Glycemic Level at the First Visit and Prediction of GDM


Abstract
Objective: To evaluate the glycemic level at the first visit that is likely to predict gestational diabetes mellitus (GDM).

Methods: Consecutive pregnant women underwent a 75g oral glucose tolerance Test (OGTT) recommended by WHO and diagnosed GDM if 2hr post plasma glucose (PG) value \( \geq 140 \text{mg/dl} \). Women with normal OGTT results at the first visit were screened again with an OGTT at the subsequent visits.

Results: A total of 4151 pregnant women from different trimesters underwent OGTT. Of them 739 women (17.8%) had GDM. Among the GDM women, 528 (71.4%) were detected at the first visit. On screening during subsequent visits, GDM was diagnosed in the remaining 211 (28.6%) women who had normal OGTT in the first visit. We performed the analysis taking the glycemic level in the first visit of 211 pregnant women who manifested GDM in the subsequent visit. During normal pregnancy, 2hr PG level is < 120mg/dl. Taking this value into consideration among the 211 women who turned to have GDM in the subsequent visits 119 women (56.4%) had 2hrPG \( \geq 120 \text{mg/dl} \) and the remaining 92(43.6%) had 2hrPG < 120mg/dl.

Conclusion: Pregnant women irrespective of 2 hr PG \( \geq \) or < 120 mg/dl at initial visit progressed to GDM in the subsequent visit. No glycemic level in the early weeks of pregnancy predicts GDM and at the same time at no statistically significant glycemic cut-off level could we say that a woman will not develop GDM. Hence rescreening in the subsequent trimester or visits is essential.

INTRODUCTION
Gestational Diabetes Mellitus (GDM) is defined as carbohydrate intolerance of varying degrees of severity with onset or first recognition during pregnancy. The usual recommendation is to perform screening between 24–28 weeks of gestation though 40% of women with GDM could be detected in the early weeks of pregnancy. As such GDM is considered to be a heterogeneous entity and pregnant women diagnosed to have GDM in the first trimester are likely to have Type 2 DM before pregnancy or pregnancy induced glucose intolerance. Though GDM can develop any time during pregnancy, it becomes apparent most often in the third trimester due to diabetogenic stress induced by the hormonal and metabolic adaptations that occur as pregnancy advances. Thus GDM appears to manifest in all trimesters of pregnancy. Screening for glucose intolerance during the early weeks of pregnancy is beneficial as this policy would help in identifying undiagnosed diabetes prior to conception and to render appropriate care. It is also prudent to advice a pregnant women to undergo rescreening in the later weeks of pregnancy if she had normal glucose tolerance (NGT) in the first visit. However it would be helpful if we know the glycemic level in the first visit that is likely to predict the possibility of pregnant women developing gestational diabetes in the later weeks of pregnancy to keep them under surveillance. Hence this study was undertaken.

MATERIAL AND METHODS
Consecutive pregnant women irrespective of gestational weeks attending the antenatal health posts across Chennai city were enrolled in this study. Women with a history of pregestational diabetes were excluded. Every antenatal woman in the fasting state was given a 75 g of glucose load and intravenous blood sample was collected at 2 hrs. Diagnosis of GDM was made if the 2 hr post glucose (PG) was \( \geq 140 \text{mg/dl} \) (WHO criteria). The plasma glucose was estimated by the glucose oxidase peroxidase (GOD POD) method in the central
laboratory using Hitachi auto-analyzer. A1c was not estimated as this was a community based study. Women, who had normal OGTT results at the first visit, were screened with a repeat OGTT at the subsequent visits and followed throughout pregnancy. To compare the mean values between the groups, independent ‘t’ test was used. Analysis was two tailed and a p-value < 0.05 was considered statistically significant. Statistical analysis was performed by using SPSS version 10 package.

RESULTS

A total of 4151 pregnant women from different trimesters underwent OGTT. The mean age of the population screened was 23.66 ± 3.55 years and the mean BMI was 21.88 ± 3.98. Of them, 739 women (17.8%) were diagnosed with GDM. Among the GDM women, 528 (71.4%) were detected at the first visit. On screening during subsequent visits, GDM was diagnosed in the remaining 211 (28.6%) women who had normal OGTT in the first visit. The demographic details of the GDM women are given in Table 1.

We performed the analysis taking the glycemic level in the first visit of 211 pregnant women who manifested GDM in the subsequent visit. Studies have shown that 2hrPG < 120mg/dl is normal during pregnancy. Taking this value into consideration among the women who turned to have GDM in the subsequent visits, 119 women (56.4%) had 2hrPG ≥ 120mg/dl (Group 1) and the remaining 92 (43.6%) had 2hrPG <120mg/dl (Group 2) at their respective first OGTT testing. The demographic details and the glycemic status of these two cohorts of women are given in Table 2. There was no statistically significant difference between the age and BMI of the two groups of women (P > 0.05).

DISCUSSION

Women with a history of GDM are at increased risk of future diabetes predominantly Type 2 DM as are their children. The extent of the risk depends upon the prompt diagnosis and the care given during the gestational period. The screening for GDM is usually recommended between 24-28 gestational weeks. We may not miss any GDM woman by screening around this period but a substantial number of pregnant women who develop GDM in the early weeks of pregnancy are likely to have a delayed diagnosis and may not receive appropriate medical care. Women diagnosed to have GDM in the early weeks of pregnancy represent a higher risk of sub group and should be promptly identified and managed as pre-GDM. But at the same time, pregnancy induces a state of progressive glucose intolerance as gestation advances. Hence women with NGT in the first visit require repeat screening in subsequent visits.

In our cohort of 4151 pregnant women 739 (17.8%) had GDM. Among this population 528 (71.4%) were detected at first visit. On screening during subsequent visits GDM was diagnosed in the remaining 211 (28.4%) women, who had normal OGTT in the first visit. We performed our analysis taking the glycemic level in the first visit of the 211 pregnant women who manifested GDM in the subsequent visits. For analysis 2 hr PG value of 120 mg/dl was taken as cut off value as this level maximizes both the sensitivity and specificity in predicting macrosomia. Further the occurrence of macrosomia was continuum as 2 hr PG increases from 120mg/dl.10 Tamso et al recommended repeat OGTT at 32 – 34 weeks of gestation for those pregnant women who had 2hr PG < 122.4 mg/dl at gestational weeks ≤ 16.11 But we found in our study that among pregnant women who turned GDM in the subsequent visits, 119 (56.4%) had 2hr PG ≥ 120mg/dl and remaining 92(43.6%) had 2hr PG <120mg/dl. The proportion of GDM was higher (56.4%) among mothers who had 2hr PG ≥ 120mg/dl compared to women who had 2hr PG <120mg/dl (43.6%). The difference in the proportion of GDM between these two cohorts was 13% which was not statistically significant (P=0.05). We observed that irrespective of a 2hr PG ≥ 120mg/dl or < 120mg/dl in the first visit, there are chances for a pregnant woman to develop GDM as pregnancy advances.

CONCLUSION

Pregnant women irrespective of 2hrPG ≥ or<120mg/dl at initial visit, manifested GDM in the subsequent visits. No glycemic level in the early weeks of pregnancy predicted GDM and at the same time at no statistically significant glycemic cut off level could we say that a woman will not develop GDM. Hence rescreening in the
subsequent trimesters or visits is essential in women who had NGT in the initial visit.

Acknowledgement
Our sincere thanks to World Diabetes Foundation (Denmark) for funding this study and make it happen.

REFERENCES