

Screening Test: OGCT Verses Bloods Sugar Levels Fasting and Post Prandial) in 24 to 28 Weeks of Pregnancy

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Abstract

Introduction: The present study aimed to assess OGCT and BSL (fasting and post prandial) as a mode of screening of GDM in pregnancy. The study was intended as there is considerable controversy regarding the type and timing of test used to screen for GDM.

Methods: A total of 500 antenatal patients matching the inclusion and exclusion criteria was taken up for this study. Each subject was asked to consume 75g OGCT and was also asked to do fasting and post prandial blood sugars within 1 week and values were noted and compared.

Results: Out of 500 women in the study, 247 had impaired blood sugar parameters as per oral glucose test, in the form of impaired oral glucose test (28%), gestational diabetes (17.4%) and frank diabetes (3.2%). 232 women has impaired fasting levels (46.4%). Astonishingly only 75 women had deranged post prandial values. The correlation of OGCT to BSL fasting was found to have statistical significance with p value 0.01 and as noted in (table), OGCT and fasting BSL have a good correlation. On the contrary the correlation of OGCT with abnormal PP was insignificant.

Conclusion: Fasting glucose measurement performs comparably to 75-g OGCT, but post prandial glucose does not.

Keywords: GDM; Gestational Diabetes Fasting Sugar; OGCT - Oral Glucose Challenge Test; Post Prandial Sugars; Screening.

Introduction

Gestational diabetes mellitus (GDM) poses many challenges to screening and diagnosis. There is more than one diagnostic test and no agreed gold-standard. There are several threshold criteria for the tests that are currently used, and no agreement on which criteria best identifies women at risk of poor outcomes. Hence it is of immense importance that we can find a unison on how to screen for GDM, while making sure we do not over diagnose or under diagnose the condition.¹

There is also considerable controversy regarding the type and timing of blood tests with which to diagnose GDM. The ACOG and USPSTF favour a two-step 50g glucose challenge test (GCT) and a confirmatory test using the 100g Oral glucose tolerance test (OGTT).² The WHO, ADA and IADPSG advise a one-step 75g OGTT with blood sugar level assessment at baseline and at 1 and 2h after the glucose load. The NICE guidelines recommend a 75g OGCT with glucose measurement at baseline and at 2h post load. Multiple studies have suggested that tests such as fasting plasma glucose³ or random plasma glucose (RPG)¹ might have validity in screening for GDM.

This study was aimed at assessing the screening methods of GDM and the effectiveness of OGCT and Fasting and Post Prandial BSL.

Methods

Study Area: Department of Obstetrics and gynecology in a tertiary care hospital, Bharati hospital and research centre at Bharati Vidyapeeth (Deemed to be University), Pune.

Study Design: A Prospective, observational, Clinical study

Study Duration: October 2017 to June 2019.

Inclusion Criteria

1. Completed 18 years of age.
2. Antenatal patients within 24 to 28 weeks of pregnancy.

Exclusion Criteria

Women having

1. Prepregnancy diabetes/Overt diabetes
2. Diagnized case of GDM
3. Comorbidities like PIH, Thyroid disorders, Heart disease

Methodology: The women were screened for gestational diabetes mellitus in pregnancy. Values of OGCT was documented under deranged (OGCT 119-139/mg/dl), GDM (139-199 mg/dl) and overt diabetes (>199/mg/dl) and similarly fasting (BSL> 100 mg/dl)post prandial (BSL> 140 mg/dl) levels were documented under abnormal as per ADA criteria 2013.

Statistical Analysis: All the collected data was entered in Microsoft Excel Sheet 2007. The data was then transferred and analyzed using SPSS ver. 17. Qualitative data was represented in the form of frequency and percentage while quantitative data was represented using Mean +/- S.D. Appropriate statistical evaluation was carried out as per the type and distribution of data. Screening parameters (sensitivity, specificity, etc.) of DIPSI criteria as compared to gold Standard (ADA criteria) was calculated using standard formulae. A p-value of < 0.05 was taken as level of significance.

Results

A positive correlation of OGCT to BSL fasting with statistical significance of p value 0.01 was noted.

(Table 1). On the contrary the correlation of OGCT with abnormal post prandial was insignificant.

Table 1: The relation of the fasting and post prandial insignificant OGCT.

OGCT	Fasting		PP	
	Normal	Abnormal	Normal	Abnormal
Abnormal (n-247)	153 61.9%	94 38.1%	207 83.8%	40 16.2%
Normal (n-253)	115 46.6%	138 55.9%	218 88.3%	35 14.2%
Total	268	232	425	75
p- value	<0.01		0.53	

The study population has 87.4% of women 21-35. 48% of women in 21-35 years age group had DGT. Prevalence was highest in ages greater than equal to 35 years (57.1%) followed by age group less than 20 (56%). The correlation of DGT to abF shows that 100 percent of DGT of age >35 had abnormal fasting levels and half of them had abnormal PP blood sugar levels.

It can be concluded that DGT has better correlation with fasting blood sugars than with post prandial blood sugar levels with respect to age. 5.2% were educated below secondary school.

Primary education to postgraduate education for DGT and abF was well corelated. 43.6% were primigravida and 52.2% of these primigravida had DGT. 50% of gravida 2-4, 33.3% of gravidity of 5 had DGT. 48% of primigravida, and 42-45% of multigravidas had abnormal fasting levels.

98 women having 1 abortion 45.9% had DGT while 47.9% had abF and 12.4% had abPP. DGT was noted in 50 % in women with 2 abortions, while 29% had abF and 16.67% had abPP.

Interrelationship of DGT and fasting showed concordance while none were comparable for DGT and ab PP.

Among the 500 women in the study, 247 had impaired blood sugar parameters as per oral glucose test, in the form of impaired oral glucose test (28%), gestational diabetes (17.4%) and frank diabetes (3.2%). Out of 500 women enrolled, 232 women had impaired fasting levels (46.4%). 75 women had deranged post prandial values.

Participant baseline characteristics and outcome measures are summarized in following (Table 2).

Table 2: Participant baseline characteristics and outcome measures.

Age group (yrs.)	N	Deranged OGGT	%	Abnormal BSL F	%	Abnormal BSL PP	%
</= 20	41	23	56.1%	19	46.3%	5	12.2%
21-25	210	94	44.8%	94	44.8%	28	13.3%
26-30	168	90	53.6%	85	50.6%	29	17.3%
31-35	60	28	46.7%	22	36.7%	8	13.3%
> 35	21	12	57.1%	12	57.1%	5	23.8%
Education	N	DGGT	%	F	%	PP	%
Uneducated	4	3	75.0%	3	75.0%	2	50.0%
Primary	22	8	36.4%	8	36.4%	1	4.5%
Secondary	187	89	47.6%	85	45.5%	31	16.6%
Graduate	210	113	53.8%	98	46.7%	29	13.8%
PostGraduate	77	34	44.2%	38	49.4%	12	15.6%
Gravidity	N	DGGT	%	F	%	PP	%
1	218	114	52.3%	105	48.2%	35	16.1%
2	185	86	46.5%	84	45.4%	27	14.6%
3	65	30	46.2%	28	43.1%	9	13.8%
4	26	15	57.7%	11	42.3%	4	15.4%
5	6	2	33.3%	4	66.7%	0	0.0%
Abortions	N	DGGT	%	F	%	PP	%
1	98	45	45.9%	47	48.0%	12	12.2%
2	24	12	50.0%	7	29.2%	4	16.7%
3	4	3	75.0%	2	50.0%	0	0.0%

Discussion

We assessed Oral glucose challenge test values (OGCT) and blood sugar levels-fasting and post prandial values of antenatal women in 24-28 weeks of pregnancy and to compare and evaluate the accuracy of the two tests when done within one week. We found out of 500 women in the study, 247 had impaired blood sugar parameters as per oral glucose test, in the form of impaired oral glucose test (28%), gestational diabetes (17.4%) and frank diabetes (3.2%). 232 women had impaired fasting levels (46.4%). Astonishingly only 75 women had deranged post prandial values.

This is in accordance with the study printed in British medical journal in 2017⁴ where they have mentioned, fasting blood sugar levels has high true positive rate and test performance was very good, thereby it is valuable in excluding GDM and minimizing overdiagnosis. In another study in USA, 7% reduction in missed cases of GDM was noted when using fasting blood sugar in screening.^{4,5}

Criticism of OGCT include the time and cost involved, the taste may be unpleasant to some leading to deranged compliance to the test with respect to time complete consumption. The test constitutes a supra-physiological glucose load and is not related to body weight. Precision in testing and methodology is also criticized while performing OGCT.

Limitations include being tertiary referral centre and an educational institute in a metropolitan city the data analyzed could have been the different with respect to age, parity, education and gravidity.⁶ Difference in post prandial test values could be attributed to irregular testing methods of post prandial BSL.

Conclusion

The study concluded that a positive correlation exists when fasting blood sugar levels are analyzed while comparing it with oral glucose challenge test. Our study has shown that the OGCT and fasting BSL are comparable. Therefore considering the tedious methodology of OGCT (viz buying medicated sugars, consuming within 20 minutes in the hospital and reporting back to laboratory exactly after 2 hours etc) and the cost of OGCT is higher in comparison with fasting BSL, BSL Fasting can be preferred.

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