**Clinical Case Study**

**Gestational Diabetes**

Diabetes mellitus is a disease that has afflicted humans for centuries. More than 25.8 million adults and children in the United States have been diagnosed with diabetes. That is equivalent to 8.3% of our population.1 The four clinical classes of diabetes are type 1, type 2, gestational and other specific types of diabetes caused by genetic defects.3-5 In each of the four types of diabetes there is a defect in the action of glucose within the body.2 The name diabetes mellitus has its roots in both the Greek and Latin languages. Diabetes, a Greek word, means to siphon in a continual flow. Mellitus has Latin origins and refers to the honey or sweet urine of diabetics. High blood sugar or hyperglycemia (generally, blood glucose levels >180 ml/dL) causes the urine of diabetic individuals to be high in glucose.6 All types of diabetes share the characteristic of persistent hyperglycemia or high blood sugar. The pancreas produces the hormone, insulin, which is necessary for the transport of glucose into the cells of the body to be used as energy. The diagnosis of diabetes is made as a result of a failure in either insulin secretion, production or action.1

Type 1 Diabetes or insulin dependent diabetes is caused by an autoimmune process in which the body’s immune system attacks the beta cells where insulin is produced within the pancreas. In type 1 diabetes, no insulin is produced and daily insulin injections are required to maintain normal blood glucose levels. Type 1 diabetes typically manifests in children and is usually apparent by the age of 14.2

Type 2 diabetes is also known as insulin resistant diabetes or adult onset diabetes and is the most common type of diabetes, comprising 90-95% of diabetes diagnoses. Insulin is still produced by the pancreas in cases of type 2 diabetes. However, cells require more insulin than is being produced or the cells no longer respond normally to the insulin being produced. Lifestyle factors including diet, lack of exercise, obesity, and family history of diabetes are all predictors of the onset of type 2 diabetes.2

Gestational diabetes occurs when the initial manifestation of diabetes occurs during pregnancy. Approximately 5% of pregnant women in the U.S. develop gestational diabetes. Women diagnosed with gestational diabetes have a greater risk of developing type 2 diabetes later on in life. The disease process of gestational diabetes is similar to type 2 diabetes. However, blood sugar levels usually return to normal after giving birth.3

In the past, recommendations called for testing all pregnant women for gestational diabetes mellitus (GDM). However, current guidelines call for the use of screening criteria that are used to assess pregnant women to determine who may be at higher risk for the onset of gestational diabetes. The testing recommendations for GDM include a low risk group, a high risk group and an average risk group. To be considered at a low risk for developing GDM an expectant mother must meet all of the following criteria: be less than 25 years old, have a normal BMI before becoming pregnant, have no first degree relatives diagnosed with diabetes, have no history of abnormal glucose tolerance, no past history of poor obstetric outcome and not belong to an ethnic group with a high prevalence of diabetes. Criteria for inclusion in the high risk group include women with any of the following risk factors: obesity, history of GDM, glycosuria and a family history of diabetes. An expectant mother is categorized in the average risk group if she does not meet the criteria outlined in the low risk or high risk groups. Pregnant women who fall within the low risk group require no glucose testing while women in the high risk group require fasting plasma glucose or casual plasma glucose as soon as is possible, with retesting recommended at 24 and 28 weeks gestation if the first screening was negative for GDM. Women categorized in the average risk group should be tested between 24 and 28 weeks gestation. When it is necessary to test glucose between 24 and 28 weeks gestation one of two approaches may be used. The first is a one-step approach where a diagnostic 100-g OGTT (oral glucose tolerance test) is administered. The second is a two-step approach where an initial screening using a glucose challenge test with a 50-g oral glucose load is performed along with a diagnostic 100-g OGTT being performed on those women exceeding the glucose threshold value on the initial glucose challenge test. A fasting plasma glucose of greater than 126 mg/dL or casual plasma glucose of greater than 200 mg/dL meets the threshold for a gestational diabetes diagnosis. To validate the initial diagnosis, a confirming diagnosis must be made on the day following the initial test, thereby leaving no doubt about the validity of the initial diagnosis of hyperglycemia.7

The American Diabetic Association recommends using the Carpenter and Coustan diagnostic guidelines for abnormal glucose tolerance.7 The Carpenter and Coustan diagnostic criteria are as follows.

**Carpenter and Coustan Diagnostic Criteria for Detection and Diagnosis of Gestational Diabetes**7

|  |  |  |
| --- | --- | --- |
| **Plasma glucose** | **50-g Glucose Challenge Test** | **100-g Diagnostic OGTT** |
| Fasting | --- | 95 mg/dL |
| 1 Hour | 140 mg/dL | 180 mg/dL |
| 2 Hour | --- | 155 mg/dL |
| 3 Hour | --- | 140 mg/dL |

For a positive diagnosis of gestational diabetes two or more of the listed plasma glucose values must be met or exceeded. The test must be administered after an overnight fast of at least 8-14 hours. Additionally, on the 3 days prior to testing, the patient must have been consuming an unrestricted diet of at least 150 grams of carbohydrate per day. The patient must also have had unlimited physical activity on the 3 days before the test is administered. However, during the test the patient must limit physical activity by remaining seated quietly. Any excess physical activity can alter the test results.7

**Patient History**

Patient A.C. is a 36 year old female 28 weeks pregnant. AC is an RN at Holy Cross Hospital who was recently diagnosed with gestational diabetes.

**Pertinent Labs:**

|  |  |
| --- | --- |
| **Test Name** | **Result** |
| WBC | 1.0 |
| RBC | 3.66 |
| Hgb | 11.9 L |
| Hct | 34.0 L |
| MCV | 92.9 |
| MCH | 32.4 |
| MCHC | 34.9 |
| RDW | 13.1 |
| Plt Count | 18.7 |
| Differential Method | AUTOMATED |
| Neutrophils % | 80.1 H |
| Lymphocytes % | 10.8 L |
| Monocytes % | 7.0 |
| Eosinophils # | 1.7 |
| Basophils % | 0.4 |
| Neutrophils # | 8.0 H |
| Lymphocytes # | 1.1 |
| Eosinophils # | 0.20 |
| RBC Morphology | Normal |
| Hemoglobin A1 | 97.2 |
| Hemoglobin A2 | 2.8 |
| Hemoglobin C | 0.0 |
| Hemoglobin F (Fetal) | 0.0 |
| Hemoglobin S | 0.0 |

**Pertinent Nutritional Medications:** No pertinent nutrition related medications.

**Nutrition Assessment Data**

**Height**: 5’6”

**Weight**: 179 lbs. (81 kg); Pre-pregnancy weight = 155 lbs (71 kg)

**Weight Gain During Pregnancy:** 24 pounds (11 kg)

**BMI**: 28.9

**Ideal Body Weight**: 130 lbs (pre-pregnancy), 154 lbs 28 weeks gestation

**Estimated Energy Requirements**: 25-30 kcals/kg body weight = 2025-2430 kcal/day

**Estimated Protein Requirements**: 1.2-1.5 grams protein/Kg = 30-122 gm pro/day

**Estimated Fluid Requirements**: 1 mL per kcal = 2025-2430 mL/day

**Comments:** Patient seen in outpatient dietitian’s office. Discussed gestational diabetes, carbohydrate counting with food list examples, high fiber, low sodium, lean proteins, healthy fats, label reading tips, meal planning, dining out and general nutrition. Provided patient with gestational diabetes nutrition therapy handout with a sample menu.8 Patient works the night shift as a nurse at Holy Cross Hospital. Patient states that she will adhere to gestational diabetes nutrition therapy dietary recommendations to help control her blood glucose levels.

**Nutrition Diagnosis**: Food and nutrition related knowledge deficit

**Related to**: Lack of previous information

**As Evidenced By**: Patient’s statements

**Patient Education Topics**: Carbohydrate counting, meal planning and general nutrition.

**Intervention**: Gestational Diabetes nutrition therapy education provided.

**Nutrition Goals:** Patient will choose appropriate foods based upon dietary needs.

**Monitoring and Evaluation:** Follow up as needed.

**References**

1. American Diabetes Association. Diabetes Statistics. 2011.

http://www.diabetes.org/diabetes-basics/diabetes-statistics/

1. Center for Disease Control and Prevention. 2011 National Diabetes Fact Sheet. 2011. http://www.cdc.gov/diabetes/pubs/factsheet11
2. Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Report of the expert committee on the diagnosis and classification of diabetes mellitus. *Diabetes Care* 1997;20:1183-1197.
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4. American Diabetes Association. Clinical Practice Recommendations. *Diabetes Care* 2006;29 (Suppl 1):S4-42.
5. U.S. Department of Health and Human Services. National Diabetes Information

Clearinghouse. 2008. <http://www.diabetes.niddk.nih.gov/dm/pubs/>

1. Carpenter MW, Coustan DR. Criteria for screening test for gestational diabetes. *Am J Obstet Gynecol* 1982;144:768-773.
2. *Academy of Nutrition and Dietetics.* Gestational Diabetes Nutrition Therapy from the Nutrition Care Manual.