Gestational Diabetes
Questions and Answers for Every Pregnant Woman to Consider
Introduction

The history of the diagnosis "gestational diabetes" is one full of twists and turns. This is due to the fact that there is no agreement on the definition of the term" gestational diabetes" that does not differ or directly conflict with other definitions of the term. As you will read, the research, diagnosis, and recommended treatments that are standard to our health care system are fraught with questionable methods and conclusions. To gain an understanding of what we are talking about when we use the phrase "gestational diabetes" we must take a look at how the body processes sugar and how we measure the amount of sugar that is in our blood and urine. We will then examine the current screening, testing, diagnosis, and treatment for this condition. Finally we will review what quality research and common sense thinking point to for appropriate testing, prevention, and treatment plans.

While this information can help us gain a deeper understanding of gestational diabetes, there is no substitute for a woman's inner guidance system and creating space for her to speak about how she is feeling, what her concerns are, and even which testing and treatment plans she feels are best for her. After reading the facts all women are encouraged to have an open discussion with their midwife about how they want to proceed with screening, testing, or treatment options. If you do not feel heard or understood, speaking with another midwife may be a prudent step to take.

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Overview of Questions

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What is Diabetes?
Diabetes mellitus refers to a group of metabolic disorders and is usually. The word "diabetes" is derived from the Greek word meaning "to siphon, to pass through", and mellitus comes from the Latin word "honey". "Mellitus" is often dropped and just the word "diabetes" is used to describe this disease. It is a nutritional disorder characterized by an abnormally high level of blood glucose and the excretion of the excess glucose in the urine. These high levels of blood glucose lead to difficulties with carbohydrate metabolism.

What is Carbohydrate Metabolism?
Normal carbohydrate metabolism is the breakdown of starches and results in the formulation of glucose which is a simple sugar and the primary nourishment for cells. Pancreatic cells regulate the use of glucose throughout the body by producing a hormone called insulin. Insulin functions as a gatekeeper which allows or denies glucose access into the cells. When glucose does enter into the cells, it combines with oxygen to create carbon dioxide and water. This process releases energy which is used for maintaining body temperature and taking care of nerve tissue (especially in the brain).

How Does Insulin Work?
After one eats a meal, carbohydrates are converted to glucose. When the pancreas is functioning in a healthy way it will release insulin right away to act as the gatekeeper for cells. This process, called the postprandial period, or period of carbohydrate breakdown, takes 4-5 hours in total but glucose and insulin levels will peak within 30-60 minutes of a meal. As the levels of glucose and insulin fall, the body responds by releasing glycogen from the liver which is converted to glucose to provide nourishment until the next meal. When a body is properly fueled through good nutrition, glycogen stores become low 12 hours later, and more glucose is needed. The body breaks down proteins and fats to get the glucose it needs. When more food is eaten, glucose levels rise again and the process starts over.

How does insulin physiology work during pregnancy?
To ensure that the developing fetus gets the nutrition it needs, the pregnant body changes how it metabolizes carbohydrates, fats, ketones, and protein metabolism. The placenta produces hormones which counteract the function of insulin and creates enzymes that destroy it entirely. The mother's shifting hormones also help suppress insulin as does the increase in body fat that pregnant women experience. In late pregnancy, the levels of insulin resistance rise to the same as those of nonpregnant people with Type II Diabetes, but the mother's pancreas generates more insulin to compensate for this rise. This suppression of insulin allows more glucose to stay in the mother's bloodstream for longer periods of time than before she was pregnant. This allows the glucose to be available for the baby's growth and development. This process increases as pregnancy advances and it will peak in the last trimester when baby is putting on weight and needs the most nourishment for proper growth. The placenta is thought to play an important role in regulating glucose delivery as demonstrated by the fact that fetal glucose levels will be 20-40 mg/dL lower than the mothers. All of these changes result in the pregnant mother's glucose levels during the postprandial period of carbohydrate breakdown measuring the same or higher than a nonpregnant woman. Fasting glucose levels will also rise as pregnancy advances.

How does insulin trouble lead to diabetes?
The short answer is that diabetes is a metabolic disorder characterized by high glucose level due to insufficient insulin secretion or insufficient action of the insulin, or both. Damaged insulin-producing cells in the pancreas resist the entry of insulin. When the cells cannot use the glucose, they begin to starve from lack of nourishment which is why untreated diabetes leads to failure of a variety of organs.

What is a brief overview of type 1 diabetes?

- Onset usually occurs in childhood or adolescence
- Symptoms include
  - Weight loss
  - Fatigue
  - Frequent urination
  - Excessive thirst
  - Blurry vision
  - Blood volume contraction
  - Ketoacidosis (an accumulation of ketones in the body)
  - Extremes of low and high blood sugar which in early pregnancy can cause malformations or miscarriage
  - Possible kidney complications due to long-standing damage if undiagnosed which can jeopardize the fetus

What is a brief overview of type 2 diabetes?

- Onset occurs in adulthood
- Symptoms include
  - Gradual insulin resistance with a rise in insulin levels
  - Hyperglycemia after eating
  - Normal fasting glucose levels maintained until late in the disease process
  - Possible kidney complications due to long-standing damage if undiagnosed which can jeopardize the fetus

What is a brief overview of gestational diabetes?

- Onset occurs during pregnancy regardless of type of diabetes
- Transient impaired glucose regulation—about 1 in 1000 pregnant women tested will actually have sugar values in the range of true diabetes
- All diabeteic diagnoses that are established after conception, either diet or insulin controlled
- No long-standing diabetes damage to the maternal blood vessels or kidneys.

What about pregnant women who had type 2 diabetes before pregnancy began?
For Type 2 diabetes, a mother who can maintain normal fasting and postprandial blood sugar levels through diet and exercise has very little increased risks with her pregnancy. Women should be encouraged to test more frequently as their body will change with the advance of pregnancy and even several years of successful management technique should not be relied upon. At the 24th week a postprandial lab test should be done to confirm the home test findings and to adjust nutrition and exercise recommendations. If she is unable to control her blood sugar levels without the use of insulin, she falls into the risk category of a woman with type 1 diabetes (see below).

What about pregnant women who had type 1 diabetes before pregnancy began?
Type 1 diabetes is insulin-controlled. The goal during pregnancy is to keep fasting glucose levels between 80 and 100 mg/dL with no glucosuria. Levels can change significantly quite quickly during pregnancy and labor and careful control is required for the health of the mother and the baby. Women with type 1 should birth under the care of a specialist in a hospital environment where their levels will be monitored frequently unless the midwife has a sophisticated pump that assesses glucose levels almost constantly and titrates insulin dosage accordingly.

Does Gestational Diabetes disappear after birth?
While gestational diabetes tends to disappear after the pregnancy is over and the over-taxed pancreas gets to return to normal production rates, there is a significant increase in the likelihood of adult onset diabetes later in life. Some studies report levels as high as 40% of women who had gestational diabetes going on to develop adult onset diabetes. This may be due to the fact that many women with gestational diabetes fix in their minds that they only have to make the diet and exercise changes for the duration of their pregnancies and with relief that they "made it" return to previous lifestyle choices in terms of nutrition and exercise after their baby is born. A mother might approach the new way she handles her diet and exercise regimen as a life-long commitment that will potentially help totally avoid adult onset diabetes.

Can diet and exercise offset the risks for the baby?
A great diet may mean that baby will have less of a chance of being macrosomic (large for gestational age), and this can decrease the chances of a cesarean birth. It is worth it to stick with the recommended diet and exercise program regardless of your risk factors for gestational diabetes (see below for more information).

What are the risks to the developing baby if gestational diabetes goes untreated?
An important piece of this puzzle is that the typical risks listed for the baby in healthcare education materials are not risks that have been proven to be directly associated with gestational diabetes for the baby. The real risk to the baby is that the mother who is labeled as a gestational diabetic may be encouraged to induce or elect to have a cesarean birth, both of which carry a host of well researched and documented risks.

During pregnancy, babies of truely diabetic women can grow larger than others. When the mother's blood has too much glucose, the baby's pancreas produces more insulin in an attempt to use the glucose. The baby then converts the extra glucose to fat. The combination of high blood glucose levels from the mother and high insulin levels in the baby results in large deposits of fat, causing the baby to grow quite large.

What are the risks to the newborn?
During labor high blood glucose in the mother (with true and uncontrolled gestational or other diabetes) will produce high insulin levels in the baby, which can drive its blood glucose levels very low immediately after delivery since the baby no longer has the high sugar concentration from the mother's blood. If this goes uncorrected, it can lead to tremors, respiratory distress, listlessness, abnormal crying, feeding difficulties, possible convulsions, and/or potential brain damage. Babies of diabetic mothers can also be born with chemical imbalances such as low serum calcium or magnesium levels.

Babies who have been exposed to too much insulin (through an overuse of the treatment therapy in

women who may not have actually needed it) can cause underweight babies and symptomatic episodes of low blood sugar.

What can a mother do to alleviate the risks to her newborn?
The best answer is early and frequent breastfeeding which should balance out and prevent hypoglycemia. A midwife should do a heel stick with a glucometer if she is at all concerned about the newborn's well being. In the hospital, treatment ranges from a 12-24 hour NICU stay for the baby with heel pricks every half hour to three hours ranging all the way to heel sticks every hour for three hours, dropping the ones that would come if a normal result is obtained.

What kind of diet will give me the best chances to avoid the risks associated with gestational diabetes or to avoid it altogether?
The two diets that are recommended are the Brewer Diet, and the Eat to Live diet (by Dr. Fuhrman). Gestational diabetes is a sign of inadequate nutrition at a time when nutritional excellence is of paramount importance. There is just no substitute for saying yes to an optimal diet that squeezes the most nutrients out of each bite a pregnant woman takes. For more information on proper diet, visit blue ribbonbaby.org, drbrewerpregnancydiet.com or for a vegetarian diet, visit drfuhrman.com. The essential equation is to eat small, frequent meals throughout the day with complex carbohydrates that are high in fiber as well as vegetables, fruits, and a lot of protein. Salt a bit more than to taste, drop simple sugars and carbohydrates from the diet and exercise some every day—preferably including walks after meals to help metabolize the food in a healthy way. Check with your provider to get individualized diet plans or consider meeting with a nutritionist who specializes in the nutrition of pregnancy (more information below).

Are there factors that predispose a woman to develop gestational diabetes?
Factors that increase the risk for gestational diabetes are obesity, a family history of diabetes, having given birth to a very large infant previously, having had a stillbirth or a child with a birth defect, or having too much amniotic fluid. Women older than 25 are at greater risk than younger ones. Women with a history of alcoholism, anorexia, bulimia, or nutritional deficits in their diet (or a diet based on white flour, white sugar and processed food) and those that do not exercise regularly are also at increased risk.

How does a woman know if she has gestational diabetes?
In typical allopathic or standardized care in America, all pregnant women are screened for gestational diabetes and even in midwifery care, all women are offered the screening as part of their standard care plan. There are two types of tests typically offered. The GCT (Glucose Challenge Test) which is actually a screen and not a test at all. To perform this screen, a woman is given a drink called Glucola, which has 50gm of glucose in it to drink the morning of her screen. She then arrives at the midwife's office or lab an hour later and has her blood drawn. If the level of sugar in the blood is greater than 7.8 mmol/L (140 mg/dL), the woman will be asked to take the OGTT.

The OGTT (Oral Glucose Tolerance Test) is given by taking a venous plasma sample (blood draw from the veins) after an overnight fast of at least 10 hours. She is then given 100gm of glucose to drink within 5 minutes and blood samples are taken at 1, 2, and 3 hours. If two or more values are high, the woman is considered to have gestational diabetes. This test is not reproducible 24%-70% of the time which calls

into question the validity of the results. Even when taken one week apart, the same woman's test results will disagree 20%-25% of the time.

What levels are considered high?
Fasting (prior to glucose load): 95 mg/dL (5.3 mmol/L)
1 hour after glucose load: 180 mg/dL (10.0 mmol/L)
2 hours after glucose load: 155 mg/dL (8.6 mmol/L)
3 hours after glucose load:140 mg/dL (7.8 mmol/L)

These thresholds have never been demonstrated for onset or marked increase in fetal complications. They do not indicate pathology. These numbers came from the original researchers who chose them for convenience sake when they were doing follow-up work. Yet all studies since then have used this criteria with one exception.

The 2007 HAPO (Hyperglycemia and Adverse Pregnancy Outcome) Study led to new guidelines being published in 2010. They suggest testing HgA1C and random plasma glucose at the first prenatal visit to check for diabetes that predates the pregnancy and that the diagnosis is positive if the the HgA1C test result is greater than 6.5% and the random plasma glucose level is greater than 200 mg/dL

The guidelines they give for a positive diagnosis of gestational diabetes are as follows:
2 of the following:

- FPG of 92-125 mg/dL
- Random plasma glucose of greater than 200mg/dL
- HgA1C of greater than 6.5%

Or
OGTT (with 75g of glucose) after an overnight fast levels of:

- Fasting greater than 92 mg/dL
- 1-hour greater than 180 mg/dL
- 2-hour greater than 153 mg/dL

Are there any tests that are not typically offered but which I should ask for?

The research has shown the importance of a a fasting venous plasma glucose value at the time of initial blood work with your midwife. This will pick up on glucose regulation issues before the bulk of pregnancy influences come into play. Repeating the test at 24 weeks, or doing it for the first time provides valuable insight into how the mother is adapting to the pregnancy with regards to her sugar absorption.

Endocrine function should be tested—a thyroid that is working too fast or too slow can affect blood sugar regulation. This is simply statement but the importance cannot be overstated. Undiagnosed thyroid conditions are prevalent among American women.

Urine tests for glucose and ketones throughout pregnancy can be informative. The presence of both glucose and ketones early in pregnancy is suggestive of diabetes that predates the pregnancy.

As pregnancy advances, the finding of glucose in the urine becomes more common simply due to increased blood volume which triggers the kidneys to release glucose at a lower threshold. Even so, if glucosuria is found, the mother should eliminate all refined sugars and test again two days later first

thing in the morning, not drink anything, and test again two hours later. Research has shown that this 2 hour test may be the more accurate reading.

An informative screening can be accomplished by assessing glucose levels after a normal meal. This is called a postprandial test and shows what is actually happening in the body during a typical day. The testing is done over the course of a week via a glucometer which the mother can use to prick her own finger and get her own readings from which she can enter into a diary to share with her midwife.

Another test recommended in a lot of literature as a sort of side note, and overtly as one that should be given both at the initial visit and at the time of screening in the 2010 HAPO study is the Hemoglobin (Hg) A1C test.

What is HgA1C?
Glucose binds to hemoglobin in a reaction called glycosylation and forms glycohemoglobin. This process is irreversible. Normal values outside of pregnancy for total glycohemoglobin range from 5.3%-7.5%. While there are actually three types of hemoglobin, noted by the letter A, B, or C, it is the C that correlates best with blood glucose levels over the 2 or 3 months prior to when the test is taken. This is because it takes about 120 days for red blood cells to regenerate, so the red blood cells in our bodies at any given time are like a picture of what has been happening in the body for that long. The test itself is weighted to reflect this, so it is possible to improve the hgA1C test results in as little as 3 weeks through improved diet and exercise.

Abnormal HgA1C values at the 13th week of pregnancy indicate previously undiagnosed diabetes and there is an associated increased rate of birth defects with these findings. During pregnancy there is a progressive expansion of red cell volume and shortened life span of red cells which make establishing normal values very challenging. A1C values begin to fall between the 11th and 14th week of pregnancy, hit their lowest between weeks 23 and 26, and return to baseline between 31 and 34 weeks. They average lower during pregnancy than outside of it, measuring from 3.2%-5.8%, likely due to the process of hemodilution (a normal increase in the volume of plasma within the blood stream, resulting in a reduced concentration of red blood cells).

Why can't we just diagnose diabetes with the HgA1C test?
Until recently, the test was not standardized. Confirmation with the lab where the test will be analyzed that their A1C assay has been certified as having documented traceability to the Diabetes Control and Complications Trial Reference Method through the NGSP assures you of accurate, comparable, and reproducible results. Additionally, hemoglobin variants are prevalent in some populations, which would skew the meaning of the test results. According to the International Expert Committee Report, the HgA1C, if used as a diagnosis tool, must be done so in conjunction with the testing and finding of plasma glucose levels >200 mg/dl to diagnose a woman with gestational diabetes.

While the numbers are interesting, the most important statement that came out of the recommendations based on the 2010 HAPO study were, "…treatment, achieved primarily by **diet/lifestyle modification** [the bold is mine], resulted in reduced birth weight and frequency of LGA births and preeclampsia." Therefore it is clear, from studies from the far and recent past and from common sense and intuition that there is one course to reduce any risks associated with high blood sugar to the mother and the baby: make sure that the calories a pregnant woman ingests are nutrient dense and that she is exercising (more details about this below).

I am not a big sugar eater, won't my body react to all of that sugar in a way that would distort the test results?
Having a concentrated load of refined sugar can produce a physiological reaction to the glucose overload which is a shock reaction called starvation diabetes, and is not true diabetes. This is because the pancreas is presented with a high glucose load and it cannot produce insulin fast enough to compensate for it. This creates a false-positive result to the test.

It is standard to require a woman to eat an extra complex carbohydrate diet for the three days prior to the test. This includes 150 g daily of whole grains, beans, and vegetable starches. The last meal before the fast should contain 50g of complex carbohydrates and the mother should engage in moderate exercise throughout. This will fortify the glycogen reserves and prepare the body to tolerate the glucose load that comes with the test.

There is a lot of conflicting information online and in books about the screening and testing for gestational diabetes. How do I know which source is the right one?
Obstetrics is notorious for not using Randomized Control Trials for research that guides policy making. Gestational diabetes is a prime example of this unfortunate practice. In 2000 the third edition of a guide which reviews the best quality research on a variety of subjects related to pregnancy and birth was published. The evidence that the authors found regarding the screening and testing for gestational diabetes directly conflicts with the standard practices in America. To read "A Guide for Effective Care in Pregnancy and Birth" in full, please visit http://www.childbirthconnection.org/article.asp?ck=10218 where the full text is available online and organized to click through by topic. The work used to form the content on the childbirthconnection.org website is all evidence-based, well designed research, the gold standard for the use of research when gathering pieces together to make a decision about care plans.

What is the difference in the test measurements for Gestational vs other types of diabetes?
Prior to 1979, decreased glucose tolerance during pregnancy was measured and evaluated on the same scale as non-pregnant women. The research used to determine a new scale is full of controversy because of the type of testing that was used to measure blood sugar levels and dietary history was not controlled for. Other important factors that were not controlled for included high risk pregnancies, previous poor outcomes, and known diabetics. This lack of control means that the research does not pass muster in scientific standards. Upon review of this research, the only correlate that could be proved was that women who are diagnosed with gestational diabetes are at increased risk for developing type II diabetes later in life.

The 2007 HAPO study looked for the lowest possible threshold of numbers to completely prevent gestational diabetes and is discussed in detail below.

Does every woman have to be tested for diabetes?
Every woman should be evaluated for her risk. If she has any of the following her risk for developing gestational diabetes increases:

- maternal age over 25
- obese woman prior to pregnancy
- previous birth of baby weighing over 10# at birth
- previous unexplained stillbirth at term
- family history of diabetes
- previous history of recurrent miscarriages

- extremes of heaviness or thinness
- history of alcohol abuse
- history of anorexia or bulimia

A woman and her provider will need to decide together whether or not to test if she has any of the risk factors and if so, which test to perform.

How effective is all of this screening and testing—can it help prevent bad outcomes or instruct me on what to do differently?
If your midwife suspects you need glucose-tolerance testing as opposed to just offering it to you because that is the normal thing that is done, your outcome is the same as if you have the test with a positive test result. This means that if a woman falls into the at-risk category she needs to consider what she can do to move out of that category (via diet and exercise) or mitigate her risk (via diet and exercise). This is very important because it shows that glucose intolerance is simply a marker for other underlying conditions that adversely influence perinatal outcome.

The most likely "adverse outcome" associated with gestational diabetes is a baby who is larger than 4000g (8lbs, 13 oz) which can result in increased cesarean deliveries and shoulder dystocias. Yet a midwife's moxy (aka clinical judgment), based on prepregnant weight, weight gain, and pregnancy past 42 weeks with no reference whatsoever to a glucose tolerance test is *more predictive* of large for dates babies than a GCT. Therefore, screening everyone does not even give the best chance for identifying women at risk for large babies. What will identify the risk is a provider who is observant and can listen well. Prenatal appointments longer than 7 or even 15 minutes facilitate the provider's ability to really get to know a woman and to have a good sense of who she is based on her history and the conversations shared. The midwifery model of care establishes the foundation for such a relationship to grow with the pregnancy as mother's enjoy long prenatal appointments and extensive guidance regarding the kind of decisions that can be made to avoid diabetes altogether.

If the biggest risk is large for dates babies, why don't all women who have a diagnoses of gestational diabetes just have cesarean births so they can avoid the danger to their babies?
One research trial was done to assess the use of elective cesarean section for gestational diabetes. The results showed a statistically significant increase in maternal morbidity, with no benefits shown for the baby.

Bottom Line: How should I be tested for gestational diabetes?
If your midwife suspects or is concerned that you may have gestational diabetes, the most effective testing is either with a fasting blood glucose test or through measuring levels 2 hours after meals throughout pregnancy with the use of a hand-held glucometer. There is no evidence that supports screening all pregnant women through the use of 50gm glucose challenge.

Blood glucose values rise naturally as pregnancy advances, but no adjustments are made for this in terms of the thresholds that result in a gestational diabetes diagnosis. Taking a test at week 28 might result in a failing level while the same mother may have passed the test had she taken it in week 24. Take the test at the earliest time it is offered to get the most accurate results. Ask your providerfor the test to be performed that is described at the end of this section under "What information regarding the testing should I bring to discuss with my provider?".

I have decided to do the 3 hour OGTT (oral glucose tolerance test) with the 100gm glucose load. Do you have food alternatives that equal 100gm of glucose?
The following options are offered but it should be noted that the standards are based on the ingestion of pure glucose and the juices and foods listed here will break down differently than straight glucose. While the results will be different they will provide a better understanding of what actually happens in a woman's body as she is absorbing and processing food.

The options typically given are: 8 oz. apple juice, 2 slices bread, 1 banana and 1 c. milk (102 gms) or 16 oz. orange juice, 2 slices bread, 1 banana and 1 c. milk (102 gms) or 8 oz. grape juice, 2 slices bread, 1 banana and 1 c. milk (102 gms) or 4 level tablespoons sugar in 8 oz. lemon water.

The World Health Organization has lowered the amount of glucose to 75gm for gestational diabetes to help curb the nausea that this test tends to cause. Anne Frye recommends following their lead and using 75gm instead of 100gm glucose.

Bottom Line: How should I be treated for gestational diabetes?
The use of insulin injectable therapy based on the research available is highly contentious. The fact remains that despite best efforts to control gestational diabetes through diet and exercise, a very small percentage of women will continue to have high blood sugar levels and will need help controlling them. Anne Frye recommends that if values rise to nonpregnant abnormal levels it is prudent to act and treat the diabetic condition.

Nonpregnant abnormal levels are:
Fasting Blood Glucose >140 mg/dL (repeated for confirmation)
OGTT-2 hours >200 mg/dL (repeated for confirmation

Are there natural remedies I can use for gestational diabetes?
Attempting to control diabetes through nutrition and exercise is an excellent approach. Acting like one has to control gestational diabetes before one is ever overtaken by symptoms or diagnosed with it is an even better one. Preventative care is called preventative care for a reason: it prevents the onset of the disease. It is not easy, but it is worth it—the mother is worth the effort and the baby is worth the effort. Gloria Lemay says that "Whole, organic foods, fresh water, and love are the ingredients to grow a healthy baby." Restricting calories is not the answer, making sure that the calories a mother intakes have a high nutritional value is. Telling a woman to "eat better and exercise more" is not the answer. Educational discussions, guidance and help creating specific plans for meals and an exercise program are. A diet high in legumes (beans), nuts, and high chromium food, such as broccoli can help prevent gestational diabetes and control it once it has set in. As well as making a good meal and exercise plan with your midwife or nutritionist, there are some simple additions you can make to your intake every day:

- String Bean Skin Tea
    - 1 cup of tea made of the skin of string beans introduces inulin; a precursor to insulin, into the blood stream. Jerusalem artichokes thinly peeled and sautéed provide the same
- B6 it up
    - A family history of diabetes can point to a genetic tendency for the woman's estrogen to bond to insulin if there is a B6 deficiency
    - 100mg doses of B6 three times per day can uncouple the estrogen and allow the insulin to be used properly

    - It is estimated that B6 plays a role in over 100 chemical reactions in our body
    - In addition to helping separate estrogen from insulin, it creates amino acids which build proteins, essential for the repair and growth of our tissue. It helps us make serotonin, norepinephrine, dopamine and GABA—all important neurotransmitters for pregnancy and birthing. It helps with vascular health and metabolizing our food into energy.
    - ➢ Get your Vitamin B6 Deficiency Test and make a treatment plan with your midwife
- Steep the Cinnamon
    - The kind of dry cinnamon we get here in the United States is called cinnamon cassia.
    - It has been shown to have hypoglycemic (lowers blood sugar levels), anti-oxidant, and insulin-enhancing properties
    - It is safe to consume during pregnancy (even according to the conservative FDA)
    - ➢ Make your own infusion by boiling cinnamon with water. Dried cinnamon should have 2 teaspoons per 1 cup of boiling water. Cinnamon seeds should be brewed with 2 teaspoons of seeds per 1 cup of boiling water and if bark is used 1 tablespoon per cup of boiling water.
- Add in the Onion
    - Onions have allicin and ally propyl disulfide which help block sudden increase in blood sugar levels
    - ➢ Work them into salads, veggie side dishes and main courses throughout the day
- Get your Broccoli on
    - Broccoli has chromium in it, an essential mineral which facilitates the entry of glucose into the cells by working with insulin
    - Broccoli is sometimes called a miracle food because it has the additional benefits of being an iron-rich food, high in vitamin C, folic acid, potassium, carotenoids, and is high in fiber.
    - ➢ Boil it in the morning and munch all day long but keep it green—overcooking sucks all of the nutrients out
- Count your Beans
    - Beans are high in complex carbohydrates and fiber
    - Black beans are the super star of the bean family, packing in the highest percentage of vitamins and minerals
    - They help you feel full, longer
    - When combined with a whole grain like brown rice, they form a perfect almost fat-free protein
    - Research has shown with increased levels of beans in the diet, type II diabetics were able to stop their use of insulin and type I diabetics reduced it by 38%
    - They help prevent the blood sugar from rising too fast after a meal
    - ➢ Add a serving into your meal and then plan even a 10 minute walk around the block after meals to keep your blood sugars steady
- Get to know the Glycemic Index as a general guide
    - All pregnant women can choose foods that are the most useful to their and their baby's body and one tool in the decision making process is to find foods that fall low on the glycemic index and then checking them against the idea that every calorie needs to be dense in nutrients.

        - Foods that are ranked high on the index are followed by a quick and significant increase in glycemia.
        - Foods that are ranked low on the index will release glucose slow and steady into the blood stream
        - Quality and quantity both matter—get to know the right amount of the right foods to eat for your best health during pregnancy, nursing, and beyond
- Exercise helps increase glucose uptake into the cells of muscle regardless of insulin levels
    - head out for a ten minute walk after each meal
    - add swimming or sustained walking into your weekly schedule

Is there anything to watch out for when using foods, plants, or supplements to prevent or control gestational diabetes?

One commonly used medicinal plant for diabetes goes by several names including Bitter Gourd, Bitter Melon, Balsam Pear and Karena. If you start to look online for natural remedies, this will be one of the first to come up. It looks like a spikey cucumber and is a member of the Cucurbitaceae family along with cucumbers, squashes, and melons. While it has many beneficial minerals and vitamins for people with diabetes, it should be avoided during pregnancy. The red seeds have a chemical called Vicine in them (commonly found in fava beans) which can cause intestinal upset and other side effects including uterine contractions and harm to the fetus through an action it may have on red blood cells. It also severely affects newborns and children so should be avoided during breast feeding.

What information regarding the testing should I bring to discuss with my provider?

Providers should collect and test the venous plasma. The blood should either be drawn into a grey-topped tube with sodium fluoride and refrigerated or put into a centrifuge and tested immediately.

Instead of the standard and unreliable OGTT, consider having the woman come in after fasting overnight. Do a fasting test of the venous plasma. Then have the woman eat a breakfast containing at least 75-80 gm of complex carbohydrares and 600 calories (whole grain pancakes with butter and natural syrup, protein, eggs, and a glass of juice for example). Timing for the postprandial glucose test begins at the start of the meal, which should be eaten within the hour after the fasting specimen is drawn. There is no time-interval recommended to being eating. After the woman is done, and before the test, she should engage in some moderate exercise such as walking.

If the results are border line or over the recommended levels (fasting = <95, 2hr = < 120 for venous specimens), review dietary recommendations (eliminate all white sugar and flour, add in recommended foods), retest after five days and follow up with a hemoglobin (Hg) A1C test if the numbers are still high. The recommendations that came out of the 2007 HAPO study suggested a HgA1C test in combination with a one hour test (a result greater than 200mg/dL) provide the best chances for finding diabetes in pregnant women.

Another option which creates a broader picture of the woman's health is to send her home with a glucometer and instructions for regular postprandial testing for a week. She should do the test regularly at 60 minutes postprandial (research has shown the ideal time to be between minutes 45 and 120 minutes, but it is easy to remember one hour and it tends to not interfere with the frequent small meals often plan encouraged for pregnant mothers). Be sure to use a glucometer that selectively uses plasma to derive the reading (not one that calculates the value to approximate what it would be if only plasma were used). A device that uses an electric current rather than color-change to derive a result will be

more accurate as it is not affected by the hemodilution of pregnancy. The American Diabetes Association has current and oft updated information about available glucometers on its website.

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