Alterations in First Trimester Maternal Blood Prior to Gestational Diabetes Mellitus Diagnosis.

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Abstract:
Introduction: Gestational Diabetes Mellitus (GDM) is a frequent pregnancy disease, leading to perinatal and long-term complications for mother and baby. It is characterized by insulin resistance, hyperglycaemia, low-grade inflammation and oxidative stress. Dietary counselling and supplementation may mitigate GDM adverse effects. An early intervention may be more effective, but diagnosis usually occurs at mid pregnancy.
Methods: Healthy Caucasian women with single pregnancies were screened at 11-14 weeks, when fasting blood samples were collected. Among 176 subjects, 13 were diagnosed with GDM at 24-28weeks. In these women and in 39 matched controls (3:1), blood was tested for standard clinical analysis, plasma assessed for 8-isoprostane (ELISA) and reactive oxygen metabolites (ROMs, photometric assay) and erythrocytes for reduced/oxidized glutathione (GSH/GSSG, fluorimetric assay) and fatty acids (chromatography). Data were analysed with SPSS (IBM).
Results: Groups were similar for age, prepregnancy BMI, previous smoking, parity, sampling gestational age, C-Reactive Protein, haemoglobin, ferritin and Vitamin D. Women who developed GDM showed significantly doubled Total Fatty Acids (TFA, 8962 *vs* 4207 µg/ml, p=0.000), lower DHA (4.7 *vs*5.9 %, p=0.003), DHA/TFA (0.05 *vs* 0.06, p=0.014) and Ω3 index (5.2 *vs* 6.5, p=0.006). They also had lower GSH/GSSG (4.7 *vs* 7.5, p=0.001) and higher ROMs (39.6 *vs* 32.8 UCARR, p=0.000). Vitamin D strongly and negatively (r=-703, p=0.007) correlated with prepregnancy BMI only in the future diabetics.
Conclusion: Women who later developed GDM showed increased oxidative stress (lower GSH/GSSG, higher ROMs) already at 11-14 weeks. 8-isoprostane may become altered later, as reported by other studies at third trimester. Ω3 and DHA were reduced, while iron and inflammatory status seemed unaffected at first trimester. Our results foster larger cohort studies to confirm these potential early biomarkers of GDM and support trials on early supplementation with Ω3 fatty acids and antioxidants.
Sponsored by Bayer Consumer Health AG