

EDITORIAL

Glucose tolerance test: varying diagnostic strategies for gestational diabetes mellitus

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Gestational diabetes mellitus (GDM) is one of the common medical conditions that complicates pregnancy and has been associated with higher incidences of maternal and neonatal complications.^{1,2} It has been demonstrated that treatment of GDM improves perinatal outcomes such that women treated for GDM have lower rates of pre-eclampsia, macrosomia, admissions to the neonatal nursery and composite perinatal complications that include neonatal death, shoulder dystocia, bone fracture and nerve palsy compared to routine prenatal care.³ Thus, it is imperative to identify women with GDM at risk of adverse outcomes.

While an oral glucose tolerance test (GTT) is often employed to diagnose GDM, the quantity of the glucose load (75 g vs. 100 g) and how frequent the postprandial blood draws (1, 2 or 3 h) should be performed to achieve the optimal diagnostic utility while minimizing the cost and inconvenience remains controversial. In the United States, most clinicians adopt the 100 g 3-h GTT (checking serum glucose level for fasting, 1-, 2- and 3-h post-glucose load) using either the National Diabetes Data Group (NDDG) or the Carpenter–Coustan criteria with two or more abnormal values above the thresholds considered diagnostic.^{4–6} However, the application of the 75 g 2-h GTT to diagnose GDM has also been advocated,^{7,8} while others have explored alternative methods.^{9,10} Since the diagnostic criteria for GDM have not been standardized, how best to diagnose and treat GDM continues to be an area of intense research interest.

In this issue of *Journal of Perinatology*, Drs Phaloprakarn and Tangjitgamol¹¹ examined a cohort of women who had 100 g GTT and developed a new diagnostic scheme for GDM. The authors found that a summation of 1- and 2-h plasma glucose levels post-100 g GTT using 341 mg per 100 ml and greater as the diagnostic threshold yielded high sensitivity (93.5%) and specificity (95.2%) compared to NDDG criteria. By lowering the sensitivity and specificity in changing to this proposed diagnostic test, what is gained or lost? While this novel diagnostic method offers the benefit of patient convenience, less time-consuming, fewer venopunctures and lower costs, one trade-off is that a small percentage of women (6.5%) who would have been diagnosed with GDM would have been missed and thus not treated for GDM using the proposed diagnostic method. While one could argue that these women may

have a milder degree of carbohydrate intolerance and are not necessarily at increased risk for adverse outcomes related to untreated or poorly controlled GDM, others would propose that even women with one elevated 100 g GTT value are at increased risk for perinatal complications associated with GDM.^{12,13}

Additionally, because of the 95% specificity in the current study as compared to NDDG criteria, 5% of women who would have not been diagnosed by the NDDG criteria would now be given a diagnosis of GDM. While leading to more falsely diagnosed patients is generally undesirable, in some of these women, such a diagnosis might lead to improved glycemic control and outcomes. Of note in the current study, these ‘false-positive’ women actually have the greatest mean birthweight and highest rate of macrosomic infants (19%). However, in others who truly did not have GDM, the consequences of a false diagnosis may be the inconvenience and medical stigma of gestational diabetes.

As Carpenter and Coustan have eloquently stated, the relationship between carbohydrate intolerance and perinatal outcome is likely continuous such that no single diagnostic threshold can truly separate women at high risk of complications from those with no risk at all.¹⁴ As we seek to refine both the screening and diagnostic tests for GDM, large, multicenter cohort studies, which examine the perinatal outcomes from a variety of testing strategies should be conducted. With the development of continuous glucometers, perhaps an even better diagnostic test may be described using such technology. Further, perhaps simple ‘one-size-fits-all’ screening or diagnostic tests should be modified within various risk strata of the population in order to improve testing characteristics. It does seem that test characteristics do vary in different populations.¹⁵ It also may be that by examining not simply diagnostic thresholds, but other mathematical relationships between the test values, we may be better able to identify the population at risk of GDM-related perinatal complications. Thus, the efforts of Drs Phaloprakarn and Tangjitgamol should be applauded, replicated and extended.

The balance between optimal perinatal care and cost-per-GDM diagnosis depends on the disease prevalence in a given population as well as medical resources available to diagnose and treat GDM in order to improve outcomes. With an obstetric population that is increasingly older and overweight, attention to identifying those women at increased risk for perinatal complications associated with

GDM requires further investigation and probably requires testing strategies with increased sensitivity.

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