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Original Research Article

Does mild hyperglycemia in 75gm Glucose Tolerance Test (GTT) affect outcome in pregnant women?

Karthiga Prabhu J.*, Muthulakshmi M.

Department of Obstetrics and Gynecology, SRM Medical College Hospital and Research Centre, Potheri, Kanchipuram, Tamil Nadu, India

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***Correspondence:**
Dr. Karthiga Prabhu J.,
E-mail: j.karthigaprabhu@gmail.com

ABSTRACT

Background: Glucose tolerance in pregnancy is fundamentally linked to fetal growth. The relationship between maternal glycemia and adverse outcomes is a continuous process, with no distinct cut off point for increased risk. The objective of the study is to find out whether mild hyperglycemia in 2 hour 75 gm Glucose Tolerance Test (GTT) affects maternal and perinatal outcome in pregnant women.
Methods: This case control study was conducted in SRM Medical College during a 10-month period. Mild hyperglycemia was diagnosed when the - 2hour non- fasting 75gm GTT was between 120-139 mg/dl and Controls were women with 2hour nonfasting 75gm GTT <120mg/dl. Maternal and neonatal parameters were noted and the results were compared.
Results: During the study period 142 delivered women had mild hyperglycemia, of which 10 patients on subsequent blood sugar monitoring required insulin for blood sugar control. There was significant family history of diabetes in women with mild hyperglycemia when compared to controls. There was no significant difference in incidence of hypertension, hypothyroidism, preterm delivery and caesarean section between the two groups. LGA (Large for gestational age babies) (p=0.001) and serum triglyceride levels (p=0.04) were significantly more in women with mild hyperglycemia when compared to controls.
Conclusions: Mild hyperglycemia during pregnancy should not be ignored and periodic blood sugar monitoring should be done to improve maternal and fetal outcome.

Keywords: GDM, Glucose tolerance test, Hyperglycemia in pregnancy, Impaired glucose tolerance, Large for gestational age (LGA) babies

INTRODUCTION

Increasing carbohydrate intolerance in pregnant women is associated with a graded increase in adverse maternal and fetal outcomes.[1] Untreated GDM is associated with a higher incidence of complications during pregnancy and increased perinatal mortality and morbidity.

Glucose tolerance in pregnancy is fundamentally linked to fetal growth. Glucose is the main energy substrate for intrauterine growth and is transmitted steadily from mother to fetus. Pedersen hypothesized that in maternal diabetes, hyperglycemia leads to fetal hyper-insulinemia and increased utilization of glucose and, hence, increased fetal growth.[2] This is supported by observations in gestational and pregestational diabetes where higher glucose concentrations, particularly post meal, predict greater infant birth weight.[3]

A relation between maternal glucose and fetal growth also exist in women who do not have diabetes.[4] In India, Gestational diabetes is diagnosed and treated when 2hour

non-fasting 75gm GTT was ≥140mg/dl.[5] The relationship between maternal glycemia and adverse outcomes is a continuous process, with no distinct cut off point for increased risk.[6]

The objective of the study is to find out whether mild hyperglycemia in 2 hour 75 gm GTT (120-139 mg/dl) affects maternal and perinatal outcome in pregnant women.

METHODS

This case - control study was conducted in SRM Medical College Hospital and Research Centre during a 10 month period. All patients delivered during the study period were divided into 3 groups based on 2hour non- fasting 75gm GTT - Gestational diabetes (≥140 mg/dl), Mild hyperglycemia (120-139 mg/dl) and Controls (<120mg/dl). Women with gestational diabetes and pregestational diabetes were excluded from the study. Maternal and neonatal parameters were noted and the results were compared between women with mild hyperglycemia and controls.

Statistical Analysis was done using Graph pad Instat 3 and SPSS 12 Software. P value <0.05 was considered significant.

RESULTS

Total number of deliveries during the ten month study period was 1027. Among the delivered mothers 142 women had mild hyperglycemia, of which 10 patients required insulin for blood sugar control on subsequent blood sugar monitoring.

Table 1: Maternal characteristics between women with mild hyperglycemia and controls.

	Cases (142)	Controls (827)	p
Mean age (yrs)	26.38±3.92	25.51±3.67	0.14
<20yrs	4 (3.1%)	13 (1.5%)	
20-29yrs	113 (79.6%)	711(85.9%)	
30-34 yrs	22 (15.6%)	84 (10.1%)	
>35yrs	2 (1.5%)	19 (2.3%)	0. 38
Parity			
Primipara	60 (42%)	299 (36%)	0.18
Previous history of pregnancy loss	15 (10.5%)	65 (7.85%)	0.32
History of GDM in previous pregnancy	6 (4.2%)	2 (0.02%)	-
Family history of diabetes	42 (29.5%)	36 (4.3%)	0.03*
BMI			
25-29.9kg/m^2 (overweight)	32 (22.5%)	144 (17.4%)	0.15
>30kg/m^2(obesity)	18 (12.6%)	75 (9.06%)	0.21
Hypothyroidism	24 (16.9%)	54 (6.5%)	0.33

*statistically significant

Mild hyperglycemia was noted in 2 patients in first trimester, 30 patients in second tyrimester and remaining in third trimester. There was significant family history of diabetes in women with mild hyperglycemia (29.5%) when compared to controls (4.3%), p=0.04 (Table 1).

Table 2: Maternal and neonatal outcome between women with mild hyperglycemia and controls.

	Cases (142)	Controls (827)	p
Hypertensive disorders	12 (8.4%)	69 (8.3%)	0.31
Urinary tract infection	14 (9.8%)	51 (6.2%)	0.1
Mean serum triglyceride levels	218.8±68.48 mg/dl	179.25±55.25 mg/dl	0.04*
Caesarean section	62 (43.6%)	290 (35%)	0.05
Indications for CS			
Fetal distress	14 (30%)	30 (35.2%)	
CPD	17 (36.9%)	29 (34.11%)	
Doubtful scar	7 (15.2%)	16 (18.8%)	
Malpresentations	2 (4.3%)	2 (2.35%)	
Failed induction	3 (6.5%)	7 (8.23%)	
Cervical dystocia	3 (6.5%)	5 (5.88%)	
Preterm labour	9 (6.3%)	50 (6%)	0.8
Sex of baby			
Male	75 (53.1%)	433 (52.3%)	1
Female	67 (46.9%)	394 (47.6%)	
Weight of the baby			
<2500g	6 (9.3%)	15 (12.09%)	
2500-3500g	47 (73.4%)	105 (82%)	
>3500g	22 (15.5%)	55 (6.6%)	0.001*
NICU admission	11 (7.7%)	60 (7.2%)	0.8
Indications – NICU			
Birth asphyxia	4 (36.3%)	16 (26.7%)	
Neonatal jaundice	5 (45.4%)	32 (53.3%)	
Prematurity	2 (18.1%)	12 (20%)	

*statistically significant

There was no significant difference in incidence of hypertension, hypothyroidism, preterm delivery and caesarean section between the two groups. LGA (large for gestational age babies ≥3500g) (p=0.001) and serum triglyceride levels (p=0.04) were significantly more in women with mild hyperglycemia when compared to controls (Table 2).

DISCUSSION

GDM is becoming an increasing health problem worldwide. GDM is associated with increased maternal – fetal morbidity as well as long-term complications in both mother as well as the offsprings. Recent studies have reported that maternal glucose intolerance less severe than GDM is associated with an increased risk of adverse pregnancy outcomes.[6]

In the present study, though there were no significant difference in hypertensive disorders, preterm labour, urinary tract infections and NICU infections, Large for

gestational age babies (Birthweight ≥3500gm) was significantly more in women with mild hyperglycemia when compared to controls.

Scholl et al has shown that increased maternal glucose concentration was associated with an increased risk of large-for-gestation fetuses (p<0.001) and a decreased risk of fetal growth restriction (p<0.05) in non diabetic mothers.[4] Maternal complications including cesarean section and chorioamnionitis were increased twofold or more with high maternal glucose concentrations. A observational study from the Toronto Tri-Hospital Gestational Diabetes Project has shown that in women without GDM increasing carbohydrate intolerance is associated with a graded increase in adverse feto-maternal outcomes. Macrosomia is an important factor in high cesarean delivery rates for women with untreated borderline GDM.[1]

Several studies suggested that maternal circulating fatty acids play important roles in fetal growth and development.[7,8] Elevated Fatty acids in the maternal circulation are associated with increased insulin resistance and β-cell dysfunction, which play a role in the development of gestational diabetes mellitus (GDM) and increases the risk of adverse perinatal outcomes, including preterm delivery.[9]

In the present study serum triglyceride levels was also significantly more in women with mild hyperglycemia when compared to controls. Wei et al, has shown that blood serum Triglyceride, total cholesterol and LDL-Cholesterol concentrations were higher in the Gestational impaired glucose tolerance (GIGT) and GDM groups (p<0.05) which is supported by Chen et al. who noted that abnormalities in fat metabolism are present in both GDM and GIGT women.[9,10]

CONCLUSION

Mild hyperglycemia during pregnancy should not be ignored and periodic blood sugar monitoring should be done to improve maternal and fetal outcome.

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