

ASSESSMENT OF DIABETIC STATE IN VARIOUS SKIN DISORDERS USUALLY ASSOCIATED WITH HYPERGLYCEMIA

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Summary

A study for the detection of diabetes was carried out on 170 cases presenting with skin disorders likely to be associated with hyperglycemia; none of whom with any previous history of diabetes mellitus.

12.35 percent of all cases studied in this series were found to be diabetic. The highest incidence was seen in cases of pruritis of unexplained origin (40 percent) followed by candidiasis and xanthomatosis (each 20 percent), pyoderma (15.38 percent) epidermophytosis (13.33 percent) acne vulgaris (11.1 percent) seborrhoeic dermatitis (10 percent), psoriasis (8.88 percent) and chronic eczema (5.71 percent).

Of 21 cases (12.35 percent) found diabetic, 9 cases (5.3 percent) had glycosuria also while in remaining 12 cases (7 percent) there was no glycosuria and the diabetes was detected by glucose tolerance test (G.T.T.). The importance of glucose tolerance test in cases of pruritis of unexplained origin, recurrent pyoderma, monilial infections, xanthomatosis and all intractable cases of eczema, seborrhoeic dermatitis, acne vulgaris and epidermophytosis has been emphasised.

The positive results obtained by G. T. T. in elucidating the subclinical diabetic state in psoriasis and other dermatological disorders emphasises its importance in the detection of diabetes at an early stage thus facilitating its management and early cure.

While it is known for some time that there is a definite relationship between frank diabetes and skin diseases it is not yet generally recognised that frequently diabetes can also be the underlying cause of skin conditions which are not accompanied by glycosuria or which may even show normal fasting blood sugar levels. Therefore in order to determine whether a given skin

condition is due to diabetes, it is necessary to do a G. T. T. This test should be done in every case in which there is reason to suspect diabetes even if the fasting blood sugar is normal and there is no glycosuria¹. Ayres², Haldon Davis and Willis³, Campbell and Burges⁴ are of the same opinion.

Schwartz et al⁵ found high blood sugar levels in 15 of 30 acne cases. Mackenna and Lehman⁶ studied glucose tolerance test in 7 cases of hidradenitis suppurativa and found none of these normal. Subsequently they studied glucose tolerance test in 158 patients with a variety of skin diseases

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and found normal curves constituted 8 percent. Cruikshank, Fairburn and Trotter⁸ demonstrated increased urinary excretion of glucose in acne.

The aim of the present work is to assess the existence of diabetes by G. T. T. in various dermatological disorders often associated with hyperglycemia in patients unaware of their diabetic state.

Material and Method

In accordance with the aim of the present study, patients with the following skin diseases were chosen for study:—

- (i) Pruritis (of unexplained origin)
 - (a) Generalised pruritis.
 - (b) Pruritis Vulvae.
- (ii) Pyoderma
 - (a) Multiple recurrent boils
 - (b) Hidradenitis suppurativa
 - (c) Chronic folliculitis
 - (d) Sycosis barbae (Coccogenic).
- (iii) Fungus Infections
 - (a) Candidiasis (Monilial infections).
 - (i) Monilial Intertrigo
 - (ii) Monilial balanitis
 - (iii) Monilial paronychia
 - (b) Epidermophytoses.
- (iv) Xanthomatosis
- (v) Psoriasis
- (vi) Chronic Eczema
- (vii) Seborrhoeic dermatitis
- (viii) Chronic urticaria (of unexplained origin).

A total of 170 cases studied constitute the material for this group.

After recording the history, urine was examined by Benedict's (qualitative) reagent. If the patient showed glycosuria, a fasting blood sugar estimation was done to confirm the diagnosis

of diabetes. If fasting blood sample showed hyperglycemia, a diagnosis of overt diabetes was made. The additional presence of glycosuria was a corroborative evidence. If patient showed glycosuria without any hyperglycemia, the possibility of renal glycosuria was entertained. If there was no glycosuria a modified glucose tolerance test was done, estimating fasting as well as two hour blood sugar values after 100 gms of glucose orally. The glucose tolerance was regarded as normal if the fasting as well as two hour blood sugar values were less than 100 mg per 100 ml. If the two hour blood sugar level was more than 100 mg percent a standard 100 gm G. T. T. was carried out after 2 weeks.

The criteria employed for the diagnosis were those of Duncan⁹. A glucose tolerance test was considered normal if the fasting value was below 100 mg, a one hour value below 160 mg, a one and half hour value below 110 mg and a two hour value at or below 100 mg per 100 ml. Tolerance curve was considered indicative of diabetes if the fasting blood sugar was normal or greater than 110 mg, $\frac{1}{2}$ hour value greater than 150 mg, one hour value greater than 160 mg and two hour value 120 mg per 100 ml or more and a three hour value of normal or greater than 120 mg per 100 ml or more. If the results were not conclusive the test was repeated after a period of 7 to 10 days.

Modified Folin Wu technique was used for blood sugar estimation.

The details of 170 cases studied for each disease is given in Table-I.

Age sex distribution of the cases given in Table II.

Results

The age sex distribution of cases who were found to be diabetic is given

in Table III. Figures within brackets signify those cases who had glycosuria and whose diabetes was detected by abnormal glucose tolerance test.

TABLE I
Details of cases studied

Pruritis	10
Pyoderma	26
Candidiasis	10
Epidermophytosis	15
Xanthomatosis	55
Psoriasis	45
Chronic eczema	35
Acne vulgaris	9
Seborrhoeic dermatitis	10
Chronic urticaria	5

Discussion

Out of 170 cases studied, 21 showed positive results. None of these gave any previous history of diabetes and presented only for their skin complaints. It is apparent that the diagnosis of diabetes mellitus would have been missed if urine examination as well as blood sugar determination and G. T. T. were not done.

Age sex distribution of cases as well as those found diabetic is summarized in Table IV.

TABLE 4

Age & sex distribution of 170 cases including those found diabetic

Age range	Total cases		Cases found positive	
	Male	Female	Male	Female
11-20	4	9	-	-
21-30	48	20	-	2
31-40	27	21	2	2
41-50	24	6	7	1
51-60	7	4	4	3
Total	110	60	13	8

These results show that the incidence of positivity is higher in the higher age group and in females. The stress and strain of pregnancy and child bearing may be the cause of this increased incidence in females. Moreover women live longer, are less

active physically and are more prone to become obese between forty and seventy years of age than are men.

Among the 21 positive cases, 9 had glycosuria and hyperglycemia while 12 cases had no glycosuria and the diabetes was detected by the glucose tolerance test.

10 cases of pruritis were studied. Otherwise unexplained pruritis of the generalized or localized type may be one of the earliest pointers to the existence of diabetes is as shown by the figures in Table V.

TABLE 5
Details of cases of pruritis

Disease	Total cases	Diabetes	Positivity
Generalized pruritis	3	1	33.3
Pruritis Vulvae	7	3	42.85
Total	10	4	40

Out of 4 cases found diabetic, 2 had glycosuria while diabetes was detected by G. T. T. in 2 cases. In the series by Winner and Strakosch¹⁰ diabetes was the cause in 26 out of 31 consecutive patients who had pruritis vulvae and of these 26 diabetics, 15 failed to show sugar in urine. It was only blood sugar tests and a detailed history which established the diagnosis in those fifteen cases. Our results are thus in conformity with Winner and Strakosch's findings and emphasise the fact that a sugar tolerance test should be carried out in all cases with intractable pruritis.

Among 26 patients with pyoderma 4 had diabetes. Their data is presented in Table VI.

The percentage positivity in cases of recurrent boils is 25 percent while hidradenitis suppurativa gave a high positivity of 50 percent. Those found diabetic were in the age group of 41-50 in cases of hidradenitis suppurativa and 31-40 in case of recurrent boils.

TABLE 2
Age & Sex distribution of cases of Skin diseases studied

Main group	Sub group	11-20		21-30		31-40		41-50		51-60		Total
		M	F	M	F	M	F	M	F	M	F	
Pruritis	(a) Generalized	—	—	—	—	—	1	—	—	2	—	3
	(b) Localized (P. Vulvae)	—	—	—	3	—	2	—	1	—	1	7
Pyoderma	(a) Multiple boils (Recurrent)	1	—	4	—	2	—	1	—	—	—	8
	(b) Hidradenitis suppurativa	—	—	1	—	1	—	2	—	—	—	4
	(c) Chronic folliculitis	—	1	4	—	1	—	1	—	—	—	7
	(d) Sycosis barbae (cocoogenic)	—	—	4	—	2	—	1	—	—	—	7
Fungus infections												
(I) Candidiasis (moniliasis)	M. Intertrigo	—	—	—	1	—	2	—	—	1	—	4
	M. Balanitis	—	—	—	—	2	—	—	—	—	—	2
	M. Paronychia	—	—	1	—	1	1	—	1	—	—	4
(II) Dermatophytosis	Xanthomatosis	1	—	8	—	1	—	4	—	—	1	15
	Psoriasis	—	—	—	1	1	2	—	—	—	1	5
	Eczema	2	5	12	4	3	4	12	1	2	—	45
	Acne vulgaris	—	1	6	6	10	5	2	3	1	1	35
	Seborrhoeic dermatitis	—	1	5	2	1	—	—	—	—	—	9
	Chronic urticaria	—	1	3	2	2	—	1	—	1	—	10
		—	—	—	1	—	4	—	—	—	—	5
		4	9	48	20	27	21	24	6	7	4	170

TABLE 3

Age & Sex Distribution of Positive Cases

Main group	Sub group	11-20		21-30		31-40		41-50		51-60		Total	
		M	F	M	F	M	F	M	F	M	F		
Pruritis	Generalized	—	—	—	—	—	—	—	—	(1)	—	1	
	Localized (P. vulvae)	—	—	(1)	—	—	—	—	—	—	1	3	
Pyoderma	Boils (recurrent)	—	—	—	—	1	—	1	—	—	—	2	
	Hidradenitis suppurativa	—	—	—	—	—	—	2	—	—	—	2	
	Chronic folliculitis	—	—	—	—	—	—	—	—	—	—	—	
Fungus infections candidiasis	M. intertrigo	—	—	—	—	—	(1)	—	—	—	—	1	
	M. balanitis	—	—	—	—	—	—	—	—	—	—	—	
	M. paronychia	—	—	—	—	—	—	—	—	(1)	—	1	
Dermatophytosis	Xanthomatosis	—	—	—	—	—	—	—	—	—	(1)	2	
	Psoriasis	—	—	—	—	—	—	(2)	—	—	—	1	
	Eczema	—	—	—	—	—	—	1	—	—	(1)	4	
	Acne vulgaris	—	—	—	—	—	—	(1)	—	—	(1)	2	
Seborrhoeic Dermatitis	Chronic urticaria	—	—	—	—	—	—	—	—	—	—	1	
		—	—	—	—	—	—	—	—	(1)	—	1	
		—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	2	2	2	7	1	3	4	21

Figures within brackets signify those cases who had glycosuria and whose diabetes was detected by abnormal G. T. T.

TABLE 6
Details of cases of pyoderma

Disease	Total cases	Diabetes	Percentage Positivity
Recurrent boils	8	2	25
Hidradenitis suppurativa	4	2	50
Chronic folliculitis	7	-	-
Sycosis barbae (Coccogenic)	7	-	-
Total	26	4	15.38

Mackenna and Lehmann (1960) studied glucose tolerance test in 7 cases of hidradenitis suppurativa and found none of them normal. Out of 7 cases 5 showed flat curve, 1 steep curve, and one diabetic. In this study the G. T. T. was not flat or steep but diabetic in both the cases. The present figures thus emphasise the importance of glucose tolerance in cases of hidradenitis suppurativa in the detection of diabetes.

None of the cases of sycosis barbae (Coccogenic) and chronic folliculitis showed evidence of diabetes. The folliculitis in these cases was mostly confined to the legs. These cases of chronic pyogenic skin infections were included in this series to see whether any underlying diabetes contributed to the chronicity of the disease. It is apparent from the results that factors other than diabetes are responsible for the chronicity of the infection.

10 cases of candidiasis (moniliasis) were studied and of these, two showed evidence of diabetes as shown below:-

TABLE 7
Details of cases of candidiasis

Disease	Total cases	Diabetic	Percentage
Monilal intertrigo	4	1	25
Monilial balanitis	2	-	-
Monilial paronychia	4	1	25
Total	10	2	20

In both diabetic cases there was no glycosuria and glucose tolerance test was necessary to diagnose diabetes. Mycological examination in all the 10 cases was positive for candida. The importance of glucose tolerance test in cases of moniliasis is evident from this study.

Of the five cases of xanthomatosis only 1 showed evidence of diabetes with glycosuria. These 5 cases comprised 4 cases of xanthoma palpebrum and one of eruptive xanthoma. The positive case was one of xanthoma palpebrum. The age of the patient with xanthoma palpebrum was 52 years.

Of the 48 cases of psoriasis studied, 4 were found to be diabetic. Of these 2 had glycosuria and other two found diabetic on glucose tolerance tests.

TABLE 8

Age distribution of psoriatic patients and their diabetic status

Age group	Number of cases	Number found Diabetic	Percentage
11-20 years	7	-	
21-30 years	16	-	
31-40 years	7		
41-50 years	13	3	23.07
51-60 years	2	1	50.00
Total	45	4	8.88

The incidence of diabetes in cases of psoriasis is 8.88 percent and is in the higher age group as brought out by this study. Aschner, Curth and Gross¹¹ found the incidence of diabetes as 5.7 percent in a study of 239 psoriatic patients. Considering the prevalence of diabetes in the Indian population to vary between 1.9 to 2.7 percent¹², the results are statistically significant. There is an apparent relationship between diabetes and psoriasis which expresses itself in the occasional coincident occurrence of both conditions.

This is corroborated by the findings of Reeds et al¹³. They found an incidence of 25 percent in a survey of one hundred and three psoriatics based on the abnormal response to oral glucose tolerance test and employing the criteria utilized at the Mayo Clinic for diagnosing diabetes mellitus. These varying results may be due to the different criteria used for the diagnosis of diabetes. It is likely that more refined tests like cortisone glucose test and tolbutamide tolerance test may further elucidate the relationship between diabetes and psoriasis.

The general impression given by McGlosson^{14,15} in regard to a disturbed carbohydrate metabolism in many cases of eczema is confirmed by the glucose tolerance reactions in this series of 35 cases of eczema resistant to treatment and in which a definite external or internal cause was not apparent. The duration of the disease varied from 6 months to 18 years. The cases included mild and severe, extensive and localized, oozing and dry forms. Of the 35 cases studied, two showed subclinical diabetes. The fact that none of these abnormal patients had ever suspected any derangement of their mechanisms for the utilisation of carbohydrate and that eczema was the cardinal symptom which led to the discovery of their decreased sugar tolerance, deserves recognition. The eczema cleared promptly on diabetic diet and oral hypoglycemic drugs, supplemented with local therapy.

TABLE 9

Age distribution of eczema patients and their diabetic status

Age Group	Number of cases	Number found	Percentage
11—20 years	1	—	
21—30 years	12	—	
31—40 years	15	—	
41—50 years	5	1	20
51—60 years	2	1	50
Total	35	2	5.71

From these results it cannot be said that the disturbed carbohydrate metabolism is the cause of eczema. It may be a mere association but carbohydrate intolerance must be given serious consideration in the treatment of any refractory eczema which is resistant to treatment and in which a definite etiological factor is not detected. Our results are in conformity with those of Mackenna and Lehman⁷ who found 1 diabetic in 16 cases of eczema studied by glucose tolerance test giving 6.25 percent incidence.

In 9 cases of acne vulgaris studied, one was found with subclinical diabetes giving a percentage of 11.1 percent. The glucose tolerance test was carried out only in those resistant to treatment or in whom the disease was markedly pustular. Mackenna and Lehman⁷ found one potential diabetic in 19 cases of acne vulgaris giving 5.26 percent incidence.

Of the 10 cases of seborrhoeic dermatitis studied, 1 case of subclinical diabetes was detected in a 55 years old male who had suffered from the skin trouble for 11 years. The disease was resistant to routine anti-seborrhoeic therapy. He was placed on rastinon and antidiabetic diet and showed good response with marked clearing of the lesions. This again emphasises the importance of glucose tolerance test in intractable cases of seborrhoeic dermatitis. Mackenna and Lehman⁷ found 1 diabetic in a study of 35 cases of seborrhoeic dermatitis which gives 2.85 percent incidence.

Although the physician is often conscious of the possible etiological role of diabetes in cases of furunculosis carbuncle or pruritis vulvae; the association of hidradenitis suppurativa, generalized pruritis, candidiasis, xanthomatosis, chronic intractable eczema and other skin conditions with diabetes

is often not appreciated. The diabetic state will have to be established by G. T. T.

The cases in whom the diabetes was detected by urine examination or glucose tolerance test showed considerable improvement in their clinical condition on antidiabetic regime where local therapy for the skin condition previously carried out gave poor results. The importance of detection of diabetic state in these cases is thus of great importance in the management of these cases.

REFERENCES

1. Urbach E and Lentz JW : Carbohydrate Metabolism and the Skin Arch Derm Syph 52 : 301, 1945.
2. Ayres S Jr : Glucose tolerance reactions in eczema. A report of eighty six consecutive cases Arch Derm Syph (Chicago) 11 : 623, 1925.
3. Haldon Davis H and Wills L : Abnormalities of sugar level in eczema Brit J Derm 37 : 364, 1925.
4. Campbell GG and Burges JF : Brit J Derm 39 : 187, 1927.
5. Schwartz HJ Highman WJ and Mahnkin HC : Sugar content of the blood in various diseases of the skin J Cut Dis 34 : 159, 1916
6. Mackenna RMB and Lehman H : The glucose tolerance curve in hidradenitis suppurativa Brit J Derm 72 : 143, 1960.
7. Mackenna RMB and Lehman H : Further observations on the glucose tolerance test in skin diseases Lancet 1 : 1393, 1963.
8. Cruikshank CND Fairburn EA and Trotter MD. Subclinical glycosuria in acne vulgaris Brit J Derm 75 : 363, 1963.
9. Duncan GG : Diseases of Metabolism 5th Ed Philadelphia WB Saunder Co, 1964.
10. Winner LH and Strakosch EA : and Vulvular Pruitis as possible early symptom of unrecognized diabetes Lancet 60 : 532, 1940.
11. Aschner B Curth HO and P: Genetic aspects of psoriasis Acta Genet Gross (Basel) 7 : 1957.
12. Ahuja MMS Uma Shanker P and Garg VK : Different clinical types of Indian diabetes-characterisation based on response of immunoreactive plasma insulin to glucose and tolbutamide load Ind J Med Res 60 : 123, 1972.
13. Reeds et al : Psoriasis Vulgaris Arch Derm 89 : 205, 1964.
14. Mcglasson L : Hyperglycemia as etiological factor in certain dermatoses Arch Derm Syph 8 : 665, 1923.
15. Mcglasson L : Hyperglycemia : its therapeutic application in certain dermatoses Arch Derm Syph 13 : 338, 1926.

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