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ORIGINAL ARTICLE

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Intrapartum and perinatal outcomes in women with gestational diabetes and mild gestational hyperglycemia

Gajjar *F*, Maitra *NK*,

Department of Obstetrics and Gynecology, Medical College and SSG Hospital, Baroda (Gujarat)

OBJECTIVE(S) : To evaluate O' Sullivan's screening test to identify women at risk for gestational diabetes, evaluate intrapartum and neonatal outcomes, and analyze the risk factors.

METHODS(S) : Three hundred and seventy eight pregnant women attending the antenatal clinic with gestation of 24 to 28 weeks were recruited for the study. They were given 50g glucose orally, regardless of the time of previous meal, and one hour later blood was collected for glucose estimation. Women with a plasma glucose level ≥ 140 mg/dL were subjected to a 75 g 2-hour oral glucose tolerance test.

RESULTS :The detection rate of mild gestational hyperglycemia (MGH) was 6.8% and that of gestational diabetes mellitus (GDM) was 2.6%. Pregnancy induced hypertention and placental abruption were significantly associated with MGH/ GDM. No statistical association was found with mode of delivery and other intrapartum complications. Babies born to women with MGH or GDM were eight times more likely to have hypoglycemia and three times more likely to have jaundice requiring phototherapy , as compared to babies born to women without MGH or GDM.

CONCLUSION(S) : Antepartum, intrapartum and perinatal morbidity is increased in women with both MGH and GDM. These results need to be validated against a larger cohort.

Key words : gestational diabetes mellitus, mild gestational hyperglycemia, delivery outcome, perinatal outcome

Introduction

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during the current pregnancy [1]. The definition applies regardless of whether insulin or diet modification is used for treatment and whether or not the condition persists after pregnancy. It does not recognize the possibility that unrecognized glucose intolerance may have antedated or begun concomitantly with pregnancy.

According to the American Diabetic Association, approximately 7% of all pregnancies are complicated by GDM, resulting in more than 2,00,000 cases annually [2]. The prevalence may range from 1 to 14% of all pregnancies, depending on the population studied and the diagnostic tests employed for detection.

The optimal approach for screening and diagnosis is uncertain. Expert panels in the United States recommend O'Sullivan's glucose challenge test (GCT) in which 50 g of glucose is given to the patient regardless of a previous meal followed by glucose estimation after one hour, at 24 to 28 weeks of gestation [3]. This is followed by a 75 g 2 hour or 100 g 3 hour oral glucose tolerance test (OGTT) for women who screen positive on GCT i.e. women with plasma glucose values ≥ 140 mg / dL. Although current guidelines state that fasting is unnecessary before the GCT, the results do vary with the length of time since the last meal or snack [4].

The confirmational diagnostic test for GDM remains controversial. GDM is usually diagnosed on the basis of an OGTT. However, the exact load administered (50,75 or 100g glucose) varies between centers. Epidemiologically, the 75 g OGTT has the advantage that it is internationally used outside pregnancy. However the diagnostic limits at

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Correspondence :
Dr. Nandita Maitra
15 Gautamnagar Society, Race Course Road,
Bardoa 390 007
Tel. 0265 2355142 Email : nanditamaitra@hotmail.com

which treatment is required still need to be defined [5].

This study was undertaken to evaluate O'Sullivan's screening test to identify women at risk for gestational GDM and to study the intrapartum and perinatal outcomes in these women.

Material and Methods

Pregnant women attending the antenatal clinic with a gestation of 24 to 28 weeks were enrolled in the study . After a detailed personal, obstetric and family history was taken, the women were administered 50 g of glucose orally, regardless of time of previous meal, and one hour later blood was collected for glucose estimation. Three mL venous blood was collected with complete aseptic precautions in a sterile fluoride vacutainer and the samples were transported to the laboratory within 6 hours. Venous plasma glucose estimation was performed by glucose oxidase peroxidase enzyme by end point biochemistry technic at a private laboratory. All samples were tested at the same laboratory to avoid subjective error. Women with a plasma glucose level > 140 mg/dL were subjected to a 75 g 2 hour OGTT.

The OGTT was performed in the morning after an overnight fast following preparatory diet of at least 250 g (approximately) carbohydrates per day for 3 days. A positive 2 hour OGTT with a 75 g glucose load was defined using the National Diabetes Data Group (NDDG) [3] criteria of two or more venous plasma glucose values meeting or exceeding the following –

Fasting value 105 mg / dL.

One hour value 190 mg / dL.

Two hour value 165 mg / dL.

A clinical assessment was performed at the same visit and the women were categorized into 3 risk categories as recommended by Metzger et al [6]. However all women underwent screening by blood test regardless of risk category.

Statistical analysis was performed using an EPI Info 6 and Microsoft Excel Software. A P value of less than 0.05 was considered to be statistically significant. Statistical evaluation was done using the Chi-Square test and Relative Risk with 95% confidence intervals was used to assess the degree of risk.

Results and Discussion

Out of these 378 women studied, 36 had positive screening test (>140mg/dL) and were subjected to OGTT. Women with positive GCT but negative OGTT have been classified as mild gestational hyperglycemia (MGH) in accordance with the study by Weijers et al [7]. The detection rate of MGH was 6.8% and that of GDM 2.6%. Ninety-one women (24.07%) chose to deliver at other hospitals. These women who were lost to follow-up had the same socio-demographic and clinical characteristics as those completing the study. All these women belonged to the normal GCT group.

Table 1 shows the distribution of associated complications such as pregnancy induced hypertension (PIH), abruptio placentae, preterm birth, intrauterine growth restriction (IUGR), and chronic hypertension. In the normal GCT group 59 (17.25%) had an associated complication, whereas 283 (82.74%) had no associated complications. In the MGH group 18 (69.23%) women had an associated complication and in the GDM group all 10 had them. The association with PIH and abruption was statistically significant (P<0.001).

Table 1. Associated antepartum and intrapartum complication.

Associated Compliations	Normal (n=342) No. (%)	Mild gestional hyperglycemia (n=26) No. (%)	Gestational diabeties (n=10) No. (%)	P value
Pregnancy induced hypertention	13 (0.29)	5 (19.23)	6 (60.0)	< 0.0001
Abruptio placentae	10 (2.92)	9 (34.61)	2 (20.0)	< 0.0001
Preterm delivery	18 (5.26)	3 (11.53)	—	0.70
Intrauterine growth restriction	16 (4.67)	1 (3.85)	1 (10.0)	0.86
Chronic hypertention	2 (0.58)	—	1 (10.0)	0.67
None	283 (82.74)	8 (30.76)	—	0.00

Four women each in the GDM and MGH group had both abruption and PIH.

Antepartum morbidity in women with GDM is limited to an increased frequency of hypertensive disorders. The data are more convincing for an association with preeclampsia and more controversial for an association with PIH [8,9]. Careful monitoring of blood pressure, weight gain and urinary protein excretion is recommended, particularly during the second half of gestation.

Table 2 shows the statistical correlation between delivery outcomes in women with and without GDM and MGH. Factors such as mode of delivery, shoulder dystocia, post-

partum haemorrhage (PPH), retained placenta, meconium stained liquor and malpresentation have been analyzed here. None of these outcomes were found to be statistically significant. In the study by Godwin et al [10], the delivery outcomes found to be significantly correlated with GDM were shoulder dystocia (three times more likely) and assisted vaginal delivery (three times more likely). Logistic regression analysis with assisted vaginal delivery showed that the need for assisted vaginal delivery was related to GDM and not to birth weight.

Table 2. Delivery outcomes in women with and without gestional diabetes (GDM) and mild gestational hyperglycemia (MGH).

Outcome	GDM / MGH (n=36) No (%)	Normal (n=251) No (%)	Relative Risk with 95% CI	P value
Cesarean delivery	7 (19.44)	37 (14.74)	1.36 (0.63, 2.90)	0.59
Spontaneous vaginal delivery	25 (69.44)	175 (69.72)	0.97 (0.50 1.88)	0.92
Instrumental vaginal delivery	4 (11.11)	39 (15.54)	0.72 (0.27, 1.94)	0.68
Shoulder dystocia	—	1 (0.39)	—	0.25
Postpartum hemorrhage	—	2 (0.79)	—	0.59
Meconium	5 (13.89)	25 (9.96)	1.40 (0.59, 3.34)	0.64
Malpresentation	1 (2.77)	12 (4.78)	0.61 (0.09, 4.12)	0.93

Table 3 analyzes the statistical significance of perinatal outcomes in women with and without GDM. The factors analyzed were birth weight > 3.5 kg, apgar < 7 at 1 minute, hypoglycemia, hypocalcemia, jaundice requiring phototherapy, congenital anomaly, and perinatal death. Hypoglycemia is eight times more likely and jaundice requiring phototherapy is three times more likely in women with MGH/GDM. When the data was further broken down according to the presence of GDM or MGH, hypoglycemia was seen in the two neonates of mothers with GDM whereas jaundice requiring phototherapy was seen in four neonates of mothers with MGH. There were no still-births reported in this study.

In the study by Godwin et al [10], no association was found with apgar scores, rate of congenital anomaly or neonatal death rate while neonates born to women with gestational diabetes were seven times more likely to have had hypoglycemia, nine times more likely to have experienced hypocalcemia and three times more likely to have received phototherapy for jaundice. It is possible that these other associations have not been found in our study of 378 women, given the small sample size.

Table 3. Perinatal outcome in women with and without gestational diabeties (GDM) and mild gestational hyperglycemia (MGH).

Outcome	GDM / MGH (n = 36) No (%)	Normal (n = 255 including 4 sets of twins) No (%)	Relative Risk with 95% CI	P value
Birth weight > 3.5 kg	(3 (8.33)	6 (2.35)	2.85 (1.07, 7.57)	0.15
Apgar < 7 at 1 min	3 (8.33)	18 (7.05)	1.17 (0.39, 3.50)	0.95
Hypoglycemia	2 (5.55)	—	8.5 (6.20, 11.66)	0.006
Hypocalcemia	—	1 (0.39)	—	0.25
Jaundice requiring phototherapy	4 (11.11)	5 (1.96)	3.92 (1.76, 8.72)	0.014
Congenial anomaly	—	2 (0.78)	—	0.58
Early neonatal death	1 (2.78)	9 (3.53)	0.8 (0.12, 5.29)	0.79

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