Gestational Diabetes

Gestational Diabetes (diabetes during pregnancy) is also called Gestational Carbohydrate Intolerance or Type III diabetes.

Diabetes is an endocrine disorder affecting carbohydrate metabolism that is caused from inadequate production or utilization of insulin. Insulin is produced in the pancreas by the beta cells of the islets of Langerhans. It serves to lower blood glucose levels by enabling glucose to move from the blood into muscle and adipose tissue cells.

During pregnancy metabolism of carbohydrate, protein and fat undergoes significant changes. Serum levels of estrogen, progesterone, and other hormones rise. These hormones affect carbohydrate metabolism. They stimulate increased insulin production and increase tissue response to insulin early in pregnancy. This results in storage of glycogen in the liver and other tissues. In the second half of pregnancy there is an increased resistance to insulin. The placenta makes potent enzymes that destroy insulin. Rising levels of human placental lactogen, estrogen, progesterone, cortisol, prolactin and insulinase increase insulin resistance through their actions as insulin antagonists. This implies that an elevated glucose level in pregnancy is normal, allowing extra glucose to circulate in the maternal system for use by the baby and placenta. As a result of the suppression of insulin, glucose remains available in the mother's bloodstream for longer periods of time so that her baby can use it for growth and to convert to glycogen.

The delicate system of checks and balances that exist between glucose production and glucose utilization is stressed by the growing baby. The baby derives energy from glucose taken solely from maternal sources. This stress is referred to as the "diabetogenic effect" of pregnancy. Therefore any preexisting disturbance in carbohydrate metabolism is magnified by pregnancy. This preexisting potential may put the pregnant woman at increased risk of developing gestational diabetes.

- In diabetes the pancreas does not produce sufficient amounts of insulin necessary for carbohydrate metabolism. With inadequate amounts of insulin, glucose cannot enter the cells but remains outside in the blood. The body cells become energy depleted, while the blood glucose level remains elevated. Fats and proteins in the body tissues are then oxidized by the cells as a source of energy. This results in:
- Wasting of fat and muscle tissue of the body.
- Negative nitrogen balance due to protein breakdown.
- Ketosis due to fat metabolism.
- Strong osmotic force of glucose concentration as the blood pulls water from the cells into the blood resulting in cellular dehydration.
- High glucose level in the blood spill over into the urine producing glucosuria.
- Osmotic pressure of the glucose in the urine prevents reabsorption of water into the kidney tubules, resulting in extra-cellular dehydration.

These developments cause the four cardinal signs and symptoms of diabetes.
1) Polyuria: frequent urination, results because water is not reabsorbed by the renal tubes due to the osmotic activity of glucose.

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2) Polydipsia: excessive thirst, caused by dehydration from polyuria.
3) Weight loss: due to the use of fat and muscle tissue for energy.
4) Polyphagia: excessive hunger, caused by tissue loss and a state of starvation, which results from the inability of the cells to utilize the blood glucose.
Often in Gestational diabetes the mother may remain asymptomatic or have mild symptoms.

After pregnancy women who have had Gestational diabetes have a higher risk of developing type I or type II diabetes later in life. Approximately 60% of these women may develop glucose intolerance by 16 years later.

Diabetic pregnancy carries higher risks for complications than normal pregnancy.

- Hydramnios (an increase in the volume of amniotic fluid) occurs in 10% to 20% of pregnant diabetics.
- Pregnancy-induced hypertension (PIH) occurs more often in diabetic pregnancies. Hyperglycemia due to insufficient amounts of insulin can lead to ketoacidosis.
- Larger babies are common when the mother is diabetic, which may lead to feto-pelvic disproportion.
- Anemia may develop may develop as a result of vascular involvement and poor nutritional intake.
- There is an increased risk of yeast infection and urinary tract infections because of increased glycosuria, which contributes to a favorable environment for bacterial growth.
- There is a higher risk of maternal complications such as toxemia, circulatory, visual, and kidney problems.
- Macrosomia (birth weight greater than the 90th percentile) and hypoglycemia are common risks for the baby of the diabetic mother. The baby responds to maternal hyperglycemia by secreting large amounts of insulin. Insulin acts as a growth hormone, leading to increased fetal size, or macrosomia. These infants are considered large for gestation age (LGA). This may cause the baby to be disproportionally large compared to the mother's pelvis, and is responsible for increased rate of cesarean birth among diabetic mothers.
- There is also a higher incidence of prematurity with respiratory distress, fetal abnormalities, and unexplainable intrauterine death.

Gestational diabetes is estimated to occur in 3% to 6% of pregnancies. Therefore, screening for diabetes is a standard part of prenatal care. If a woman has the cardinal signs of diabetes, a family history of diabetes, obstetric history indicating gestational diabetes, or if she is more than 20 pounds overweight she will be more susceptible to gestational diabetes.

The management of diabetes during pregnancy is very important. Most women with gestational diabetes can achieve diabetic control by diet. The calorie needs of pregnant women are not altered by diabetes. Approximately 50% to 60% of the calories should come from complex carbohydrates (including adequate fiber), about 12% to 20% should be protein, and 20% to 30% should be fat. This caloric intake is divided between three meals and three

snacks. The pre-bedtime snack is the most important and must include both protein and complex carbohydrates to prevent hypoglycemia during the night.

Exercise is very important with diabetes because exercise enhances the utilization of glucose and decreases insulin need while promoting circulation and improving muscle tone. It does not have to be vigorous to be beneficial. Thirty minutes of walking each day is satisfactory for most pregnant women. The best time for exercise is after meals when the blood sugar is rising.

Glucose monitoring is an essential part of diabetes management. This can be done at home with a glucometer. It is usually recommended that the monitoring be done at least four times per day: a fasting blood sugar before breakfast, then a postprandial test two hours after each meal. The goal is for the woman to maintain blood sugars in the normal ranges:

- Fasting 60 to 100 mg/dL
- 2 hours after each meal 100 to 140 mg/dL

Whether or not the woman with gestation diabetes needs additional insulin depends on how well her blood glucose levels can be maintained by diet alone.

Daily evaluation of the baby's activity beginning at about 28 weeks will provide information about the well being of the baby. It is easy to perform. The mother lies on her left side at approximately the same time each day and counts the number of times the baby moves in one hour. She records the results and brings them to each prenatal visit. An ultrasound is sometimes ordered to monitor fetal growth.

Because the diabetic woman is at risk for developing infections, eye problems, and neurologic changes, good skin and foot care is important. For dry skin, lotions creams or oils can be applied. Tight clothing should be avoided. Shoes should fit properly and are best worn with socks or stockings. Feet should be inspected regularly; toenails are cut straight across. Blood pressure is monitored carefully throughout pregnancy because of the increased risk for pregnancy-induced hypertension. The woman's weight gain also is monitored at each visit. Fundal height is measured, noting any abnormal increase in size for dates, which may indicate hydramnios or fetal macrosomia.

In most diabetic pregnancies, pregnancy is allowed to go to term with spontaneous labor. However in pregnancies in which there is evidence of fetal compromise, the decision of when the baby will be born must be weighed.

During labor maternal insulin requirements often decrease dramatically and the mother's glucose levels are measured hourly. After the birth maternal insulin requirements fall significantly. This occurs because the levels of hPL, progesterone, and estrogen fall after placental separation. Maternal tissues quickly regain their pre-pregnancy sensitivity to insulin.

Lactation utilizes maternal glucose, so that the breast-feeding mother's insulin requirements will remain low. On completion of weaning, pre-pregnancy insulin requirement is

reestablished. Breast-feeding is beneficial to both mother and baby. The composition of breast milk is not altered by diabetes. The lactating mother with diabetes often has a diminished insulin need.

The pregnant woman with diabetes must recognize symptoms of changing glucose levels and take appropriate action by immediately checking her capillary blood glucose level. If it is less than 60 mg/dL she is advise to drink 8 oz. of milk and recheck in 15 minutes. The woman should carry a snack at all times and should have other fast sources of glucose at hand so that she can treat an insulin reaction when milk is not available.

The primary goal for the control of diabetes is maintaining the blood sugar level within a normal range to prevent long-term complications. Balancing the right amounts of food, exercise, body weight, and medication (if indicated) is the key to good diabetes control. Healthy food choices are important for the control of the blood sugar and can affect how you feel. It is important to attain and maintain desirable body weight, observe portion sizes, avoid skipping meals and to increase daily activity.

- Eat less sugar. This includes table sugar, honey, syrup, jam, jelly, sweet rolls, donuts, candy, cookies, cake, pops, etc. Choose fresh fruit or fruit canned it its own juice instead of fruit canned in syrup.
- Eat less fat. Prepare foods by roasting, baking or broiling. Avoid fried foods. Avoid hot dogs or processed meats.
- Increase fiber intake.
- Use less salt. Reduce the amount of processed foods and convenience or fast foods.

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