EARLY SCREENING FOR GESTATIONAL DIABETES LEADS TO SUCCESS

ABSTRACT

Gestational diabetes mellitus (GDM) is a common complication that occurs during pregnancy, and the rate of diagnosis in the United States is on the rise. Early screening and treatment of GDM has the potential to make a positive difference for mothers and their infants. Multiple approaches for the screening of GDM have been recommended, including a two-step approach and a one-step approach. Since GDM may lead to an increased risk of birth defects, or may result in the development of type 2 diabetes for the mother after delivery, early treatment of GDM through diet, exercise, and possibly the administration of insulin and other medication can increase the chances of positive results.
**INTRODUCTION**

With increased rates of obesity and societal trends of a more sedentary lifestyle, rates of gestational diabetes mellitus (GDM) are increasing. It is estimated that up to 7% to 8% of all pregnancies are affected, or approximately 240,000 of 4 million annual births [1]. The prevalence is even higher among Hispanic and African American populations. Early screening and treatment for all women could make an important positive difference that would lead to a successful pregnancy [2].

GDM is a different disease than traditional type 1 diabetes. The etiology is a complex interplay between the maternal, fetal, and placental unit. The placenta produces human placental lactogen (hpl), which is a hormone that metabolizes maternal fat into nutrition for the fetus [3]. It can lead to insulin resistance and carbohydrate intolerance in the mother, which is why the glucose challenge is an appropriate screening method. The ideal time to perform this test is when this hormone is at high levels, around 26 to 28 weeks gestational age.

**SCREENING**

The American College of Obstetrics and Gynecology (ACOG) recommends that all patients be screened for GDM either by risk factors, medical history, or laboratory data. In addition to ethnicity, there are other health factors that can increase one’s risk of developing GDM, such as age greater than 25 years, those with a family history of diabetes, GDM in a previous pregnancy, chronic hypertension, centripetal obesity, Polycystic Ovary Syndrome (PCOS), and high fasting glycemia in the first trimester [4]. The U.S. Preventative Services Task Force also recommends screening asymptomatic pregnant women after 24 weeks of gestation [5].

Screening is typically performed between 24 and 28 weeks gestation. However, women with the following risk factors are candidates for early screening: previous history of GDM, known glucose intolerance, and obesity [6]. Women who pass the early screening should still be screened again between 24 and 28 weeks gestation [7]. One study performed in India recommended early universal screening at the first prenatal visit for all women due to the 11-fold increased risk of developing GDM when compared with Caucasian women. This study also showed increased association of GDM with increasing age, parity, family predisposition, and infertility [8]. Additionally, women who are diagnosed with GDM should be screened 6-12 weeks postpartum with the 75g oral glucose tolerance test due to the increased rate of progression to type 2 diabetes in these women [2].

Multiple different approaches for the screening of GDM have been recommended, including both a two-step approach and a one-step approach. Currently, ACOG supports the two-step approach over the one-step approach for GDM screening [2]. The two-step approach involves administering 50g of an oral glucose solution followed by a one-hour venous glucose level. Subsequently, determining a fasting blood glucose level and administering 100g of an oral glucose solution with venous glucose levels drawn each hour for a total of three hours in women who exceed the cutoff value for the 50 g oral glucose tolerance test is indicated to make the definitive diagnosis. Different cutoff values have been suggested for the one-hour glucose tolerance test. However, ACOG supports selecting either 135 mg/dL or 140 mg/d depending on the prevalence of GDM in the given patient population [2]. When performing the three-hour glucose tolerance test, the diagnosis of GDM is established when at least two of the four measured serum glucose levels exceed the defined cutoff values. Again, different cutoff values have been established by different organizations and ACOG supports choosing a defined set of cutoff values based on the prevalence of GDM depending on a given institution’s patient population [2].

An alternate method is the one-step approach for screening for GDM. It involves drawing a fasting blood glucose level and subsequently administering a 75g oral glucose solution and measuring venous glucose levels one and two hours after administration. The diagnosis of GDM is established when any single value exceeds the defined cut-off values.

**RISKS ASSOCIATED WITH GESTATIONAL DIABETES**

There are both maternal and fetal risks associated with gestational diabetes. In women with preexisting diabetes, conceiving with a high hemoglobin A1C is linked to birth defects, including cardiac and caudal regression. Interconception control of blood sugars and normalization of hemoglobin A1C are interventions with proven benefit to pregnancy outcomes [9].
Women with GDM have higher rates of hypertensive disease in pregnancy, including both gestational hypertension and preeclampsia, and a higher rate of cesarean delivery. Additionally, obese women with GDM have higher index morbidity than non-obese women with gestational diabetes. Cesarean delivery carries its own potential morbidities including, but not limited to, bleeding, infection, and unintended injury or operative complications. Women who deliver vaginally also have greater risks to the fetus at delivery, including greater risk of operative delivery, shoulder dystocia, and birth trauma [2].

All babies born to mothers with GDM are also at increased risk of macrosomia, neonatal hypoglycemia in the immediate postpartum period, and hyperbilirubinemia [2]. These infants are also more prone to neonatal respiratory disorders, such as transient tachypnea of the newborn and perinatal asphyxia, as well as hypertrophic cardiomyopathy [10]. These can have drastic implications for neonates in both the immediate postpartum period and potentially, long term. Any such complications can lead to an initial separation at birth, which has the potential to impair bonding and breastfeeding experience, or result in a prolonged hospital stay.

There are also long-term maternal health consequences associated with GDM. There is an increased risk for progression to type 2 diabetes later in life. One study also showed that women with GDM had a higher prevalence of cardiovascular disease that occurred at a younger age and was independent of the development of metabolic syndrome and type 2 diabetes postpartum [11]. The study also showed that these women were also younger and less likely to be postmenopausal when they developed metabolic syndrome, type 2 diabetes, and cardiovascular disease [11]. With cardiovascular disease being the leading cause of death amongst women worldwide, risk assessment and primary prevention are necessary to improve morbidity and mortality rates [6]. This includes all aspects of care from adequate screening and diagnosis to treatment and management options.

**TREATMENT**

Once a diagnosis of GDM is established, treatment is indicated. Women who are adequately treated for GDM have lower frequencies of large-for-gestational-age infants, birth weight exceeding 4000g (8.8 lbs), cesarean delivery, shoulder dystocia, and hypertensive disorders, including gestational hypertension and preeclampsia [2]. The first-line management for women with GDM is dietary modification in which carbohydrate intake does not exceed forty percent of total calorie intake [12]. Additional recommendations include moderate exercise, which may be of benefit in glycemic control in pregnancy. Exercise and dietary modification have been shown to lead to superior glycemic control over dietary modifications alone [13].

Initial monitoring should involve measuring serum glucose levels four times daily, including a fasting level and three post-prandial measurements [2]. The relative superiority of measuring postprandial values at one versus two hours has not been identified [2]. Women with GDM who are not well-controlled with dietary modification require medical intervention either with insulin or oral hypoglycemic agents, such as glyburide or metformin. Insulin is the most commonly used pharmacotherapy, although glyburide and metformin have been shown to be equally as effective in maintaining tight glucose control [12]. A recent study showed that metformin may have some maternal and fetal benefits when compared with the use of insulin for glycemic control, although further study is warranted. The study compared insulin versus metformin for glycemic control in mothers with GDM, and rates of both preeclampsia and overall weight gain were lower in the group controlled with metformin [13]. In terms of neonatal outcomes, metformin had a lower risk of neonatal hypoglycemia and neonatal intensive care unit (NICU) admission when compared with the insulin group [1].

**CONCLUSION**

With adequate screening, prompt diagnosis, and effective management of gestational diabetes, both maternal and neonatal morbidity and mortality can be effectively reduced. Not only can this be improved in the immediate peripartum period, but there are also long-term benefits to glycemic control in mothers with GDM, both for the mother and for the neonate.
REFERENCES


