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Diabetes during Pregnancy

Why is this Association Present, and How Can It Be Prevented?

During pregnancy, there is an increase in metabolic activity. In a short period of time (9 months), the mother must provide enough energy to support the development of a newborn that may weigh up to four kilograms and measure approximately 50 centimeters. To metabolize sufficient energy for the vitality and growth of the fetus, the mother must increase insulin production by the beta cells in the pancreas, which produce this hormone. In addition to this increase, there is a greater degree of insulin resistance because the fetus's growth requires the activity of hormones, some produced by the mother or the placenta, which interfere with insulin's glucose-lowering efficacy. These two factors—higher insulin demand and resistance to its action—form the conceptual basis for why diabetes during pregnancy is not uncommon. On the contrary, it is quite prevalent. Today, according to the International Diabetes Federation (IDF), diabetes can occur in 14% of pregnancies, and this risk varies between populations, reaching 27.6% in North Africa and 7.8% in Europe. These differences are related not only to genetic characteristics of these populations but also to the presence or absence of pre-existing obesity, sedentary lifestyle, or other diabetes-related risk factors.

Of course, the onset of diabetes during pregnancy—also referred to as gestational diabetes—does not necessarily mean that this diabetes will persist after delivery, because some of the factors that induced it disappear. The demand for insulin decreases, as do the hormones that caused insulin resistance. However, the occurrence of diabetes during pregnancy is already an indicator of future risk for developing diabetes mellitus. This is because gestational diabetes is linked to many of the same factors that contribute to the development of type 2 diabetes in the general population, such as being overweight, obesity, a sedentary lifestyle, and a family history of diabetes. The sign of diabetes during pregnancy arises, as previously mentioned, from the inability of beta cells to respond to increased demand and insulin resistance. This balance may break again with age, weight gain, or reduced physical activity.

We already understand the reasons for this association between diabetes and pregnancy. However, we have not yet discussed the impact it may have on pregnancy development, delivery, and the health of the newborn and the mother. One major impact of diabetes is the fetus's weight gain throughout pregnancy, caused by fat accumulation in the body. This increase, known as macrosomia (large body), makes delivery more complex, as the baby may weigh up to 5 kg at birth. If diabetes during pregnancy is not managed, this size increase may require inducing labor before term. In such cases, it is important to assess fetal lung maturity through indicators in the amniotic fluid to avoid respiratory difficulties at birth due to a surfactant deficiency, which prevents the lungs from expanding correctly. This is the most significant complication of immaturity in a fetus born to a mother with gestational diabetes.

Additionally, a fetus exposed to high glucose levels compensates by overproducing its insulin, which can result in hypoglycemia after birth. It is crucial to monitor and immediately address this complication at birth to prevent brain damage. Furthermore, due to the high birth weight, it is not uncommon for the newborn to sustain joint or nerve injuries, particularly in the arms, during a difficult delivery. However, there is no evidence to suggest that the newborn may suffer from congenital abnormalities in the heart, kidneys, or nervous system, unlike pregnancies in women with poorly controlled pre-existing type 1 diabetes mellitus. Neonatal jaundice, on the other hand, is common. The high fetal weight demands increased oxygen, which leads to an elevated production of red blood cells. After birth, the excess red blood cells break down, releasing hemoglobin, which can cause jaundice and give the skin a characteristic yellow tint.

For the mother, the potential for developing diabetes later in life must be considered. Additionally, studies show that adults born with high birth weights due to diabetes during pregnancy are at a higher risk of obesity, diabetes mellitus, and cardiovascular disease. This is referred to as a "legacy effect," a persistent mark sometimes linked to epigenetic changes—acquired changes in the genes.

Diagnosing gestational diabetes and preventing these negative impacts on both mother and child is a priority. Diagnostic tests are recommended between 24 and 28 weeks of pregnancy, no later. The test involves an oral glucose tolerance test, which requires the ingestion of 100 grams of oral glucose and measuring blood glucose levels before the test and 1 and 2 hours afterward. Values > 92 mg/dL fasting, 180 mg/dL at 1 hour, and 155 mg/dL at 2 hours are consistent with a diagnosis of gestational diabetes. This test has 2 drawbacks: it requires fasting and involves consuming 100 grams of oral glucose, a quantity that is not always well-tolerated by pregnant women. Therefore, a simpler screening test is often performed initially. This test is not diagnostic but, if negative, eliminates the need for the oral glucose tolerance test. It is called the O'Sullivan test. The O'Sullivan test can be performed at any time of the day. It involves administering 50 grams of glucose—half the amount used in the tolerance test, making it better tolerated—and measuring blood glucose levels after 1 hour. If the result is < 140 mg/dL, diabetes is ruled out. If the result is above this threshold, the diagnostic curve test must be performed. If the O'Sullivan test is used as a preliminary screening method, it should be repeated in the 3rd trimester of pregnancy.

How to prevent and treat diabetes during pregnancy. The prevention of gestational »

CURRENTLY, ACCORDING TO THE INTERNATIONAL DIABETES FEDERATION (IDF), DIABETES CAN OCCUR IN 14% OF PREGNANCIES, AND THIS RISK VARIES BETWEEN POPULATIONS, REACHING 27.6% IN NORTH AFRICA AND 7.8% IN EUROPE

ONCE DIAGNOSIS HAS BEEN ESTABLISHED, THE FIRST TREATMENT RECOMMENDATION IS DIET. A DIET THAT SHOULD NEVER REDUCE CARBOHYDRATE INTAKE < 40%–50% OF TOTAL CALORIC INTAKE, FOCUSING ON COMPLEX CARBOHYDRATES RICH IN FIBER, AND WITH A MINIMUM PROTEIN INTAKE OF 70 GRAMS PER DAY

» diabetes follows the same guidelines as those for type 2 diabetes in the general population: avoiding overweight and obesity, as well as a sedentary lifestyle. Women with a family history of diabetes who wish to become pregnant are advised to do so before the age of 35, as insulin resistance increases with age and the beta cells' ability to respond to higher demand decreases.

Early diagnosis of gestational diabetes is critical to avoid adverse consequences for both mother and child. Once the diagnosis is established, the first treatment recommendation is a balanced diet. This diet should not reduce carbohydrate intake < 40%-50% of total caloric intake, favoring complex carbohydrates rich in fiber. Protein intake should be at least 70 grams per day, and fat consumption should focus on unsaturated fats. It is essential to avoid fast-absorbing sugars, especially sucrose, and foods that contain it, as well as fructose and other sugars, except for fruit. A daily intake of two to three servings of fruit is recommended. It is advisable to have 5 to 6 meals per day: breakfast, lunch, and dinner, with additional snacks mid-morning, in the afternoon, and possibly a small complement before bed. However, caloric intake should align with general recommendations for each trimester of pregnancy. Although rigorous weight control is required, the diet must not be hypocaloric concerning the pregnancy's needs. Moderate physical exercise is recommended, such as walking, light jogging, swimming, yoga, or other similar activities unless contraindicated. If diet alone is insufficient to normalize blood glucose levels— »

» monitored via a sensor or multiple capillary measurements—insulin therapy may be introduced. Oral antidiabetic drugs are considered only exceptionally if insulin is not an option. After delivery, a glucose tolerance test is conducted 6-8 weeks postpartum to rule out persistent diabetes. Breastfeeding is not contraindicated; on the contrary, it is strongly encouraged, just as for other mothers. D

CONCLUSIONS

Attention must be paid to diabetes during pregnancy due to its impact on the health of both the mother and the child. Early diagnosis and appropriate treatment are essential. With proper management, neither the pregnancy nor delivery will face additional complications, ensuring an optimal health outcome for the newborn.

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