**Gestational diabetes**

Gestational diabetes also known as gestational diabetes mellitus (GDM), is a condition in which a woman without diabetes develops high blood sugar levels during pregnancy. Gestational diabetes generally results in few symptoms; however, it does increase the risk of preeclampsia, depression, and requiring a Caesarean section. Babies born to mothers with poorly treated gestational diabetes are at increased risk of being too large, having low blood sugar after birth, and jaundice. If untreated, it can also result in a stillbirth. Long term, children are at higher risk of being overweight and developing type 2 diabetes.

Gestational diabetes is caused by not enough insulin in the setting of insulin resistance. Risk factors include being overweight, previously having gestational diabetes, a family history of type 2 diabetes, and having polycystic ovarian syndrome. Diagnosis is by blood tests. For those at normal risk screening is recommended between 24 and 28 weeks gestation. For those at high risk testing may occur at the first prenatal visit.

Prevention is by maintaining a healthy weight and exercising before pregnancy. Gestational diabetes is a treated with a diabetic diet, exercise, and possibly insulin injections. Most women are able to manage their blood sugar with a diet and exercise. Blood sugar testing among those who are affected is often recommended four times a day. Breastfeeding is recommended as soon as possible after birth.

Gestational diabetes is especially common during the last three months of pregnancy. In 90% of people gestational diabetes will resolve after the baby is born.

Classification

Gestational diabetes is formally defined as "any degree of glucose intolerance with onset or first recognition during pregnancy". This definition acknowledges the possibility that a woman may have previously undiagnosed diabetes mellitus, or may have developed diabetes coincidentally with pregnancy. Whether symptoms subside after pregnancy is also irrelevant to the diagnosis. A woman is diagnosed with gestational diabetes when glucose intolerance continues beyond 24–28 weeks of gestation.

The White classification, named after Priscilla White, who pioneered research on the effect of diabetes types on perinatal outcome. It distinguishes between **gestational diabetes** (type A) and **pregestational diabetes** (diabetes that existed prior to pregnancy). These two groups are further subdivided according to their associated risks and management.

The two subtypes of gestational diabetes under this classification system are:

1. Type A1: abnormal oral glucose tolerance test (OGTT), but normal blood glucose levels during fasting and two hours after meals; diet modification is sufficient to control glucose levels
2. Type A2: abnormal OGTT compounded by abnormal glucose levels during fasting and/or after meals; additional therapy with insulin or other medications is required

Diabetes which existed prior to pregnancy is also split up into several subtypes under this system:

1. Type B: onset at age 20 or older and duration of less than 10 years.
2. Type C: onset at age 10–19 or duration of 10–19 years.
3. Type D: onset before age 10 or duration greater than 20 years.
4. Type E: overt diabetes mellitus with calcified pelvic vessels.
5. Type F: diabetic nephropathy.
6. Type R: proliferative retinopathy.
7. Type RF: retinopathy and nephropathy.
8. Type H: ischemic heart disease.
9. Type T: prior kidney transplant.

Criteria for diagnosis of gestational diabetes according to National Diabetes Data Group:

* Fasting 105 mg/dl
* 1 hour 190 mg/dl
* 2 hours 165 mg/dl
* 3 hours 145 mg/dl

Risk factors

Classical risk factors for developing gestational diabetes are:

* Polycystic Ovary Syndrome
* A previous diagnosis of gestational diabetes or prediabetes, impaired glucose tolerance, or impaired fasting glycaemia
* A family history revealing a first-degree relative with type 2 diabetes
* Maternal age – a woman's risk factor increases as she gets older (especially for women over 35 years of age).
* Ethnicity (those with higher risk factors include African-Americans, Afro-Caribbeans, Native Americans, Hispanics, Pacific Islanders, and people originating from South Asia)
* Being overweight, obese or severely obese increases the risk by a factor 2.1, 3.6 and 8.6, respectively.[10]
* A previous pregnancy which resulted in a child with a macrosomia (high birth weight: >90th centile or >4000 g (8 lbs 12.8 oz))
* Previous poor obstetric history

 Other genetic risk factors: There are at least 10 genes where certain polymorphisms are associated with an increased risk of gestational diabetes, most notably TCF7L2.

In addition to this, statistics show a double risk of GDM in smokers. Some studies have looked at more controversial potential risk factors, such as short stature.

About 40–60% of women with GDM have no demonstrable risk factor; for this reason many advocate to screen all women. Typically, women with GDM exhibit no symptoms (another reason for universal screening), but some women may demonstrate increased thirst, increased urination, fatigue, nausea and vomiting, bladder infection, yeast infections and blurred vision.

Diagnosis

Diagnostic tests have been used to look for high levels of glucose in plasma or serum in defined circumstances.

**Non-challenge blood glucose tests** involve measuring glucose levels in blood samples without challenging the subject with glucose solutions. A **blood glucose level** is determined when fasting, 2 hours after a meal, or simply at any random time. In contrast, **challenge tests** involve drinking a glucose solution and measuring glucose concentration thereafter in the blood; in diabetes, they tend to remain high.

The most elaborate regimen entails a random blood glucose test during a booking visit, a screening glucose challenge test around 24–28 weeks' gestation, followed by an OGTT if the tests are outside normal limits.

When a **plasma glucose level** is found to be higher than 126 mg/dl (7.0 mmol/l) after fasting, or over 200 mg/dl (11.1 mmol/l) on any occasion, and if this is confirmed on a subsequent day, the diagnosis of GDM is made, and no further testing is required.

**Screening glucose challenge test (O'Sullivan test)**

**Oral glucose tolerance test**

**Urinary glucose testing**

Prevention

During pregnancy moderate physical exercise is effective for the prevention of gestational diabetes. Theoretically, smoking cessation may decrease the risk of gestational diabetes among smokers.

Management

Treatment of GDM with diet and insulin reduces health problems mother and child. Treatment of GDM is also accompanied by more inductions of labour. If a diabetic diet or G.I. Diet, exercise, and oral medication are inadequate to control glucose levels, insulin therapy may become necessary.

The development of macrosomia can be evaluated during pregnancy by using sonography. Women who use insulin, with a history of stillbirth, or with hypertension are managed like women with overt diabetes.

Lifestyle

Counselling before pregnancy (for example, about preventive folic acid supplements) and multidisciplinary management are important for good pregnancy outcomes. Most women can manage their GDM with dietary changes and exercise. Self monitoring of blood glucose levels can guide therapy. Some women will need antidiabetic drugs, most commonly insulin therapy.

Any diet needs to provide sufficient calories for pregnancy, typically 2,000 – 2,500 kcal with the exclusion of simple carbohydrates. The main goal of dietary modifications is to avoid peaks in blood sugar levels.

Medication

If monitoring reveals failing control of glucose levels with these measures, or if there is evidence of complications like excessive fetal growth, treatment with insulin might be necessary.

There is some evidence that certain medications by mouth might be safe in pregnancy, or at least, are less dangerous to the developing fetus than poorly controlled diabetes. The medication metformin is better than glyburide. People may prefer metformin by mouth to insulin injections. Treatment of polycystic ovarian syndrome with metformin during pregnancy has been noted to decrease GDM levels.

Prognosis

Gestational diabetes generally resolves once the baby is born. Based on different studies, the chances of developing GDM in a second, are between 30 and 84%, depending on ethnic background. Women diagnosed with gestational diabetes have an increased risk of developing diabetes mellitus in the future. Children of women with GDM have an increased risk for childhood and adult obesity and an increased risk of glucose intolerance and type 2 diabetes later in life.

Complications

GDM poses a risk to mother and child. This risk is largely related to uncontrolled high blood glucose levels and its consequences. The risk increases with higher blood glucose levels.

The two main risks GDM imposes on the baby are growth abnormalities and chemical imbalances after birth, which may require admission to a neonatal intensive care unit. Infants born to mothers with GDM are at risk of being both large for gestational age (macrosomic). Neonates born from women with consistently high blood sugar levels are also at an increased risk of low blood glucose (hypoglycemia), jaundice, high red blood cell mass (polycythemia) and low blood calcium (hypocalcemia) and magnesium (hypomagnesemia). Untreated GDM also interferes with maturation, causing dysmature babies prone to respiratory distress syndrome due to incomplete lung maturation and impaired surfactant synthesis.