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Gestational Diabetes Mellitus

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Abstract: Gestational diabetes mellitus (GDM) — the most common metabolic disorder in pregnant women, which endocrinologists and obstetricians-gynecologists encounter, which is due to both a sharp increase in the incidence of type 2 diabetes mellitus (DM) in the population and an improvement in the quality of GDM diagnostics.

Keywords: gestational diabetes, pregnancy, complication.

GDM in different countries varies from 1 to 14%, averaging 7%. These variations are due to differences in the methods of diagnosing this disease and are directly related to the prevalence of type 2 diabetes in certain ethnic groups. The frequency of pregnancy complications and morbidity in newborns with GDM reaches almost 80%.

The threat of miscarriage and premature birth is noted in 30-50% of patients, and a clear relationship has been established between miscarriage and maternal hyperglycemia. Polyhydramnios complicates the course of pregnancy with GDM in 20-60% of cases; preeclampsia develops in 25-65% of cases, and its severe forms - in 2.9-3.7% of cases. Fetal shoulder dystocia in GDM is 2.8-5.6%, clavicle fracture - 6-19%, Erb's palsy - 2.4-7.8%, trauma of the cervical spine - 42%, severe asphyxia 1.4-5 3%, and cerebrovascular accident of traumatic origin - 20%. Perinatal mortality in this pathology is generally 5 times higher than in the population.

The frequency of cesarean section (CS) in pregnant women with GDM is 28.8-46.6%, the main indications for CS are large fetal size, cephalopelvic disproportion, clinically narrow pelvis, weakness of labor, shoulder dystocia, and acute fetal hypoxia. Diabetic fetopathy (DF) in GDM occurs in 30-60% of cases. Its most typical signs are: macrosomia (newborn body weight> 90th percentile), hyperemia of the skin, pastosity of soft tissues, moon-shaped face, short neck, "relatively short" limbs, hypertrichosis, organomegaly. Newborns of mothers with GDM have a high risk (5%) of developing respiratory distress syndrome as a result of the inhibitory effect of hyperinsulinemia on the maturation of pulmonary surfactant.

Separation of the placenta after childbirth and a sharp cessation of glucose supply to the fetus in conditions of fetal hyperinsulinemia leads to neonatal hypoglycemia. Metabolism of newborns with DF is also characterized by hypocalcemia (8-22%), hypomagnesemia, hyperbilirubinemia (15-30%), hypoxia, acidosis, electrolyte imbalance, which is the cause of metabolic cardiopathy. Excessive body weight of children at birth further leads to the development of adolescent obesity and arterial hypertension (AH), and subsequently to type 2 diabetes.

Due to the fact that in most pregnant women GDM occurs without severe hyperglycemia and obvious clinical symptoms, it is difficult to diagnose it. In some cases, the diagnosis of GDM is established retrospectively, after delivery, based on the phenotypic signs of DF in the newborn, or is skipped altogether. According to the data of appeals to the scientific advisory department of

MONIIAG, in 50-60% of cases, the diagnosis of GDM is made with a delay of 4-20 weeks. In 2008, in Pasadena (USA), the International Association of Diabetes and Pregnancy Study Groups (IADPSG) proposed new criteria for diagnosing GDM for discussion [3].

According to the protocol, the diagnosis of carbohydrate metabolism disorders during pregnancy is carried out in stages, there are 2 phases. Phase I is carried out at the first time a woman contacts a doctor of any specialty due to the onset of pregnancy. At the first visit for up to 24 weeks, all pregnant women are required to conduct a study of fasting glucose levels (mandatory in venous plasma) or determine the level of glycated hemoglobin (HbA1c) by high performance liquid chromatography (DCCT / UKPDS standard), or determine the level of glycemia (in venous plasma). plasma) at any time of the day, regardless of food intake. If the result of the study corresponds to the category of DM, the diagnosis of overt (first detected) DM is established, its type is specified, and the patient is immediately transferred for further management to the endocrinologist according to the plan, corresponding pregestational SD. Fasting venous plasma glucose ≥5.1 mmol/L but <7.0 mmol/L is immediately diagnosed as GDM.

Threshold values of venous plasma glucose for the diagnosis of GDM or overt (newly detected) DM during pregnancy GDM, at the initial visit to the perinatal center

Fasting venous plasma glucose ≥5.1 but <7.0 mmol/l

(≥92 but <126 mg/dl)

GDM, OGTT with 75 g glucose

Fasting venous plasma glucose ≥5.1 mmol/L (≥92 mg/dL)

Venous plasma glucose at 1 hour ≥10 mmol/L (≥180 mg/dL)

Venous plasma glucose at 2 hours ≥8.5 mmol/L (≥153 mg/dL)

Manifest (newly diagnosed) diabetes in pregnant women

- Fasting venous plasma glucose ≥7.0 mmol/L (126 mg/dL)
- HbA1c (DCCT, UKPDS standards) ≥6.5%
- Venous plasma glucose regardless of time

day and food intake in the presence of symptoms of hyperglycemia ≥11.1 mmol / l (200 mg / dl)

During the initial visit of pregnant women with fasting venous plasma glucose <5.1 mmol/l, oral glucose tolerance test (OGTT) is not performed.

Such women should have an OGTT with 75 g of glucose between 24 and 28 weeks of gestation (Phase II). It is important to note that OGTT with 75 g of glucose is a safe exercise diagnostic test for the detection of carbohydrate metabolism disorders during pregnancy. OGTT is performed on the background of normal nutrition (at least 150 g of carbohydrates per day) for at least 3 days prior to the study. The study is carried out in the morning, on an empty stomach, after 8-14 hours of overnight fasting; the last meal must necessarily contain 30-50 g of carbohydrates. Drinking water before the test is not prohibited. During the test, the patient must sit, because physical activity can change glycemic values \u200b\u200band make it difficult to interpret the results. Smoking is prohibited until the end of the test. Medicines,

Oral glucose tolerance test is not performed in the following cases:

- with early toxicosis of pregnancy (vomiting, nausea), if it is necessary to comply with strict bed rest (until the expansion of the motor regimen), against the background of an acute inflammatory or infectious disease, with exacerbation of chronic pancreatitis or the presence of dumping syndrome (syndrome of resected stomach).

The test is carried out in 3 stages.

At stage I, after taking the first sample of venous blood plasma on an empty stomach, the level of glycemia is measured immediately, since upon receipt of results indicating a newly diagnosed DM or

GDM, further glucose loading is not carried out and the test is terminated. When the test continues, stage II is performed - the patient should drink a glucose solution (75 g of dry (anhydrite or anhydrous) glucose dissolved in 250-300 ml of warm (37-40C) non-carbonated (or distilled) drinking water) within 5 minutes. When using glucose monohydrate, 82.5 g of the substance is required for the test. The start of taking a glucose solution is considered the beginning of the test. Stage III: blood sampling to determine the level of venous plasma glucose 1 and 2 hours after the glucose load. If results are obtained indicating GDM after the 2nd blood draw, the test is terminated.

In exceptional cases, OGTT with 75 g of glucose can be performed up to the 32nd week of pregnancy (high risk of GDM, fetal size, according to intrauterine growth charts, ≥ 75th percentile, ultrasound signs of DF).

The use of the IADPSG criteria has already resulted in an increase in the detection rate of GDM, for example in the Australian population from 9.6% to 13.0%. The Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study also demonstrated that higher baseline body mass index (BMI) in pregnant women with GDM, regardless of maternal glycemic level, was associated with >90th percentile neonatal body weight, percentage of adipose tissue in the newborn >90th percentile, cord blood C-peptide concentration >90th percentile, as well as preeclampsia, operative delivery by caesarean section and early delivery.

Obesity is one of the key risk factors for the development of GDM due to a decrease in the number of insulin receptors on the surface of effector cells, which leads to a decrease in binding and a decrease in the effect of this hormone. Thus, in patients with increased body weight, the action of placental hormones can lead to an increase in insulin resistance, as a result of which the risk of developing GDM increases by 2–6.5 times, with obesity these figures are even higher, reaching 17%. Thus, according to M. Torloni et al., an increase in baseline BMI by 1 kg/m2 increases the likelihood of developing GDM by 0.92%. According to our data, patients with uncomplicated pregnancy had the lowest baseline BMI — 25.8 (22.1–30.1) kg/m2, and the highest BMI — 34 (29.4–37.5) kg/m2 observed in pregnant women with preeclampsia ($p<0.001$).

The choice of treatment tactics for GDM is based on the severity of carbohydrate metabolism disorders. The first step in the treatment of GDM is dietary therapy, which usually reduces insulin resistance. The diet consists of 3 main meals and 3 snacks. At the same time, 10-20% of the diet is proteins, less than 10% is saturated fats, the rest is unsaturated fats and carbohydrates with a long carbon chain. It has recently been found that a low carbohydrate diet (<42%) leads to better glycemic control and perinatal outcome than a higher carbohydrate diet (45-50%).

The second important aspect of treatment is adequate physical activity, which must be individualized and strictly controlled from a medical point of view (walking, swimming). Exercises that cause an increase in blood pressure and uterine hypertonicity should be avoided, especially in patients with threatened abortion.

Approximately 30-50% of pregnant women with GDM require insulin therapy, the indication for which is an increase in blood glucose during the diet >5.1 mmol/l in the morning on an empty stomach and >7.0 mmol/l 1 hour after eating more than 2 times during 1-2 weeks of observation. The risk of developing a large fetus is increased 5-9 times if maternal glycemia is >5.8 mmol/l on an empty stomach and >7.8 mmol/l after a meal, compared with women without diabetes or with GDM, whose glucose levels were from 3.3 to 6.6 mmol/l.

Additional indications for prescribing insulin, regardless of the level of maternal glycemia on the diet, are: Ultrasound signs of DF/macrosomia (abdominal diameter ≥75th percentile, hepato-splenomegaly, cardiomegaly/cardiopathy, double contour of the fetal head, edema and thickening of the subcutaneous fat layer , thickening of the neck fold, etc.), as well as newly diagnosed or increasing polyhydramnios with an established diagnosis of GDM (if other causes of polyhydramnios are excluded), which indirectly indicates the presence of long-term chronic hyperglycemia.

The need for insulin, as in pregnant women with type 1 diabetes, increases with increasing gestational age. The scheme of insulin therapy and the choice of insulin preparation is determined depending on the data of self-monitoring of glycemia. Oral hypoglycemic drugs during pregnancy and breastfeeding are contraindicated. 6–12 weeks postpartum, all women with fasting venous plasma glucose <7.0 mmol/l undergo OGTT with 75 g of glucose (fasting glucose test and 2 hours after exercise) to reclassify the degree of carbohydrate metabolism disorder into glycemic categories (normal, impaired tolerance to glucose, impaired fasting glycemia, DM). According to the literature, in 20–50% of women who have had GDM, it occurs during a subsequent pregnancy, and in 25–75%, overt DM develops 16–20 years after birth.

An important problem in GDM is the consequences of birth and maternal trauma associated with childbirth with a large fetus, as well as gynecological and urogynecological problems (genital prolapse, urinary incontinence).

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