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ScienceDirect
Diabetes Research and Clinical Practice 77 (2007) 482–484
DIABETES RESEARCH AND CLINICAL PRACTICE
www.elsevier.com/locate/diabres

Brief report

Gestational diabetes mellitus manifests in all trimesters of pregnancy

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Received 22 December 2006; accepted 8 January 2007
Available online 9 February 2007

Abstract

Screening for GDM is usually performed around 24–28 weeks of gestational age. We undertook a study to estimate the prevalence of glucose intolerance during different trimesters, as data in this aspect is sparse.

A total of 4151 consecutive pregnant women irrespective of gestational weeks attending antenatal health posts across Chennai city underwent a 75 g OGTT recommended by WHO and diagnosed GDM if 2hr PG value ≥140 mg/dl. Women who had normal OGTT at the first visit were screened with a repeat OGTT at the subsequent visits.

Among the screened, 741 women (17.9%) had 2hr PG ≥ 140 mg/dl and were identified to have gestational diabetes. Analysis based on gestational weeks revealed that out of the 741 GDM women, 121 (16.3%) were within 16 weeks, 166 (22.4%) were between 17 and 23 weeks and 454 (61.3%) were more than 24 weeks of gestation. Observation in this study was that 38.7% developed gestational diabetes even prior to 24th week of gestation. Out of the total 741 GDM women, 214 (28.9%) were diagnosed on repeat testing at subsequent visits.

Glucose intolerance occurs in the early weeks of gestation. Women who had normal glucose tolerance in the first visit require repeat OGTT in the subsequent visits.

Keywords: Gestational diabetes mellitus (GDM); Oral glucose tolerance test (OGTT); 2 h plasma glucose (2hr PG); World Health Organisation (WHO); Glucose oxidase peroxidase (GOD–POD)

GDM is defined as carbohydrate intolerance of varying degrees of severity with onset or first recognition during pregnancy. The diagnosis of GDM has implications beyond the index pregnancy in that, women with GDM are at increased risk of future diabetes, predominantly Type 2 DM as are their offsprings [1]. This observation indicates that universal screening for glucose intolerance is necessary during pregnancy. The usual recommendation is to do a selective screening and that too during 24–28 weeks of pregnancy. This policy of screening in the third trimester has resulted in a significant number of pregnant women delivering big babies despite good glycemic control [2]. Whereas, an early screening for glucose intolerance and care, has resulted in the

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0168-8227/$ – see front matter
doi:10.1016/j.diabres.2007.01.001

reduction of some of the hyperglycemia related complications [3]. We believe from these studies that screening and diagnosing glucose intolerance in early pregnancy is prudent. As no data is available on the prevalence of glucose intolerance 'during different trimesters' in our population, we undertook this focused study.

1. Materials and methods

This was a community based study involving 4151 antenatal women. All antenatal women irrespective of gestational weeks attending the antenatal health posts across Chennai city were enrolled in this study. Women with a history of pre-gestational 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 h. Diagnosis of GDM was made if the 2 h post glucose was $\geq$140 mg/dl (WHO criteria) [4]. The plasma glucose was estimated by the GOD POD method in the central laboratory using Hitachi auto-analyzer. Women, who had normal OGTT results at the first visit, were screened with a repeat OGTT at the subsequent visits and followed throughout pregnancy. HbA1c was not estimated as this was a community based study.

2. Results

A total of 4151 antenatal women from different trimesters underwent the OGTT. The mean age was 23.66 $\pm$ 3.55 years.

Out of this population, 741 (17.9%) had 2hr PG $\geq$ 140 mg/dl and were identified as GDM. Analysis on the gestational weeks of a total of 741 (17.9%) GDM women revealed that 121 (16.3%) were within 16 weeks of gestation, 166 (22.4%) were between 17 and 23 weeks of gestation and 454 (61.3%) women were more than 24 weeks (Fig. 1). Thus in our study, among the 741 antenatal women, 38.7% had developed gestational diabetes even prior to 24th weeks of gestation. Among the 121 pregnant women in whom GDM was diagnosed within 16 weeks of gestation, six (4.96%) of them had a 2hr PG $\geq$ 200 mg/dl, indicating that these women were more likely to be pre-GDM.

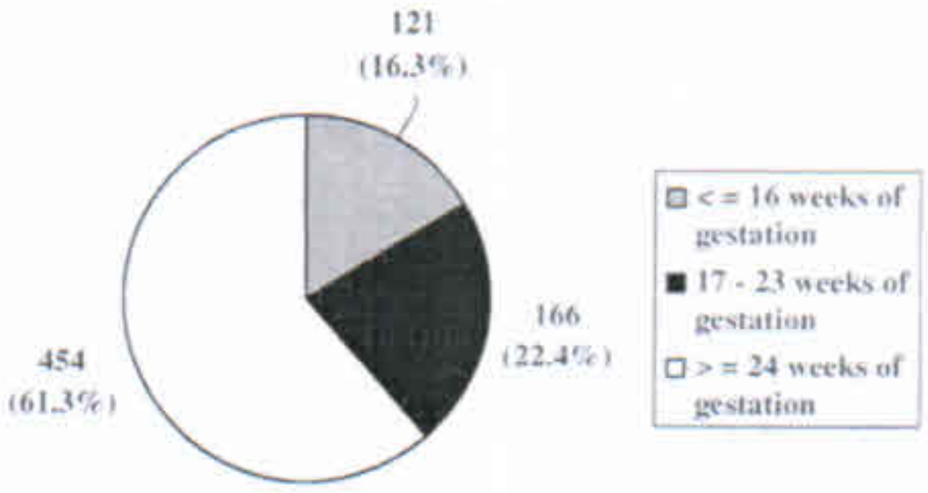

Fig. 1. Prevalence of GDM in different trimesters.

Another important observation was the occurrence of glucose intolerance on follow up, in a significant number of pregnant women, whose glucose tolerance was normal in the first visit. Out of the total 741 GDM women, 214 (28.9%) were diagnosed on repeat testing at subsequent visits.

3. Discussion

The screening for glucose intolerance is usually performed around 24–28 weeks of gestation. But a statistically significant number of GDM mothers deliver big babies despite good glycemic control in the third trimester [2]. This is due to the influence of maternal hyperglycemia in the early weeks of gestation on fetal growth [5]. Studies have also shown an increase in beta cell mass and insulin secretion in fetuses of poorly controlled diabetic women by the 16th week of gestation [6]. The priming of the beta cell mass in early gestation may account for the persistent fetal hyperinsulinaemia throughout pregnancy and the risk of accelerated growth, even when the mother enjoys good metabolic control in the later half of pregnancy [7].

In our study, 38.7% were detected to have glucose intolerance prior to 24 weeks and the remaining 61.3% beyond 24 weeks of gestation. There are reports that claim about 40–66% of women with GDM can be detected early during pregnancy [8,9].

These studies stress the need for screening for GDM during the early weeks of gestation. We may not miss any GDM by screening around 24–28 weeks of gestation, but a substantial number of pregnant women who develop GDM in the earlier weeks of pregnancy are likely to have a delayed diagnosis and may not receive appropriate medical care. Evidence shows that early screening for glucose intolerance and care could avoid some diabetes related complications in women with gestational diabetes [3]. Further the risk of macrosomia is continuum as the glycemia increases. The ideal period to screen for GDM is around 16 weeks of gestation and even earlier in high risk groups with a history of fetal wastage [10]. Woman with normal glucose tolerance in the first visit are to be advised to undergo glucose tolerance test in the subsequent visits atleast up to 36th week, if not beyond [11]. In our study, out of 741 GDM women 214 (28.9%) were detected during screening at subsequent visits, stressing the need for repeat screening of those women who were found to have normal blood glucose levels in the first visit. This study also confirms that glucose intolerance manifests

in the early weeks of pregnancy. The chances are that, a pregnant woman may be a pre-GDM or GDM in whom the glucose intolerance was detected in the early weeks of pregnancy; all the more validating that the screening needs to be performed in the early weeks of gestation. The estimation of A1c may help in distinguishing a pre-GDM from an early onset GDM, but this differentiation is of no consequence in clinical practice, as the treatment approach is going to be the same.

In our study, we observed glucose intolerance occurring in all the trimesters of pregnancy. GDM was detected on follow up in a significant number of women who had normal glucose tolerance in the first visit. This study emphasizes the need for repeat OGTT atleast upto 36 weeks of gestation if not beyond. Early screening gives an early opportunity to institute appropriate management.

Acknowledgement

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

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