] Shemer A, Bergman R, Linn S, et al. Diabetic dermopathy and internal complications in diabetes mellitus. *Int J Dermatol* 1998;37(2):113-115.
- [10] Demirseren DD, Emre S, Akoglu G, et al. Relationship between skin diseases and extra cutaneous complications of diabetes mellitus: clinical analysis of 750 patients. *Am J Clin Dermatol* 2014;15(1):65-70. <https://link.springer.com/article/10.1007/s40257-013-0048-2>.
- [11] Mahbobeh-Sadat H, Amir-Hoshang E, Farhad HP, et al. The correlation between skin lesions, micro albuminuria and other micro vascular complications in type 2 diabetic patients. *Int J Nephrol Urol* 2010;2(4):553-560.
- [12] Abdollahi A, Daneshpazhoo M, Amirchaghmaghi E, et al. Dermopathy and retinopathy in diabetes: Is there an association? *DRM* 2007;214(2):133-136.
- [13] McCash S, Emanuel PO. Defining diabetic dermopathy. *J Dermatol* 2011;38(10):988-992.
- [14] Zoungas S, Chalmers J, Ninomiya T, et al. Association of HbA1c levels with vascular complications and death in patients with type 2 diabetes: evidence of glycaemic thresholds. *Diabetologia* 2012;55(3):636-643.
- [15] Chatterjee N, Chattopadhyay C, Sengupta N, et al. An observational study of cutaneous manifestations in diabetes mellitus in a tertiary care Hospital of Eastern India. *Indian Journal of Endocrinology and Metabolism* 2014;18(2):217-220.
- [16] Bansal P, Gupta RP, Kotecha M. Frequency of diabetic retinopathy in patients with diabetes mellitus and its correlation with duration of diabetes mellitus. *Medical Journal of Dr DY Patil University* 2013;6(4):366.
- [17] Magliah SF, Bardisi W, Al Attah M, et al. The prevalence and risk factors of diabetic retinopathy in selected primary care centers during the 3-year screening intervals. *J Family Med Prim Care* 2018;7(5):975-981.
- [18] Raman R, Pal SS, Adams JSK, et al. Prevalence and risk factors for cataract in diabetes: Sankara Nethralaya Diabetic Retinopathy Epidemiology and Molecular Genetics Study, Report No. 17. *Invest Ophthalmol Vis Sci* 2010;51(12):6253-6261.
- [19] Javadi MA, Zarei-Ghanavati S. Cataracts in diabetic patients: a review article. *J Ophthalmic Vis Res* 2008;3(1):52-65.