

Association of Skin Tag with Metabolic Syndrome and its Components: A Case-control Study from Eastern India

Abstract

Background: Skin tags are benign polyps, usually found in the natural folds of the skin. Some studies have found an association of skin tags with obesity, diabetes, hypertension, and atherogenic lipid profile. Metabolic syndrome refers to co-occurrence of these cardiovascular risk factors such as insulin resistance, obesity, dyslipidemia, and hypertension. **Aims and Objectives:** To find out any possible association of skin tags with metabolic syndrome and its components. **Materials and Methods:** A case-control study was conducted including 140 participants. Seventy patients with skin tags were considered cases, and 70 age- and sex-matched patients without skin tags were considered as controls. Various anthropometric and biochemical parameters were compared and analyzed between the two groups. **Results:** Univariate analysis revealed significantly higher waist circumference, high triglyceride, and low high-density lipoproteins (HDLs) in cases compared to controls. The prevalence of diabetes, hypertension, and metabolic syndrome was significantly higher in patients with skin tags, and risk of developing metabolic syndrome was 11.13 times higher in cases compared to controls ($P < 0.05$). Multivariate logistic regression analysis revealed high waist circumference and low serum HDL had significant association with skin tags. **Conclusion:** Risk of development of metabolic syndrome is significantly higher in patients with skin tags. Among the various components of metabolic syndrome, only high waist circumference and low serum HDLs are significantly associated with skin tags.

Keywords: Diabetes, dyslipidemia, hypertension, metabolic syndrome, skin tags

Introduction

Skin tags are benign growths that are usually seen in the body folds. Metabolic syndrome refers to the concurrence of several features such as insulin resistance, obesity, dyslipidemia, and hypertension which share common pathophysiology. It predisposes patients to cardiovascular diseases and remains one of the common preventable health hazards. Metabolic syndrome being multifactorial may have regional and ethnic variations in its associations. This study is a case-control study to show possible association of skin tags with metabolic syndrome and its components in eastern India.

Materials and Methods

This was a case-control study conducted from July 2012 to May 2015 at a tertiary care hospital in eastern India. The study included 140 participants: 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 with unrelated dermatological illness. Considering a prevalence of 25 skin tag patients per 1000 outpatient cases in our institute, the sample size with a 95% confidence interval was calculated to be 72.

Exclusion criteria

- i. Age less than 18 years
- ii. Pregnancy, lactation, and postpartum period up to 1 year
- iii. Endocrinopathies such as Cushing's syndrome and hypothyroidism
- iv. Patients on systemic steroids >3 weeks, hormones, or drugs causing dyslipidemia.

History and examination

Thorough history of diabetes, hypertension, lipid abnormalities, and concurrent medications for the above illness and family history of skin tag were obtained. Skin tag

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number, site, size, and color were noted. As adapted and modified from Kahana *et al.* and Safoury *et al.*, the number of skin tags was classified as few (3–4), moderate (5–10), and many (>10).^[1,2] The skin tags were classified according to their size as very early (visible not felt), small (projection of <0.5 cm), medium (0.5–1 cm), and large (>1 cm). The location of the skin tags was noted. Categorization of skin tags into flesh colored, hyperpigmented, or of a mixed color was done. Mixed color meant presence of both flesh colored and hyperpigmented skin tags in the same anatomical location.

Height, weight, waist circumference, and blood pressure of cases and controls were listed. Fasting blood glucose, plasma cholesterol and triglycerides (TGs), plasma high-density lipoproteins (HDL), and low-density lipoproteins (LDL) were measured in all participants. The metabolic syndrome parameters were recorded according to the guidelines of the International Diabetes Federation consensus worldwide definition.^[3] All statistical calculations were done using computer program Microsoft Excel 2007 and Statistical Package for the Social Science (SPSS) version 16 for Microsoft Windows.

Results

The mean age of patients with skin tag was 43.86 ± 9.79 years with the highest number of patients (40%) presenting to us in the fifth decade of life. The number of patients with skin tags increased with increase in age up to 50 years with a decline thereafter. Males outnumbered females with a ratio of 1.69:1. The average duration of skin tag at the time of presentation was 20.02 ± 10.54 months. Demographic characteristics and biochemical profile of cases and controls are shown in Table 1.

A total of 1199 skin tags were studied with a mean number of 17.12. 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 other than eyelid. Most of the patients had

skin tags of all three colors. Majority of the skin tags were less than 0.5 cm (60.13%). Few (2%) skin tags were more than 1 cm. A family history of skin tag was present in 40% of cases [Table 2]. We did not find any association between different age groups or gender with various skin tag characteristics such as number, color, or length.

In addition, no significant difference of skin tag characteristics was found between patients with and without metabolic syndrome on statistical analysis.

Our study results showed that the relative risk of developing metabolic syndrome in patients with skin tag was 11.13 times higher than controls ($P = 0.001$). The prevalence of metabolic syndrome was significantly higher in cases compared to controls. Also, greater number of cases had raised blood pressure compared to controls. Prevalence of diabetes mellitus was more in patients with skin tags ($P < 0.05$). The mean waist circumference and mean serum TG were significantly higher in cases compared to controls. Patients with skin tags had low mean serum HDL in cases compared to controls ($P < 0.05$). Although the mean fasting plasma glucose was higher in cases compared to controls, this difference was not statistically significant.

Step-wise multivariate logistic regression of metabolic syndrome components with the occurrence of skin tag showed that only increased waist circumference (odds ratio = 1.122, 95% confidence interval for odds ratio 1.006–1.181, $P = 0.0001$) and low serum level of HDL (odds ratio = 0.787, 95% confidence interval for odds ratio 0.7160.865, $P = 0.0001$) were statistically significant ($P = 0.0001$) [Table 3]. None of the other metabolic syndrome components had significant association with the number of skin tags.

Discussion

In our study, the mean age of patients with skin tag was 43.86 ± 9.79 years. Our study showed an increase in the number of patients up to age 50 years and after that there was a decline, similar to the observation by Thappa.^[4] In

Table 1: Demographic and biochemical characteristics of cases and controls

Parameter	Cases	Controls	P
Age (years) (mean±SD)	43.86±9.79	44.23±9.52	0.82
Sex (male/female)	44/26	42/28	0.728
Height (cm)	159.48±11.58	158.68±9.19	0.65
Weight (kg)	74.30±12.21	66.43±13.47	<0.0001
BMI (kg/m ²)	29.27±4.54	26.27±4.36	<0.0001
Waist circumference (cm)	108.19±14.81	93.79±9.72	<0.0001
Fasting blood glucose (mg/dL) (mean±SD)	95.88±23.78	90±19.46	0.142
Serum total cholesterol (mg/dL) (mean±SD)	190.51±47.12	165.47±53.79	0.004
Serum triglyceride (mg/dL) (mean±SD)	168.67±67.80	144.01±61.78	0.026
Serum high-density lipoprotein (mg/dL) (mean±SD)	38.88±6.26	47.20±5.89	<0.0001
Serum low-density lipoprotein (mg/dL) (mean±SD)	99.07±23.59	93.24±20.87	0.12

BMI: Body mass index; SD: Standard deviation

our study, males outnumbered females similar to few other studies.^[4,5] However, many authors also observed a female predominance.^[6-8]

Neck was the most frequent site with skin tags in our study. We found skin colored skin tag to be the commonest type. Sessile skin tags were more compared to pedunculated type in our study. Unusual sites such as genitalia with giant skin tags have also been reported,^[9] but we did not find any.

We did not find any difference in skin tag characteristics such as number, localization, and color in different age groups or gender similar to the results by Shah *et al.*^[10]

Prevalence of metabolic syndrome was significantly higher in patients with skin tags compared to controls, similar to the observation by Shenoy *et al.* and Safoury *et al.*^[11,12]

The risk of developing metabolic syndrome was 11.13 times higher in cases compared to controls; however, we were unable to find similar data from other studies.

Among the components of metabolic syndrome, increased waist circumference and low serum level of HDL contribute significantly for the development of skin tags when analyzed by stepwise multivariate analysis. Agmia *et al.* and Safoury *et al.* in contrast to our study, found significant association of skin tags with high TG levels and low HDL levels.^[11,13]

In the univariate analysis of components of metabolic syndrome, higher waist circumference, high TGs, and low HDL were observed among cases compared to controls ($P < 0.05$), similar to Shah *et al.*, Safoury *et al.*, and Agamia *et al.*^[10,11,13] Although mean fasting plasma glucose was higher in cases when compared to controls, the difference was not statistically significant which is in accordance with the study by Shenoy *et al.*, Maluki *et al.*, and Wali *et al.*^[12,14,15] However, other studies have found significantly higher fasting plasma glucose in cases compared to controls at significant level.^[10,11,13,16] The prevalence of hypertension was significantly higher in patients with skin tags, in accordance with the results by Sari *et al.* and Senel *et al.*; however, Safoury *et al.*, did not observe such difference.

The lipid profile status in this 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.*^[7,11,16] In contrast, Gorpelioglu *et al.* found significantly higher total cholesterol and LDL levels in cases compared to controls ($P < 0.01$).^[6]

In our study, multivariate linear regression analysis of the metabolic syndrome components with the number of skin tags showed no significant association between the two. Shaheen *et al.* found that waist circumference correlated with the number of skin tags.^[17] Rasi *et al.* found a positive correlation between the total number of skin

tags and the mean fasting plasma glucose.^[18] We did not find any significant association between various skin tag characteristics such as color, localization, and length with metabolic syndrome on statistical analysis. Similar results were obtained by Shah *et al.*^[10]

Significant association of various components of metabolic syndrome in patients with skin tags compared to control in different studies is given in Table 4.

Table 2: Skin tag characteristics of patients

Site (n=1199) (%)	Neck	692 (57.14)
	Axilla	294 (24.72)
	Eyelid	82 (6.84)
	Trunk	62 (5.17)
	Others	69 (5.75)
	Colour (n) (%)	Skin colored
	Hyperpigmented	345 (28.77)
	Mix colored	259 (21.60)
Length	Barely raised	342 (28.52)
	<0.5 cm	721 (60.13)
	0.5-1 cm	112 (9.34)
	>1 cm	24 (2)
Sessile/pedunculated (%)		53.54/46.45
Average duration at presentation (months) (mean±SD)		20.02±10.54

SD: Standard deviation

Table 3: Step-wise multivariate logistic regression analysis of the presence of skin tag for the components of metabolic syndrome

	Odds ratio	95% CI for odds ratio		P
		Lower	Upper	
WC	1.122	1.006	1.181	0.0001*
FBG	1.004	0.983	1.026	0.689
TG	1.001	0.994	1.008	0.727
HDL	0.787	0.716	0.865	0.0001*
Hypertension	1.148	0.385	3.423	0.805

CI: Confidence interval; WC: Waist circumference; FBG: Fasting blood glucose; TG: Triglyceride; HDL: High-density lipoprotein.

*P=0.0001 denotes highly significant association

Table 4: Comparison of different study results showing association of skin tags with various metabolic syndrome components

Authors, year	Metabolic syndrome components
Shenoy <i>et al.</i> , 2016	High TG, high WC
Maluki <i>et al.</i> , 2016	HTN, high WC
Agamia <i>et al.</i> , 2014	High WC, high FBS, HTN, high TG, low HDL
Shah <i>et al.</i> , 2014	High WC, high FBS, high TG, HTN
Apkinar <i>et al.</i> , 2012	HTN, high TG, low HDL
Safoury <i>et al.</i> , 2011	High WC, high FBS, high TG, low HDL
Shaheen <i>et al.</i> , 2011	High WC, HTN, high FBS, high TG, low HDL
This study	High WC, HTN, high TG, low HDL

TG: Triglyceride; WC: Waist circumference; HTN: Hypertension; HDL: High-density lipoprotein; FBS: Fasting blood glucose

Conclusion

The risk of developing metabolic syndrome is significantly higher in patients with skin tags. Presence of metabolic syndrome is independent of number, color, and size of skin tags. Among all the parameters of metabolic syndrome, only high waist circumference and low HDL have significant association with the presence of skin tags. Hence, patients with skin tags should be carefully evaluated for blood sugar, lipid profile, blood pressure, and other components of metabolic syndrome. They should be counselled regarding the predisposition for metabolic syndrome and necessary lifestyle modification to decrease the cardiovascular complications.

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Conflicts of interest

There are no conflicts of interest.

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