Vol. 35 / No. 2 / August 2023
Sinta 2 (Decree No: 200/M/KPT/2020)
Online ISSN : 2549-4082 ; Print ISSN : 1978-4279
Available online at https://e-journal.unair.ac.id/BIKK

Berkala Ilmu Kesehatan Kulit dan Kelamin

Original Article
Periodical of Dermatology and Venereology

The Correlation between Blood Glucose and Lipid Profile with Skin tag

Wahyu Lestari[1], Sulamsih[1], Cut Yunita[1], Hendra Zufry[2], Sitti Hajar[1]

[1]Department of Dermatology, Dr. Zainoel Abidin General Hospital, Banda Aceh, 24415, Indonesia
[2]Department of Endocrinology, Dr. Zainoel Abidin General Hospital, Banda Aceh, 24415, Indonesia

ABSTRACT

Background: Skin tags or acrochordons are benign fibroepithelioma skin tumors with soft consistency, usually pedunculated, primarily originating from the dermis. High levels of blood sugar and a high lipid profile are risk factors for inflammation and hormonal imbalance, which can contribute to the development of skin tags. **Purpose:** The objective of this study is to identify the association between blood sugar and lipid profile with skin tags. **Methods:** This study is a cross-sectional study conducted from April to August 2019 at the Dermatovenereology and Endocrine Policlinic, Dr. Zainoel Abidin General Hospital, Banda Aceh. The sampling method of this study was consecutive sampling with 60 samples that met the inclusion and exclusion criteria. A blood glucose, lipid profile, and skin tag examination was conducted on all subjects. **Result:** The majority of the subjects are women (61.5%), have an average age of 41-50 years old (43.3%), are obese (41.7%), and have one to five lessions of 1-5 (53.3%). There was a significant correlation between blood glucose, 2 hours post-prandial, total cholesterol, triglyceride, high-density lipoprotein (HDL), and low-density lipoprotein (LDL) levels with skin tags with Spearman's correlation values of 0.645, 0.645, 0.794, 0.704, 0.606, and 0.606 consecutively. **Conclusion:** A high level of blood sugar and lipid profile, whether it is total cholesterol, triglycerides, HDL, or LDL level, can contribute to the development of skin tags.

Keywords: blood glucose, blood lipid profile, skin tag.

Correspondence: Wahyu Lestari, Department of Dermatology, School of Medicine, Universitas Syiah Kuala Dr. Zainoel Abidin General Hospital, Jl. Tgk.Daud Beureueh No.108 Banda Aceh 2415, Indonesia, Phone : +628126991901, Email : Wahyu_lestari2000@unsyiah.ac.id.

| Article info |
Submited: 14-08-2022, Accepted: 22-02-23, Published: 31-07-2023

BACKGROUND

A skin tag is a benign skin tumor derived from loose connective tissue, small in size with soft consistency, pedunculated, and the color ranges from skin color to dark brown. It is commonly found at the axillary, groin, and neck. The incidence is higher in middle age or people older than 40 years old.[1] Lesions can be single or multiple, with a diameter of 2 - 10 mm, and may progress. The prevalence in men and women is balanced, with a mean middle age to old age. The prevalence of skin tags is 46% in Germany and 0.7% in India.[2,3] In 2018, 36 (11.3%) of 408 patients with a skin tumor diagnosis who came to the Dermatology and Venereology Polyclinic and the Endocrine Polyclinic of Dr. Zainoel Abidin General Hospital Banda Aceh were diagnosed with skin tags.

The etiology of a skin tag can be trauma, like repeated friction between the skin and jewelry or cloth.[3,4] Some risk factors are hormonal, obesity, genetics, and several other conditions such as pregnancy, acromegaly, human papillomavirus infection, aging, Crohn's disease, colon polyps, organ transplantation, increased androgen receptor, estrogen, increased number of mast cells, dyslipidemia, diabetes mellitus, and insulin resistance.[2,5]

Several studies have reported that obese patients experience skin tags more often than non-obese patients. Research by Idris S, et al. in 2014 in India assessed the relationship between body mass index, lipid profile, and skin tags. The results showed that of 40 patients with skin tags, 60% were overweight and 10% were obese.[7] Thus, the researcher wanted to find out the relationship between blood sugar levels, blood lipid profiles, and skin tags at RSUD dr. Zainoel Abidin Banda Aceh.

DOI : 10.20473/bikk.V35.2.2023.136-141

METHODS

The method used in this study was a cross-sectional method. The research was conducted at Dermatology and Venereology Polyclinic Dr. Zainoel Abidin General Hospital Banda Aceh from April 15th to August 15th, 2019. The study population was patients with skin tag who came to the Dermatology and Venereology Polyclinic and the Endocrine Polyclinic of Dr. Zainoel Abidin General Hospital Banda Aceh. The research subjects were selected by non-probability sampling, namely accidental sampling, where the research sample was collected for 3 months, or the minimum number of samples was 30 respondents.

Inclusion criteria consisted of new patients with skin tags aged 18-60 years who signed an informed consent. Exclusion criteria for this study were patients with secondary hyperlipidemia, chronic renal insufficiency, obstructive liver disease, and nephrotic syndrome. In addition, taking systemic drugs in the past 6 months, namely corticosteroids, retinoids, beta blockers, lipid-lowering medication, thiazides, and cyclosporine, being pregnant, and breastfeeding were the exclusion criteria.

Assessment of blood glucose levels and lipid profiles is carried out by taking a blood sample and then examining it with the XL-600 analyzer for total cholesterol, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglycerides (TG). Determination of lipid profile numbers based on the National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III), with total cholesterol values <200 mg/dL, LDL-C <100 mg/dL, HDL-C 60 mg/dL, and TG <150 mg/dL.[7–9]

The SPSS application was used for data processing. To assess the relationship between two variables, namely blood glucose levels and lipid profiles with skin tags, a correlation test was used. Spearman's (r_s) non-parametric correlation test was used for data that were not normally distributed. The interpretation of Spearman's correlation (r_s) is no relationship (0.00), a less significant relationship (0.01-0.09), a weak relationship (0.10-0.29), a moderate relationship (0.30-0.49), a strong relationship (0.50-0.69), a very strong relationship (0.70-0.89), and a close to perfect relationship (>0.90). This research has been reviewed and approved by the ethics committee for health research at Dr. Zainoel Abidin General Hospital Banda Aceh No. 095/EA/FK-RSUDZA/2022.

RESULT

Table 1 shows the characteristics of skin tag patients in Dermatology and Venereology Polyclinic and the Endocrine Polyclinic of Dr. Zainoel Abidin General Hospital Banda Aceh, on April 15 - August 15, 2019. There were 60 patients diagnosed with skin tags. Based on the table below, skin tag were more female subjects diagnosed with skin tags than male subjects, namely 37 people (61.5%). Most of the skin tag patients were 41-50 years old (43.3%), followed by the 51–60 year age group (21.7%). This data shows that people with skin tags are more common among adults. It was found that the patients with the highest education level were those with bachelor's, graduate, and postgraduate degrees, which accounted for 46.7% of all patients. Most of the subjects worked as civil servants, as many as 27 patients (45%) and at least 7 patients were unemployed (11.7%).

The highest number of lesions in this study was 1-5 (53.3%), followed by more than 10 (33.4%) and 6-10 (13.3%). Most of the patients were in the obese category (41.7%), followed by the overweight category (28.4%), normal weight (25%), and underweight category (5%). The profile of blood glucose and lipid levels of the subjects can be seen in Table 2. It can be seen that skin tag patients tend to have fasting blood glucose levels within normal limits (58.3%). Spearman's correlation value (r_s) is 0.645, which means that the greater the number of skin tag lesions, the higher the fasting blood sugar level. Overall, patients with skin tags had blood glucose levels 2 hours postprandial within normal limits (58.3%). Spearman's correlation value (r_s) is 0.645, where the more the number of lesions, the higher the 2-hours postprandial blood glucose (2hPPG) level.

Based on the Table 2, the majority of patients with skin tags had high trygliseride levels which were found in 42 patients (70%). The remaining 18 patients (30%) had a normal triglyceride level. Spearman's correlation value (r_s) was 0.606, which means that the greater the number of skin tag lesions, the higher the trigliceride level.

Total cholesterol levels had the same frequency as triglyceride levels. Forty-two patients (70%) of the patients with skin tags had high total cholesterol levels, while 18 patients (30%) had normal total cholesterol levels. According to Spearman's correlation coefficient (r_s), which was 0.794, the total cholesterol level rises as the number of skin tag lesions increases.

The majority of patients with skin tags had high LDL levels, which were found in 42 (70%). Spearman's correlation value (r_s) is 0.606, which means that the higher the LDL level, the greater the number of skin tag lesions. Contrasted with trigliseride, total kolesterol, and LDL level, 35 out of 60 patients (58.3%) had a normal HDL level. Spearman's correlation value (r_s) was 0.704, which means that the more the number of skin tag lesions, the higher the trigliceride level.

Table 1. Demographic characteristic of research subject

Characteristic	Frequency (%)
Gender	
Male	23 (38.3)
Female	37 (61.5)
Age (years old)	
20 – 30	10 (16.7)
31 – 40	11 (18.3)
41 – 50	26 (43.3)
51 - >60	13 (21.7)
Level of Education	
Elementary – High School	7 (11.6)
Associate degrees	25 (41.7)
Bachelor's-Graduate-Postgraduate	28 (46.7)
Number of lessions	
1 – 5 (mild)	32 (53.3)
6 – 10 (moderate)	8 (13.3)
>10 (severe)	20 (33.4)
Job	
Unemployed	7 (11.7)
Civil servant	27 (45)
Private employee	12 (20)
Others	14 (23.3)
Body mass	
Obese	25 (41.7)
Overweight	17 (28.4)
Normal	15 (25)
Underweight	3 (5)
Total	60 (100)

Table 2. Correlation between blood glucose level and lipid profile with skin tag

Characteristic	Frequency (%)	Correlation value
Blood glucose level		0.645
Low	0 (0)	
Normal	35 (58.3)	
High	25 (41.7)	
2-hour postprandial blood glucose level		0.645
Low	0 (0)	
Normal	35 (58.3)	
High	25 (41.7)	
Triglyceride level		0.606
Low	0 (0)	
Normal	18 (30)	
High	42 (70)	
Total cholesterol level		0.794
Low	0 (0)	
Normal	18 (30)	
High	42 (70)	
HDL level		0.704
Low	0 (0)	
Normal	35 (58.3)	
High	25 (41.7)	
LDL level		0.606
Low	0 (0)	
Normal	18 (30)	
High	42 (70)	

HDL: High-density lipoprotein; LDL: Low-density lipoprotein

DISCUSSION

Most of the skin tag patients in this study were dominated by women. This data was in line with the research of Sari et al. in 2022 at Dermatology and Venereology Outpatient Clinic, Dr. Soetomo General Academic Hospital, Surabaya.[10] This study demonstrates the preponderance of female sex in skin tags.

The sex difference in skin tags may be due to differences in sun exposure, outdoor employment or activity, and health-seeking behavior between the sexes. Female patients may have sought treatment earlier because they were more concerned about skin changes than male patients were. The cutaneous lesions in the male patients were less likely to be treated before they were symptomatic or worsened, as in the case of skin tags.[10]

A high incidence of skin tags is linked to age. This study demonstrates that adults in their fourth decade of life are more likely to have skin tags. Research by Darjani et al. reported that skin tags were the most common benign neoplasm in elder patients.[11] Skin tags are a natural aspect of aging, so it makes sense that older individuals would have more of them. The presence of skin tags has been linked in a number of studies to hypertension and an atherogenic lipid profile. Almost 50 to 60 percent of adults are predicted to experience at least one of these benign growths over their lifetime, with the risk of this happening rising after the fourth decade.[6] Age above 45 is associated with reduced immunity, increased cumulative UV exposure, DNA mutation accumulation, and DNA repair capacity.[10,12]

Most of the patients in this study are obese. Research by Idris S. et al.[6] in 2014 assessed the relationship between body mass index, lipid profile, and skin tag on 40 patients in India. The results showed that there was an increase in body mass index and total cholesterol/HDL ratio in patients with skin tags.

This study demonstrates that patients with skin tags typically have fasting blood glucose levels within the normal range. Based on the research of Salem et al in 2013, there was no increase in fasting or post-prandial blood glucose.[13] In addition, there was no association between an increase in BMI and blood cholesterol and the number of skin tags. The results of the study by Tosson et al. in 2013 showed that fasting blood glucose and HbA1C levels were significantly higher in patients with skin tags compared to control patients.[7]

Two hours after a meal, blood glucose levels in patients with skin tags were also within the normal range. According to Shah et al. in 2014, there was a positive correlation between skin tags and blood glucose levels.[14] In the study by Wali et al., blood glucose and HbA1c levels were higher in respondents with skin tags.[15]

An investigation of overweight or obese non-diabetic people serves as evidence for this. Skin tags were present on more than 75% of people, and the quantity of skin tags exhibited a strong, independent relationship with insulin levels. The fact that majority of the subjects did not have diabetes supports the idea that insulin, not high blood sugar, is the issue. The scientists came to the conclusion that in non-diabetic, obese patients, skin tags should be regarded as clinical indicators of hyperinsulinemia. Since insulin is a growth-stimulating hormone, some experts hypothesize that skin tags appear as a result of hyperinsulinemia.[16,17]

Insulin resistance should be assessed in patients who have skin tags but normal blood glucose readings (such as HbA1c and fasting glucose). According to a case-control study of people with two or more skin tags, those with skin tags had significantly higher mean levels of triglycerides, fasting glucose, and liver enzymes compared to controls of the same age and gender. They also had lower HDL cholesterol and higher blood pressure, all of which are signs of metabolic disturbances brought on by chronic hyperinsulinemia.[16,17]

In this study, skin tag patients had higher total cholesterol, LDL, and triglyceride levels. This is in accordance with previous studies, which said that there was a significant relationship between triglycerides, total cholesterol, LDL, and triglycerides with skin tags.[15,18] For HDL levels, it was seen that skin tag patients in this study tended to have normal levels. In another study, it was also stated that there was no significant relationship between HDL cholesterol levels and skin tags. Based on the research by Shaheen et al it was found that the HOMA-IR value was significantly higher in skin tag patients than in the control group.[19] From the literature, it is stated that the etiology of skin tags is not fully known, but there is a relationship with diabetes mellitus (DM), obesity, friction, acromegaly, colon polyps, human papilloma virus (HPV), an increase in mast cells, and leptin.[14]

Shah et al in 2014 reported that 110 skin tags patients showed a significant increase in fasting blood glucose level, body mass index, insulin resistance, total cholesterol, LDL and triglycerides.[14] An increase in fatty acids also plays an important role in the pathogenesis of skin tags, which states that an increase in unesterified fatty acids caused by hyperinsulinemia

will result in the expression of epidermal growth factor (EGF) and contribute to skin tags, in addition to an increase in the production of EGF and tumor necrosis factor (TNF)-beta as a result of hyperinsulinemia will result in a synergistic situation, namely increasing free insulin growth factor (IGF)-1 and decreasing IGFBP 3 as a mitogenic effect on keratinocytes.[14] Subramanian G, et al in 2019 reported that from 80 patients (40 cases and 40 controls), the patient's average age was 44 years, with the most cases in women, and there was a significant relationship between total cholesterol, LDL, and HOMA-IR with skin tags. [20] In line with the results of the study by Platsidaki E, et al (2018), there is a relationship between hypercholesterolemia and triglycerides in skin tag patients.[3] Other studies according to Maluki AH, et al. reported a significant relationship between total cholesterol and LDL cholesterol with skin tag respondents compared to the control group, and there was no significant relationship between fasting blood sugar levels with HDL cholesterol and triglycerides.[21]

The etiology of skin tags in raised fat mass brought on by elevated leptin levels can be explained by feasible processes. Increased fat mass could result from abnormal serum lipid profiles. Leptin concentration and fat mass are connected, and obese people frequently have increased levels of the hormone. Leptin is a growth hormone that has a role in the differentiation and proliferation of keratinocytes and fibroblasts. It is also linked to BMI and fat accumulation. Leptin has the capacity to stimulate keratinocyte proliferation when combined with other growth factors.[18]

Furthermore, the majority of skin tag patients in this study had multiple lesions based on a number of skin tags. The result of this study according with the research by Putra et al. in 2019 showed that most patients have multiple skin tag lesions.[4] The number of skin tags is associated with lipid metabolic disorders, including leptin. A high mean body mass index is linked to a substantial connection between serum leptin levels and the frequency of skin tag lesions in skin tag patients. More lipid is produced when a person has a high body mass index, and a lot of leptin is also secreted, which has an impact on several organs, including the skin. The proliferation and differentiation of keratinocytes and fibroblasts into skin tag lesions can be sparked by high levels of leptin and leptin ob R receptors on these cells.[4]

Although the association between serum triglyceride and leptin level was minimal, it was statistically significant. The goal of our investigation was to examine the relationship between the serum lipid profile and leptin level in individuals with skin tags. This may be consistent with the literature, which states that triglycerides make up between 90% and 95% of the lipids in adipose tissue.[18] Demographically, most of the subjects were female (61.5%), had an age range of 41-50 years (43.3%), were obese (41.7%), had a 1-5 skin tags (53.3%), has an education level of bachelor's, graduate and postgraduate degrees (46.7%), and has a civil service job (45.0%). There is a significant relationship between skin tags and blood sugar levels, total cholesterol, LDL, and triglycerides. However, skin tags were not significantly associated with HDL cholesterol. In addition to being given electrical or surgical therapy, patients with skin tags also need to control their blood sugar and lipid levels so that they can prevent the appearance and increase of skin lesions.

REFERENCES

1. Cuda J, Rangwala S, Taube J. Benign epithelial tumors, hamartomas, and hyperplasias. In: Kang S, Amagai M, Bruckner AL, Enk AH, Margolis DJ, AJ M, et al. Fitzpatricks Dermatology in General Medicine. 9th ed. New York: McGraw-Hill Education; 2019. p. 1799-1802
2. Jusuf NK, Putra IB, Kartayana J. The correlation between body mass index with the occurrence of skin tag. Maced J Med Sci 2017;5(3):271–4.
3. Platsidaki E, Vasalou V, Gerodimou M, Markantoni V, Kouris A, Vryzaki E, et al. The association of various metabolic parameters with multiple skin tags. J Clin Aesthet Dermatol 2018;11(10):40.
4. Putra IB, Siregar R, Jusuf NK, Ginting O, Nurhayati R. Correlation between serum leptin level with type and number of lesion skin tag. Open access Maced J Med Sci 2019;7(1):53–5.
5. Gani W, Ismail S. Case report: skin tag. J Med Prof 2020;2(1):18–23.
6. Idris S, Sunitha S. Assessment of BMI, serum leptin levels and lipid profile in patients with skin tags. J Clin diagnostic Res JCDR 2014;8(9):CC01.
7. Tosson Z, Ibrahim SA, Kandil AH, Husam M. Relationship between skin tags, leptin hormone and metabolic disturbances. Egypt Dermatology Online J 2013;9(2):1–12.
8. Agamia NF, Gomaa SH. Assessment of serum leptin, atherogenic lipids, glucose level, insulin resistance and metabolic syndrome in patients with skin tags. Egypt J Dermatology Venerol 2014;34(1):58.
9. Rasi A, Faghihi A, Rahmanzadeh Y,

Hassannejad H. A comparison study of lipid profile levels between skin tags affected people and normal population in Tehran, Iran. Adv Biomed Res 2014 Mar;3:109.
10. Sari M, Bintanjoyo L, Kusumaputra BH, Citrashanty I, Hidayati AN, Murtiastutik D, et al. A retrospective study of demographic, clinical, and histopathological profiles of cutaneous tumors. Berkala Ilmu Kesehatan Kulit dan Kelamin 2022;34(3):149–55.
11. Darjani A, Mohtasham-amiri Z, Amini KM, Golchai J, Sadre-eshkevari S, Alizade N. Clinical study skin disorders among elder patients in a referral center. Hindawi Dermatology Res Pract 2013;4(1):16–20.
12. Sari F, Lestari S, Gustia R, Asri E, Tofrizal T. The correlation between human papillomavirus and increased expression of p53 in seborrheic keratosis. Berkala Ilmu Kesehatan Kulit dan Kelamin 2020;32(3):195.
13. Salem SAM, Attia EAS, Osman WM, El Gendy MA. Skin tags: a link between lesional mast cell count/tryptase expression and obesity and dyslipidemia. Indian J Dermatol 2013;58(3):240.
14. Shah R, Jindal A, Patel NM. Acrochordons as a Cutaneous Sign of Metabolic Syndrome: A Case. Control Study. Ann Med Health Sci Res 2014;4(2):202–5.
15. Wali V, Wali V V. Assessment of various biochemical parameters and BMI in patients with skin tags. J Clin diagnostic Res 2016;10(1):BC09.
16. Shenoy C, Shenoy MM, Krishna S, et al. Skin tags are not merely cosmetic: a study on its association with metabolic syndrome. Int J Heal Allied Sci 2016;2(1):3–11.
17. Hui ES, Yip BH, Tsang KW, Lai FT, Kung K, Wong SY. Association between multiple skin tags and metabolic syndrome: a multicentre cross-sectional study in primary care. Diabetes Metab 2016;42(2):126–9.
18. Kurniawati Y, Devi M, Yakub K, Affandi K, Marlina A. Correlation of serum lipid profile with leptin levels of skin tags patients. In: Journal of Physics: Conference Series. IOP Publishing; 2019. p. 12022.
19. Shaheen MA, Abdel Fattah NSA, Sayed YAA, Saad AA. Assessment of serum leptin, insulin resistance and metabolic syndrome in patients with skin tags. J Eur Acad Dermatology Venereol 2012;26(12):1552–7.
20. Subramanian G, Vishwa Teja T, Karthikeyan K. Correlation of acanthosis nigricans and acrochordans with insulin resistance – A case control study. Indian J Res 2019;8(9):9–12.
21. Maluki AH, Abdullah AA. Metabolic associations with skin tags. Int J Dermatology Clin Res 2016;2(1):3–11.