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GESTATIONAL DIABETES

Sharipova Shakhnoza Ozod kizi

Email: sharipova.shaxnoza@bsmi.uz https://orcid.org/0009-0006-7764-9782

Bukhara State Medical Institute named after Abu Ali ibn Sina, Uzbekistan, Bukhara, st. A. Navoi. 1
Tel: +998 (65) 223-00-50 e-mail: info@bsmi.uz

Resume: This article is devoted to the statistics of gestational diabetes mellitus , the most common causes, clinical signs , as well as to modern measures for diagnosis , treatment and Prevention , which are found in fetal patients on the territory of Uzbekistan and are written based on the clinical standard of the Republic of Uzbekistan (compiled on the recommendation of the World Health Organization).

Diabetes mellitus - is a group of metabolic (metabolic) diseases characterized by chronic hyperglycemia, which is a violation of insulin secretion, the action of insulin, or the result of both of these factors. Chronic hyperglycemia with SD is accompanied by damage, dysfunction and insufficiency of various organs and systems.

Gestational diabetes (GDM) - is a disease first identified during pregnancy, but characterized by hyperglycemia that does not meet the criteria for "manifest" diabetes mellitus (dm).

Epidemiology.

During pregnancy, DM is a serious medical and social problem, as it significantly increases unwanted pregnancy outcomes for the mother and fetus (newborn). During pregnancy, DM may be pregestation (pre-existing) or pregnancy. GSD is the most common type of DM during pregnancy: up to 90% of all cases of DM during pregnancy.

Thus, according to the International Diabetes Federation Atlas, the prevalence of hyperglycemia in pregnant women in 2019 was about 15.8%, of which 83.6% of cases are associated with GSD. In the total population of different countries, the frequency of GSD ranges from 1% to 20%, with an average of 7%. Since in most pregnant women the disease proceeds without clear hyperglycemia and clear clinical symptoms, one of the characteristics of gqd is difficulties in diagnosing it and late detection.

The results of the HAPO multicenter study (Hyperglycemia and Adverse Pregnancy Outcomes – hyperglycemia and adverse pregnancy outcomes) showed a correlation between the glycemic level of the mother and the negative pregnancy outcomes of both the mother and fetus.

The most common complications of pregnancy and childbirth during GDM and previous pregnancy include: preeclampsia, fetal shoulder dystrophy, clavicle fracture in newborns, Erb paralysis, severe asphyxia of newborns. Cerebral circulatory disorders of traumatic Genesis occur in 20% of newborns. These children are more likely to develop hyperinsulinism and postpartum hypoglycemia, polycythemia and hyperbilirubinemia, as well as respiratory distress syndrome and neurological disorders.

Pregnancy - is a condition of physiological insulin resistance, so it itself is an important risk factor for a violation of carbohydrate metabolism. Despite numerous publications on this disease, today the early

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diagnosis of DM during pregnancy, the algorithm for managing women with DM, induction of Labor, childbirth and the postpartum period remain relevant.

Diagnostics

Anamnesis.

Active identification of complaints that may be associated with hyperglycemia when collecting Anamnesis, clarification of hereditary information on type 2 diabetes, the presence of GSD in the previous pregnancy (the period of detection and what therapy is taken), the weight of children 7 birth in the previous pregnancy, fetal malformation, polyhydramnios in the previous pregnancy, PCOS, arterial hypertension, dyslipidemia. therapy is underway. Pregnancy is an independent risk factor for the development of hyperglycemia due to physiological changes that occur in the female body. Therefore, regardless of the presence or absence of complaints, it is necessary to actively identify GSD in all pregnant women.

Risk factors for GSD:

overweight or obesity in Anamnesis (BMI above 30 kg/m2);

in anamnes gdm;

family history of any type of DM in relatives of the 1st and 2nd degree;

fetal macrosomy (4500 g)during real pregnancy or Anamnesis;

polyhydramnios during real pregnancy in Anamnesis;

history of stillbirth;

birth of children with a history of congenital malformations;

incomprehensible death of a newborn in Anamnesis.

Physical examinations :

At the first prenatal visit, assess the risk of GSD of each pregnant woman using risk factors •

* overweight or obesity (IMT above 30 kg/m2)

* History of GSD * DM family history of any type in relatives of Level 1 and 2

* fetal macrosomy (4500 g) or Anamnesis during real pregnancy

* polyhydramnios during real pregnancy or Anamnesis

* history of stillbirth

* history of the birth of children with birth defects

* the history of the incomprehensible death of a newborn.

https://www.nice.org.uk/guidance/ng201

Laboratory diagnostic research

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To exclude a violation of carbohydrate metabolism, at 12 weeks, all pregnant women are advised to determine venous plasma glucose on an empty stomach during the first prenatal visit to a doctor of any specialty (obstetrician-gynecologist, therapist, family doctor) glucose is detected only in venous plasma. Determination of serum glucose or whole capillary blood is not allowed. Determination of venous plasma glucose is carried out only in laboratory biochemical analyzers or glucose analyzers for at least 8 hours and no more than 14 hours after initial fasting. It is not recommended to use individual glucometers for 8 determination of blood glucose. In the case of the first visit of a pregnant woman after the 12th week, it is also necessary to determine venous plasma glucose on an empty stomach.

All pregnant women show a 2-hour oral glucose tolerance test (PPTT) with 75 grams of glucose at 26-28 weeks of pregnancy as a GSD screening test in all pregnant women with gqd risk factors are advised to do a 2-hour oral glucose tolerance test (PGTT) twice with 75 grams of glucose: at the first prenatal visit and at 26-28 weeks high risk).

Fetal dimensions ≥75 percent according to ultrasound tables, ultrasound signs of diabetic fetopathy, disproportionate fetal dimensions), but without delay. In the case of detection of signs of fetal macrosomy under ultrasound examination (ultrasound tables ≥90 percentile fetal size) for 32 weeks and later, venous plasma glucose on an empty stomach should be detected without pgtt transfer.

PGTT-safe load diagnostic test.

During PGTT during pregnancy, venous plasma glucose is detected: on an empty stomach, 1 and 2 hours after the load.

Contraindications for PGTT:

GSD/manifest diabetes mellitus installed before the 24th week of pregnancy;

malabsorption syndrome (resected stomach syndrome, bariatric surgery, dumping syndrome);

vomit, nausea; acute inflammation or infectious disease;

exacerbation of diseases of the gastrointestinal tract;

rest in hospital bed mode due to obstetric complications (risk of termination of pregnancy, cervical sutures, B2 adrenomimetk infusions, dysstrus prophylaxis of newborn syndrome).

In this cohort, PGTT can be performed after expanding motor activity, canceling hyperglycemic drugs, if necessary. after removing glucocorticoids, PGTT can be done after 3 days.

For pregnant women with a history of bariatric surgery (surgical treatment of obesity), the diagnosis of GSD is carried out according to the results of the detection of venous plasma glycemia in the morning on an empty stomach. This category of pregnant women should be considered as the maximum risk group for the development of GDM, therefore, from the beginning of pregnancy, patients of this category should be advised to adhere to dietary recommendations for GDM, and from the 24th week of pregnancy, self-control of glycemia using a glucometer is recommended. Interpretation of the results of PGTT is carried out by an obstetrician-gynecologist, therapist, family doctor, endocrinologist.

Rules for conducting an oral glucose tolerance test (PGTT).

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The test is carried out against the background of the usual diet (at least 150 g of carbohydrates per day), for at least 3 days before the study. The test is carried out in the morning on an empty stomach after 9 - 8 hours of night fasting. The last meal should contain 30-50 g of carbohydrates. Drinking water is not prohibited. During the testing process, the patient must sit down. Smoking is prohibited before the end of the test. Drugs that affect blood glucose levels (multivitamins and iron preparations containing carbohydrates, glucocorticoids, b-blockers, B-adrenomimetics), if possible, should be taken after the test is complete.

Pgtt stages:

Stage 1: taking the first sample of venous blood plasma on an empty stomach.

Stage 2: for 5 minutes, drink a glucose solution of 75 grams of dry (anhydride or anhydrous) glucose dissolved in 250-300 ml of warm (37-40 o c) non-carbonated (or distilled) water. When using glucose monohydrate, 82.5 g of the substance is needed to carry out the test. Starting to take a glucose solution is the beginning of the test.

Stage 3: to determine the level of glucose in venous plasma, the following blood samples are taken 1 and 2 hours after glucose loading.

Determination of venous plasma glucose is carried out only in biochemical analyzers or glucose analyzers in the laboratory. The blood is taken as an enolase inhibitor to prevent spontaneous glycolysis in a cold vacuum tube containing sodium fluoride (1 ml of 6 mg for whole blood) and EDTA or sodium citrate preservatives as anticoagulants. The test tube is placed on ice. Then immediately (no later than the nearest 30 minutes) the blood is centrifuged to separate plasma and shaped elements. Plasma is transferred to a secondary test tube. In this biological fluid (venous plasma), glucose levels are determined.

Table 1. Diagnostic criteria for GSD and DM during pregnancy.

	GSD	**Manifested Diabetes Mellitus Type 1 or 2**
Venous glycemia on an empty stomach	5,1 - 6,9 mmol \ l	More than 7,0 mmol\l
Venous glycemia 1 hour after Pgtt with 75 g glucose	More than 10mmol\l	

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Venous glycemia 2 hours after Pgtt with 75 g glucose	8,5-11,0 mmol\l	More than 11,0 mmol\l((or when suddenly detected in blood plasma)
HbA1c(glycated hemoglobin	Not recommended	More than 6,5 %

If the glucose in the Viennese plasma is ≥5.1 mmol/l on an empty stomach, but <7.0 mmol/l, pregnant women are advised to diagnose GSD The diagnosis of GSD can be made based on a one-time definition of glycemia. This criterion for diagnosing GSD applies to the entire period of pregnancy. In hungry venous plasma glucose, manifest diabetes is diagnosed 2 hours after a load of ≥7.0 mmol / l or ≥11.1 mmol/L.

To rule out/confirm diabetes mellitus, it is recommended to carry out an additional examination for a pregnant woman when venous plasma glucose ≥7.0 mmol / l is detected on an empty stomach: it is necessary to confirm the exact diagnosis of diabetes: fasting glycemia or at any time of the day, from nutrition in the following days regardless or with the determination of Hba1c (glycated hemoglobin), with the exception of cases of acute metabolic decompensation or indisputable hyperglycemia with pronounced symptoms. Determination of glycated hemoglobin should be done by a method certified to 6.0% (42 mmol/mol) by National Glycohemoglobin standardization. **A diagnosis of DM is made at or above 6.5% at Hba1c level**. According to WHO recommendations, hba1c levels of 6.0-6.4% (42-47 mmol/mol) do not allow any self-diagnosis, but do not exclude the possibility of diagnosing DM by blood glucose levels.

https://diabetes.org/newsroom/american-diabetes-association-2023-standards-care-diabetes-guide-forprevention-diagnosis-treatment-people-living-with-diabetes

https://dmsjournal.biomedcentral.com/articles/10.1186/s13098-019-0406-1

https://pubmed.ncbi.nlm.nih.gov/30314289/

Instrumental Diagnostic Research

There is no instrumental diagnosis of GSD. It is recommended to carry out the same instrumental examination methods as in low-risk pregnancy (see national clinical protocol "antenatal care, management of pregnant risk groups", Tashkent, 2024).

To detect diabetic fetopathy, polygamy and fetal condition disorders, it is recommended to perform fetal ultrasound at 28-29 weeks in pregnant women with GSD . In the absence of diabetic fetopathy according to ultrasound at 28-29 weeks, it is recommended to timely adjust the tactics of the obstetrician – gynecologist and endocrinologist, at least once every 4 weeks, if there is fetopathy, at least once every 3 weeks, or in pregnant women with GSD, according to the instructions .

Ultrasound for GSD should include:

1. Standard fetometry,fetometric parameters and percentile evaluation of fetal mass;determination of phenotypic and visceral signs of diabetic fetopathy; determination of fetal maturity:

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2.The nucleus of the pelvis (the largest size of the secondary ossification point of the femoral distal epiphysis), size > 5 mm indicates fetal maturity;

3. Evaluation of paraphetal structures: placenta thickness, amniotic fluid content, fetal circulation assessment (dopplerometry). For the timely diagnosis of fetal discomfort in pregnant women with GSD, cardiotocography is recommended from 32 weeks at least 1 time in 7-10 days, from 37 weeks – at least 1 time in 7 days, or often according to the instructions.

Treatment measures at GSD.

To reduce maternal and perinatal morbidity and mortality, it is recommended to use an interdisciplinary approach to the management and treatment of pregnant women with GSM (obstetrician-gynecologist, general practitioner/endocrinologist/family physician). Basic principles of outpatient management of pregnant women with any type of DM.

All pregnant women with any form of DM consult a nutritionist and endocrinologist for the first week after detection;

- Pregnant women with DM have been shown to take 5 mg of folic acid before 12 weeks of pregnancy;

-12 A combination of diet with exercise is indicated to improve glycemic status;

- moderate exercise and exercise programs are recommended, such as walking for 30 minutes after meals; and hypoglycemic drugs are indicated if blood glucose goals are not achieved with a change in diet and exercise for 1-2 weeks;

Pregnant women with diabetes are advised to visit antenatal clinics and endocrinologists every 1-2 weeks during pregnancy, in order to prevent the addition of unstable glycemia , obstetric complications from the mother or fetus.

Conservative treatment for GSD

Dietary therapy with a high glycemic index of carbohydrates (gi), easily digestible carbohydrates, trans fats, daily carbohydrate content of 175 g or at least 40% is recommended to ensure adequate maternal and fetal needs and prevent obstetric and perinatal complications.

For all pregnant women, 40% of the daily calorie intake calculated under the control of glycemic and ketone bodies in the urine is with GSD. Carbohydrate-containing foods are distributed throughout the day into 3 Main and 2-3 complementary foods. Each meal should contain slow-digesting carbohydrates, protein, mono and polyunsaturated fats, dietary fiber. the daily amount of cellulose fiber should be at least 28 grams, which consists of fiber, allowed vegetables, fruits, leaf salads, cereals and Bran.

In obese pregnant women, it is recommended to limit saturated fats to 10% of your daily fat intake. Limiting calorie intake is recommended for obese pregnant women with BMI before pregnancy and a pathological increase in body weight during pregnancy, but at least 1,800 kcal per day to prevent ketonuria. The distribution of carbohydrates during the day: breakfast 15-30 g, second breakfast 15-30 g, lunch 30-60 g, afternoon snack 15-45 g, dinner 30-60 g, second dinner 10-15 G – on average 150-175 g carbohydrates per day. The break between meals-2.5-3 hours, 14 meals between the last intake and no more than the first-10 hours the next day.

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The consumption of easily digestible carbohydrates and high glycemic carbohydrates is completely excluded. To prevent ketonuria or ketonemia, it is recommended to introduce additional carbohydrates (≈12-15 g) before bedtime or at night. When post-breakfast hyperglycemia persists, a protein-fat breakfast may be recommended, with the exception of complex (or difficult to digest) carbohydrates, or with a minimum. Sucralose allowed during pregnancy, steviazite can be used as a sugar substitute. To improve glycemic performance, at least 150 minutes of dosed aerobic exercise per week is recommended for pregnant women with GSD: 10-15 minutes of walking after meals every day after meals, 30 minutes before bed to improve postprandial glycemia.

Control glucose levels in the blood

To assess carbohydrate metabolism compensation, daily glycemic self-control is recommended until the end of pregnancy for all pregnant women with GSD .

Self-control is performed by the patient and involves the detection of glycemia using plasma-calibrated portable instruments (glucometers). If the patient is only in dietary therapy, then self-control of glycemia is carried out every morning on an empty stomach and 1 hour after the start of main meals. If, in addition to dietary therapy, the patient is prescribed insulin therapy, then self-control of glycemia is carried out daily according to the instructions of the Attending Physician, from 4 to 8 times a day: in the morning on an empty stomach, before the main meal (to calculate the dose of bolus insulin for meals and correct hyperglycemia), 1 hour after the start of main meals.

POINTER	RESULTS
Glucose on an empty stomach	Less than 5,1 mmol\l
1 hour after consuming the main meal (breakfast , lunch and dinner)	Less than 7,0 mmol'l
2 hours after consuming the main meal (breakfast , lunch and dinner)	Less than 6,7 mmol\l

Insulinotherapy

To compensate for carbohydrate metabolism, insulin therapy is recommended for pregnant women with GSD if it is not possible to achieve glycemic target indicators (two or more non-glycemic values, following the instructions for dietotherapy and physical activity) for self-control for 1-2 weeks. 2 hours after the start of nutrition in pregnant women with gqd in the diet, it is recommended to immediately correct the diet, additional glycemic control, if, according to ultrasound, the abdominal circumference of the fetus is more than 75 percentiles, diabetic signs are detected fetopathies to

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determine the possible displacement of hyperglycemia peaks when consuming large amounts of fat and protein in, the target glycemic level is less than 6.7 mmol/L.

To prevent the negative effects of these drugs on the fetus, pregnant women with GSD are not recommended to use oral sugar-lowering drugs if a woman has a glycemic disorder or impaired glucose tolerance to an empty stomach before pregnancy, so if biguanides (metformin) are prescribed, the drug should be discontinued when pregnancy is detected. Taking metformin in the early stages of pregnancy is not an indication for abortion.

Carrying out childbirth.

For Optimal routing and timely hospitalization, it is recommended to determine the tactics of carrying out childbirth at 36 weeks, depending on the presence of obstetric complications by the mother and fetus in pregnant women with any form of DM . For metabolic disorders and uncomplicated 1 or 2 types of dm by the mother and fetus without any other complications, delivery is recommended between 37 and 38 weeks of pregnancy through induction of labor or selective CK (if indicated).

For women with 1 or 2 types of dm with metabolic (uncontrolled dietary therapy and/or glycemia with insulin intake, vascular complications) or other complications by the mother or fetus (fetopathy), scheduled delivery at or before 37 weeks of pregnancy (in the presence of obstetric induction or – KK indications) is recommended: pregestation dm with vascular complications: 370/7 – 396/7 weeks; pregestation with poorly controlled glycemia QD: 340/7-386/7 weeks.

Women with GSD should give birth on their own before the 41st week (41) of pregnancy, unless there are obstetric complications of the mother and or fetus. If self-delivery does not occur before the specified period of pregnancy, then it is recommended to carry out the induction of labor or, if there are indications for it, the selected CS .

If gestational diabetes is the only pathology, induction of labor in less than 41 weeks is not recommended.

Pregnant women with GSD are advised to deliver no later than 39 weeks if there are obstetric complications of the mother and/or fetus.

Caesarean section is performed in pregnant women with DM : in the presence of diabetic fetopathy with an estimated fetal weight ≥ 4500 G, according to obstetric guidelines. For women with any form of DM with fetal weight ≥ 4,500 g, planned KK is recommended, as the risk of shoulder dystrophy is a complication found in fetopathy with >15% DM .

In order to detect fetal discomfort in time, it is recommended to carry out cardiotocography at the beginning of labor in pregnant women with GSD with a change to the regime of periodic monitoring of the state of the fetus in normal indications according to the maternity protocol, constant cardiotogographic control is indicated when conducting induction of labor with oxytocin infusion or epidural analgesia.

Glycemic control is recommended to be carried out during childbirth (in the laboratory or in a portable glucometer) only in pregnant women who have received insulin therapy,once every 2-2.5 hours in pregnant women with GSD, for the timely diagnosis of hypo - and hyperglycemia during childbirth.

Prevention :

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To prevent the development of QD type 2 in the future, lifestyle changes (correction of nutrition and physical activity) are recommended in women at high risk of developing QD 2 . To prevent the development of Type 2 diabetes, patients with GSD should continue to be monitored by an endocrinologist. All women with risk factors for Type 2 diabetes should undergo a standard examination to determine pre-gestational diabetes at the pregnancy planning stage, as well as recommend lifestyle changes at the pregnancy planning stage.

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