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Comparison of Perilipin Protein Levels in Obese with Metabolic Syndrome and Obesity Non Metabolic Syndrome

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Abstract: Perilipin is a highly phosphorylated adipocyte protein that is localized on the surface of the lipid droplet, that has a role in controlling access to the lipid lipolytic enzymes and played a role in setting the storage and mobilization of triglyceride in the adipocytes. Because of the potential importance of adipocyte lipolysis to obesity and increasing perilipin protein in obesity, this study aimed to analyze the comparison of protein perilipin levels in obese with metabolic syndrome and obese non metabolic syndrome. The sample population is obese adults, then we examined the weight, height, waist size, blood pressure, laboratory tests such as blood sugar levels and lipid profile of sample population to separate obese with metabolic syndrome and obese non metabolic syndrome. After we determined each group we measured perilipin protein levels in blood in obese with metabolic syndrome and obese non metabolic syndrome by Enzyme Link Immunosorbent Assay (ELISA) method. With statistical analysis using T test found that there was significant difference of perilipin protein levels between obese with metabolic syndrome and obese without metabolic syndrome (p<0.005). Perilipin protein levels was higher in obese with metabolic syndrome than obese non metabolic syndrome.

Keywords: Obesity, metabolic syndrome, perilipin, triglyceride.

Introduction

The incidence of obesity increase rapidly as a result of inactive lifestyle. The energy that used for daily activity decrease parallels along with advances in technology. Based on WHO data there are 1.6 billion adults with overweight and 400 million among them are obese. Based on research data Riset Kesehatan Dasar in 2007, obesity prevalence in Indonesia generally in the population aged ≥ 15 years old is 10.3% (men 13.9% and women 23.8%). An individual determined as obese based on Body Mass Index (BMI) it is a simple index of weight–height relationship calculated as weight in (kg) divided by height in (m) squared. One is categorized as obese I when the BMI 25-29.9 and obese II when the BMI BMI >30 (4). Metabolic syndrome is a condition that characterized by visceral obesity, increasing triglyceride levels and glucose and decreasing High Density Lipoprotein (HDL) and hypertension that can cause a greater risk incidence of type 2 DM and cardiovascular diseases. Prevalences of metabolic syndrome varies greatly due to uniformity criteria that used to determine, ethnic difference, sex and age. It can be confirmed that metabolic syndrome likely to increase parallels with obesity or central obesity prevalences.
Obesity is caused by accumulation of fat in adipose tissue. The adipocyte holds the major source stored energy in the body in the form of triacylglycerol (TAG). It is covered by lipid droplet. The perilipins are highly phosphorylated adipocyte proteins that are localized at the surface of the lipid droplet. With activation by protein kinase A, perilipins translocate away from the lipid droplet and allow hormone-sensitive lipase to hydrolyze the adipocyte triglycerides to release nonesterified fatty acids (NEFA) and glycerol from fat tissue can be regulated by a cAMP-mediated process. The perilipins proteins are phosphorylated by protein kinase A and phosphorylation is necessary for translocation of HSL to the lipid droplet and enhanced lipolysis. Overexpression of perilipin inhibited adipocytes lypolysis. This study aimed to analyze the comparison of protein perilipin levels in obese with metabolic syndrome and obese non metabolic syndrome, in other study about perilipin protein was evidenced that was elevated at obesity.

1. Method

This study involved 40 obesity subjects, all of whom were in good health. All subjects gave informed consent. Subjects divide two groups, one group is obesity with metabolic syndrome and other group is obesity without metabolic syndrome. Each group consisted of 20 subjects. To determine whether the subject of the metabolic syndrome so examination of weight, height, waist size, blood pressure, laboratory tests such as blood sugar levels and lipid profile. Sample So, two these groups examined the levels of protein perilipin by ELISA method.

Table 1. Baseline characteristic of the 40 samples

<table>
<thead>
<tr>
<th>Obesitas with metabolic syndrome</th>
<th>Obesitas non metabolic syndrome</th>
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<tbody>
<tr>
<td>Age 43.9±11.3</td>
<td>34.55±10.8</td>
</tr>
<tr>
<td>BMI 33.86±5.0</td>
<td>31.75±4.0</td>
</tr>
<tr>
<td>Waist size 107±10</td>
<td>104±15</td>
</tr>
<tr>
<td>FBG 101.85±50.8</td>
<td>88.49±7.2</td>
</tr>
<tr>
<td>HDL 63.2±23.85</td>
<td>46.05±6.99</td>
</tr>
<tr>
<td>Trig 193.15±88.59</td>
<td>91.9±32.81</td>
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<tr>
<td>Sistole 139.85±16.3</td>
<td>123±15</td>
</tr>
<tr>
<td>Diastole 87±8.4</td>
<td>81.3±9.1</td>
</tr>
<tr>
<td>Perilipin 35.07±29.84</td>
<td>29.35±20.95</td>
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Statistical Analysis

The data were statically analyzed, using the statistical analysis with T test, we found p<0.005, it means that there was significant difference of perilipin protein levels between obese with metabolic syndrome and obese without metabolic syndrome.

Table 2 One-Sample Test

<table>
<thead>
<tr>
<th>Test Value = 0</th>
<th>T</th>
<th>Df</th>
<th>Sig.(2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
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<tr>
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<td>Lower</td>
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<tr>
<td>Perilipin SM</td>
<td>5.255</td>
<td>19</td>
<td>.000</td>
<td>35.06685</td>
<td>21.1013</td>
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<tr>
<td>Perilipin Non SM</td>
<td>6.264</td>
<td>19</td>
<td>.000</td>
<td>29.34848</td>
<td>19.5417</td>
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P<0.005

Results and Discussions

The characteristics of the subjects of this study are shown in Table 1. Subjects in this study were not 20 years old. Body Mass Index (BMI) in the sample used in both obesity with metabolic syndrome and
Obesity non metabolic syndrome \( \geq 27 \), in this study the waist size of the samples at the obesity with metabolic syndrome found from 89-119 cm and waist size of the obesity non metabolic syndrome found 97-117 cm. Fasting Blood Glucose (FBG) in the obesity non metabolic syndrome samples were normal but the obesity with metabolic syndrome range from low to the moderately elevated range. Profile lipid like HDL value of the samples of obesity with metabolic syndrome range 34-60 mg/dL and HDL value of the samples of obesity non metabolic syndrome range 46-162 mg/dL. Triglyceride value of the samples of obesity with metabolic syndrome range 91-452 mg/dL and obesity non metabolic syndrome was 46-162 mg/dL. Dividing sample group in to obesity with metabolic syndrome and obesity non metabolic syndrome base on 5 criteria, that are LP \( > 102 \) cm at male and \( > 88 \) at female, triglyceride levels \( \geq 150 \) mg/dL, HDL \( < 40 \) mg/dL at male and \( < 50 \) at female, Blood Pressure (BP) \( \geq 130/85 \) Hg, so can be categorized as obesity with metabolic syndrome or obesity non metabolic syndrome. Perilipin protein in serum was measured by ELISA method. Allow samples to clot for 2 hours at room temperature or overnight at 4°C before centrifugation for 20 minutes at approximately 1000xg. Collect the supernatant and carry out the assay immediately. Microplate reader with wavelength 450nm. The result of measuring perilipin protein was found the lower value at obesity with metabolic syndrome was 5.52 ng/ml and the highest value at obesity with metabolic syndrome was 15.24 ng/ml and the value at obesity non metabolic syndrome was 4.76 ng/ml and the highest was 85.77 ng/ml. This study aimed to analyze the comparison of protein perilipin levels in obese with metabolic syndrome and obese non metabolic syndrome, so we used the statistical analysis with 1 test found that there was significant difference of perilipin protein levels between obese with metabolic syndrome and obese without metabolic syndrome \( p < 0.005 \). This study protein perilipin value was highest at obesity with metabolic syndrome than obesity non metabolic syndrome. Normal value perilipin protein range 0.156-10 ng/ml. This study protein perilipin value was highest at obesity with metabolic syndrome than obesity non metabolic syndrome. Normal value perilipin protein range 0.156-10 ng/ml. The study was done by Philip and friends found increasing perilipin protein at obesity and increasing perilipin, so decrease lypidosis. As we know that perilipin protein is the function of inhibit the lypolysis process. It is be evidenced that perilipin knockout mice so basal adipocyte lypolysis was increased, resulting in a lean mouse. The other research that finding low concentration of perilipin is related with high basal and cathecolin that induction of lypolysis rate in the cell. So many studies prove that perilipin protein have the function of inhibited the lypolysis process and it is be evidenced with increasing perilipin protein at obesity and that this study we found that concentration of perilipin protein was highest at obese with metabolic syndrome than obese non metabolic syndrome. However, further research needs to be investigated whether there is a correlation perilipin protein with the occurrence of metabolic syndrome.

Acknowledgments

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