3 Hour Gestational Glucose Tolerance Test

Principle

The 3 hour Gestational glucose tolerance test is used for the diagnosis of Gestational Diabetes Mellitus (GDM). GDM is a condition in which women without previously diagnosed diabetes exhibit high blood glucose levels during pregnancy. It is caused when the insulin receptors do not function properly in the mother. This is likely due to pregnancy related factors such as the presence of human placental lactogen that interferes with susceptible insulin receptors. This in turn causes inappropriately elevated blood sugar levels. Untreated, gestational diabetes can lead to complications for both the mother and the baby (oversized baby, increased chance of cesarean section delivery, high blood pressure during pregnancy, low blood sugar in the baby immediately after delivery, or stillbirth).

The 3 hour gestational glucose tolerance test requires a fasting glucose blood draw followed by a 100 gram dose of glucola, then a 1, 2, and 3 hour post load glucose blood draw. An abnormally high fasting glucose value with a delayed return to normal indicates decreased tolerance to glucose and supports the diagnosis gestational diabetes.

In 2011, the American College of Obstetricians and Gynecologists (ACOG) recommended that all pregnant women should be screened for GDM, whether by patient history, clinical risk factors, or with a 50 gram one hour loading screen at 24 to 28 weeks of gestation to determine blood glucose levels. They further recommended the reliance on the results of the 100 gram three hour oral glucose tolerance test for diagnosis of gestational diabetes mellitus.

Patient Preparation

The following conditions should be met before performing an oral glucose tolerance test.

1. Discontinue, when possible, all non-essential medications known to affect glucose metabolism. Medications include: apmetamine, arginine, beta-adrenergic blockers, diuretics, epinephrine, glucocorticoids, glucose administered intravenously, insulin, lithium, oral contraceptives, oral hypoglycemic agents, phenothiazines, phenytoin, and salicylates.
2. Patient must be fasting for at least 8 hours, but no more than 14 hours before the test (water is acceptable).

3. Individual should remain at rest, and avoid medications, smoking, caffeine, and alcohol before and during the test.

4. The individual should not be ill and should have had normal physical activity and carbohydrate intake greater than 150 grams/day for at least 3 days before the test.

Reagents

Glucose Tolerance Beverage, 100 grams.

Procedure

1. Patient must be fasting for at least 8 hours, but no more than 14 hours before the test. Water is acceptable during the fast.

2. Collect a fasting blood glucose specimen from the patient.

3. Give pregnant patients 100 grams of glucose (1 full bottle of glucose tolerance beverage). The glucose beverage should be consumed within 5 minutes. The patient should remain at rest and avoid medications, smoking, caffeine and alcohol for the duration of the test. Water is allowed.

4. Obtain blood glucose specimens at 1, 2, and 3 hours after the patient finishes drinking the glucose tolerance beverage.

Reference Ranges

All tolerance tests are reported along with the following comment:

Reference ranges for 3 hour Gestational GTT based on current American Congress of Obstetricians and Gynecologists and the American Diabetes Association recommendations:

Glucose load: 100 gram glucose drink

Fasting glucose: <95 mg/dL
1 hour post load of glucose: <180 mg/dL
2 hour post load of glucose: <155 mg/dL
3 hour post load of glucose: <140 mg/dL

If two or more values meet or exceed target level, gestational diabetes is diagnosed.

**Adverse Reactions**

The heavy glucose load can result in nausea and vomiting in some patients. The test is invalid and must be terminated if the patient vomits within the first two hours of testing.

Occasionally a patient will respond to the glucose tolerance test with a dangerously low blood glucose level. These patients become weak, lightheaded, and may faint. Efforts are made to complete the test in these situations, but the phlebotomist must seek help from the Lab or Outpatient nurses if the patient experiences severe reactions.

**References**


