ASSESSMENT OF SERUM LEPTIN, LIPID PROFILE, GLUCOSE LEVEL, INSULIN RESISTANCE AND BMI IN PATIENTS WITH SKIN TAGS

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Clinical study

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Abstract

Background: Skin tags are small, soft, pedunculated papillomas, usually occurring on the neck, axillae and eyelids. Skin tags are associated with obesity and atherogenic profile.

Aim: The aim of this study was to evaluate the relationship between serum leptin, body mass index, lipid profile, fasting glucose, insulin levels and homeostasis model assessment of insulin resistance in patients with skin tags and to compare them with the levels in healthy controls.

Materials and Methods: This study included 84 participants, 45 skin tags patients and 39 apparently healthy controls. Body mass index, fasting glucose and insulin levels were estimated in addition to lipid profile, leptin and homeostasis model assessment of insulin resistance levels.

Results: The skin tags group showed significantly higher values of age, total cholesterol, low-density lipoprotein cholesterol, body mass index, triglycerides, very low-density lipoprotein cholesterol and homeostasis model assessment of insulin resistance, when compared with the healthy control group. There was no significant difference in sex, leptin levels, high-density lipoprotein cholesterol, glucose and insulin levels between the two groups.

Conclusion: The results of this study confirm that skin tags are associated with obesity and dyslipidemia. Therefore, follow-up of these patients regarding to development of atherosclerosis associated diseases may be beneficial.
considered to be a new growth factor. Leptin is a 16-kDa protein, produced primarily by adipocytes, and low levels have been detected in gastric fundic epithelium, intestine and skeletal muscle. It is involved in the regulation of appetite, energy expenditure via hypothalamic mediated effects, carbohydrate and lipid metabolism. Serum leptin levels are increased in obesity, being strongly associated with cardiovascular risk factors such as insulin resistance, hypertension, dyslipidaemia, hyperuricaemia and inflammatory markers (7).

The aim of this study is to investigate serum leptin, atherogenic lipids, glucose levels, homeostasis model assessment of insulin resistance (HOMA-IR), and body mass index (BMI) in patients with ST and to compare them with these markers’ levels in healthy controls.

Materials and methods

This study included 84 participants: 45 patients with at least three skin tags and 39 healthy participants serving as controls. All participants were selected from the outpatient clinic of the Department of Dermatology, Private Sakarya Vatan Hospital, Sakarya, Turkey. The study protocol respected the ethical guidelines of Kocaeli University and was approved by the ethical committee.

Exclusion criteria included patients on oral contraceptives, lipid lowering agents, pregnant or lactating women, medical history of endocrine disease (Cushing syndrome, acromegaly, hyperthyroidism, glucagonoma), acute infection, erythroderma and/or psoriasis, cases with drug history of isotretinoin use in the last six months. All participants underwent full history taking, family history and general examination. The height and weight of the participants were measured and their BMI was estimated. The BMI was determined by dividing body weight to height square (kg/m²). Participants with BMI 19.25 kg/m² were considered normal, those with BMI 25-29 kg/m² overweight and those with BMI equal or higher than 30 kg/m² obese.

Blood samples were collected from patients and healthy controls between 9 and 10 a.m. after they had fasted overnight. Two cc. of blood were taken from healty controls and patients for measurement of insulin, glucose, HOMA-IR, low-density lipoprotein cholesterol (LDL), high-density lipoprotein cholesterol (HDL), triglycerides, total cholesterol and leptin levels. Serum very low-density lipoprotein cholesterol (VLDL) was calculated using the following formula: VLDL = TG/5. After getting centrifuged at 3500 rpm, serum samples were extracted and studied. The same procedure was applied to the control group at the same time as patients. Remaining serum was stored at 40°C and thawed just before analysis. Leptin levels were measured by solid phase sandwich ELISA, using a commercial kit (Leptin, DRG Instruments, Marburg, Germany).

The statistical software used was IBM SPSS 20.0 (SPSS Inc, Chicago, IL, USA). Normality of the distribution was evaluated with the Kolmogrov-Smirnov test. Numeric variables that show normal distribution were given as mean±standard deviation, non-numeric variables median±deviation and categorical variables were given as frequency. Differences between groups were evaluated with Student’s t test for numeric variables that are normally distributed, and Mann Whitney U test for non-numeric variables that are not normally distributed. P<0.05 was sufficient for being statistically significant.

Results

This study enrolled 84 participants, who were divided into two groups: group 1 included 45 patients (21 men and 24 women) with ST, with a mean of 41.13 ±13.67 years of age, who were compared with group 2, which included 39 control participants (14 men and 25 women), with a mean of 31.38 ±13.05 years age (Table 1).

The mean BMI of group 1 and group 2 were 28.72±5.49 and 24.69±4.82, respectively, which was found to be statistically significant (p=0.001) (Table 2); 28.9% of cases were in the overweight group (BMI 25-29.9 kg/m²) and 31.1% were obese (BMI> 30 kg/m²).

The mean total cholesterol levels in group 1 and group 2 were 207.25±37.08 and 174.49±33.54, respectively, which was found to be statistically significant (p<0.001) (Table 2).

The mean LDL cholesterol levels in group 1 and group 2 were 128.35±33.16 and 105.46±29.55, respectively, which was found to be statistically significant (p<0.001) (Table 2).

The mean triglyceride levels in group 1 and group 2 were 161.21±73.71 and 100.53±46.99, respectively, which were found to be statistically significant (p<0.001) (Table 2).

The mean VLDL cholesterol levels in group 1 and group 2 were 32.25±14.78 and 20.20±9.30, respectively, which were found to be statistically significant (p<0.001) (Table 2).

The mean HOMA-IR levels in group 1 and group 2 were 3.45±6.23 and 2.89±1.08, respectively, which were found to be statistically significant (p<0.05) (Table 2).

There was no significant difference between group 1 and group 2 with respect to HDL cholesterol, glucose, insulin and leptin levels (p>0.05) (Table 2).

Discussion

Skin tags are small, soft, flesh-colored to dark brown, pinhead-sized and larger, sessile and pe-
dilated papillomas commonly occurring on the neck. ST are also frequently seen in the axilla and eyelids and less often on the trunk and groins (1).

The presence of ST is associated with diabetes mellitus, obesity and atherogenic lipid profile. ST is also associated with friction, acromegaly, Crohn’s disease, aging, organ transplants, colonic polyps, pregnancy, human papilloma virus, increased mast cell count and increased androgen and oestrogen receptors (2-6).

Leptin is a 16-kDa protein, produced primarily by adipocytes, and low levels have been detected in gastric fundic epithelium, intestine and skeletal muscle. It is involved in the regulation of appetite, energy expenditure via hypothalamic mediated effects, carbohydrate and lipid metabolism. Serum leptin levels are increased in obesity, being strongly associated with cardiovascular risk factors such as insulin resistance, hypertension, dyslipidemia, hyperuricaemia and inflammatory markers (7).

Obesity and dislipidemia are frequently associated with a marked risk for the development of metabolic syndrome. Metabolic syndrome includes raised blood pressure, elevated glucose level, cholesterol and triglycerides (TG) levels and low HDL cholesterol. ST frequently occur in patients with obesity, their prevalence being correlated with the severity of obesity. Our study showed that the BMI values in ST patients were significantly higher than in the control group.

There have been reports in the literature about the relationship between ST and atherogenic lipid profiles. Crook presented four cases with multiple ST who had elevated serum TG and decreased serum HDL cholesterol levels (2). He suggested that ST might show an abnormal lipid profile and increased cardiovascular risk (2). Demir et al showed hiperlipidemia and obesity accompanied with ST in 45.8% and 70.8% of the cases, respectively (8). Erdogan et al reported higher TG serum levels in the ST group than the control group (9). Gorpelioglu et al found that total cholesterol and LDL cholesterol levels were higher in the ST group than the control group (10). Tamega et al showed higher serum TG levels in the ST group than the control group (11). Idris S and Sunitha showed that the mean total cholesterol and total cholesterol/HDL cholesterol ratio were significantly higher in the ST group (12). Agamia NF and Gomaa SH reported that total cholesterol, triglycerides and LDL cholesterol levels were significantly higher in ST patients compared with controls (13). El Safoury et al found that total cholesterol, triglycerides and LDL cholesterol levels were significantly higher in ST patients compared to controls (4). In our study, we found that total cholesterol, triglycerides, LDL cholesterol and VLDL cholesterol levels were significantly higher in the ST group than the control group.

We evaluated the relationship between obesity, diabetes mellitus, insulin resistance and multiple skin tags. In this study, the mean BMI was 28.72±5.49, most of our patients being overweight. HOMA-IR levels were statistically significant higher in the patients’ group than controls. There was no significant difference in levels of serum fasting glucose, insulin and leptin between the two groups. El Safoury et al reported that BMI, fasting glucose, insulin levels, HOMA-IR and leptin levels were significantly higher in ST patients compared with controls (4). Agamia NF and Gomaa SH showed that BMI, fasting glucose, insulin levels, HOMA-IR and leptin levels were significantly higher in ST patients compared with controls (13). Gorpelioglu et al reported that there was no significant difference in serum glucose and leptin levels between

| Table 1. Frequency of ST according to gender in the study sample |
|-----------------|-----------------|-----------------|
| Gender          | Group 1 | Group 2 | Total |
| n | %     | n | %     |        |
| Male          | 21 | 24.2 | 14 | 16.8 | 35 |
| Female        | 24 | 28.7 | 25 | 30.3 | 49 |
| Total         | 45 | 52.9 | 39 | 47.1 | 84 |

| Table 2. Comparison of biochemical results of the study participants |
|------------------|------------------|------------------|
| Case mean±SD     | Control mean±SD  | P value |
| BMI              | 28.72±5.49       | 24.69±4.82       | 0.001 |
| Total cholesterol| 207.25±37.08     | 174.49±33.54     | 0.001 |
| Triglyceride     | 161.21±73.71     | 100.53±46.99     | 0.001 |
| LDL              | 128.35±33.16     | 105.46±29.55     | 0.001 |
| HDL              | 45.2±11.04       | 49.11±12.96      | 0.212 |
| VLDL             | 32.25±14.78      | 20.20±9.30       | 0.001 |
| Insulin          | 11.76±4.46       | 9.68±12.50       | 0.628 |
| HOMA-IR          | 3.45±6.23        | 2.89±1.08        | 0.042 |
| Leptin           | 11.97±13.27      | 9.67±12.49       | 0.092 |
the insulin resistant groups (10). Idris S and Sunitha showed that there was no statistical difference in leptin levels between the groups (12).

As a result, patients with ST were found to have significantly high total cholesterol, triglycerides, LDL cholesterol, VLDL cholesterol levels and HOMA-IR, when compared to the control group. However, there was no significant difference in serum fasting glucose levels, insulin levels and leptin levels between the two groups.

The results of this study confirm that ST are associated with obesity, insulin resistance and dyslipidemia. Therefore, follow-up of these patients regarding the development of atherosclerosis and metabolic syndrome associated diseases may be beneficial.

Conflicts of interest: None declared.

Financial disclosure: none declared.