

Gestational diabetes

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Abstract

Gestational diabetes affects a total of 3% to 9% of all pregnancies. It has an important impact on both the mother's and the baby's future, by exposing them to higher perinatal risks and by predicting long-term chronic metabolic complications. It is believed that its effects are being transmitted across generations.

Keywords: gestational diabetes, metabolic syndrome, complications, metabolic memory

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Diabetul gestațional

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Rezumat

Diabetul gestațional afectează 3-9% din sarcini, implicațiile acestuia asupra mamei și copilului fiind uriașe, întrucât crește riscul complicațiilor perinatale. În același timp, prezice complicații metabolice tardive, cronice, atât la mamă, cât și la copil, iar uneori efectele sale se fac resimțite pe parcursul mai multor generații.

Cuvinte-cheie: diabet gestațional, sindrom metabolic, complicații, memorie metabolică

Along with hypertension, gestational diabetes is the most common medical condition occurring during pregnancy. It is defined as hyperglycemia that begins or is detected for the first time during pregnancy, usually in the second and third trimesters. The association of diabetes with pregnancy has a steadily rising prevalence, both in parallel with the increase in the prevalence of diabetes in the general population, as well as due to the increasing age of pregnancy, the increase in the prevalence of obesity in women of childbearing age and the spread of assisted reproduction that uses ovarian stimulation. In addition, a history of gestational diabetes predisposes to a 50-fold higher recurrence risk for a subsequent pregnancy. The prevalence of gestational diabetes in Romania is not well established, but that of type 2 diabetes is high, of 12%. The unfavorable consequences on the mother and fetus are numerous and proportionate to the glycemic value, therefore active control during pregnancy monitoring is required.

Gestational diabetes affects 3-9% of pregnancies, with increased incidences in certain ethnic groups, such as women in Polynesia, India, Australia or in American women⁽²⁾. In 2012, the prevalence of gestational diabetes in France was 7.24%, while in the USA it was 15%, and in Australia – 13%⁽³⁾.

The first case in the literature on gestational diabetes dates back to 1824^(4,5), when Bennowitz described the case of a German woman with polydipsia and glycosuria in three consecutive pregnancies, one of whose children weighed 5.5 kg.

The World Health Organization (WHO) and the American Diabetes Association (ADA) recommend for the diagnosis of gestational diabetes to perform an oral glucose tolerance test on week 24-28 using 75 g of anhydrous glucose dissolved in 250-300 ml of water^(1,6). Unlike the diagnosis of diabetes in the general population, for pregnant women, the normal blood glucose limit is only 92 mg/dl.

The knowledge of non-genetic risk factors of gestational diabetes leads to an easier identification of pregnant women at risk, helps early diagnosis, and also to the introduction of measures to minimize the effects of the disease on pregnant women and the fetus⁽⁷⁾. These are:

- The advanced age of the pregnant woman. The correlation between age and diabetes is linear, with gestational diabetes prevalence increasing with aging. The prevalence of gestational diabetes in pregnant women under the age of 20 years old is 0.15%, compared with 4.2% in pregnant women over 30 years of age.
- Multiparity.
- Diet rich in saturated fatty acids.
- Deficiency of vitamin D. Some studies have revealed a correlation between vitamin D deficiency in the first six months of pregnancy and gestational diabetes.
- History of complicated pregnancies: congenital malformations, intrauterine death of the fetus, macrosomy, caesarean section or gestational diabetes at previous pregnancies.
- Lifestyle: sedentary, smoking, unbalanced diet, carbonated juice consumption.
- Short stature of the mother. Although cited in literature, the predictive value of the stature for gestational diabetes identification is low and not taken into account when conducting selective screening.
- Overweight and obesity. Here we talk both about the weight before pregnancy and about the excessive weight gain during the pregnancy. Studies have shown that, compared to normoponderal pregnancies, those with a body mass index (BMI) between 25 and 30 have a risk of developing gestational diabetes 2.14 times higher, those with a BMI between 30 and 40 have a 3.56 times higher risk, and those with BMI over 40 have a 8.56 times higher risk⁽⁸⁾.
- Early menarches is a risk factor independent of both type 2 diabetes and gestational diabetes.

Hyperinsulinemia has a hypertensive effect by weight gain, increasing the extracellular volume due to sodium retention and sympathetic stimulation.

Obesity and gestational diabetes are risk factors for preeclampsia. Studies have shown an incidence of preeclampsia of 7.8% among pregnant women with good glycemic control (glycemia <105), and 13.8% among pregnant women with high blood glucose (over 105)⁽¹⁰⁾.

As far as birth is concerned, pregnant women with gestational diabetes have an increased birth rate by caesarean section of up to 35%, chosen to avoid the traumatic complications of a natural birth. The natural birth of a child of high weight, or even macrosome, often requires the use of instrumental aids, but also episiotomy.

To measure the risk of perinatal effects of gestational diabetes, Billionnet and Mitanchez conducted a comprehensive study on a 796,346 pregnant group from France in 2012. Compared to non-diabetic pregnancy, pregnancy with gestational diabetes presents a higher risk of preeclampsia (Odds Ratio=1.6), followed by pregnancy with type 2 diabetes (OR=4) and pregnancy with type 1 diabetes (OR=6.6). The risk of premature birth is higher in pregnancies with gestational diabetes versus non-diabetic pregnancy (OR=1.2), followed by pregnant women with type 2 diabetes (OR=3.1) and pregnant women with type 1 diabetes (OR=5.8)⁽³⁾.

Pregnancies with gestational diabetes that return to normoglycemia with normoinsulinemia after birth have a seven-fold higher risk of developing type 2 diabetes than normal normoglycemic pregnancies⁽¹¹⁾. In fact, 13% of the pregnant women with gestational diabetes develop type 2 diabetes in the first five years after pregnancy. It is therefore important to monitor these women postpartum; initially at 6-12 weeks postpartum, by performing an oral glucose tolerance test with 75 g of glucose, and if this is normal, performing controls at 1-3 years⁽¹⁾.

Perinatal mortality is three times higher in pregnancies complicated with gestational diabetes due to possible congenital malformations (neural tube defect, omphalocele, cardiac malformations), respiratory distress syndrome, and prematurity.

The growth pattern of diabetic mothers' fetuses is different, uneven, characterized by a decrease in head-to-shoulder ratio, explained by an increase in shoulder

circumference. This makes the risk of traumas at birth high – the shoulder distraction and lesions of the brachial plexus.

Newborn babies with diabetes are at increased risk of developing respiratory distress syndrome, even though they are born on time. Hyperglycemia is thought to delay development and pulmonary maturation of the fetus.

In the neonatal period, neonatal hyperinsulinism caused by maternal hyperglycemia can cause, in up to 25% of children with mothers who have developed diabetes during pregnancy, a neonatal hypoglycemia that, unrecognized in time, may be complicated with seizures, coma and irreversible brain injury.

The long-term effects of gestational diabetes on the baby

The exposure to unfavorable, non-physiological conditions during pregnancy or during perinatal period may increase the risk of newborn babies developing certain chronic diseases⁽¹⁴⁾. This process by which a stimulus produces lasting effects on the fetus, formerly called “fetal programming”, creates a metabolic memory. In case of babies born from hyperglycemic pregnancies, metabolic memory may cause type 2 diabetes, obesity and metabolic syndrome during adolescence or adulthood, long after children are no longer exposed to a hyperglycemic environment. The metabolic syndrome that occurs during childhood includes obesity, hypertension, dyslipidemia, and type 2 diabetes. High birth weight babies from diabetic pregnant women are at a higher risk for developing metabolic syndrome.

Conclusions

Knowing the causes and effects of gestational diabetes requires a serious approach to the problem. The involvement of the family doctor in identifying pregnant women with gestational diabetes during the 24-28 weeks of pregnancy, and the special attention given to these women and their children over the years are extremely important. By direct, targeted interventions, one can try to stop the vicious circle of intergenerational perpetuation of the metabolic syndrome. ■

Conflict of interests: The authors declare no conflict of interests.

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