GLUCOSE CONTROL DISORDERS IN PREGNANCY

Hormonal changes and weight gain in pregnancy cause a pregnant woman to need more insulin to maintain normal blood glucose levels. Insulin is a hormone secreted by the pancreas, which ensures that the level of glucose in the body is always within normal limits. If the pancreas of a pregnant woman cannot increase insulin secretion, as required by the increased need during pregnancy, the blood glucose concentration in her blood excessively increases.

A glucose control disorder, which is first detected in pregnancy and is not defined as diabetes according to the diagnostic criteria, is referred to as **gestational diabetes (GDM).** This condition is caused by a lack of insulin during pregnancy, and results in an excessive increase in blood glucose, which can be harmful for both the pregnant woman and her baby.

Gestational diabetes has no symptoms, and is therefore detected by planned screening tests in all pregnant women. It can be detected with increased fasting glucose. However, if fasting glucose is normal, oral glucose tolerance tests (OGTTs) are carried out for the detection of GDM during the 24-28th week of pregnancy. It is important to remember that women who have had gestational diabetes in previous pregnancies, women with close family members with diabetes, or who have given birth to a child weighing more than 4.5 kg have a higher risk of developing gestational diabetes. For pregnant women in the vulnerable group, the doctor carries out the OGTT at the 12th week of pregnancy.
In the diabetological clinic, you will be taught to take all the necessary measures to ensure that you have the best possible pregnancy and childbirth, and they will help you when you are in doubt.

HOW CAN GESTATIONAL DIABETES AFFECT YOU AND YOUR BABY?

Gestational diabetes can lead to dangerous complications in pregnant women and their babies, but these complications can be effectively prevented by careful regulation of blood glucose levels.

The most common complications of gestational diabetes in the fetus and the newborn are:

Macrosomia
It means an abnormally accelerated growth of the baby. It is caused by an increased concentration of glucose in the mother, which then passes through the placenta to the child's blood, and its pancreas begins to secrete larger amounts of insulin, resulting in an abnormally accelerated growth of the baby. And a larger baby means a greater chance of injuries in childbirth, as well as an increased risk of complications after childbirth.
Hypoglycaemia in a child after childbirth
It is a condition of a concentration of glucose that is too low. If the baby is exposed to an excessive amount of glucose in the womb,
its pancreas will secrete excessive amounts of insulin, even after birth, and lower its blood glucose concentration below the normal limit.
Jaundice
It means a yellow colouring of the skin and is caused by the accumulation of bilirubin in the skin of the newborn. Bilirubin is caused by the breakdown of red blood cells (erythrocytes), and under normal conditions, the liver completely processes it into biliary dyes, which are secreted via stool. In newborns, however, the liver is not yet able to completely process bilirubin, so their stool is colourless and their skin often becomes slightly yellowish.

Children who have been exposed to excessive levels of glucose in the uterus have a more pronounced jaundice, due to the decreased ability of the liver to metabolise bilirubin and the increased number of erythrocytes.

Respiratory distress

It is a consequence of immaturity of the lungs. It causes breathing problems in newborns that require the addition of oxygen or mechanical respiratory support.

The most common complications in pregnant women with gestational diabetes are:

Urinary tract infections

They are caused by bacteria for which high glucose levels represent an ideal environment for their development.

Preeclampsia

It is a clinical condition in which the pregnant woman has high blood pressure, protein in the urine, and swelling around the body (around the ankles, eyes, face, etc.). All of these factors should be closely monitored during regular examinations in the diabetologist and gynecologist clinics.

In pregnant women with high blood pressure, it is important that blood pressure is regulated at all times. This requires good treatment, as well as frequent blood pressure measurements at home.

Polyhydramnios

It is a condition in which there is an excessive accumulation of amniotic fluid in the uterus. Polyhydramnios may cause premature birth.

Caesarean delivery

The need for caesarean delivery is much more common in women with gestational diabetes. In most cases, the caesarean section needs to be performed due to the excessive size of the baby.

It is important to know that regulated glucose during pregnancy greatly reduces the risk of all these complications - both for the baby and for the mother!

What should be done to ensure that the concentration of glucose is in the range that provides a normal course of pregnancy?

Most pregnant women with gestational diabetes will have a healthy pregnancy and a healthy baby if they take into account and implement all the necessary instructions and measures.

These instructions and measures are:

- dieting,
- regular moderate physical activity,
- self-monitoring of blood glucose and achievement of target values,
- keeping a log of nutrition, exercise, and blood glucose levels,
- self-monitoring of ketones in the urine,
- insulin therapy when dieting and physical activity can no longer reach the target values of blood glucose.

Dieting is the basis of the treatment of any diabetes, and is particularly important in gestational diabetes. A nurse - educator - will put together an appropriate nutrition plan with you and help you compile a variety of food menus that are suitable for you, and which you love.

Physical activity is an integral part of the treatment. It is important that you discuss your physical activity

with your gynecologist, who will advise you, according to your gynecological condition, what kind of physical activity is best for you. If pregnancy is normal, regular moderate physical activity is advised

(e.g. walking, guided exercise for pregnant women, swimming).
Physical activity after meals has the greatest effect on blood glucose control. So, after a meal, 15 minutes of rest and then 20 to 30 minutes of physical activity is recommended.

Self-monitoring of blood glucose gives you plenty of information and is the best aid in compiling a proper nutrition plan. It will be easier for you to decide on the most suitable foods and their amount, depending on the blood glucose values per individual meal. When you crave a piece of chocolate, you will be able to monitor its effect on the level of glucose in your blood, and realise that you can eat it after certain meals - especially if you immediately undertake a proper form of physical activity. Most pregnant women feel calm when they see their regulated blood glucose levels, because they know that appropriate values ensure the normal development of their baby and a normal delivery. To maintain blood glucose levels, self-monitoring is essential. The process of drawing blood, and glucose measurement, will be shown to you by a nurse educator, who will also determine the frequency of measurements. Usually, the glucose value should be determined in a fasting state and 90 minutes after main meals. It is recommended that the fasting value is below 5.3 mmol/l and 90 minutes after a meal under 6.6 mmol/l.
The level of glucose in the blood is most often increased by inadequate food (especially sweet and starchy dishes), and very often also illness, stressful situations, and smoking.

Keeping a log is important for you to gain experience in managing diabetes, and the doctor is a source of information, according to which all necessary measures are decided. It is important that in the self-measuring log, in addition to blood glucose, you should also record changes in your well-being.

You must also carry out self-measuring of ketones. Ketones are substances that are formed when the fat, which your body needs as an important source of energy, breaks down. Ketones will appear in your blood and urine when you are not consuming enough carbohydrates or calories, and when you go more than five hours without food. Most often, this happens after a skipped meal, or in case the nutrition plan is inadequate, due to the increased need for food.

Insulin therapy is necessary when diet and exercise are no longer successful in achieving blood glucose targets. Insulin replacement is the most appropriate and the most successful way of treating diabetes in pregnancy. It is only uncomfortable that it cannot be inserted into the body in the form of tablets, but must be injected into the subcutaneous tissue. The necessary training for performing insulin therapy will be done in a diabetological clinic, where they will assist you with the first injections of insulin.

Insulin will not endanger your baby, as it does not pass through the placenta and therefore does not come into the bloodstream of the baby, but will lower the level of blood glucose to the normal range and thus ensure the child's development and birth.

Do not worry if insulin doses increase with time during pregnancy, as a greater need for insulin is only an indication of a normal course of pregnancy. Insulin therapy in pregnant women with gestational diabetes is only necessary up to childbirth.

The most common side effect of insulin is that blood glucose levels drop too low, which is called hypoglycaemia. By following the instructions for injecting insulin and regular compliance with dietary instructions in a pregnant woman with gestational diabetes, there is little risk of lowering blood glucose below the lower limit. Before the blood glucose drops below the lower limit, you will feel hunger, restlessness, tiredness, and trembling hands. These are signs that you should immediately measure your blood glucose. If glucose level is below 4 mmol/l, you should immediately take in 20 g of carbohydrates (e.g. 2 dl of fruit juice).

CHILDBIRTH
Most childbirths are normal, therefore vaginal. However, if the baby is overly large, or other complications occur, the obstetrician will perform a caesarean section. Before and after the delivery, the maternity department always determines the blood glucose value.

AFTER CHILDBIRTH
If you were receiving insulin before giving birth, it will probably not be necessary after childbirth. Breast-feeding is recommended.

Continue with the same diet as you had before giving birth, especially if you were overweight before pregnancy. If your weight was normal before pregnancy and weight gain during pregnancy is within the allowed limits, your diet should be healthy, and with a calorie intake that will gradually return you to your normal body weight.

If you were receiving insulin therapy, fasting blood glucose will need to be checked six weeks after the delivery. If your fasting blood glucose level is elevated, but not in a range that already confirms diabetes, a further diagnostic procedure for diagnosing diabetes will be necessary.

Women who have had gestational diabetes have a greater chance of developing type 2 diabetes later in life, so regular monitoring of the possible presence of a disorder in the metabolism of glucose, at time periods specified by the doctor, will be required.

It is important to remember that in the next pregnancy, gestational diabetes is likely to reoccur.

DIETARY TREATMENT OF DIABETES

The basis of dietary treatment of GDM is the elimination of sugar and sugary foods from the diet, and the limitation of carbohydrates from the group of starchy foods and fruits. Most pregnant women succeed in maintaining the level of blood sugar in the targeted area by changing their diet. It is important, however, that you maintain a healthy diet with a corresponding calorific value that ensures an adequate supply of nutrients to your baby. Carbohydrates must be taken in a limited amount per meal, and meals must be taken at regular intervals. To ensure that the amount of nutrients during pregnancy is sufficient for your needs, you will measure ketones in the urine that are secreted from the blood through the kidneys into the urine when you starve.

A strategy that allows optimal blood sugar adjustment after a meal, is to plan the correct amount of carbohydrates in your diet. Foods with carbohydrates are broken down into glucose that passes into the blood. Glucose in your blood is necessary, because it is a fuel for your body and the food your child receives from you. However, it is important that the level of glucose remains within the range suitable for the baby.

Carbohydrates in food

Carbohydrates are found in the following foods:

- milk and yoghurt,
- fruit and fruit juices,
- pasta, rice, cereals and products from cereals,
- bread and dough products,
- dried beans, beans, and lentils,
- potatoes.

Carbohydrates in foods are measured in grams. The definition of how much food can be consumed for a certain amount of carbohydrates can be defined in the weight of foods, or units that we call food units. The amount of carbohydrates in the product is also evident from the label on foods (declarations) and food lists that you will receive from the educator, and it can also be found in literature on nutrition.

The correct choice of carbohydrates in a meal is very important. Carbohydrates increase blood glucose levels at different rates. Carbohydrates, such as white sugar and white bread, are rapidly broken down into glucose. And whole grain cereals and carbohydrates from vegetables are gradually broken down into glucose. Two foods with the same amount of carbohydrates can therefore have a very different effect on the increase in glucose after ingestion. The information that tells us how fast we can expect a rise in glucose (blood sugar) in the blood after a meal is called the glycaemic index. The glycaemic index (GI) is a number assigned to the food, according to how quickly it can increase blood glucose levels. The lower the glycaemic index, the lower the expected increase in glucose. Foods with a glycaemic index below 60 are recommended most, because they cause a slow and gradual increase in glucose and are a good assistant in maintaining normal blood sugar. Research has confirmed that the most successful diet in the treatment of gestational diabetes is a diet with a low glycaemic index.

Preparation of foods can also affect the glycaemic index:

Removing the skin of fruit increases the GI.
Preparation: Overcooked pasta and rice have a higher GI. The GI of potatoes increases if we mash them. Preparation of fruit drinks (using a mixer) is not recommended. Toasted bread has a higher glycaemic index.
Combining foods: The glycaemic index is reduced by adding food with a low glycaemic index.

General instructions
Divide your food between three meals and two or three snacks each day. It is very important not to skip meals. Excessive amounts of carbohydrates in the meal cause an excessive increase
in blood sugar after a meal.

Do not add sugar, honey, or syrup to your food.

Drink one cup of milk (up to 2 dl) or yogurt at a time. Milk is a healthy food and an important source of calcium. However, milk contains carbohydrates, and excessive drinking can increase your blood sugar.

Limit the amount of fruit in each meal and your all-day diet. Fruit is healthy, but it has many natural sugars. On a daily basis, you can eat up to three units of fruit, but only one at a time. Do not eat fruit that has been preserved in syrup.

Avoid sugar-sweetened drinks. If you really crave a sweet drink, choose one that is sweetened with artificial sweeteners. We recommend a small amount of such sweetened drinks.

The following sweeteners have been certified as safe during pregnancy:
- Aspartame (e.g. NutraSweet)
- Acesulfame K (e.g. Sunett)
- Sucralose (e.g. Splenda)

Avoid fruit juice. For a glass of juice, you need quite a lot of fruit. Juice is a concentrated source of carbohydrates and very quickly increases blood sugar. It is only needed when your glucose level is below
3.5 mmol/l. The same applies to smoothies.

Strictly limit sweets and desserts. Cakes, biscuits, candies, and pastries usually contain a high amount of carbohydrates. These foods often also contain large amounts of fat.

Some "sugar-free" products are carbohydrate-free and will not affect blood sugar, but this does not apply to products "without added sugar". For these, you need to check the amount of carbohydrates on the food declaration.

MONITORING THE PRESENCE OF KETONES IN URINE

1. Ketones do not usually appear in urine with adequate nutrition. If in the last 12 hours, you take in less than you burn, there is a greater chance of detecting the presence of ketones in urine.
2. Measure ketones 2 times a day - before breakfast (when you wake up) and before dinner.
3. Record the results in the log, as shown in the picture above.
4. Always bring the log with you to examinations.

What to do if you detect the presence of ketones in urine?

BEFORE BREAKFAST
Do not miss your dinner or after dinner snack.
Increase the intake of protein in your dinner or after dinner snack.
If ketones are still present, you can drink a glass of milk or yogurt at night.

BEFORE DINNER
Have regular meals, in accordance with the guidelines for a healthy diet (6 meals).
Increase the intake of protein for lunch.
Drink an additional 2 dcl of milk, yoghurt, 3-5 dag of cheese or curd (or some nuts), over the course of the day.

CORRECT WAY OF MEASURING BLOOD GLUCOSE
1. Wash your hands with soap and warm water, and thoroughly dry them.
2. Insert the test strip into the opening on the measuring device.
3. Touch a drop of blood with the tip of the test strip.
4. The measurement result is displayed on the screen after a few seconds.

Measurement methods can vary, depending on the type of the measuring device in the part described in points 2-3.