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THE IMPACT OF NEW APPROACHES TO THE DIAGNOSIS AND TREATMENT OF GESTATIONAL DIABETES MELLITUS (GDM)

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Abstract: Given the high incidence of perinatal complications in women with gestational diabetes mellitus (GDM), an effective algorithm for the diagnosis and treatment of this disease is needed. We analyzed the characteristics of the course and outcomes of pregnancy in 500 women with GDM, in whom new clinical recommendations for the diagnosis and treatment of gestational diabetes mellitus were used. The comparison group consisted of 100 women with GDM (V.G. Baranov criteria, 1977). Analysis of the results is necessary to optimize the management tactics of this group of patients.
Key words: gestational diabetes mellitus; glucose; glucose tolerance test; gestosis; C-section; macrosomia; hypoglycemia of the newborn; insulin therapy

The purpose of our work was to analyze the effectiveness of using new Russian clinical guidelines for the diagnosis and treatment of gestational diabetes mellitus [2].
Material and methods of the study: an analysis was carried out of 500 birth histories of women with GDM for the period 2019–2020, the diagnosis of which was established in accordance with the new clinical guidelines (group I). According to modern criteria, the diagnosis of GDM is carried out in 2 phases. The first phase is carried out when a pregnant woman contacts an antenatal clinic and is aimed at earlier detection of pregestational diabetes mellitus and GDM that were not diagnosed before pregnancy. One of the following indicators must be determined: fasting venous plasma glucose (FPG), random determination of blood glucose, level of glycated hemoglobin (HbA1c). Thus, with a FPG level ≥7.0 mmol/l, or HbA1c ≥6.5%, or a random determination of glycemia ≥11.1 mmol/l, a diagnosis of overt GDM is established (diabetes reclassification is carried out after childbirth). If the FPG level is ≥5.1 mmol/L and less than 7.0 mmol/L, a diagnosis of GDM is made. The second phase is carried out at a gestation period of 24–28 weeks - all pregnant women who have not had a violation of carbohydrate metabolism before this period are tested for glucose tolerance (GTH). GDM is diagnosed when one of the following values is higher than normal (fasting less than 5.1 mmol/L, 1 hour after exercise less than 10.0 mmol/L, and 2 hours less than 8.5 mmol/L). The comparison group consisted of 100 pregnant women with GDM [3], established according to the criteria of V.G. Baranova (1977), which were used in our institution until 2012, according to which the diagnosis of GDM was established based on the result of PTG performed at 16–34 weeks of pregnancy, and based on the results of glucose levels in capillary whole blood: fasting more than 5.5 mmol/l, after 1 hour more than 9.4 mmol/l and after 2 hours more than 7.7 mmol/l. The age of women in group I was 28.7±4.9 years, in group II it was higher -

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32.2±2.9 years. Body mass index (BMI) before pregnancy in group I was 30.5 kg/m², in group II it was 31.5 kg/m². With a confirmed diagnosis of GDM, all pregnant women received recommendations on a diet excluding easily digestible carbohydrates. Food calories were calculated according to BMI. If the BMI was normal (18–24.9 kg/m²), the calorie content was 30 kcal/kg body weight, with a BMI of 25.0–29.9 kg/m²—25 kcal/kg body weight, and in the case of a BMI of 30 kg/m² and above - 12–18 kcal/kg body weight, but not less than 1800 kcal/day. All women were recommended to eat frequent meals (5–6 times a day). The share of slowly digestible carbohydrates in the daily diet was 55%, proteins - 20% (1.1–1.3 g/kg body weight), fats - 25%, of which the share of saturated fats was less than 30%. Self-monitoring of glycemia was carried out daily using individual glucometers; women determined blood glucose on an empty stomach and 1 hour after main meals (at least 4 times a day). Women entered all glycemic indicators into a self-monitoring diary. To analyze the correctness of compliance with dietary recommendations, the patients kept a food diary. After 1–2 weeks from the start of the diet, in the absence of compensation for carbohydrate metabolism, insulin therapy was added to treatment. Insulin was prescribed in group I when postprandial glycemia (1 hour after a meal) was more than 7.0 mmol/l, fasting glycemia was more than 5.1 mmol/l; in group II, with glycemia after eating after 1 hour more than 7.8 mmol/l, fasting glycemia more than 5.5 mmol/l. Ultra-short-acting insulin aspart (novorapid), approved for use during pregnancy, was used as a bolus component. Novorapid was administered 15 minutes before meals before each main meal. The long-acting analogue detemir (levemir), also approved during pregnancy, was used as a basal component (if it was necessary to prescribe intensive insulin therapy). Levemir was administered to women before bedtime at 10 p.m.

Results and discussion In the opinion of the overwhelming majority According to most researchers [4, 5, 6, 7], excess body weight is a predictor of the development of GDM. In our study, excess body weight was detected in more than 50% of women (56.1% of women in group I, 72% of women in group II). In group I, the diagnosis of GDM was established significantly earlier, at 27.8 weeks (11–32) of pregnancy, than in group II — at 31.8 weeks of pregnancy (26–35). Group I was divided into 3 subgroups in connection with the diagnostic criteria for GDM: diagnosis by fasting glycemia ≥5.1 mmol/l in 57% of cases - subgroup a; excess glycemia at one or several points during a glucose tolerance test (GTG) in 35% of cases - subgroup b; fasting glucose ≥7.0 mmol/l, which meets the criteria for manifest diabetes mellitus, in 8% of cases - subgroup B. In subgroup a, the period of detection of GDM was the earliest and amounted to 17.6 weeks of pregnancy (11-29), in subgroup b - 26.8 weeks of pregnancy (24-33 weeks), in subgroup c - 27.5 weeks of pregnancy (13 -32 weeks). In group II, the diagnostic criteria in more than 90% were changes in PTH result values. According to the literature [9], 20–30% of women with GDM require insulin therapy during pregnancy. In group I, 27.8% of women were transferred to insulin therapy (in subgroup a - 28.4%, in subgroup b - 29% and in subgroup c - 100%). The frequency of bolus and basal-bolus insulin therapy was comparable in both groups. Bolus insulin therapy was used by 64.9% of women; basal-bolus regimen - 31.5% of women and only 3.6% of women used long-acting insulin. In group II, 40% of women received insulin therapy. In group I (Table 1), pathological weight gain of more than 12 kg was noted in 4.7% of cases, in group II in 28.4%. The frequency of polyhydramnios in GDM, according to the literature [8, 12], ranges from 20 to 60%. According to our data, polyhydramnios complicated the course of pregnancy in 23.5% of women in group I. This figure was significantly lower than in group II (46%) (p=0.032). The frequency of

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gestosis was lower in group I (15%) compared to the rate in group II (21%). According to the literature [8, 12], the incidence of preterm birth in GDM ranges from 5 to 33% and depends on the degree of compensation for DM during pregnancy [1, 8]. In our study, the incidence of preterm birth in group I was 5.6%, in group II - 13% (p = 0.07). The delivery time in group I was close to physiological and was 38.5±0.9 weeks, in group II it was 37.6±1.1 weeks, respectively. The frequency of surgical delivery by cesarean section did not differ significantly in the study groups and amounted to 52% in group I and 58% in group II. Indications for surgical delivery in group I were obstetric indications not related to GDM in 42.5% of cases (uterine scar, primigravida's age over 35 years, history of long-term infertility using ART programs, narrow pelvis). Indications for the totality, where complications of GDM were the leading indications for surgical delivery, amounted to 24.8%. These indications included large fetus, preeclampsia, placental insufficiency. Indications for the totality, where complications of GDM were not leading, amounted to 32.6%. The incidence of macrosomia was significantly lower in group I and amounted to 17% compared to the indicators in group II - 32% (p = 0.038). The frequency of neonatal hypoglycemia in the newborn (glycemia less than 2.2 mmol/l in full-term pregnancy and less than 1.7 mmol/l in preterm pregnancy) was lower in group I - 20% compared to the rate in group II - 24% (Table . 1). We analyzed the risks of developing preeclampsia with maternal fasting blood glucose ≥5.1 mmol/l, and studied the risks of developing fetal macrosomia associated with maternal BMI, total weight gain during pregnancy and fasting blood glucose ≥ 5.1 mmol/l. The results were calculated based on the calculation of the odds ratio (OR) and are presented in Table 2. Many researchers [5, 6, 13] identify fasting hyperglycemia and increased BMI of the woman before pregnancy among the predictors of the development of preeclampsia in patients with GDM. Our study obtained a significant relationship between the development of preeclampsia and fasting plasma glucose levels: OR at a level of 0.92–1.68), at a level ≥5.1 mmol/l - 3.0 (95% CI 1.92–4.1). According to the literature, the main cause of increased trauma during childbirth and emergency cesarean section in GDM is macrosomia, which means the birth of a child ≥4000 g or more than 90 P on a percentile scale developed for a specific population (in the Russian Federation, the scale of Dementieva G.M., 1999). It is known that the body weight of newborns is influenced by many factors, including BMI before pregnancy, overall weight gain during pregnancy, and the presence of carbohydrate metabolism disorders during pregnancy [10, 12, 13]. The frequency of macrosomia in GDM, according to the literature [10, 12], ranges from 15 to 40%. The introduction of more stringent criteria for compensation for GDM makes it possible to reduce this indicator [1, 8]. Based on the results obtained, the following conclusions can be drawn: 1. The use of new Russian clinical procedures recommendations for the diagnosis and treatment of gestational diabetes mellitus contributes to earlier detection and initiation of treatment for GDM. 2. The introduction of more stringent criteria for target glycemia in GDM leads to a decrease in the incidence of complications and pregnancy outcomes. Article presented by E.K. Ailamazyan, Federal State Budgetary Institution "Research Institute of Agir" named after. D.O. Otta", St. Petersburg

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