

Original Research Article

Metabolic syndrome in south Indian population with skin tags: a hospital-based case control study

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ABSTRACT

Background: Metabolic syndrome is a constellation of several clinical and laboratory cardiovascular risk factors that have been linked with numerous medical and dermatologic conditions. Recent evidence suggests a strong association between skin tags and insulin resistance and obesity, yet there is a paucity of data on relation of skin tags with metabolic syndrome as a whole. Aim of the study was to evaluate the strength of association between skin tags and metabolic syndrome.

Methods: 70 patients with skin tags and an equal number of age and gender matched controls were enrolled in a hospital-based case control study. Anthropometric measures, blood pressure, fasting glucose, high density lipoprotein cholesterol and triglycerides were measured. Metabolic syndrome was diagnosed by the presence of 3 or more of the south Asian modified national cholesterol education program's adult panel III criteria. Statistical analysis was performed using chi square test, and odds ratio was calculated. $P \leq 0.05$ were considered significant.

Results: Metabolic syndrome was significantly more common in patients with skin tags than in controls (70% vs. 26%, $p < 0.001$). Triglycerides and waist circumference values were significantly increased in cases as compared to controls ($p < 0.05$). There was no statistically significant difference in the high-density lipoprotein levels, fasting blood glucose levels and presence of hypertension among cases and controls.

Conclusion: Skin tags when present in multiple could be an early warning sign for Metabolic syndrome. They serve a cutaneous marker to initiate early detection and intervention of at-risk patients for cardiovascular disorders.

Keywords: Metabolic syndrome, Skin tags, Dyslipidaemia, Diabetes, Hypertension

INTRODUCTION

Skin tags, acrochordons, soft fibromas and fibroepithelial polyps are all alternative terms to describe a common benign skin condition which consists of a bit of skin projecting from the surrounding skin. They often develop in the intertriginous areas, mainly the neck, axillae, flexures of middle aged and elderly people.^{1,2} Apart from their cosmetic impact, they have now been linked to various clinical conditions like aging,

acromegaly, colonic polyps, Birt-Hogg-Dube syndrome, naevoid basal cell carcinoma syndrome and metabolic complications such as diabetes mellitus, dyslipidaemia, obesity and cardiovascular diseases and may therefore serve as a cutaneous marker of underlying systemic disorders.³⁻⁷ The pathogenesis of Skin tags is not fully understood; however, insulin resistance and hyperinsulinemia play an important role. Other proposed pathogenetic mechanisms involve mast cell tryptase, hyperleptinemia and leptin resistance, various growth

factors, inflammatory mediators, oestrogens, androgens.⁸ Metabolic syndrome is defined as a clustering of interrelated metabolic abnormalities that confer increased risk of cardiovascular diseases. Peripheral Insulin resistance is believed to be the root cause of metabolic syndrome also as is in skin tags. The association of skin tags with Diabetes was first mentioned by Touraine.⁴ Since then, a few clinical studies have been conducted to investigate the relationship between skin tags and the components of Metabolic syndrome (diabetes, hypertension, obesity, and dyslipidaemia) with contradictory results.^{9,10} Although the relation of Skin tags to insulin resistance and type 2 diabetes mellitus was established in previous studies further studies are warranted to establish the relationship with metabolic syndrome as a whole.¹¹ Thus, this study was conducted to explore these lacunae.

METHODS

The study was conducted at a teaching hospital (Gayatri Vidhya Parishad Medical College and Hospital, Visakhapatnam) in southern India. This was a case-control study conducted over one year from July 2018 to June 2019.

Sample size for the study included total 140 patients in total were included in the study; 70 patients with at least three skin tags were taken as cases and an equal number of age- and sex-matched patients without skin tags as controls. Control group was randomly selected from the same outpatient department.

Inclusion criteria for the study included, 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 were included in the present study.

Exclusion criteria for the study patients aged less than 16 years, 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, Secondary disease with possible alternating lipid profile such as gastroenteropathy, malabsorption disorders, hepatic disease, Patients with endocrinopathies like acromegaly, Cushing's syndrome and with, medical disorders like liver or kidney disease, Patients with history or pre-existing diabetes, hypertension, lipid abnormalities and/or concurrent medication for the above illness and Pregnant and lactating women were excluded from the study.

Informed consent was taken from all the participants. A detailed general, cutaneous and systemic examination followed by relevant investigations was carried out. The number, site, size, and colour of the skin tags and other findings were recorded in a proforma.

Measurement of various parameters

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/m², and obesity was defined as BMI >30 kg/m². 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 triglycerides (TG) by an enzymatic method. Serum high density lipoprotein (HDL) by phosphotungstate precipitation, followed by enzymatic method.

Venous blood samples were taken at the enrolment visit after the participants had fasted overnight. Glucose was measured in serum immediately. Commercial kits were used for determination of fasting blood glucose.

Diabetes mellitus and hypertension were diagnosed according to American diabetes association (ADA) and the Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure (JNC VII) criteria.^{12,13}

Serum lipid levels were analysed as per the third report of the national cholesterol education program expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (Adult treatment panel III).¹⁴ Body mass index (BMI) was calculated as weight (in kg)/height² (in m²), and values were interpreted according to World Health Organization (WHO).¹⁵

Metabolic syndrome was diagnosed using updated NCEP ATP III criteria.¹⁴ A diagnosis was made when three or more of the following criteria were present: 1. Waist circumference of more than 102 cm in men or more than 88 cm in women. Blood pressure level of 130/85 mmHg or higher or use of antihypertensive medication. Fasting plasma glucose levels of 100 mg/dl or higher or on treatment for elevated glucose. 4. Fasting triglyceride (TG) levels of 150 mg/dl or higher or on drug treatment for elevated TG. Fasting high-density lipoprotein cholesterol (HDL-C) level of less than 40 mg/dl in men or less than 50 mg/dl in women or on treatment for reduced HDL-C.

In statistical analysis for the study Microsoft Excel 2007 was used for data entry and statistical package for the social science (SPSS) version 24 was used for statistical analysis. Chi-square test and odds Ratio were calculated. P<0.05 was considered statistically significant.

RESULTS

The mean age of patients with skin tag was 41.24 ±7.49 years. 40% of patients presenting were in fifth decade of life. Males outnumbered females (1.63:1). The number of skin tags ranged from 3 to 35. Neck was the commonest site involved, followed by axilla. Other less common sites were eyelids, perineum, retro auricular area, thigh, breast, nipple, infraclavicular area and face. 22.05±9.56 months

was the average duration of skin tag at presentation was. Majority were less than 0.5 cm in size (60.13%). Few (2%) skin tags were more than 1 cm. 39% of cases had a family history of skin tags (Table 1).

The noteworthy findings in this study include the statistically significant association between serum triglycerides, waist circumference and skin tags (P<0.05). The mean waist circumference and mean serum triglycerides were significantly higher in cases compared to controls. Fasting blood sugar levels were higher and serum HDL levels were lower in the patients with skin tags compared to controls but were not statistically significant (Table 2).

This study results showed that the Odds Ratio of developing metabolic syndrome in patients with skin tag was 6.74 times higher than controls (P<0.001) (Table 3). 70% of cases had Metabolic syndrome as compared to control group (26%). Also, greater number of cases (38%) had raised blood pressure compared to controls (32%) (Table 2).

Not found any association between different age groups or gender with various skin tag characteristics such as number, colour, or length. In addition, no significant difference of skin tag characteristics was found between patients with and without metabolic syndrome.

Table 1: Demographic data of case and control groups.

| Variable | Cases | Controls |
|---------------------------------|----------------|-------------|
| No. of subjects | 70 | 70 |
| Age (Years) | 41.24 ±7.49 | 43.56 ±5.18 |
| Male: Female | 1.63:1 | 1:61:1 |
| Range of skin tags | 3 to 35 | none |
| Mean duration | 22.05 ± 9.56 | none |
| Site (%) | Neck (60.02) | none |
| | Axilla (22.52) | |
| | Eyelid (7.84) | |
| | Trunk (5.87) | |
| | Others (3.75) | |
| Size (cm) (%) | <0.5 (60.13) | none |
| | 0.5-1 (37.87) | |
| | >1 (2) | |
| Family history of skin tags (%) | 39 | 8 |

Table 2: Comparison of metabolic syndrome components between case and control group.

| Components of metabolic syndrome | Case (n=70) | | Control (n=70) | | P value |
|--|-------------|----|----------------|----|---------|
| | N | % | N | % | |
| Hypertriglyceridemia* (≥150 mg/dl) | 46 | 66 | 29 | 42 | 0.004 |
| Decreased High density lipoprotein (<50 mg/dl females) (<40 mg/dl Males) | 45 | 64 | 48 | 68 | 0.59 |
| Raised fasting blood sugar (≥100 mg/dl) | 18 | 26 | 13 | 19 | 0.31 |
| Increased waist circumference* (≥90 cm males or ≥80 cm females) | 59 | 84 | 31 | 44 | <0.001 |
| Hypertension ≥135/85 mmHg) | 27 | 38 | 22 | 32 | 0.38 |

Table 3: Association of metabolic syndrome with skin tags.

| Variables | Case (n=70) | | Control (n=70) | | P-value |
|-----------------------|-------------|----|----------------|----|---------|
| | N | % | N | % | |
| Metabolic syndrome | 49 | 70 | 18 | 26 | <0.001 |
| No Metabolic syndrome | 21 | 30 | 52 | 74 | |
| Odds ratio=6.74 | | | | | |

DISCUSSION

Skin tags are common benign lesions that are composed of loose fibrous tissue and occur mainly on the neck and major flexures are often overlooked as a part of aging process.¹⁶

Metabolic syndrome is a constellation of risk factors and is a strong predictor of cardiovascular disease, and stroke and significantly increases the risk of cardiovascular mortality compared with the individual factors.¹⁷⁻¹⁹ The increasing prevalence of Metabolic syndrome is a worldwide health problem and its association with skin

tags has recently attracted growing attention. Multiple skin tags have also been associated with abnormalities in the glucose metabolism, specifically type-2 diabetes, hyperinsulinemia, obesity thus reflecting insulin resistance states. Raised circulating insulin levels, hyperleptinemia, leptin resistance can lead to increased epidermal proliferation due to activation of insulin-like growth factor 1 receptor activation in areas of skin folds.²⁰ Though chronic inflammation is thought to be the bridging link, the role of oxidative stress and endocrine abnormalities has recently been proposed in bringing skin tags and metabolic syndrome together.^{17,21}

Among the various components of metabolic syndrome, increased waist circumference and hypertriglyceridemia were significantly found to be associated with skin tags which are in concordance to the results obtained by Shenoy et al, Agmia et al and Safoury et al as in this study found significant association of skin tags with high triglyceride levels and low HDL levels.^{9,22,23} Observed higher waist circumference, high Triglycerides, and low HDL among cases compared to controls (P<0.05). Similar observation was made by Shah et al, Safoury et al, and Agamia et al.^{16,23,9} The mean fasting plasma glucose although was higher in cases when compared to controls, the difference was not statistically significant. These results are comparable to those of Shenoy et al, Maluki et al.^{22,24} However, other studies have found significantly higher fasting plasma glucose in cases compared to controls at significant level.^{16,25}

In the present study, the prevalence of hypertension was significantly higher in patients with skin tags which is comparable with the results by Sari et al and Senel et al.^{25,26} However, Safoury et al, did not observe such difference.²³ The lipid profile status in the study showed significantly higher cholesterol and TG levels and lower HDL levels in cases compared to controls, similar to the observations made by Safoury et al, Sari et al, and Senel et al.^{23,26,25}

Rasi et al found a positive correlation between the total number of skin tags and the mean fasting plasma glucose.²⁷ Not found any significant association between various skin tag characteristics such as colour, localization, and length with metabolic syndrome on statistical analysis. Similar results were obtained by Shah et al.¹⁶

CONCLUSION

The present study showed statistically significant higher prevalence of metabolic syndrome in patients with skin tags compared to patients without skin tags suggesting that skin tags can be a useful clinical indicator to screen and follow up long-term all obese patients with multiple skin tags for concomitant diseases such as diabetes, hypertension, dyslipidaemia and cardiovascular disease. Early detection of these complications followed by appropriate lifestyle changes and/or drug therapy would

be beneficial in terms of reducing the considerable morbidity and mortality.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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