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Skin Tag As A Cutaneous Marker For Impaired Carbohydrate Metabolism: A Case Control Study

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Abstract

Background: Diabetes mellitus (DM) has variouscutaneous manifestations like skin tags, acanthosis nigricans, striadistensae and along with overweight may be first clinical presentation of an impaired carbohydrate metabolism. Skin tags are benign, fibro epithelial skin tumors with small, soft, pedunculated or sessile protrusions form of the skin. The present study is to find the presence of multiple skin tags as markers of an impaired carbohydrate metabolism.

Aim and Objective: To investigate and compare the prevalence of diabetes and impaired glucose tolerance test (IGT) in patients with skin tag and a control group.

Materials and Methods: 200 cases and 200 controls, screened for skin tag, with age > 20 years, presenting in out-patient/admitted in the department of Dermatology, Venereology and Leprosy (between from November 2011 to April 2013) were included in the study. Detailed history, clinical examination, histopathological examination and an oral glucose tolerance test (OGTT) were done in both the cases and the controls with age, sex and body mass index (BMI) matched.

Results: 29.5% cases and 7% controls were diabetic. IGT was present in 16% cases and 6% controls. The mean number of skin tags in patients with DM, IGT and normoglycemia was 15.50, 10.15 and 6.25 respectively. Patients with DM / IGT had greater number of skin tags thannormoglycemic.In patients with skin tag, a positive correlation was found between the total number of skin tags and fasting plasma glucose, 2-h post plasma glucose levels and OGTT.

Conclusions: The results show an increased risk of DM in patients with multiple skin tags. Early diagnosis of DM, regular exercises, weight reduction, changing carbohydrate

diet into high protein diet, diets rich in polyunsaturated fatty acids is advisable for patients to reduce skin tag ultimately.

Keywords: Diabetes mellitus, skin tags, body mass index, oral glucose tolerance test.

Introduction

Diabetes mellitus is a common metabolic disorder worldwide and a growing problem in Indian scenario. It has varied cutaneous manifestations like skin tags, acanthosis nigricans, striadistensaeas the first clinical presentation of an impaired carbohydrate metabolism in the body. Skin tags are benign, fibro epithelial skin tumours that present as small, soft, pedunculated or sessile protrusions form of the skin. The present study is an attempt to find the importance of the presence of multiple skin tags as markers of an impaired carbohydrate metabolism.

Aim and Objectives

Aim:

- To investigate and compare the prevalence of diabetes and impaired glucose tolerance test in patients with skin tag and a control group.
- OBJECTIVES: To study the distribution of skin tags as per their site, size, colour in both the sexes.
- To identify possible risk factors for the development of skin tags.
- To study the age distribution pattern of skin tags in both the sexes.
- To study the correlation between the fasting and post prandial plasma glucose levels with the occurrence of skin tags in patients of skin tags and a control group.

Methodology

Study Population: The patients who attended the Dermatology outpatient department from November 2011 to April 2013 were screened for the presence of skin tags and those and who were 20 years and older were included in this study. A total of 200 cases and 200 controls were included in the present study.

Study Design: It was a cross-sectional case control study, conducted in a tertiary care hospital in rural central India. The cases and controls were matched for age, sex and body mass index (BMI) using the frequency matching technique. Skin biopsy for histopathology was done for all the cases for the confirmation of diagnosis.

Inclusion Criteria

- Cases were defined as those who had three or more skin tags at anybody site.
- Voluntary controls were defined as those who had no skin tags at the time of examination and no prior history of having had skin tags removed.
- The cases and controls were matched in age, sex and body mass index (BMI).

Exclusion Criteria

- Patients not willing to participate in the study.
- Patients suffering from disorders of exocrine pancreas.
- Endocrinopathies like Cushing's syndrome, acromegaly, pheochromocytoma, glucagonoma and hyperthyroidism
- Patients on drugs like glucocorticoids, thyroid hormone,alpha adrenergic agonists, beta adrenergic agonists, thiazides, dilantin, pentamidine, interferon alpha and nicotinic acid.
- Conditions like acute infective, traumatic, circulatory or other stress (such as erythroderma) that might cause transitory hyperglycemia.

All cases and the voluntary controls were evaluated by a detailed history and clinical examination. An oral glucose tolerance test (OGTT)was performed on both the cases and the controls and the results were interpreted according to the World Health Organisation (WHO) protocol (1999).

ORAL GLUCOSE TOLERANCE TEST (OGTT)

According to WHO diagnostic criteria (1999).[1]

Status	Plasma Glucose (fasting, 0 hr) (mg/dl, mmol/l)	Plasma glucose (2 hrs after 75 gm glucose) (mg/dl) (mmol/l)
Non diabetic	<110 (<6.1)	<140 (<7.8)
Impaired glucose tolerance (IGT)	<126 (<7.0) AND	>=140 &<200 (>=7.8 &<11.1)
Diabetic	>=126 (>=7.0) OR	>=200 (>=11.1)

Anthropometric Measurements

Body Weight

Height

Body Mass Index (Bmi): **= weight/height^2**

On the basis of BMI, subjects were classified as: [2,3]

Other Parameters: Age, sex, blood pressure values, personal and family history of diabetes mellitus were recorded for all the participants in the study. For the cases skin tag parameters like their number, localization, size, colour and family history of acrochordons were also noted.

Statistical Analysis: Statistical analysis was performed using the SPSS Windows 17.0 program and graph pad prism 5.0 version. Frequencies of categorical variables were compared using the non-parametric chi-square test. Correlation analysis was done by Pearson's and Spearman correlation test. For comparing categorical data, chi square (γ^2) test was performed. A *p* value of < 0.05 was considered significant.

Result

In the present study, 200 cases and 200 controls with age, sex and body mass index (BMI) matched were enrolled. Out of 200 cases, 54.5% were males and 45.5% were females and the corresponding figures were 63.5% and 36.5% in the control group. The mean age of the patients among the cases was 47.15% ± 11.78 and that of controls was 49.76 ± 12.84. Histopathological examination for confirmation of diagnosis was done for all the cases (figure 1).

Neck was the commonest site of skin tags in 63% of the cases. Sessile type of skin tags were found in 47% of the patients while pedunculated type of skin tags were present in 41.5% of the controls. Most of the patients 59.5% had small sized skin tags (< 0.5 cm).

29.5% patients and 7% controls were diabetic. Impaired glucose tolerance (IGT) was present in 16% and 6% amongst the cases and controls respectively. The difference between the two groups was statistically significant (p-0.01).

15.5% of the cases and 4% of the controls had positive personal history of diabetes mellitus. The difference between the two groups was statistically significant ($p < 0.05$, Table 1)

21 patients (10.5 %) in the case group and four (2%) patients in the control group had family history of skin tag ($p < 0.05$, Table 2).

16% patients in the case group and 5% in the control group had family history of diabetes mellitus ($p < 0.05$, Table 3).

The cases and controls were matched regarding their body mass index (BMI).

The mean number of skin tags in patients with diabetes, IGT and normoglycemia was 15.50, 10.15 and 6.25 respectively. Patients with diabetes or IGT had greater number of skin tags compared to normoglycemic ones (Table 5).

In patients with skin tag, more skin tags was associated with higher fasting plasma glucose ($r = 0.42$, $p = 0.0001$, Table 6). 2-h post glucose load plasma glucose levels were higher in patients with skin tag ($r = 0.43$, $P = 0.000$, Table 7). More skin tags was associated with higher body mass index ($r = 0.298$, $p = 0.00$, Table 8 and with worse oral glucose tolerance test ($p < 0.05$, Table 9).

Discussion

Skin tags are common benign tumors usually occurring on the neck and major flexors of older people. A possible association with impaired carbohydrate metabolism has been suggested in previous studies but the results are not conclusive. **Margolis et al** investigated 500 hospitalized

patients, among which 47 male patients had skin tags[4]. They found diabetes in 72.34% of the patients and concluded that large, multiple, bilateral and hyperpigmented skin tags in male patients are considerable risk factors for diabetes. They had not taken any controls for their study, while in the present study controls were included.

In the **Kahana et al**,26.38% of patients of skin tag were diabetic while 7.87% had impaired glucose tolerance (IGT)[5]. They had not taken any controls for their study while in the present study controls were included. In the present study, 29.5% patients with skin tags were diabetic and 16% had impaired glucose tolerance. Their study did not show any correlation between size and colour of skin tag and diabetes. This was in concordance with the present study.

Agarwal et al reported abnormal glucose tolerance test in 40.6% of 118 patients with skin tags[6]. In the present study abnormal glucose tolerance test was found in 45.5% of patients with skin tags and in 13% of controls.

Demir et al studied 1250 hospitalised patients, of which 120 patients had atleast one skin tag[7]. Out of those 120 patients with skin tags, 88 (73.3%) were found to have diabetes mellitus and 5% had IGT with the new criteria of American Diabetes Association[8]. The authors thus concluded that patients with acrochordons should be evaluated for impaired carbohydrate metabolism. They had not taken controls for their study while in the present study, controls were included. In the present study out of the 200 patients of skin tags, 59 (29.5%) were found to be diabetic and 32 (16%) had impaired glucose tolerance test. They did not report any relationship between the presence of carbohydrate metabolism impairment and the number and localisation of skin tags in their study. This was contrary to the present study where a positive correlation between impaired carbohydrate metabolism and number of skin tags was found.

As reported by **Demiret al**[7], a positive correlation between the number of skin tags and BMI was also found in the present study. The mean BMI of patients of skin tags was27.27 ± 3.70 in the present study which was well in concordance with another study conducted by **Gorpelioglu et al**[8] who reported the mean BMI in patients of skin tags as 27.7 ± 4.9, thereby reporting that the maximum number of patients were overweight.

The association of a positive family history with an increased incidence of skin tags has been reported by **Erkeket al**[9] where they found a positive family history in 65.5 % of their patients with skin tags and 16.7% of the controls. In the present study, statistically significant association was found between family history and skin tags. **Erkek et al** also showed that BMI is the sole predictor of leptin levels with a positive predictive value of 52% in patients with skin tag[9]

Conclusions:

Skin tags are more prevalent in overweight subjects with BMI in the range of 25 – 29.9. A change in lifestyle like regular exercises, weight reduction, changing carbohydrate diet into high protein diet ,diets rich in polyunsaturated fatty acids is advised to decrease incidence of skin tags.

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Legends Figure and Tables

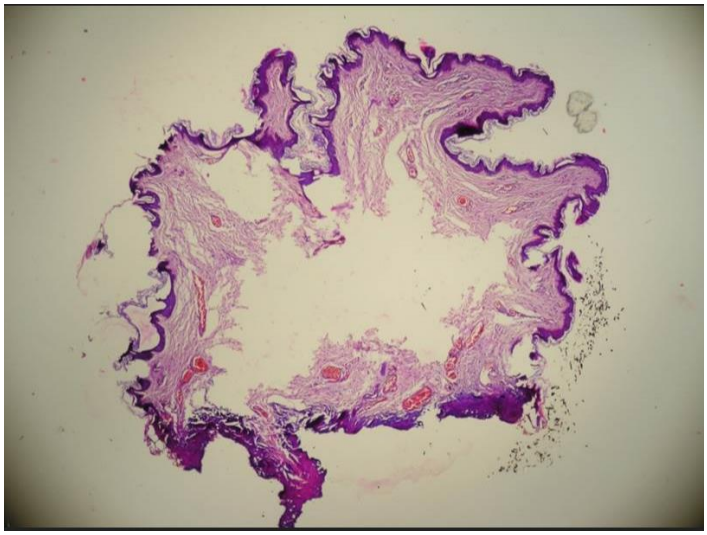

Figure 1

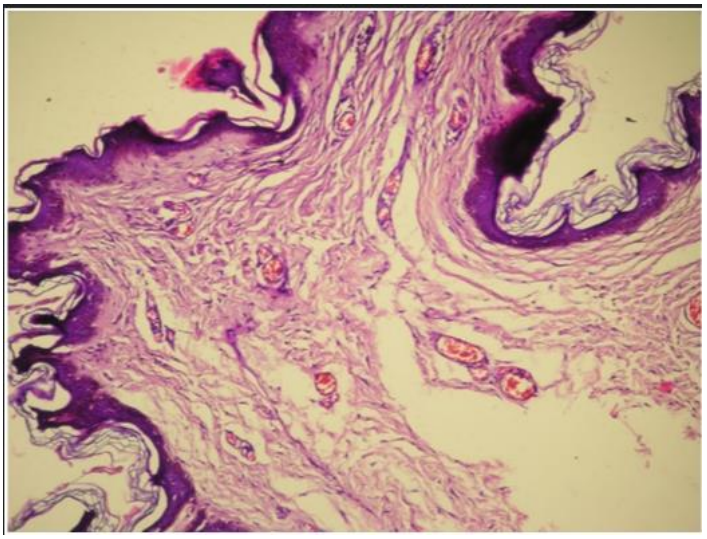

Figure 2

Figure 3

Figure 4

Tables

Table 1: Personal history of diabetic status

Diabetes Status	Case Group	Percentage (%)	Control Group	Percentage (%)	ϰ2-value	p-value
Known case	31	15.5	8	4	15.03	0.000 S,p< 0.05
No history	169	84.5	192	96		
Total	200	100	200	100		

Table 2: Family history of skin tag

F/H/O skin tag	Case Group	Percentage (%)	Control Group	Percentage (%)	ϰ2-value	p-value
Present	21	10.5	4	2	12.33	0.000 S,p< 0.05
Absent	179	89.5	196	98		
Total	200	100	200	100		

Table 3: Family history of diabetes mellitus

F/H/O DM	Case Group	Percentage (%)	Control Group	Percentage (%)	ϰ2-value	p-value
Present	32	16	10	5	12.87	0.000 S,p< 0.05
Absent	168	84	190	95		
Total	200	100	200	100		

Table 4: Distribution of body mass index (kg/m^2)

BMI (kg/m^2)	Case Group	Percentage (%)	Control Group	Percentage (%)	ϰ2-value	p-value
<18.5 (Underweight)	1	0.5	1	0.5	0.24	0.97 NS,p> 0.05
18.5-24.9 (Normal)	47	23.5	51	25.5		
25-29.9 (Overweight)	105	52.5	101	50.5		
30-39.9 (Obesity)	47	23.5	47	23.5		
≥40(Extreme obesity)	0	0	0	0		
Total	200	100	200	100		

Table 5: Mean number of skin tag

Oral GTT	Mean	SD
WNL (Normoglycemia)	6.25	2.93
Impaired Glucose tolerance (IGT)	10.15	5.16
Diabetic	15.50	8.04
Total	9.56	6.61

Table 6: Correlation between number of skin tags and fasting plasma glucose

	Mean	Std. Deviation	Rho	p-value
Number of skin tags	9.56	6.61	0.42	0.0001 S,p<0.05
Fasting plasma glucose	114.26	43.48		

Table 7: Correlation between numbers of skin tags and 2-hr pp plasma glucose

	Mean	Std. Deviation	Rho	p-value
Number of skin tags	9.56	6.61	0.43	0.000 S,p<0.05
2h pp plasma glucose	164.62	84.50		

Table 8: Correlation between numbers of skin tags and body mass index

	Mean	Std. Deviation	Rho	p-value
Number of skin tags	9.56	6.61	0.298	0.000 S,p<0.05
BMI(kg/m^2)	27.27	3.70		

Table 9: Correlation between numbers of skin tags and oral GTT

Number of skin tags	Mean	Odd's Ratio	Rho	p-value
Mean	9.56	1.74	0.19	0.000 S,p<0.05
SD	6.61			