

ASSESSMENT OF BETA-CELL FUNCTION AND INSULIN RESISTANCE IN BULGARIAN PREGNANT WOMEN WITH RISK FOR GESTATIONAL DIABETES MELLITUS

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Introduction Patients with gestational diabetes mellitus (GDM) are insulin resistant. The homeostasis model assessment (HOMA), has been widely validated and applied for quantifying insulin resistance. Pregnant women with duration of conception between 24 and 28 weeks were assessed for insulin resistance (IR) and beta-cell function by using homeostatic model assessment IR (HOMA-IR) and homeostatic model assessment of beta-cell function (HOMA-B) models, respectively.

Materials and Methods. 87 women from whom 75 pregnant and 12 post part, gestational weeks (24 Vs 25 ± 4). Based on the OGTT, participants were stratified into 4 groups (IADPSG criteria): I-st. group healthy pregnant women with normal glucose tolerance (NGT) ($n_1 = 7$; 9.4%), II-nd group pregnant with impair glucose tolerance (IGT) and high levels of insulin ($n_2 = 56$; 64%), III-rd group pregnant women with GDM ($n_3 = 13$; 14.9%), and IV-th group - 6 weeks post part with GDM ($n_3 = 13$; 12.6%). Venous blood was taken to determine the levels of insulin and glucose from 0, 60, 120 min. The analysis was done by GM 9 Analyzer "Analox Instruments" for glucose and "Elecsys 2010" – Roshe for insulin. HOMA-IR and HOMA-B were calculated.

Results and Discussions. The pregnant with NGT had significantly lower IR ($n_1 = 1.2 \pm 0.6$), but the HOMA-B was higher (168.91 +/- 121.4, suggesting excessive beta-cell function to maintain glucose homeostasis. . The pregnant with IGT ($n_2 = 2.4 \pm 1.6$, $P = 0.027$) and GDM ($n_3 = 5.3 \pm 4.7$, $P < 0.0001$) had significantly higher HOMA-IR values compared to pregnant with NGT and similar HOMA-B values as compared to pregnant women with NGT (HOMA-B $r = 0.569$).

Conclusions. Pathological IR, common for GDM, is a manifestation of a substantial loss of insulin sensitivity with constant character and does not disappear completely after birth. HOMA-IR after delivery is higher without statistically significant difference ($p = 0.733$). Women with GDM have beta cell dysfunction both during and after pregnancy. The level of beta cell dysfunction in GDM was associated with the severity of glucose intolerance and total insulin dosage required. These findings underpin clinical significance of beta cell dysfunction in GDM.

Keywords: insulin resistance, pregnant women, GDM, HOMA-IR, HOMA-B