

MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

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Evaluation of Leptin Level in Gestational Diabetes and Pregnant Women with  
Type I Diabetes Mellitus

By

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## Abstract

Background Gestational diabetes mellitus (GDM) is the most common pregnancy complication, in which women without previously diagnosed diabetes develop hyperglycemia during gestation. This hyperglycemia usually results from impaired glucose tolerance due to pancreatic  $\beta$ -cell dysfunction and increased the insulin resistance. The outcome of GDM include increased risk of maternal cardiovascular disease and type 2 diabetes and also several birth complications in the infant mainly macrosomia. There is also a longer-term risk of obesity, type 2 diabetes (DM), and cardiovascular disease in the child.

Leptin is a protein hormone secreted by white adipocytes and it plays a significant role in the regulation of body weight and food intake. Leptin acts in an autocrine/paracrine fashion in the placenta and adipose tissue in pregnancy and thus plays a role in the maternal-fetal line and additional important role in glucose metabolism and fetal development.

Aim To study leptin level in pregnancies complicated by GDM and also in type1 diabetes mellitus and their interactions with insulin.

To study how leptin level is changed when body weight, glucose metabolism and insulin resistance are changed in both GDM and pregnant women with type 1 DM. Since the description and understanding of such hormonal interplay in GDM and type1 DM could be helpful in the intervention and control strategies of the disease and to prevent its complications.

Method This is case-control study, in which leptin level, body mass index (BMI), C-peptide, glycolated heamoglobin (HbA1c%) and lipid profile were

measured in 75 control non-diabetic pregnant women, 75 gestational diabetes mellitus and 40 pregnant women with type1 diabetes mellitus. Blood samples were collected from pregnant women at 24-38 weeks of gestation. Correlations were measured between leptin level with BMI, C-peptide and lipid profile. Data were analyzed using SPSS version 21.

Results The average levels of both C-peptide and leptin were found to be significantly higher in GDM as compared to control with (mean differences of 0.9 and 3.62 ng/ml,  $P=0.05$  and  $P=0.017$  respectively). In contrast, both serum c-peptide and leptin levels were both significantly lower in pregnant women with type1 DM than in control (mean difference= $4.94$ ,  $4.14$  ng/ml,  $P$ -value= $0.000$  and  $p$ -value= $0.038$  respectively).

Body mass index (BMI) of GDM was found not to be significantly different from control (mean difference=  $-1.1$  kg/m<sup>2</sup>,  $P=0.108$ ). On the other hand, there was a significant difference in BMI between control group and type1 DM pregnancies (mean difference= $8.13$  kg/m<sup>2</sup>, and  $P=0.000$ ).

The mean serum HbA1c% levels in cases GDM and type1 DM were significantly higher than that of control ( $5.12\pm 0.01\%$  vs.  $6.88\pm 0.33\%$ ) ( $5.12\pm 0.01\%$  vs.  $6.96\pm 0.19\%$ ) ( $P=0.000$ ).

There was statistically significant increase only for cholesterol and LDL-C in type1 DM in comparing to control group ( $P=0.000$ ). On the other hand, only triglycerides was higher in GDM than in healthy pregnant women (mean difference= $43.75$  mg/dl). This change was significant ( $P=0.027$ ).

The Pearson correlation test showed a significant positive correlation of BMI with leptin of healthy pregnant women ( $r=0.624$ ,  $P=0.000$ ). Regarding pregnant women with GDM, also the Pearson correlation test showed a

significant positive correlation of BMI with leptin ( $r=0.3$ ,  $P=0.02$ ). Regarding pregnant women with type1 DM, this test showed a significant positive correlation of BMI with triglycerides of type1 DM ( $r=0.873$ ,  $P=0.000$ ) and significant negative correlation of BMI and C-peptide ( $P=0.05$ ).

This test also showed a significant positive correlations of C-peptide with leptin in healthy pregnant women ( $r=0.379$ ,  $P=0.003$ ).

Regarding GDM, the Pearson correlation test showed significant positive correlation of C-peptide with HbA1c% ( $r=0.360$ ,  $P=0.005$ ) and a highly significant negative correlation with leptin ( $r=-0.248$ ,  $P=0.05$ ).

Conclusion: serum leptin and C-peptide levels were increased in pregnant women with GDM and decreased in pregnant women with type 1 DM as compared to healthy pregnancies. Also, there was a positive correlation of leptin level with BMI.

The elevation of leptin level was significant in pregnant women with GDM during the second and third trimesters compared to the non-diabetic pregnant women. This increasing in leptin level was due to increase insulin resistance and hyperinsulinemia in gestational diabetes mellitus.

Key words: Leptin, c-peptide, BMI, HbA1c%, gestational diabetes mellitus.

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تقييم مستوى هورمون اللبتين لدى كل من الحوامل المصابات بداء سكر الحمل والمصابات بداء السكر من النمط الأول

هند نزار قاسم

بكالوريوس طب وجراحة عامة

رسالة مقدمة كجزء من متطلبات نيل شهادة الماجستير

في علم الفسلجة الطبية

المشرف: م. د. زيد قيس الأطرقجي

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