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The serum selenium status in Bulgarian pregnant women and its relationship with glucose metabolic indices

M. Genova¹, B. Atanasova¹, I. Ivanova², K. Tosheva³, D. Svinarov¹

1. Department of Clinical Laboratory, Faculty of Medicine, University Hospital "Alexander", Medical University-Sofia, Bulgaria

2. Clinical Laboratory Department, University Hospital "Sv. Ivan Rilski", Medical University – Sofia, Bulgaria

3. Medical center "Pentagram", Sofia, Bulgaria

PURPOSE / OBJECTIVES

To evaluate the status of selenium (Se) and its link to glucose metabolic indices in gestational diabetes mellitus (GDM) and healthy pregnant women in 24-28 gw of the pregnancy

MATERIALS & METHODS

.A total of 80 pregnant women aged between 18 and 40 yr are divided in two groups: with GDM diagnosis and normal glucose tolerance (NGT) by the 2 h 75-g oral glucose tolerance test (OGTT). Only singleton pregnancies are included. The exclusion criteria are based on patient hormonal substitutional treatment, oral hypoglycemic agents and insulin therapy. Cases with hypo-or hyper thyroiditis and smokers are excluded. GDM diagnosis is done according to the criteria of American Diabetes Association. The glucose and insulin levels are measured in venous blood at fasting state. Blood glucose is measured by amperometric method (Biosen C-line), serum insulin by ECLIA (Cobas Integra). HOMA-IR index is calculated by formula. Serum Se is determined by ETAAS using matrix modification and Zeeman spectral background correction.

Gestational diabetes mellitus (GDM) is defined as impaired glucose intolerance and insulin resistance (IR) with onset or recognition during pregnancy. Micronutrients may affect pregnancy outcomes through alterations in maternal and fetal metabolism owing to their role/involvement in enzymes activity, signal transduction and transcription pathways, biological functions and oxidative stress. Studies have shown that individual trace element levels might be associated with abnormal glycemic status with implications for diabetes. Selenium (Se) is an essential trace element for human health. It is an anti-inflammatory and antioxidant micronutrient, has an anti-diabetic functions due to its insulin-like characteristics, promotes the increased production and secretion of insulin in pancreatic β cells.

RESULTS

The serum Se levels are in GDM and healthy pregnant groups 694.52 ± 119.5 nmol/L vs. 730.3 ± 192.6 nmol/L with no significant statistical difference ($p=0.35$). Blood glucose and insulin at fast, and HOMA-IR are 4.4 ± 0.53 vs 5.3 ± 0.37 mmol/L, $p < 0.005$; 12.8 ± 7.4 vs 7.2 ± 3.9 μ U/ml ($p=0.02$); 2.4 ± 1.8 vs 0.96 ± 0.8 , $p < 0.05$. Very slight positive correlation between glucose and Se is established ($r=0.01$ GDM; 0.23 NGT group) with negative correlations between the trace element and insulin and HOMA-IR ($r=-0.30$, -0.38 GDM; $r=-0.25$, -0.19 NGT) respectively.

SUMMARY/CONCLUSION

Se point very slight tendency for decreasing in GDM pregnant women. The observations in the present study imply a very complicated link between the essential trace element and glucose metabolism indices as overall effect of many combined factors: oxidative stress in the same pregnancy and GDM, an insulin-like action property of Se, nutritional status and very complex molecular mechanisms of regulations and disorders during pregnancy and especially in GDM. Se may involved in maintaining normal glucose uptake and reducing the severity of IR.

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RESULTS