Oral Glucose Tolerance Test for Gestational Diabetes

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In the twentieth century, researchers developed the oral glucose tolerance test, or OGTT, as a method to diagnose different types of diabetes, a medical condition that causes blood sugar levels to become abnormally high. During the test, a healthcare provider measures a person’s blood sugar levels before and after the person consumes a predetermined amount of glucose solution. While not exclusively used for pregnant women, an OGTT may test for gestational diabetes which, according to the International Diabetes Federation, affected one in six pregnancies worldwide in 2019. Generally, the results from an OGTT can inform a patient and her physician how her body is responding to glucose during pregnancy [7], and high levels may increase her risk of developing adverse pregnancy [8] outcomes such as heavy bleeding during delivery and a high blood pressure condition known as preeclampsia. An OGTT can help to accurately diagnose, treat, and monitor gestational diabetes in pregnant women, which can reduce health and pregnancy [9] complications for the woman and the fetus [6].

While physicians may also use the OGTT to diagnose type 2 diabetes, they often use the test as a regular screening test for pregnant women. Physicians administer the OGTT to women when they are around twenty-four to twenty-eight weeks pregnant, because that is typically when pregnant women first develop gestational diabetes. Although gestational diabetes typically goes away after delivery, affected women are at higher risk of developing diabetes again later in life. According to the American College of Obstetricians [7] and Gynecologists, up to seventy percent of women with gestational diabetes will go on to develop a form of permanent diabetes later in life. Elevated blood sugar during pregnancy [8] can also cause the fetus [6] to grow larger than normal, which may result in an increased risk for cesarean section delivery. Although the test has been around since the mid-1900s, as of 2020 there is no unanimous consensus on the exact values found during an OGTT that quantify a gestational diabetes diagnosis.

Before the advent of the OGTT, scientists were researching what led diabetes to develop in the general population, in addition to why it appeared to affect pregnant women at a high rate. In the first half of the twentieth century, researchers determined that a healthy person’s blood sugar levels will quickly return to normal after the initial elevation caused by a meal. They also determined that pregnant women with diabetes delivered stillborn neonates with abnormalities of the pancreas, which is the organ often implicated in diabetes based on its management of insulin. In the 1920s, physicians first began treating diabetes with insulin, which is a hormone [8] produced within the pancreas that stabilizes the blood glucose levels among other tasks. As of 2020, patients with both type 1 and type 2 diabetes use insulin to treat their conditions. In type 1 diabetes, the pancreas does not produce insulin, and in type 2 diabetes, the pancreas does produce insulin, but the body does not respond to it, thus resulting in high levels of blood glucose.

According to author Randi Minetor, physicians Jerome Conn and Stefan Fajans collaborated on research that led to the development of the first form of OGTT in the 1940s at the University of Michigan [8] Medical School in Ann Arbor, Michigan. While the first OGTT was a one-step approach, researchers also developed two-step approaches that they specifically used for pregnant women. By 1957, in Boston, Massachusetts, physician John O’Sullivan helped invent the two-step approach to improve gestational diabetes diagnoses for women without known risk factors. O’Sullivan and statistician Claire Mahan worked together to establish threshold blood sugar values for diagnosis, later known as the O’Sullivan criteria. Although many organizations, such as the American Diabetes Association, adopted the O’Sullivan criteria, researchers have not yet established a universal consensus as of 2020. Although physicians may disagree on what levels quantify a diabetes diagnosis, patients continue to receive both the one-step or two-step OGTT around the world.

As of 2020, a patient may receive a one-step OGTT for both non-gestational and gestational diabetes testing. The preparation and procedure steps remain the same for patients being tested for both forms of diabetes, but the resulting interpretation differs between the two. In preparation for the OGTT to measure gestational diabetes, medical professionals typically advise patients to eat how they normally do in the days leading up to the test in order to ensure the most accurate results. The patient must abstain from eating or drinking anything besides water for eight hours before the test, establishing a fasted state, which is when you have completely digested your most recent meal and your insulin levels return to a baseline level. When the patient arrives at their doctor’s office or lab, a health care professional takes a small amount of blood from a vein in the patient’s arm in order to measure their baseline glucose levels. The patient must then drink a syrupy solution containing 75 g of sugar and wait one hour before the provider obtains another sample of blood from their arm. After another hour passes, the healthcare professional takes one more sample of blood and the test is done. If one of the three measurements taken during the OGTT is above the normal threshold, a doctor will diagnose the patient with gestational diabetes and explain their treatment plan.

The two-step method, which physicians solely use to diagnose pregnant patients with gestational diabetes, follows similar steps...
Sources

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