

# Early Assessment of the Risk for Gestational Diabetes Mellitus: Can Fasting Parameters of Glucose Metabolism Contribute to Risk Prediction? (*Diabetes Metab J* 2019;43:785-93)

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Gestational diabetes mellitus (GDM) is one of the most common medical complications during pregnancy, and it is associated with increased risk of perinatal morbidities, including preeclampsia, birth injury, macrosomia, and neonatal hypoglycemia. Moreover, it is related to an increased risk of diabetes mellitus after delivery, obesity, and type 2 diabetes mellitus (T2DM) of offspring. Early identification of the high-risk group for GDM as well as diagnosis of GDM are important because treatment of GDM decreases the risk of these complications. In recent diabetes treatment guidelines including the one from American Diabetes Association, standard diagnostic criteria for diabetes are used for pregnant women to find the pregestational T2DM at their first antenatal visit. In the case of women without T2DM, rescreening for GDM between 24 and 28 weeks of gestation is recommended. Therefore, GDM is usually intervened during late pregnancy and it may not be enough to improve the pregnancy outcome. Even though various biomarkers in early pregnancy have been postulated as early predictors [1], accurate biomarkers or cutoff values for GDM in early pregnancy are still not well-established [1,2].

With this background, the article entitled “Early assessment of the risk for gestational diabetes mellitus: can fasting parameters of glucose metabolism contribute to risk prediction?” covered an interesting topic. In this study, Falcone et al. [3] evalu-

ated the biochemical predictors of glycemic conditions in early pregnancy, especially fasting parameters, to predict the development of GDM and the need of glucose-lowering medication. They found that fasting parameters were significantly different between woman who developed GDM and woman who maintained their normal glucose tolerance state in late trimester. They also showed higher fasting levels of fasting plasma glucose (FPG; odds ratio [OR], 1.13; area under the receiver operating characteristic curves [ROC-AUC]=68.1) and fasting C-peptide (OR, 2.42; ROC-AUC=70.6) were associated with a higher risk of developing GDM.

Several previous studies showed the association between fasting glucose and the development of GDM [4-7]. In this study, although the number of participants is relatively small, it is meaningful to examine the association of GDM with other indices on insulin sensitivity and secretion, which have not been tested in other studies. It is expected that studies in larger cohorts will reveal solid predictors.

During pregnancy, insulin resistance increases, but pancreatic  $\beta$ -cells compensate for this, and insulin secretion increases to maintain normal blood glucose. Therefore, it is understood that gestational diabetes occurs when insulin secretion does not increase enough to compensate for the increased resistance to insulin [8,9]. In this study, several parameters of insulin se-

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cretion (homeostatic model assessment of  $\beta$ -cell function [HOMA-B], insulinogenic index [IGI] from insulin, and IGI from C-peptide) were higher in GDM patients than normal glucose tolerance participants in early trimester, suggesting physiologic response to compensate for increased insulin resistance. However, the increase in insulin secretion in the GDM group was not obvious ( $P>0.05$  for HOMA-B) compared to that of insulin resistance ( $P<0.001$ ) even from early pregnancy.

As was pointed out by authors in this study, the correlation between fasting parameters in early pregnancy and the postprandial glucose tolerance test (GTT) at later stage was relatively weak. It suggested that, fasting parameters did not fully reflect the major pathophysiology of GDM. Indeed, in a prospective randomized controlled trial to compare the diagnostic superiority of three methods (FPG, 50 g GTT, and 75 g GTT) in the first trimester, both 50 g GTT and 75 g GTT were superior to the criteria of fasting glucose [10]. However, considering the clinical feasibility, fasting variables could be used meaningfully if insulin resistance and insulin secretion capacity could be calculated appropriately, as were those in this study. The authors calculated ROC-AUC values for each variable, but composite variables representing both insulin secretion and insulin resistance might have high ROC-AUC with better predictive power.

In addition, we expect that prospective studies would be conducted to determine whether early interventions, like lifestyle modifications, in the first trimester can affect the development of GDM, perinatal outcomes or needs for medical treatment in the high-risk group of GDM stratified by these early-stage parameters of glucose metabolism.

## CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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