

Diabetic Dermopathy and Poor Glycemic Control among Diabetic Patients in Sulaimaniyah, Kurdistan, Iraq

Ali Mozan Dahir Elethawi*

Abstract

Background and objectives: Diabetes mellitus is the commonest endocrine disorder among the general population. Shin spots or diabetic dermopathy is the foremost common cutaneous sign of diabetes mellitus. Sporadic shin spots may occur in non-diabetic people. However, 4 or more spots are highly specific of microangiopathy in diabetics and may indicate a poor glycaemic control. This study was done to evaluate prevalence of diabetic dermopathy among a group of Iraqi diabetic patients living in Sulaimaniyah, region of Kurdistan and its correlation with the state of diabetic control.

Methodology: This is a cross sectional study included 500 diabetics whom were diagnosed according to standard diagnostic criteria. Demographic and clinical features were obtained such as age and sex besides duration and treatment of the disease as well as cutaneous manifestations of diabetic dermopathy.

Results: In regard to the state of glycemic control, 208 patients (41.6%) were poorly-controlled, while 292 (58.4%) were well-controlled. Overall, diabetic dermopathy was observed in 109 (21.8%) patients (males, n=70; 64.2%, females, n=39; 35.8%). In the poorly-controlled group, 98 (89.9%) patients had diabetic dermopathy while only 11 (10.1%) patients of well-controlled diabetics had DD. This difference was statistically significant.

Conclusion: diabetic dermopathy was more prevalent among poorly-controlled diabetics. Although diabetic dermopathy is a subtle clinical sign, it could be used as a marker of poor glycaemic control and hence a clue to the possible existence of serious microangiopathic changes.

Key Words: Diabetes mellitus, diabetic dermopathy, angiopathic manifestations, pretibial spots, glycemic control.

Introduction

Dermatologists commonly see skin lesions that reflect an underlying endocrine disorder. Identifying the endocrinopathy is very important, so that patients can receive corrective rather than symptomatic treatment¹. Diabetes mellitus (DM) is the commonest endocrine disorder that affects general population with a steadily increasing incidence worldwide as a result of life style changes². Cutaneous manifestations of DM include necrobiosis lipoidica diabetorum, diabetic dermopathy, scleroderma adultorum and acanthosis nigricans¹. Moreover, Diabetes can result in micro-

angiopathic complications such as retinopathy, neuropathy and/or nephropathy and large vessel diseases². Diabetic dermopathy (DD), also called shin spots or pigmented pretibial patches, is a skin lesion usually found on legs of people with DM. Although the exact etiology of DD is unclear³⁻⁵, it is thought to result from changes in the small blood vessels (microangiopathy) that supply the skin and from minor leakage of blood products from these vessels into the skin³. Trauma is additionally thought to be a causative factor⁴. Diabetic dermopathy is

* M.B.Ch.B., FICMS, CABD Assist prof. Consultant dermatologist
Department of Dermatology and Venereology/College of Medicine/University of Sulaimaniyah/Sulaimaniyah/Region of Kurdistan/Iraq
Correspondence ;Ali Mozan Dahir Elethawi, E- mail elethawi67@yahoo.com

the one of the most common cutaneous finding in diabetic patients. Up to 55% of diabetic patients may have shin spots, and it appears to be more frequent in the long-standing and the poorly controlled DM⁴⁻⁵. In non-diabetics, these pigmented lesions are often seen after injury. Shin spots appear as pink to red or tan to dark brown non-pruritic painless patches. The patches are usually round or oval in shape and are slightly scaly. Patches of long duration may become faintly indented (atrophic). They are most commonly located on shins (the pretibial area); however, thighs, forearms and feet may be involved as well³. Although located bilaterally, the distribution of shin spots is asymmetric⁴. Diabetic dermopathy is harmless and does not require a specific therapy^{3,5-8} but it is associated with other microvascular complications and large vessel disease⁵. It is typically seen in patients aged older than 50 and the incidence of DD increases

Patients and Methods

Over a 15- months period (October 2017–January 2019), 500 patients (370 females and 130 males) with a diabetes mellitus were collected from Sulaymaniyah Diabetic Center (SDC) (n=398) and intensive care unit (ICU) of Sulaimaniyah Teaching Hospital (STH) (n=102). The diagnosis of DM was made by endocrinologists according to standard diagnostic criteria⁹ for all of our patients. The Ethical Committee of College of Medicine/University of Sulaymaniyah has

with age 50⁴⁻⁵. Regarding the gender, its occur more in men than in women. There is a relationship between the presence of skin lesions and the number of microangiopathic diabetic complications. Subsequently, the incidence of DD in patients with all 3 complications is much higher than in patients with a single complication. In contrast, the incidence of DD is not related with type of DM (insulin-dependent vs. noninsulin-dependent), hypertension nor obesity⁴⁻⁵. In spite the fact that DD is more common in poorly controlled diabetic patients³, control of blood sugar levels does not affect the outcome of the lesions⁴. Previous studies showed no correlation between the presence of DD and HbA1c⁵. This study was done to evaluate frequency of DD among a group of Iraqi diabetic patients living in Sulaimaniyah, region of Kurdistan and its correlation with the state of diabetic control.

approved doing this study. A thorough clinical assessment was done for each patient. Information about the age and gender, duration of DM, treatment and state of glycaemic control. Moreover, we as dermatologist evaluated each case for Fitzpatrick skin type and skin manifestations of DD. Four or more trophic hyper-pigmented lesions whose diameter 0.5-2 cm and located on the shin were considered an evidence of DD Figure (1).



Figure(1): Multi-lesional DD on the shin of 59 years old diabetic man.

While single shin spot **Figure(2)** and hand and/or forearm lesions were excluded.



Figure(2): Single shin spot in a young diabetic female patient.

Regarding the duration of DM, patients were classified into 5 classes: Class I (<5 years), Class II (5-10 years), Class III (11-15 years), Class IV (16-20 years) and Class V (>20 years). Treatment wise, patients used either diet alone; oral hypoglycaemic drugs (OHD), Insulin injections or alternating OHD and Insulin therapy. Glycaemic control was evaluated by measurement of fasting plasma glucose (FPG) each month. A mean value of FPG ≤ 140 mg/dL indicated a good diabetic control. In selected cases, HbA1c was also checked. Glycosylated hemoglobin (HbA1C) represents the average blood glucose levels

Results

Five hundred patients; 370 (74.0%) were females and 130 (26.0%) were males with a female to male ratio of 2.85 to 1. Their age ranged between 14-82 years with a mean of 52.34 ± 16.41 . Overall, DD was observed in 109 (21.8%) patients (males, $n=70$; 64.2%, females, $n=39$; 35.8%). Their mean age was 57.73 ± 10.74 years. The remaining 391 patients (78.2%) had no DD, their mean age was 50.36 ± 12.13 years. Regarding skin types of the patients; 231 (46.2%) of them had Fitzpatrick's skin type IV, 200 (40%) of them had Fitzpatrick's skin type III and 69 (13.8%) had Fitzpatrick's skin type II.

for the previous 2-3 months. For individuals without diabetes, the normal range for the HbA1c level is 4%-5.6%. HbA1c levels between 5.7% and 6.4% demonstrate a pre-diabetic state while levels of 6.5% or higher indicate diabetes⁷. We used SPSS software program for data entry and statistical analysis to determine the frequency of DD among diabetic patients. A p-value detected by Chi-square and considered statistically significant if it is ≤ 0.05 . Prevalence of DD according to age group and standard deviation were checked by t-test.

More than 80% (91/109) of the patients have more than one shin spot (multiple DD lesion as seen in Figure(1) versus single lesion as seen in Figure(2) and the number of the lesions increase with duration of disease (DM), also it's more common among poor glycemic control group and OHD + insulin treatment group. We observed that despite having poorly-controlled insulin-dependent DM, none of the patients younger than 26 had DD. On the other hand, there was a variable rate of DD in patients older than 26 with a peak in those aged 57-60 years. In regard to the

relationship between duration of the disease and the rate of DD (as shown in Table(1), we observed that as the duration of DM increased, the percentage of patients with

DD increased (from 5.5% in patients with an illness <5 years to 42.2% in those whose illness lasted > 20 years).

Table (1): Disease duration in relation to presence of DD.

Duration of DM (yr)	+ ve DD n (%)	- ve DD n (%)	Total
5 <	6 (5.5%)	240(61.4%)	246 (49.2%)
5-10	15 (13.8%)	88 (22.5%)	103 (20.6%)
11-15	18 (16.5%)	43 (11%)	61 (12.2%)
16-20	24(22%)	11 (2.8%)	35 (7%)
20>	46(42.2%)	9 (2.3%)	55 (11%)
Total	109(100%)	391(100%)	500(100%)

In regard to distribution of patients according to therapeutic regimen, we can see that the majority used OHD (n=292; 58.4%). As far as the influence of mode of treatment on the rate of DD, we observe that patients whose treatment fluctuated

between OHD and insulin had the highest percentage of DD (60 out of 131 or 45.8%). In contrast, patients who used diet alone had the least frequency of DD (4 out of 26 or 15.4%). Table (2).

Table (2): The treatment regimen in relation to presence of DD.

Treatment	+ve DD	- ve DD	Total (%)
Diet	4 (3.7)	22 (5.6%)	26 (5.2%)
OHD	30 (27.5)	262(67%)	292(58.4%)
Insulin	15(13.8)	36(9.2%)	51(10.2%)
OHD & Insulin	60 (55)	71(18.2%)	131(26.2%)
Total	109(100%)	391(100%)	500 (100%)

In regard to the state of glycaemic control, 208 patients (41.6%) were poorly-controlled while 292 (58.4%) were well-controlled. In the poorly-controlled diabetic group, 98 out of 208 patients (47.1%) had

DD while only 11 out of 292 (3.77%) well-controlled diabetics had DD. This difference was statistically significant at p <0.05 table (3).

Table (3): The Glycaemic control state in relation to presence of DD.

Glycaemic Control state	+ve DD	-ve DD	Total (%)
Poorly-controlled	98 (89.9%)	110(28.1%)	208(41.6%)
Well-controlled	11 (10.1%)	281(71.92%)	292(58.4%)
Total	109(100%)	391(100%)	500(100 %)

The chi –square statistic is 133.8925. The p- value<0.0001(statistically significant< 0.05)

Discussion

The term “Diabetic Dermopathy” was coined by Binkley in 1965, although the lesion has been variously named “pigmented pretibial patches”, “shin spots”, “spotted leg syndrome” and “diabetic

dermangiopathy”⁵. We agree with George who suggested that at least 4 lesions are characteristic of diabetes⁵. Although disputed, some consider the presence of DD to be pathognomonic for diabetes⁸. Binkley

suggested that the predilection for the shins was due to decreased skin temperature, slow blood flow, increased plasma viscosity and vessel fragility⁵. Diabetic Dermopathy or pigmented pretibial spot is a trivial cutaneous sign observed on the legs in some diabetic patients and even in non-diabetics^{5, 10}. While in some other individuals it is usually produced by trauma, it has a different pathogenesis¹¹⁻¹² and clinical significance in the former (diabetic) group. In spite of being subtle and may easily be ignored by patients, it should not be ignored by the dermatologists as well as the treating endocrinologist. Diabetic Dermopathy is well-correlated with micro-angiopathic complications such as retinopathy, neuropathy and/or nephropathy and with large vessel disease^{1,5}. Although previous studies showed no correlation with HbA1c⁵, a test that reflects the state of diabetic control in the last 2-3 months, the present study does show a correlation between DD and glycaemic control. Poorly-controlled diabetics had a higher rate of DD when compared to well-controlled diabetics. Hence once observed, DD should alert the physician to the possible existence of serious micro- and/or macro-angiopathic complications^{1, 3, 5}. Diabetic dermatopathy occurs in between 0.2 to 55% of patients with diabetes, and the incidence varies between different reports⁵. Rangunatha et al from India reported the lowest incidence of DD (one out of 500 diabetic patients, 0.2%), this low incidence could be related to the dark skin of Indian patients which makes identification of the lesions more difficult. However, a notable exception is a study from the Western Himalayas in which DD was identified in 36% of cases⁵. In the present study, DD was reported in 21.8% (109/500) of our patients (within the previously published range). Our study show that most our patients have a light-colored skin; Fitzpatrick skin type III (40%) and IV (46.2%) which is lying in the midrange of the 6 Fitzpatrick skin types

(type I: pale, porcelain or ivory skin to type VI: mahogany or dark brown)¹³ which may explain the relative ease of detecting (shin spot) in our patients. Diabetic dermatopathy was more common in older patients and usually after the age of 50^{1,5}. In the present study, the mean age of diabetics with DD was 57.73 years with the highest rate of DD was observed in patients aged 57 to 60 years. None of our patients in this study was younger than 26 years had DD. A previous study reported more frequent DD lesions in male patients⁵. Although two thirds of our patients in this study were female but still DD is more common in male patients while Romano et al⁵ haven't found any difference based on gender. In this study, among the poorly-controlled diabetic patients, 98 (89.9%) had DD while only 11 (10.1%) of well-controlled diabetics had DD (Statistically the difference was significant at $p < 0.05$). Due to the association of DD with other microvascular complications, optimization of glycaemic control in patients with DD to reduce the progression of retinopathy, nephropathy and/or neuropathy is vital^{3,5}. Some authors believe that DD occurs in those with a longer duration of diabetes⁵. This fact was very clear in the present study. We observed that as the duration of DM increased, the percentage of patients with DD increased (from 5.5% in patients with an illness <5 years to 42.2% in those whose illness lasted > 20 years). As far as the influence of mode of treatment on the rate of DD, we observed that patients whose treatment fluctuated between OHD and insulin had the highest percentage of DD (60 out of 109, 55%), while the least frequency of DD was observed in patients who used diet alone (4 out of 109; 3.7%). This finding most probably is related to the degree of glycaemic control. People whose DM was controlled by dietary measures alone seem to have a mild disease with easily controlled blood sugar and hence less frequent DD. In contrast, those fluctuated between OHD and insulin could have

uncontrolled blood sugar and hence more frequent DD. Regarding the number of DD wither single or multiple, it increases with duration of disease (DM), also it's more common among poor glycemic control group and OHD + Insulin treatment group. They typically don't need any treatment and have a tendency to travel away once a number of years, significantly following improved glucose management. Diabetic

Conclusions

This study had been shown that DD was more prevalent among poorly-controlled diabetic patients and there was a correlation between DD and glycaemic control. Although this dermatological sign was subtle and asymptomatic, it is an indicator of serious micro- and macro-

Conflicts of interest

There were no conflicts of interest.

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dermpathy number may good indicator for follow up the internal changes (microangiopathy or macroangiopathy) in diabetic patients, the number may decrease or disappear with improvement of control glycemic state, while in previous studies showed no correlation between the presence of DD and HbA_{1c}⁵.

angiopathic complications. Once the DD was observed (especially multi-lesions), the physician should consider optimization of glycaemic control and search for any underlying complications such as retinopathy, nephropathy, neuropathy and myocardial infarction.

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