DOI: 10.7860/JCDR/2016/15994.7062

Original Article

Biochemistry Section

Assessment of Various Biochemical Parameters and BMI in Patients with Skin Tags

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ABSTRACT

Introdction: Acrochordon or fibroepithelial polyp, commonly known as Skin tags (STs) are one of the most common benign skin condition, consisting of skin projecting from the surrounding skin, usually occurring on the eyelids, neck and axillae. Studies have found an association of STs with conditions such as obesity, diabetes mellitus and atherogenic lipid profile. Abdominal obesity and the consequent insulin resistance are said be important contributing factors for diabetes, dyslipidaemia and cardiovascular disease.

Aim: To highlight the association of lipid profile, BMI, glucose, HbA1c and leptin levels in patients with STs.

Materials and Methods: This was a case control study conducted at tertiary care hospital in South India from April 2013 to May 2014. The cases were chosen those who are having minimum of 3 STs attending the dermatology clinic. A total of 171 patients were screened, out of which 126 satisfied the criteria for inclusion and were included in the final analysis. The significance of the difference between the groups was assessed by Student t-test (two tailed, independent) to find the significance on continuous scale between two groups on metric parameters, between cases and controls and p-value of <0.05 were considered as statistically significant.

Results: Maximum cases were in males and in age group of 41-50 years. There was significant association between STs and triglycerides, low density lipoprotein, very low density lipoprotein cholesterol and leptin levels. Other parameters were also altered but no statistically significant difference was seen.

Conclusion: STs are associated with change in markers of obesity and dyslipidaemia. Patients with STs need suitable interventions like weight reduction, smoking cessation, change in dietary habits. STs may also play a role in early diagnosis of metabolic syndrome.

Keywords: Dyslipidaemia, Leptin, Metabolic syndrome

INTRODUCTION

Acrochordon or fibroepithelial polyp, commonly known as Skin tags (STs) are one of the most common benign skin condition, consisting of skin projecting from the surrounding skin, usually occurring on the eyelids, neck and axillae [1]. The etiology of STs is still unknown. Some of the factors associated are, skin rubbing, obesity, metabolic syndrome and hormonal imbalance [2-5]. Histologically, STs is a polypoid lesion with overlying mildly acanthotic epidermis, a loose, edematous fibrovascular core exhibiting mild chronic inflammation and a nerveless dermis [6].

Several studies have found an association of STs with conditions such as obesity, diabetes mellitus, atherogenic lipid profile, acromegaly and Crohn's disease [7]. The incidence of obesity is increasing at an alarming rate both in developed and in developing countries. In urban parts of India, estimates varying between 30 and 65% of adults being overweight, obese or having abdominal obesity have been seen in various surveys [8]. The important contributing factors for diabetes, dyslipidaemia and cardiovascular disease are abdominal obesity and insulin resistance [9,10].

Leptin is a protein secreted by adipose tissue, which has an important role in metabolism and immunity. It regulates body weight, appetite and energy expenditure [11]. Plasma leptin displays a strong association with cardiovascular risk factors, including obesity, insulin resistance, hypertension, dyslipidaemia, hyperuricaemia and inflammatory markers [12]. Although the relation of STs to insulin resistance, lipid profile was established in previous studies, further studies are warranted in the area of obesity and STs [13]. Hence, the present study aims to highlight the association of lipid profile, BMI, glucose, HbA1c and leptin levels in patients with STs.

MATERIALS AND METHODS

Study Design

This was a case control study conducted at tertiary care hospital in South India from April 2013 to May 2014. The cases were chosen those who are having minimum of 3 STs attending the dermatology clinic. Skin tag was defined as a furrowed pedunculated skin-coloured papule approximately 2 mm in width and 3-6 mm in height, with duration of lesions for at least 6 months [14]. The controls were selected from the out-patient department without STs. The study was approved by institutional ethical committee. Informed consent was obtained from all the participants. The following were exclusion criteria-

1. Patients taking any drug (such as anti-diabetic, oral contraceptive pills, corticosteroids, anti-hypertensive and anti-uricaemic drugs) that could alter leptin levels or glucose metabolism.
2. Secondary disease with possible alternating lipid profile such as diabetes mellitus, gastroentropathy, malabsorbtive disorders, hepatic disease.
3. Patients with endocrinopathies like acromegaly, Cushing's syndrome and with, medical disorders like liver or kidney disease.
4. Pregnant and lactating women were excluded from the study.

Measurement of Various Parameters

1. Height, weight and waist circumference were measured. BMI was calculated as weight in kg divided by the square of the height in meters. Overweight was defined as BMI 25-30 kg/m^2, and obesity was defined as BMI >30 kg/m^2 [15].
2. Leptin serum level was determined by enzyme linked immunosorbent assay (ELISA) (R&D Systems, Oxford, U.K.).
3. Blood was drawn from the subjects after 12 hours fasting and 6 hours after meals with staple food for two days. Serum total cholesterol (TC) and total triglycrides (TG) by an enzymatic method. Serum high density lipo-protein (HDL) by phosphotungstate precipitation, followed by enzymatic method. Serum low density lipo-protein (LDL) Cholesterol and very low density lipo-protein (VLDL) Cholesterol by using Friedewald's formula. TC/ HDL and LDL/HDL ratio were also calculated.

All the parameters were analysed by using a semiautomatic analyser.

4. Venous blood samples were taken at the enrollment visit after the participants had fasted overnight. Glucose was measured in serum immediately. Commercial kits were used for determination of fasting blood glucose. HbA1c levels were measured by using Hitachi 902 Auto analyser.

STATISTICAL ANALYSIS

All the results were expressed as mean±SD values. The data was recorded in Microsoft excel and analysed using SPSS software (version 15). The significance of the difference between the groups was assessed by Student 't'-test (two tailed, independent) to find the significance of study parameters on continuous scale between two groups on metric parameters, between cases and controls and p-value of <0.05 were considered as statistically significant.

RESULTS

A total of 171 patients were screened, out of which 126 satisfied the criteria for inclusion and were included in the final analysis. The demographic data of the subjects is shown in [Table/Fig-1]. The lipid profile of the study subjects is shown in [Table/Fig-2].
The comparison of glucose and HbA1c levels among study subjects is shown in [Table/Fig-3]. The comparison of Leptin levels and BMI among study subjects is shown in [Table/Fig-4].

Variable	Cases	Controls
Number of subjects	63	63
Age	49.7±5.32	45.6±6.39
Male: Female	38:25	36:27
Number of skin tags (range)	6-19	None
SBP	129.21±5.19	122.45±6.13
DBP	84.11±5.14	82.15±4.55
Family history of diabetes (Yes/No)	32/31	6/57

[Table/Fig- 1]: Demographic data of the subjects
SBP = Systolic blood pressure, DBP = Diastolic blood pressure
Maximum cases were in males and in age group of 41-50 years.
p> 0.05 (No statistically significant difference was seen between cases and controls)

Lipid profile	Cases	Controls
TC	203.16±41.34	165.43±23.41
TGL	151.56±56.23	114.47±36.22*
HDL	39.78±7.22	43.34±4.69
LDL	115.34±32.19	86.15±27.82*
VLDL	34.14±8.74	25.67±7.45*
TC/ HDL	5.1±1.62	4.22±0.95
LDL/HDL	2.89±0.55	1.98±0.37

[Table/Fig-2]: Comparison of lipid profile among the study groups.
TC = Total Cholesterol, TGL = Triglycerides, HDL = High density Lipoprotein, LDL= Low density Lipoprotein, VLDL = Very low density Lipoprotein cholesterol
*$P \leq 0.01$ = Highly significant.

Parameter	Cases	Controls
Glucose	106.6±32.4	99.12±31.2
HbA1c	5.9±1.3	5.4±0.9*

[Table/Fig-3]: Glucose and HbA1c levels among study subjects.
*$p \leq 0.01$ = Highly significant
Statistically significant difference was seen in HbA1c levels.

Parameter	Cases	Controls
Leptin (ng/ml)	74.4±19.5	66.23±18.2*
BMI	27.22 ± 4.16	25.45 ±3.39

[Table/Fig-4]: Leptin levels and BMI among study subjects.
*$P \leq 0.01$ = Highly significant.

DISCUSSION

One of the most common fibrous lesions of the skin is skin tags. Skin tags remain asymptomatic and are usually not painful unless they become inflamed or irritated [16]. Most patients with skin tags consult a doctor for cosmetic reasons. Multiple STs are frequently associated with non-insulin dependent diabetes mellitus and obesity [17]. Hence, in the present study we analysed the association between STs and various biochemical parameters related to obesity and diabetes. The lipid profile was altered in patients with STs, but was statistically significant only with TGL, LDL and VLDL levels. TC and HDL levels, although altered more in ST patients, but was not statistically significant [Table/Fig-2].

Other studies have also reported an association between lipid profile and STs, but there are differences in individual lipid level [7,18]. In a study by Erdogan et al., total cholesterol was significantly higher in patients with STs [7]. A recent study observed higher total cholesterol, triglyceride, low-density lipoprotein cholesterol levels and lower HDL cholesterol in patients with STs [18]. Another study conducted by Sari et al., found that the frequency dyslipidaemia was 59.3% [5]. A recent Indian study [19] found that mean TC levels and TC/HDL-C ratio were significantly higher in the cases than those in the control group.

The glucose and HbA1c levels were higher in patients with STs and were statistically significant [Table/Fig-3]. Other studies have found a relationship between STs and diabetes mellitus [20,21]. A recent study [22], using oral glucose tolerance test, showed an increased risk of diabetes mellitus in patients with STs. A relationship between STs and diabetes mellitus has also been reported in a study conducted by Bahgat and Safory [23]. In a study conducted by Gorpelioglu et al., there was no difference for BMI and HbA1c levels [24].

Leptin levels were statistically significantly higher in cases than in controls, BMI was higher in patients with STs, but was not statistically significantly [Table/Fig-4]. Other studies have reported significant association of Leptin levels with STs [5,25,26]. But a recent Indian study did not find a significant association between Leptin levels and STs [24]. Association of BMI with ST was found in some studies [24,27]. Another study did not find any association [20]. How leptin plays a role in development of the ST is not known, but there are some studies which postulate the proliferative effects of leptin cutaneous keratinocytes [28, 29].

LIMITATIONS

We did not measure insulin level, the study was done in a single centre and the sample size was small. Future studies should be multi-centric and should include additional markers such as plasma insulin level, tumour necrosis factor-alpha and high sensitive C-reactive protein in patients with STs, which may be associated with insulin resistance and metabolic syndrome.

CONCLUSION

In the present study, there is significant association of STs with Triglycerides, LDL, VLDL and Leptin levels. Other parameters such as HDL, BMI and glucose levels were altered but were not statistically significant. Patients with STs need suitable interventions like weight reduction, smoking cessation, change in dietary habits. STs may also play a role in early diagnosis of metabolic syndrome.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Jul 30, 2015**
Date of Peer Review: **Oct 16, 2015**
Date of Acceptance: **Nov 24, 2015**
Date of Publishing: **Jan 01, 2016**