The American College of Obstetricians and Gynecologists
Women's Health Care Physicians

COMMITTEE OPINION

Number 504 • September 2011

Committee on Obstetric Practice

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Screening and Diagnosis of Gestational Diabetes Mellitus

ABSTRACT: *Gestational diabetes mellitus* (GDM), defined as carbohydrate intolerance that begins or is first recognized during pregnancy, is associated with increased maternal, fetal, and neonatal risks. The prevalence of GDM in the United States is increasing, probably because of increasing rates of overweight and obesity. A universal recommendation for the ideal approach for screening and diagnosis of GDM remains elusive. At this time, the Committee on Obstetric Practice continues to recommend a two-step approach to screening and diagnosis. All pregnant women should be screened for GDM, whether by patient history, clinical risk factors, or a 50-g, 1-hour glucose challenge test at 24–28 weeks of gestation. The diagnosis of GDM can be made based on the result of the 100-g, 3-hour oral glucose tolerance test, for which there is evidence that treatment improves outcome.

Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance that begins or is first recognized during pregnancy (1). This condition is associated with increased risks for the fetus and newborn, including macrosomia, shoulder dystocia, birth injuries, hyperbilirubinemia, hypoglycemia, respiratory distress syndrome, and childhood obesity. Maternal risks include preeclampsia, cesarean delivery, and an increased risk of developing type-2 diabetes later in life. Although the prevalence varies significantly among different populations and ethnicities, as well as with the diagnostic criteria used, GDM complicates approximately 7% of all pregnancies in the United States (2). Importantly, the prevalence of GDM in the United States is increasing, probably because of increasing rates of overweight and obesity (3–5). Specific risk factors and the degree of their influence on GDM prevalence are difficult to quantify across populations. However, a number of clinical risk factors have been demonstrated to be associated with an increased likelihood of GDM, including age, ethnicity, obesity, family history of diabetes, and past obstetric history (1).

Numerous national and international medical organizations, along with expert panels and working groups, have issued specific guidelines with recommendations for screening and diagnosing GDM. In 2001, the American College of Obstetricians and Gynecologists recommended that all pregnant women should be screened for GDM—whether by patient history, clinical risk factors, or with a 50-g, 1-hour loading test at 24–28 weeks of gestation to determine blood glucose levels—and suggested relying on the result of the 100-g, 3-hour oral glucose tolerance test for diagnosis (often referred to as a "two-step" method) (1). The U.S. Preventive Services Task Force concluded in 2008 that current evidence was insufficient to establish the balance of benefits and harms for screening for GDM (6).

In 2008, the Hyperglycemia and Adverse Pregnancy Outcomes Study Cooperative Research Group published the results of a large, multicenter, multinational observational study designed to examine the relationship between maternal hyperglycemia less severe than overt diabetes mellitus and adverse pregnancy outcomes (7). The study demonstrated a clear and continuous relationship between maternal hyperglycemia and increasing rates of large for gestational age infants, cord blood C-peptide (evidence of fetal hyperinsulinemia), neonatal hypoglycemia, and cesarean delivery. Following this, the International Association of Diabetes in Pregnancy Study Group published recommendations for the diagnosis and classification of hyperglycemia during pregnancy (8). In addition to recommendations concerning the identification of overt diabetes during pregnancy, the International Association of Diabetes in Pregnancy Study Group recommended a simplified "one-step" approach to the screening and diagnosis of GDM with a 75-g, 2-hour glu-

cose tolerance test. Notably, adoption of these guidelines would result in GDM being diagnosed in approximately 18% of all pregnant women (8). Furthermore, despite recent randomized clinical trials demonstrating that the treatment of mild GDM reduces neonatal morbidity (9, 10), there is no evidence that the identification and treatment of women based on the new International Association of Diabetes in Pregnancy Study Group recommendations will lead to clinically significant improvements in maternal and neonatal outcomes and it would lead to a significant increase in health care costs.

A universal recommendation for the ideal approach for screening and diagnosis of GDM remains elusive. Significant questions remain regarding the implications on health care costs, the effect of GDM diagnosis on the pregnant woman and her family, the effect of diagnosis on obstetric interventions in pregnancy, and whether the identification and treatment of GDM will improve meaningful perinatal, neonatal, and maternal outcomes.

Conclusion

The recent studies on GDM and its increasing incidence in the United States underscore the need for the development of uniform screening and diagnostic criteria. The National Institutes of Health is planning a Consensus Development Conference to determine the optimal approach to screening and diagnosis in the United States. Consensus regarding optimal diagnostic criteria among the many groups and professional organizations will further much needed research regarding the benefits and harms of screening and diagnosis of GDM.

Recommendations

At this time, the Committee on Obstetric Practice continues to recommend the following:

1. All pregnant women should be screened for GDM, whether by patient history, clinical risk factors, or a 50-g, 1-hour loading test to determine blood glucose levels.
2. The diagnosis of GDM can be made based on the result of the 100-g, 3-hour oral glucose tolerance test, for which there is evidence that treatment improves outcome. Either the plasma or serum glucose level established by Carpenter and Coustan or the plasma level designated by the National Diabetes Data Group are appropriate to use (see Table 1). A positive diagnosis requires that two or more thresholds be met or exceeded.
3. Diagnosis of GDM based on the one-step screening and diagnosis test outlined in the International Association of Diabetes in Pregnancy Study Group guidelines is not recommended at this time because there is no evidence that diagnosis using these criteria leads to clinically significant improvements in maternal or newborn outcomes and it would lead to a significant increase in health care costs.

Table 1. Diagnostic Criteria for the 100-g, 3-Hour Tolerance Test for Gestational Diabetes Mellitus*

Status	Plasma or Serum Glucose Level — Carpenter and Coustan Conversion		Plasma Level — National Diabetes Data Group Conversion	
	(mg/dL)	(mmol/L)	(mg/dL)	(mmol/L)
Fasting	95	5.3	105	5.8
1 hour	180	10.0	190	10.6
2 hours	155	8.6	165	9.2
3 hours	140	7.8	145	8.0

*A positive diagnosis requires that two or more thresholds be met or exceeded.

Adapted with permission from the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Diab Care 2000;23(suppl 1): S4–S19.

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Screening and diagnosis of gestational diabetes mellitus. Committee Opinion No. 504. American College of Obstetricians and Gynecologists. Obstet Gynecol 2011;118:751–3.