

## **Clinical Course and Complications of Gestational Diabetes: Approaches to Prevention and Management**

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**Abstract:** In recent years, the increasing prevalence of diabetes and its growing adverse impact on maternal and fetal health have made its management during pregnancy increasingly important. During pregnancy, attention should be given to insulin resistance and the adverse effects observed in diabetic pregnancies. Management is mainly understood as lifestyle modification and pharmacological treatment in pregnant women. In patients belonging to high-risk groups, early diagnosis and early treatment are crucial factors in achieving positive outcomes. Gestational diabetes mellitus has been regarded as a medical complication of pregnancy, and it has been associated with an increased risk of developing type 2 diabetes in the mother in the future.

**Keywords:** Gestational diabetes mellitus, prevention, risk factors, insulin resistance, glucose monitoring, pregnancy, perinatal complications, treatment, diet.

### **Introduction**

Gestational diabetes mellitus is usually defined as glucose intolerance first diagnosed during pregnancy. The main contributing factors are considered to be advanced maternal age and obesity. Pregnancy imposes a metabolic burden on women, leading to weight gain and insulin resistance. Worldwide, in the context of obesity and related metabolic disorders, gestational diabetes mellitus (GDM) is considered the most common complication during pregnancy.

If a woman has diabetes before becoming pregnant, high blood sugar levels at the time of conception and during the first trimester can affect the baby's organ development. This increases the risk of early miscarriage (abortion) and birth defects. If blood sugar levels are high in the second and third trimesters, the risks are different. During pregnancy, the mother's sugar passes to the baby, and the baby produces his or her own insulin. The baby's insulin helps to use the sugar coming from the mother as energy. If this sugar is not needed by the baby for energy, the excess is stored in the baby's body as fat. As a result, in the second and third trimesters, the baby may grow excessively large.

In gestational diabetes, insulin resistance gradually increases, mainly due to the rise in placentally produced hormones such as growth hormone, corticotropin-releasing hormone, human placental lactogen, prolactin, estrogen, and progesterone. Especially in early pregnancy, the increase in maternal adipose tissue further enhances insulin resistance and leads to activated lipolysis in late pregnancy. As a result, maternal free fatty acid levels rise, which reduces glucose uptake and increases hepatic gluconeogenesis, thereby worsening insulin resistance.

Human placental lactogen is the primary hormone that increases insulin resistance. In addition, this hormone stimulates insulin secretion and the proliferation of  $\beta$ -cells, helping to regulate maternal hyperglycemia during normal pregnancy. However, in women with GDM, functional

impairment or delayed response of  $\beta$ -cells is observed, leading to decreased insulin secretion and the development of maternal hyperglycemia. In addition, during pregnancy, hormones released from the placenta can interfere with insulin activity. As a result, insulin may not be able to regulate blood sugar levels properly, which can lead to gestational diabetes.

In the past five years, the importance of identifying and treating GDM has been confirmed through two large randomized trials: one conducted in the United States by the Maternal Fetal Network and the other in Australia through the ACHOIS study. Such programs are most effectively delivered by a medical team that includes nutritionists and diabetes educators.

Maternal hyperglycemia leads to the development of fetal hyperinsulinemia, which increases the risks of macrosomia, neonatal hypoglycemia, and hyperbilirubinemia. During the initial antenatal period, between 8 and 12 weeks of pregnancy, the midwife or doctor should determine whether there is a risk of developing gestational diabetes.

High blood pressure and preeclampsia. Gestational diabetes increases the risk of developing high blood pressure. It also raises the risk of preeclampsia, a serious pregnancy complication characterized by high blood pressure and other symptoms.

Surgical delivery. If a patient has gestational diabetes, the likelihood of having a cesarean section (C-section) is higher.

If the screening interview reveals factors related to gestational diabetes, a screening test called the oral glucose tolerance test (OGTT) is performed. The patient gives a blood sample in the morning after fasting, without food or drink. Then, a glucose solution is given to drink. After resting for 2 hours, another blood sample is taken to assess how the body processes glucose.

Lowering blood sugar can be achieved by changing your diet and increasing physical activity. This mainly includes walking, swimming, or prenatal yoga, which help reduce blood sugar. However, if you have not done these activities before, you should consult your midwife or doctor first. In most cases of gestational diabetes, dietary approaches such as the DASH diet, calorie-restricted diets, low-glycemic index diets, low-carbohydrate diets, low-unsaturated fat diets, and high-fiber diets are recommended. These diets should include moderate portion sizes, healthy fats, complex carbohydrates, and about 20% protein.

Carbohydrates are the main source of energy for your body. Not eating enough carbohydrates limits proper nutrition in babies. Carbohydrates are necessary for your baby's brain development and for growth. During pregnancy, you need to consume at least 175 grams of carbohydrates. If the body does not get enough carbohydrates, "starvation ketones" are produced. Ketones are substances that appear when the body breaks down fats instead of carbohydrates to obtain energy. During pregnancy, the production of ketones can be harmful to the baby's health.

Eating the right amount of carbohydrates is very important. If you eat more carbohydrates than your body can handle, their glucose will remain in the blood and increase blood sugar levels. If you take medication for diabetes (pills or insulin) but do not eat enough carbohydrates, your blood sugar level may drop too low.

Although metformin has been widely studied as an effective treatment for hyperglycemia in diabetes during pregnancy, some studies have shown that its benefits are minimal or may even have adverse effects on maternal and neonatal outcomes. In addition, some evidence suggests that metformin has only a minimal effect on neonatal morbidity and mortality.

Furthermore, while there is a general consensus that metformin is safe for use in the first trimester, biological changes in the placenta and fetus during the second and third trimesters may alter its effects.

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