Correlation of serum lipid profile with leptin levels of skin tags patients

Yuli Kurniawati¹, Mutia Devi, Kemas Yakub, Khairani Affandi, Allin Marlina²

¹ Dermatology and Venereology Department, Faculty of Medicine, Universitas Sriwijaya, Palembang, Indonesia
² Medical Division of Bioethics and Humanitarian, Clinical Pathology Department, Faculty of Medicine, Universitas Sriwijaya, Palembang, Indonesia

E-mail: yk_indun@yahoo.co.id

Abstract. Skin tags may be associated with increased adipose deposition. Mechanism of skin tags formation is through the activation of leptin receptor in the dermis and epidermis. Recent study suggested that the presence of skin tags is associated with obesity, abnormal lipid profile and elevated serum leptin levels. Researcher are interested to analyse the correlation between serum lipid profile and leptin levels of patients with skin tags. This is a cross sectional study, conducted from October 2017 to February 2018 at Tumor and Dermatosurgery Division-Dermatology and Venereology Department outpatient clinic in Dr. Mohammad Hoesin General Hospital Palembang. Sample study was obtained with consecutive sampling. There were 40 patients with skin tags that met the inclusion criteria included in the study. Serum lipid profile and serum leptin were measured. Statistic significant correlation between triglycerides and leptin levels was found (p=0.04; r=0.327), however there was no significant correlation between total cholesterol, LDL, HDL cholesterol with leptin levels (p =0.273; r=0.177, p =0.288; r=0.172, p =0.794; r=0.043). Triglyceride levels was found to have significant correlation with leptin levels.

1. Introduction
Skin tags is very common, presented as soft, skin-colored to slightly hyperpigmented and pedunculated tumor [1]. The lesion composed of loose fibrous tissue, occuring mainly on neck, axilla, inframammary area and major flexures [2]. Skin tags are usually asymptomatic unless they become painful secondary to irritation or friction [3]. Men and women are equally affected, and close to 50% of all individuals have at least one skin tags [1]. Incidence of skin tags is more common in adult to old age [1,2]. Etiology of skin tags is still obscure [3]. Some risk factors that increase the chance of developing skin tags such as family history, pregnancy, type II diabetes, obesity, and friction [4,5].

In recent years, skin tags may be associated with abnormalities of glucose metabolism especially type II diabetes and increased adipose deposition [5-7]. Fat mass directly increase leptin levels which involved in the regulation of appetite and energy expenditure via hypothalamic mediated effects, and also in carbohydrate and lipid metabolism [8,9]. Leptin is an adipocyte-derived hormone, product of ob (obese) gene and exerts biological effects through leptin receptor (ob-R), product of the db gene, that regulates food intake, energy expenditure and body weight by acting on the hypothalamus [3,10].
It is a 167 amino acid protein with molecular weight 16kDa and involved in the regulation of appetite and energy expenditure [5,8]. Obese individual who present with skin tags is frequently associated with elevated serum leptin levels. The mechanism of skin tags formation is through the activation of leptin receptor in the dermis and epidermis which stimulate the differentiation and proliferation of keratinocytes and fibroblast [8,11]. Recent study suggested that the presence of skin tags is associated with obesity, abnormal lipid profile and elevated serum leptin levels. Some study suggested there is a correlation between serum lipid profile and elevated serum leptin levels of patients with skin tags, however other studies proved otherwise [5,8,10]. Therefore, researchers interested in analysing the correlation between serum lipid profile and leptin levels of patients with skin tags in Dr. Mohammad Hoesin General Hospital Palembang.

2. Methods

This is a cross sectional study which was conducted from October 2017 to February 2018 at the Tumor and Dermatosurgery Division-Dermatology and Venereology Department outpatient clinic in Dr. Mohammad Hoesin General Hospital Palembang. The study was approved by the ethics committee. Sample study was obtained with consecutive sampling. The inclusion criteria was patient of age 26–70 years old with skin tags at any location who agree to participate in the study. Exclusion criteria was patients diagnosed with secondary dyslipidemia such as diabetes mellitus, nephrotic syndrome, chronic renal insufficiency, liver disease, thyroid dysfunction and Cushing’s disease; hormonal contraceptive pills, systemic corticosteroid, and anti-dyslipidemia consumptions; pregnant and lactating patients. There were 40 patients with clinical diagnosis of skin tags. Demographic data were collected and blood were drawn to measure the serum lipid profile and leptin levels. Classification of patients’ BMI based on International Association for The Study of Obesity WHO 2000, which underweight <18.5 kg/m², normal 18.5–22.9 kg/m², at risk 23-24.9 kg/m², obesity I 25-29.9 kg/m², and obesity II ≥30 kg/m² [13]. Data were analyzed using SPSS 22.0.

3. Results

The majority age groups in this study were early elderly (30%). Female patients were found more than male patients with ratio 7:3. Multiple skin tags lesions were noted in 28 patients (70%) and solitary lesion was noted in 12 patients (30%) (table 1).

In this study, 17 patients had elevated serum leptin (42.5%) dan 23 patients had normal range of serum leptin levels (57.5%) (figure 1). Obese patients were 62.5%, in which obesity I 40% and obesity II 22.5%. The mean number of skin tags was 5 ± 4.23. The mean serum level of lipid profile in study participants as follows, triglyceride was 119 ± 74.7 /dl; total cholesterol was 201,9 ± 39,63 mg/dl; LDL cholesterol was 125,1 ± 34,91mg/dl; and HDL cholesterol was 52,08 ± 10,89mg/dl (table 2). The mean serum leptin level in study patients was 25429.6 ± 15977.25.

![Figure 1. The distribution of category of serum leptin in patients.](image-url)
Statistical analysis using Pearson correlation test (table 2) have shown a significant association between triglycerides and leptin levels ($p = 0.04; r=0.327$) (figure 2), however not significant correlation between total cholesterol, LDL, HDL cholesterol with leptin levels ($p = 0.273; r=0.177$, $p = 0.288; r=0.172$, $p = 0.794; r=0.043$).

4. Discussions
One of the most common benign fibrous lesions of the skin is skin tags. Most patients are not aware that skin tags may be associated with obesity [3,4]. In the present study, we found that 42.5% patients had elevated serum leptin and 62.5% obesity. Tosson Z et al found significant different serum leptin levels in 30 patients with skin tags in compare to the 20 control group [5]. Another study by Hegazy SK et al also supported a significant different serum leptin in 20 patients with skin tags in compare to the 10 control group [14].

| Variable                          | n (%)       |
|----------------------------------|-------------|
| **Age**                          | n (%)       |
| Early adult (26-35 years old)    | 11 (27.5)   |
| Late adult (36-45 years old)     | 11 (27.5)   |
| Early elderly (46-55 years old)  | 12 (30)     |
| Late elderly (56-65 years old)   | 4 (10)      |
| Very late elderly (>65 years old)| 2 (5)       |
| **Gender**                       |             |
| Male                             | 12 (30)     |
| Female                           | 28 (70)     |
| **Education**                    |             |
| Senior high school               | 9 (22.5)    |
| Diploma-Doctor                   | 31 (77.5)   |
| **Occupation**                   |             |
| Unemployment                     | 6 (15)      |
| Non-government/public            | 4 (10)      |
| Government employee              | 25 (62.5)   |
| Labor                            | 5 (12.5)    |
| **Family history of skin tags**  |             |
| Not present                      | 27 (67.5)   |
| Present                          | 13 (32.5)   |
| **Body mass index**              |             |
| Normal                           | 8 (20)      |
| At risk                          | 7 (17.5)    |
| Obesity 1                        | 16 (40)     |
| Obesity 2                        | 9 (22.5)    |
| **Number of skin tags**          |             |
| Solitary                         | 12 (30)     |
| Multiple                         | 28 (70)     |
| **Location number of skin tags** |             |
| location                         | 30 (75)     |
| >1 location                      | 10 (25)     |

Table 2. Correlation between serum lipid profile and leptin levels.

| Variable         | Serum leptin levels |
|------------------|---------------------|
|                  | $p$     | $R$     |
| Triglyceride     | 0.04    | 0.327   |
| Total cholesterol| 0.273   | 0.177   |
| HDL cholesterol  | 0.288   | 0.172   |
| LDL cholesterol  | 0.794   | 0.043   |
Figure 2. Q-Q plot correlation between triglycerides and leptin levels.

There is plausible mechanisms that explain pathogenesis of skin tags in elevated fat mass caused by increased level of leptin [5,8]. Abnormal serum lipid profile may cause increased fat mass. Concentration of leptin is correlated with fat mass, obese individuals often had elevated levels of leptin. Leptin is a growth hormone, active in the process of proliferation and differentiation of keratinocytes and fibroblast, also associated with fat mass and BMI [3,10]. In vivo study showed that leptin has an ability to induce proliferation of keratinocytes together with other growth factor [10,14].

Our study was the first to determine correlation of serum lipid profile with leptin levels of skin tags patients, although a weak correlation between serum triglyceride and leptin levels was obtained, but a statistically significant correlation was found. This may fit the literature that triglycerides are the largest lipid component of adipose tissue that makes up the 90% range of adipose tissue lipids [10,14]. Limitation of this study was small sample size population conducted in single center.

5. Conclusions
Abnormal serum lipid profile and elevated serum leptin levels was found in almost half of patients with skin tags. Triglycerides and leptin levels was significantly correlated. Future studies with multi center and larger sample size population were needed to further support the correlation between serum lipid profile and leptin levels of patients with skin tags.

6. References
[1] Madan V and Lear J 2010 Benign keratinocytic acanthoma and proliferation Rook’s Textbook of Dermatology ed C Griffiths, J Barker, T Bleiker, R Chalmers and D Creamer (Oxford: Wiley Blackwell) pp 133.1-8
[2] Kutzner H, Kamo H, Reddy V and Pui J 2018 Fibrous and fibrohistiocytic proliferations of the skin and tendons Dermatology ed J Bologna, J Schaffer and L Cerroni (New York: Elsevier Limited) pp 2068–85
[3] Wali V V. and Wali V V. 2016 Assessment of various biochemical parameters and BMI in patients with skin tags J. Clin. Diagnostic Res. 10 BC09-BC11
[4] Tamega A, Arana H, Guiotoku M, Miot L and Miot H 2016 Association of skin taggss with insulin resistance An Bras Dermatol 85 25–31
[5] Tossen Z, Ibrahim S A, Kandil A H and Husam M 2013 Relationship between skin taggss , leptin hormone and metabolic disturbances Egypt. Dermatology Online J. 9 1–12
[6] De D, Biswas M, Pal D and Biswas T 2017 Can Acrochordons Be a Marker of Metabolic Syndrome? J. Evol. Med. Dent. Sci. 6 4183–7
[7] Eldaiem R 2016 Assessment of lipid profile among patient with skin tagss in Khartoum State- Sudan EJBPS 3 45–8
[8] Idris S 2014 Assessment of B MI , Serum Leptin Levels and Lipid Profile in Patients with Skin tagss J. Clin. Diagnostic Res. 8 CC01-3
[9] Sari R, Akman A, Alpsoy E and Balei M K 2010 The metabolic profile in patients with skin tagss. Clin. Exp. Med. 10 193–7
[10] Erkek E, Kisa U, Bagci Y and Sezikli H 2011 Leptin resistance and genetic predisposition as potential mechanisms in the development of skin tagss Hong Kong J. Dermatology Venereol. 19 108–14
[11] Jusuf N, Putra I and Kartayana J 2017 The correlation between body mass index with the occurrence of skin tagss OAMJMS 5 271–4
[12] Rasi A, Faghihi A, Rahmanzadeh Y and Hassannejad H 2014 A comparison study of lipid profile levels between skin tagss affected people and normal population in Tehran, Iran Adv. Biomed. Res. 3 109
[13] World Health Organization Western Pacific W 2000 The Asia-Pacific perspective: redefining obesity and its treatment
[14] Hegazy S K and El-Ashmawy N E 2013 Leptin and c-reactive protein are implicated in the pathogenesis of skin tagss J. Diabetes Res. Clin. Metab. 2 13

Acknowledgement
The authors would like to thank the Department of Dermatology and Venereology, and Faculty of Medicine of Universitas Sriwijaya and all those who assist in the effort of this research.