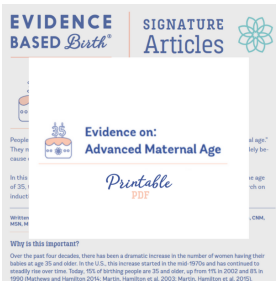
Gestational Diabetes and the Glucola Test

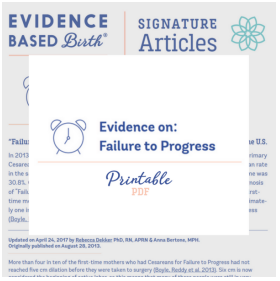
by Rebecca Dekker | Jun 14, 2012 | Evidence based practice, Tests during pregnancy

June 14, 2012 by Rebecca Dekker, PhD, RN, APRN

In the comment sections of one of my first posts, I received this question from a reader named Lela:

"I would like to know more about what routine tests are actually necessary. The one that particularly caught my interest is the gestational diabetes test. The American Diabetes Association presents a list of low risk women who should not need the glucose test , even though I fit all those categories, my physician's office still insists I take it. Is the glucose test truly the only way to catch gestational





diabetes? Am I really risking both the health of me and my baby if I declined?"

****This post was written before the 2013 NIH Consensus conference on "Diagnosing Gestational Diabetes." Since then there has been new evidence published on this topic**. To read **updated, in-depth information** about the glucola test and screening for gestational diabetes, you can read these blog articles about the conference: Day 1 and Day 2.****

This article has taken me quite a bit of time to write for several reasons. First, gestational diabetes is a very complex and controversial topic. Second, there is a ton of research that has happened in the last 10 years, and it took me a long time to read the literature. Third, my readership has really taken off in the past few weeks, and I want to make sure that my posts are of the highest quality. Fourth, my kids have had a bad virus and I was very sleep-deprived this week. It was hard for my brain to function well and critically think about this issue on so little sleep, until now. With that being said, here is my best shot at an evidence-based article on gestational diabetes and the glucola test. I tried to remain as un-biased as possible as I explored the evidence.

What is gestational diabetes?

Gestational diabetes is defined as glucose (sugar) intolerance that is first recognized during pregnancy. Gestational diabetes affects approximately 3-6% of pregnant women. It is important for you to understand that all pregnant women experience metabolic changes during pregnancy—this lowers your tolerance for glucose. As blood glucose levels rise during pregnancy, your body produces more insulin. As your pregnancy goes along, your body needs more and more insulin. For most women, this is a normal physiologic process. However, some women experience too much glucose intolerance and for these women it becomes the problem of gestational diabetes (Alwan, Tuffnell et al. 2009).

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What kind of complications can result from gestational diabetes?

One of the largest studies so far on gestational diabetes was the "Hyperglycemia and Adverse Pregnancy Outcomes" or HAPO study.. In the HAPO study, researchers followed more than 25,000 women throughout their pregnancies. These women came from more than 9 different countries. Gestational diabetes was diagnosed using the gold-standard 75-gram glucose tolerance test. The researchers found that with higher blood glucose levels on the test there is an increased risk of the following outcomes: baby being born large for gestational age, C-section, pre-ecclampsia, shoulder dystocia (difficulty birthing the shoulders), birth injury, neonatal intensive care, newborn jaundice, and premature delivery. Even with 25,000 women in the study, stillbirth and infant death are such rare occurrences that this study did not have a big enough sample size to look at deaths. However, the authors reported that they did not find any association between infant deaths and gestational diabetes (Metzger, Lowe et al. 2008).

How do you screen for gestational diabetes?

The most common method of screening for gestational diabetes in the United States is the 50-gram, 1-hour glucola test, also called the glucose challenge test. This test was first introduced in 1973. To take glucola test, you eat a normal diet beforehand. Then you drink 50 grams of a glucose polymer solution. One hour later, your blood is

drawn to measure the glucose level (O'Sullivan, Mahan et al. 1973). If your blood glucose is 130-140 mg/dL or higher, then you have screened positive for gestational diabetes, and you qualify for a follow-up 3-hour oral glucose tolerance test (OGTT) to officially diagnose the condition. The 75-gram and 100-gram OGTTs are the gold-standard for diagnosis of gestational diabetes.

Are there any adverse effects of the glucola test?

The potential adverse effects are nausea (30%), vomiting, bloating, diarrhea, dizziness (11%), headache (9%), and fatigue (Lamar, Kuehl et al. 1999). The main drawbacks of using this test are the un-pleasant nature of the exam and the cost.

What is the evidence for the glucola test?

Up until recently, there was very little evidence to support the use of the glucola test. In fact, it was very interesting to read the ACOG guidelines (2001) on testing for gestational diabetes, because in 2001 there was not very much evidence—but despite the lack of evidence they still made the following recommendations:

"All patients should be screened for GDM."

"The laboratory screening test should consist of a 50-g, 1-hour oral glucose challenge at 24-28 weeks of gestation."

As I kept reading the ACOG guidelines I was shocked by the lack of evidence and the poor quality of evidence surrounding this test and the treatment for gestational diabetes that formed the basis of the ACOG guidelines. It would be one

thing if there was poor evidence for a test and it just affected a few people, **but this was a test that is being administered almost universally to pregnant woman in the United States**.

The reason I was shocked was because the 2001 ACOG article had statements in it like this:

"The U.S. Preventive Services Task Force has concluded that although there is insufficient evidence to recommend universal screening, screening high-risk women may be beneficial."

"The 50-g, 1-hour laboratory screening test has become widely used…despite the absence of data to demonstrate a benefit to the population as a whole."

"For the population to benefit from the diagnosis… there should be an effective treatment…although a number of comparative studies of various treatments are available, there is little information regarding the effectiveness of treatment versus no treatment."

"It should be emphasized that although the evidence is inconclusive that treating gestational diabetes can prevent maternal and fetal complications, universal screening and treatment are widely practiced."

So that was where we were 10 years ago. But what is the current evidence for the glucola test right now?

There is a lot more evidence to support the glucola test now. In fact, the past 10 years have seen quite a few advances in research on gestational diabetes. Unlike in 2001, there is now

good research to support various treatments for gestational diabetes, so if you screen positive, there is actually something to offer you now.

In 2012, a group of researchers conducted a meta-analysis of 26 studies to compare the 50-g glucose challenge test to the gold-standard 75 or 100-g glucose challenge test. The quality of the meta-analysis and the studies it included were good. The authors found that the glucola test has a sensitivity of 76%. This means that **a positive result will correctly identify about 76 out of 100 women who have gestational diabetes** (the other 24 would go un-identified and not realize they have gestational diabetes). The specificity of the test is 76%. This means that **among 100 women without gestational diabetes, 76 will have a negative result** (and 24 women who do not have gestational diabetes will have a positive result!) (van Leeuwen et al., 2012).

Based on the findings of this meta-analysis, we can conclude that **the 50-g glucola test by itself can be used as a screening test, but not as a diagnostic test. A positive result needs to be followed up with the 3-hour diagnostic test.** It's important for you to understand that if your doctor diagnoses you with gestational diabetes based on the 1-hour glucose test, then you should request the 3-hour test to confirm the diagnosis.

Is the glucola test really the best way to screen for gestational diabetes?

To this day, researchers still don't know the answers to a lot of questions about screening for gestational diabetes. This is what I gathered from reading the most up-to-date literature:

- We don't know the best screening test for gestational diabetes.
- We don't know the best time during pregnancy to screen for gestational diabetes.
- We don't know if you need to fast beforehand.
- We don't know if the best cut-off point for the test.
- We don't know if screening the entire population results in improved outcomes. (*Researchers theorize that screening can improve outcomes such as large birth weight, but nobody has done a randomized, controlled trial to test this theory*)

I really don't like the glucola drink. It makes me nauseous. Are there any alternative tests?

In a Cochrane review, Farrar et al. (2011) tried to determine whether there were any alternative screening tests for gestational diabetes. However, the results were disappointing. They found 5 randomized, controlled trials that compared the various screening tests for gestational diabetes. The researchers compared the **candy bar test and 50g glucose in food** to the 50-g screening test and the gold standard 75-g and 100-g drinks. The studies that they reviewed were of uncertain or poor quality, had small sample sizes, and did not look at important infant or maternal outcomes, such as large infant birth weight. So the researchers could not recommend the candy bar test or 50 g of glucose in food as an alternative screening test.

The **random glucose** test would be a simple, cheap, and easy way to screen for gestational diabetes. In this test, a health care provider would simply "spot check" your blood sugar using a finger prick. This is actually a fairly common test for gestational diabetes—about half the women in the

United Kingdom and the Netherlands receive the random glucose screening. However, there is not enough evidence to support this test. In a meta-analysis, van Leeuwen et al. (2011) combined the results of 6 studies that compared random glucose screening to the gold-standard (the 75- or 100-gram glucose challenge test). Unfortunately, the studies had small sample sizes and were very different from one another, so it was impossible for the researchers to directly compare these studies and combine the results. The authors concluded that unfortunately, based on these 6 studies, there is not enough evidence to recommend a single, random glucose test as a screening test for gestational diabetes.

The **hemoglobin A1C** test is frequently used to evaluate long-term glucose control in diabetics. However, there is little evidence for this test in gestational diabetes. In a recently published study, researchers found that a hemoglobin A1C score of 5.45% or higher had a sensitivity of 86% and a specificity of 61% for gestational diabetes (Rajput, Yogeshyadav et al. 2012). The hemoglobin A1C screening test shows promise, but the specificity was somewhat low, and more research is needed before it can be routinely recommended.

In another study, researchers looked at an **ultrasound based screening** test for gestational diabetes. The ultrasound, which was done at 24 weeks of pregnancy had high sensitivity (91%) and high specificity (90%). This test shows promise, but it needs more research before it can be routinely recommended (Perovic, Garalejic et al. 2011).

In one study, researchers found that a **first-**

trimester fasting blood sugar of 92 or higher was predictive of a positive result on the diagnostic oral glucose tolerance test. However this study had multiple limitations and future research is needed to determine whether a fasting blood sugar could be a useful screen for gestational diabetes (Corrado, D'Anna et al. 2012).

In 1999, researchers randomized women to either receive **28 jelly beans** or the 50-g glucola drink, and then all women received the diagnostic glucose tolerance test to confirm whether or not each woman had gestational diabetes. The jelly bean test had a lower sensitivity than the glucola drink (40% vs. 80%). This difference in sensitivity was not statistically significant, perhaps because of a too-small sample size. We need more research to verify that the jelly bean test is sensitive enough to screen for gestational diabetes (Lamar, Kuehl et al. 1999).

I'm like your reader, Lela. I don't have any of the risk factors for gestational diabetes. Do I still have to take the test?

In the 2001 gestational diabetes guidelines, ACOG says that if you are low-risk and meet all of these following criteria you may not need to be screened: Age less than 25, not a member of an ethnic group with an increased risk, BMI <= 25, no history of abnormal glucose tolerance or macrosomia, and no known diabetes in a first-degree relative.

However, if you use these criteria, then only 10% of pregnant women would be exempted from screening. ACOG says that because only 10% would be exempt, "*many physicians elect to screen all patients as a practical matter.*"

Therefore, you are being screened by your physician as a practical matter. It may also be that your physician wants you to have the test just for legal liability reasons.

What if, after reading and understanding the evidence for the glucola test, I still don't want to take it? Can my care provider force me to take this test?

It is important for you, as consumers, to know that ACOG itself has affirmed your rights to receive individualized care and for you, as a pregnant woman to have the right to refuse care:

"These [gestational diabetes] guidelines should not be construed as dictating an exclusive course of treatment or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to the institution or type of practice." (ACOG, 2001)

and

"Pregnant women's autonomous decisions should be respected. Concerns about the impact of maternal decisions on fetal well-being should be discussed in the context of medical evidence and understood within the context of each woman's broad social network, cultural beliefs, and values. In the absence of extraordinary circumstances, circumstances that, in fact, the Committee on Ethics cannot currently imagine, judicial authority should not be used to implement treatment regimens aimed at protecting the fetus, for such actions violate the pregnant woman's autonomy." (You can read the free article here: ACOG, 2005)

Finally, I want you to understand a basic rule of

thumb about screening tests. No matter what screening test you are considering, you should always ask yourself, “What will I do if the results are positive?” If you are like my reader Lela, who is an extremely healthy, physically fit, young pregnant woman who eats an incredibly healthy diet (Vegan, no less!), and meets all the criteria for being exempt from screening, what would she do if she screened positive for mild gestational diabetes? Would she need to change her diet? Would she need to exercise? No, **because she is already doing these thing**s, and there is a good chance she will be a diet-controlled gestational diabetic with good outcomes, whether or not she receives an actual diagnosis. Perhaps her care-provider could spot-check her blood sugar at an office visit to make sure that she doesn’t have any overt elevated blood sugars that would need care above and beyond diet control (like medication).

If on the other hand, you are overweight, you eat a poor diet, and you don’t exercise, what would you do with positive results on the glucola test? **Receiving a diagnosis of gestational diabetes might be a very powerful incentive for you to change your behavior so that your baby can have improved outcomes.**

For a woman’s testimonial about living with gestational diabetes, click here to read, “Diagnosed with gestational diabetes: It’s not the end of the world.”

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