

# Significance of Oral Glucose Challenge Test at first antenatal visit for screening for Diabetes Mellitus

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## Abstract

**Objectives:** To study the significance of oral glucose challenge test as early screening for diabetes before 20 weeks of pregnancy

**Methods:** Two hundred seventeen consenting pregnant women attending antenatal clinic for first visit at gestation earlier than 20 weeks were on registration, administered a 1-hour 50g oral glucose challenge test. Women with abnormal test (plasma value of  $\geq 140$ mg/dL) were subjected to 3-hour 100g oral glucose tolerance test. Reevaluation with OGTT was done at 24-30 weeks of pregnancy in women with normal OGCT and those with abnormal OGCT but normal OGTT in early pregnancy.

**Results:** Overall incidence of abnormal OGTT was 8.2 per cent. Early OGCT identified 44.4 per cent, higher among women with high risk pregnancies. There was no significant difference in maternal and neonatal outcomes among groups with detection of abnormal OGTT before 20 weeks and those after 24 weeks pregnancy.

**Conclusions:** OGTT performed in first half of pregnancy will help to detect the abnormality early and permit further evaluation and intervention resulting in improved perinatal outcome.

## INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance of varying degrees of severity with onset or recognition during pregnancy (1). It does not recognize the possibility that unrecognized glucose intolerance may have antedated or begun concomitantly with pregnancy.

Prevalence of GDM may range from 1-16 per cent of all pregnancies, depending on the population studied and the diagnostic tests employed (2). Screening programs coupled with intervention strategies (diet or diet plus insulin) have reduced the perinatal morbidity and mortality associated with GDM. However, despite these interventions, the perinatal morbidity for GDM is still twice as that for mothers with normal carbohydrate tolerance during pregnancy (1). A possible explanation for the persistent higher perinatal morbidity for GDM may be the late

diagnosis. Current recommendations are to perform the oral glucose challenge test (OGCT) at 24-28 weeks of pregnancy. However, this leaves a short time of 12-14 weeks to institute appropriate interventions. In spite of reports claiming 40-66 per cent identification of abnormal glucose tolerance if carried out early in pregnancy (3, 6), there have been conflicting reports on the usefulness of screening for GDM at first antenatal visit (4, 5).

Since the key issue in the successful management of GDM is the early diagnosis and treatment, the present study was designed to determine the significance of studying the behavior of OGCT before 20 weeks of gestation.

## SUBJECTS AND METHODS

Pregnant women registering for antenatal check before 20 weeks were administered 50g of glucose orally regardless of time of previous meal and an hour later venous blood was collected for glucose determination (Oral Glucose Challenge

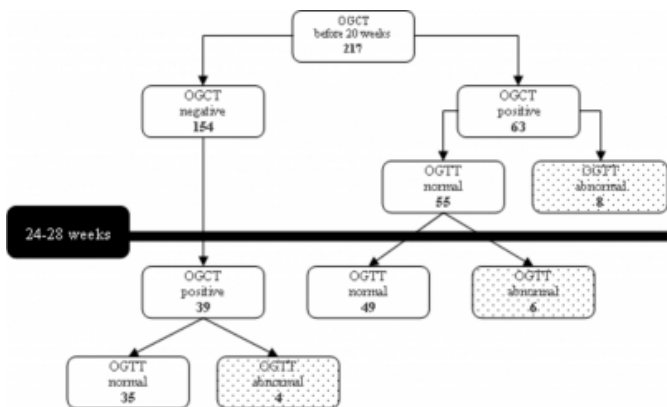
Test, OGCT). A plasma glucose value of  $\geq 140\text{mg/dL}$  was considered as abnormal. Women with abnormal OGCT were followed by 100g, 3h oral glucose tolerance test (OGTT). National Diabetic Data Group criteria were used to infer the test result. Women with normal OGCT at first visit were resubjected to OGCT as standard practice at 24 – 30 weeks of gestation and if abnormal, were followed up with OGTT as above. Women with abnormal OGCT but normal OGTT in early pregnancy underwent repeat OGTT at standard time. Cases with abnormal OGTT before 20 weeks of pregnancy were grouped as early GDM and those after 24 weeks as late GDM. Treatment for GDM was as per the practice at the institute. Maternal and neonatal outcomes in both groups were studied. Those with overt diabetes were excluded.

To determine the significance of differences in observations made, the statistical evaluation applying Z test, Fischer exact test and/or student – t test as appropriate was carried out. Statistical significance was set at 95% level. ( $p < 0.05$ ).

**RESULTS AND DISCUSSION**

During the study period 217 consecutive women attending the antenatal clinic before 20 weeks of pregnancy for the first time were recruited, and risk background for development of GDM was present in 94 (43.3%) cases. The OGCT at this visit revealed abnormal test in 29 per cent of them and the follow up OGTT was abnormal in 3.6%. Of 55 women who had positive screen at first antenatal visit but normal OGTT, six of them were diagnosed to have GDM on repeat OGTT at 24-30 weeks. Of the 154 women having negative glucose screening at first antenatal visit, 25.3% had positive screens on repeat testing at 24 – 30 weeks, and 2.5% were diagnosed as having gestational diabetes. In all, there were 10 cases that were diagnosed to have GDM late.(Fig 1)

**Figure 1**



In total 18 women were found to have gestational diabetes

mellitus. Overall incidence was 8.2%. Eight were diagnosed during early pregnancy and the other ten had normal glucose tolerance results during early pregnancy but had developed GDM later. Early glucose screening identified 8 (44.4%) of gestational diabetics.

There were 94 women who had one or the other factors assigning high risk nature for pregnancy. Even among the pregnancies at low risk the incidence of GDM was 3 percent (4 of 123 cases) with a case diagnosed at initial visit. Among the high risk pregnancies, proportion of cases diagnosed as GDM was 5 times higher and seven of 14 cases could be identified in first trimester.

Present study reiterates that screening early in first trimester leads to diagnosis of GDM in the early part of pregnancy. Dittakarn et al, also showed the usefulness and effectiveness of early GDM screening, that approximately half of women with GDM could be diagnosed early in their pregnancies. Similarly Meyer et al, detected 40% of gestational diabetes with early screening protocol. Factors associated with early detection of glucose intolerance in his study was maternal age > 30 years and presence of risk factors.

Occurrence of preeclampsia and urinary tract infection were higher in women with early diagnosis of GDM. There was no difference in the rate of preterm labor between two groups (Table1). Bartha et al, who compared pregnancy complications, obstetric

**Figure 2**

Table 1: Pregnancy outcomes

Complication	Early GDM n	Early GDM (%)	Late GDM n	Late GDM (%)	Significance ( $\chi^2$ )
<u>Maternal Outcome</u>					
Preeclampsia	2	(25)	1	(10)	NS
UTI	3	(37.5)	2	(20)	NS
<u>Neonatal Outcome</u>					
Preterm	1	(12.5)	1	(10)	NS
Term AGA	7	(87.5)	8	(80)	NS
Term SGA	0		1	(10)	NS
Preterm AGA	0		1	(10)	NS
Preterm SGA	1	(12.5)	0		NS
Hyperbilirubinemia	3	(37.5)	5	(50)	NS

and perinatal outcomes between women with early onset and late onset GDM showed that women with early onset GDM were more likely to have hypertension. There was no difference in ratio of preterm labor. Nor was there any significant difference in neonatal outcomes in either groups i.e. between early detected gestational diabetics and in whom gestational diabetes was diagnosed at 24 – 30 weeks. But for

higher number of cases of neonatal hypoglycemia in early GDM group, Bartha et al, found comparable neonatal outcomes as that with traditional diagnosis. It is presumable that early onset GDM might be Type II pregestational diabetes.

Although course and pregnancy outcomes were similar in the two groups studied, the diagnosis of abnormal glucose screen test in 44 percent of women with gestational diabetes is in itself a significant finding. These cases could be pregestational type II diabetics. It is possible that the early identification of these cases resulted in an intensive antenatal supervision and reduced rate of diabetes related complications. However, a larger multicentric study is required to conclude.

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