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Glucose tolerance test

A glucose tolerance test can show when the body can't manage blood sugar (glucose) levels well but not yet to the stage of diabetes.

What is a glucose tolerance test?

A glucose tolerance test (GTT) checks how well the body processes blood sugar (glucose). It involves comparing the levels of glucose in the blood before and after drinking a sugary drink. The results of this test can help doctors to detect type 2 diabetes or pre-diabetes (impaired glucose tolerance). It is also used in diagnosing [diabetes in pregnancy](#).

Gestational diabetes and glucose tolerance tests in pregnancy

Gestational diabetes is a term for diabetes which starts for the first time during pregnancy. It usually starts in the second half of pregnancy but resolves soon after birth. However the risks of having gestational diabetes for you and your baby are similar to those for mothers who have known diabetes, such as difficulties with giving birth and a higher chance of needing a caesarean section.

There is an increased risk of gestational diabetes for:

- Women at an older age when pregnant.
- Women who are overweight and have a body mass index (BMI) above 30.
- Women who smoke.
- Women who have had gestational diabetes in a previous pregnancy.
- Where there has been a short time interval between pregnancies.

- Women who have had a previous unexplained stillbirth.
- Women who have had a previous baby with very high birth weight (4.5 kg or more).
- Women with an immediate family member (brother, sister or parent) with diabetes.
- Some ethnic groups (South Asian, black Caribbean and Middle Eastern).

The glucose tolerance test can be used to test for gestational diabetes. The National Institute for Health and Care Excellence (NICE) recommends that:

- Woman who have had gestational diabetes in a previous pregnancy should be offered early self-monitoring of blood sugar (glucose) or a two-hour 75 g GTT as soon as possible after the first antenatal appointment. This is followed by a repeat glucose tolerance test at 24-28 weeks of pregnancy if the first test is normal.
- Women with other risk factors (as listed above) should have a glucose tolerance test at 24-28 weeks of pregnancy.

How does a glucose tolerance test work?

In most people a simple blood test is enough to detect diabetes. However, some people have 'borderline' results on routine blood tests and then a glucose tolerance test may help. Also, a glucose tolerance test can show when the body can't manage blood sugar (glucose) levels well but not yet to the stage of diabetes. This is known as pre-diabetes (impaired glucose tolerance) and is a condition that can lead to diabetes.

In healthy people, glucose levels in the blood always rise after a meal but they soon return to normal as the glucose is used up or stored. A glucose tolerance test helps to distinguish between this normal pattern and the patterns seen in diabetes and pre-diabetes.

Prior to a glucose tolerance test you are asked not to eat or drink for a certain length of time before the test. Then you drink a glucose drink. Normally, the body should quickly move glucose from the blood into the body's cells. This would reduce the amount of glucose found in the blood samples taken. If there is a problem moving glucose into the cells, glucose remains in the bloodstream. This shows as a higher level of glucose in the blood samples.

When the results of the blood samples come back, doctors compare the level of glucose found in your blood samples taken after the test with specific values. These values can determine if you have diabetes or pre-diabetes.

What happens during a glucose tolerance test?

For the days leading up to the test you should eat a normal diet without restricting what you eat. The night before the test your doctor may ask you to stop eating 8-12 hours before you are due to have the glucose tolerance test. You will usually be allowed to drink water but may be asked to avoid sugary drinks.

On the morning of the glucose tolerance test your doctor or nurse will take a sample of blood before the test begins. This is known as the fasting sample; it provides a comparison for the other test results. To do this you may have a small needle placed into a vein in the back of your hand.

You will then be given a drink which contains a particular amount of sugar (in the form of glucose) and water.

How long does a glucose tolerance test take?

Timings may vary but another blood sample will be taken 1-2 hours after you have had the drink. In some cases more samples may be taken. After the blood samples are taken, the needle in the back of your hand is removed and you can leave.

What should I do to prepare for a glucose tolerance test?

Your doctor should give you advice about what to do to prepare for a glucose tolerance test. This may include information about how long to fast for before having the test.

Are there any side-effects or complications from a glucose tolerance test?

There are usually no side-effects from a glucose tolerance test apart from a small bruise which may appear at the place where the needle was inserted. Rarely, the vein used to take the blood may become swollen; this usually settles within a few days.

Further reading

- [Type 2 diabetes: prevention in people at high risk](#); NICE Public Health Guidance (last updated: September 2017)
- [Type 2 Diabetes Know Your Risk](#); Diabetes UK
- [Diabetes in pregnancy - management from preconception to the postnatal period](#); NICE Clinical Guideline (February 2015 - last updated December 2020)
- [Type 2 diabetes in adults: management](#); NICE Guidance (December 2015 - last updated June 2022)
- [Position Statement - Early identification of people with, and at high risk of Type 2 diabetes and interventions for those at high risk](#); Diabetes UK, August 2021.
- [Jackson SL, Safo SE, Staimez LR, et al](#); Glucose challenge test screening for prediabetes and early diabetes. *Diabet Med.* 2017 May;34(5):716-724. doi: 10.1111/dme.13270. Epub 2016 Nov 2.
- [Fritsche L, Peter A, Hummel J, et al](#); HbA1c Measurement Cannot Replace an Oral Glucose Tolerance Test for the Diagnosis of Gestational Diabetes. *Dtsch Arztebl Int.* 2021 Jun 25;118(25):432-433. doi: 10.3238/arztebl.m2021.0159.

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