

Diagnosis of Gestational Diabetes in Females and Comparison of Glucose Challenge Test Versus Glucose Tolerance Test

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ABSTRACT

Objective: To compare the glucose challenge test versus glucose tolerance test for diagnosis of gestational diabetes in females.

Study Design: Cross sectional study.

Place and Duration of Study: Department of Medicine/Gynaecology and Obstetrics, Social Security Teaching Hospital Multan Road, Lahore from September 2018 to September 2019.

Materials and Methods: This study included 200 cases of female patients. It was measured when glucose challenge test and glucose tolerance tests were performed for diagnosis of gestational diabetes mellitus either both positive or negative cases which show comparison between GCT and GTT i.e. 85.54% for diagnosis of GDM in females.

Results: Total of 200 patients, age ranged from 20-45 years. The mean age was 24.83±4.75 years. The mean gestational age was 24.86±2.12 weeks. There were 122 (61%) patients diagnosed with glucose challenge test and 108 (54%) patients were diagnosed with glucose tolerance test which is statistically significant (p 0.001).

Conclusion: It is concluded that in screening for gestational diabetes mellitus, the glucose challenge test is more useful than the glucose tolerance test.

Key Words: Gestational diabetes, Glucose challenge test, Glucose tolerance test

Citation of article: Aslam I, Farhan A, Iftikhar G. **Diagnosis of Gestational Diabetes in Females and Comparison of Glucose Challenge Test Versus Glucose Tolerance Test. Med Forum 2020;31(2):74-76.**

INTRODUCTION

Gestational diabetes is characterized as carbohydrate intolerance resulting about hyperglycemia of variable severity with beginning or first acknowledgment during pregnancy whether or not diabetes perseveres after pregnancy. Diabetic pregnancies are particularly in high risk group is related with expanded risk of congenital anomalies of embryo, early premature deliveries, hypertension, fetal macrosomia and obstructed labour. Gestational diabetes mellitus is also more common in obese women with sedentary life style. It has been proven that babies born to diabetic Asian mothers compared with diabetic Caucasian mothers have worse outcome.^{1,2,3}

In screening for gestational diabetes mellitus (GDM), 50gm glucose challenge test is more valuable than the arbitrary glucose test. The test evaluates the ability to metabolize glucose, the body's primary source of energy.

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Received: October, 2019

Accepted: December, 2019

Printed: February, 2020

All pregnant females ought to be screened for gestational diabetes but selective screening on the basis of risk factors is highly effective.^{4,5}

The glucose challenge test (GCT) is typically ordered between 24-28 weeks of pregnancy. Pregnant women who are at higher risk of developing gestational diabetes may be screened earlier between 12 and 14 weeks of pregnancy. Screening and diagnosis of gestational diabetes is important to anticipate fetomaternal complications. The plasma glucose value of 140mg/dl in the GCT should be used because of its high sensitivity (70.2%) and specificity (89.1%) as screening value. In the given reference agreement between GCT and gestational tolerance test (GTT) is 88.45%. Gestational diabetes mellitus is unlikely to be present if venous plasma glucose is less than 140mg/dl, one hour after administration of 50gm oral glucose load at 24-28 week gestational age. The sensitivity of 75gm glucose tolerance test 2 hours after glucose load is 90% and specificity is 93%.^{6,7,8}

Prevalence of GDM is 0.6%-15% globally and 8% in Pakistan. As GCT is achievable regarding better detection rate, time saving, less cost because of repeated visits to hospital and less repeated sampling, it can help in decrease in perinatal morbidity, identify females at risk of future type 2 DM and gives opportunity for life changes. Morbidity identify in females at danger of future type 2 DM and gives opportunity for life changes.^{9,10}

MATERIALS AND METHODS

This study was done in Medicine/Obstetrics and Gynaecology Department at Social Security Teaching Hospital, Multan Road, Lahore from September 2018 to

September 2019 and included 200 cases calculated who fulfill the criteria. The age range of patients was >20 years with family history of diabetes. It was measured when both GCT and GTT agreed for diagnosis of GDM either positive or negative cases which show frequency between GCT and GTT i.e. 85.54% for diagnosis of GDM in females. All patients were presented after 24 weeks of gestation by early dating scan. Informed consent was taken. Demographic profile (name, age, gestational age etc) were maintained 50gm glucose challenge test and blood glucose were estimated after 1 hour of 50gm glucose load and was noted. The patient was given date for 75gm, GTT in laboratory and patients was subjected to 75gm OGTT after overnight fast, blood sugar level was checked after 2 hours and findings were noted to assess agreement between GCT & GTT. Each patient was enrolled as study patient only when she was complete both diagnostic tests.

RESULTS

A total of 200 patients were included in this study and age range from 20-45 years and divided in two age groups. A major portion of patients were 184 (92%) in age group between 20-30 years. Sixteen (8%) patients were >35 years of age and mean age was 24.83 ± 4.75 years (Table 1). 116 (58%) patients were gestational age from 24-26 weeks while 84 (42%) patients from 27-29 weeks of gestation age and mean gestational age was 24.86 ± 2.12 weeks (Table 2).

Table 3 shows the frequency of gestational diabetes diagnosed by glucose challenge test. There were 122 (61%) patients who had gestational diabetes and 78 (39%) patients had no gestational diabetes. In Table 4 there were 108 (54%) patients who had gestational diabetes while 92 (46%) patients had no gestational diabetes of glucose tolerance test.

In comparison between glucose challenge test and glucose tolerance test, 122 (61%) patients were diagnosed with glucose challenge test and 108 (54%) patients who were diagnosed with glucose tolerance test respectively (p 0.001) (Table 5).

Table No.1: Age distribution of patients (n=200)

Age in years	No.	%
20-35	184	92.0
>35	16	8.0
Total	200	100.0
Mean±SD	24.83±4.75	

Table No.2: Gestational age of patients

Gestational age (weeks)	No.	%
24-26	116	58.0
27-29	84	42.0
Mean±SD	24.86±2.12	

Table No.3: Frequency of gestational diabetes diagnosed by glucose challenge test

Gestational diabetes	No.	%
Yes	122	61.0
No	78	39.0

Table No.4: Frequency of gestational diabetes diagnosed by glucose tolerance test

Gestational diabetes	No.	%
Yes	108	54.0
No	92	46.0

Table No. 5: Comparison of gestational diabetes of glucose challenge test vs glucose tolerance test

Glucose Challenge Test		Glucose Tolerance Test		P value
No.	%	No.	%	
122	61.0	108	54.0	0.001

DISCUSSION

Gestational diabetes mellitus is a major obstetrical problem so its screening and diagnosis is important to reduce the fetomaternal complications.¹¹ It is related with critical fetal and neonatal morbidity and mortality. The mean age of patients was 24.83 ± 4.75 . Most of the patients were between 20-35 years of age because some females pick pregnancy during the later long periods of life, although most of them develop obvious diabetes.¹² In our study the gestational age of patients from 24-29 weeks. The mean age of gestational patient was 24.86 ± 2.12 weeks which is comparable with Hassan¹³, the mean gestational age was 30.42 weeks which was consistent with most world studies in which it is viewed as the disease influencing the females at advance age.¹⁴ A similar study done Adegbola the gestational age range from 24 to 28 weeks which is comparable with our study.⁸

In our study the frequency of gestational diabetes mellitus is 62% of patients which is slightly high with another study conducted by Hassan the frequency of gestational diabetes mellitus was 43 per 1000 (4.3%) pregnancies and incidence of IGT was 17 per 1000 (1.7%) cases.¹⁵ In another study carried out by Lolemans¹⁶, a portion of factors contributing to this high occurrence are poverty and ignorance. Individuals are generally not aware of dietary and caloric values of food and suggestions on body weight and health. The circumstance is further emphasized during pregnancy, wherein the females are usually encouraged to take the food for two time. This prompts to obesity and unfortunately, this is taken as an indication of beauty and health in a large portion of rural people.

Among various screening test commonly used were glucose challenge test and glucose tolerance test. In this study the glucose challenge test in 122 (61%) patients and 108 (54%) patients were diagnosed respectively. The gestational diabetes mellitus according to glucose challenge test is 61% of patients while gestational diabetes with glucose tolerance test is 54%. Agarwall et al¹⁷ reported in their study which shows that fasting plasma glucose at threshold 4.7mmol/L has sensitivity of 78.1% and specificity of 32.2% which is comparable to current study. This study concluded that due to high false positive rate fasting plasma glucose is inappropriate test for screening which is same as in my study. A study was done by Agarwal et al¹⁷ about utility of fasting plasma glucose as screening test which shows sensitivity of fasting blood sugar is 85% but specificity

is poor with WHO criteria which is comparable to current study. Another study reported by Wallace et al about the comparison of fasting plasma glucose and glucose challenge test (GCT) which showed get yield better specificity than FPG for comparable level of sensitivity which is same as in current study so GCT is better than FPG.¹⁸

Benhalima¹³ done a study about the screening of gestational diabetes which showed that 50gm GCT has high predictive value to diagnose gestational diabetes and impaired glucose intolerance disorders which is comparable to our study. A study was carried out by Ramos et al¹⁹ which showed that fasting blood glucose is an easier screening test yet it requires diagnostic test in 30% as compared to 14% require diagnostic test with GCT so diagnostic accuracy of GCT is more as compared to fasting FPG.

CONCLUSION

It is concluded that glucose challenge test is a useful diagnostic tool to detect gestational diabetes mellitus in high risk pregnancies, depending upon the high frequency of number of risk factors in each individual. It will not just improve the perinatal outcomes but also enable us to distinguish ladies in danger of creating diabetes in future. These potential diabetic females can be cautioned of that future occurring and encouraged to adopt preventive measures to end or delay that procedure.

Author's Contribution:

Concept & Design of Study: Imran Aslam
 Drafting: Attiya Farhan
 Data Analysis: Ghazala Iftikhar
 Revisiting Critically: Imran Aslam, Attiya Farhan
 Final Approval of version: Imran Aslam

Conflict of Interest: The study has no conflict of interest to declare by any author.

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