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Amrita Gupta

Associate professor, Department of
Obstetrics and Gynaecology, Mayo
Institute of Medical Science
Barabanki U.P., India

Mamta Joshi

Associate professor, Department of
Obstetrics and Gynaecology, Era's
Lucknow medical University
Lucknow, U.P., India

Assessment of neonatal complications with mothers diagnosed with gestational diabetes mellitus

Amrita Gupta and Mamta Joshi

Abstract

Background: GDM is associated with higher incidence of maternal mellitus later in life. Perinatal outcomes associated with poor glycemic control in mothers are associated with as high as 42.9% mortality. As the incidence of diabetes is rising in epidemic proportion, more women of childbearing age are at increased risk of diabetes during pregnancy.

Aim of the study: To assess neonatal complications with mothers diagnosed with gestational diabetes mellitus.

Materials and methods: The present study was conducted in the Department of Obstetrics and Gynecology of the medical institute. We selected a total of 70 cases for the study and these cases were followed throughout their antenatal period in all three trimesters. Women with positive GDM test were treated with medical nutritional therapy (MNT) for two weeks. If MNT failed to achieve controlled blood sugar, then insulin was initiated. The patients were followed from antenatal period up to delivery.

Results: We observed that 12 cases were diagnosed as having Gestational diabetes mellitus, 7 cases as Gestational Glucose intolerance and rest of the patients were normal. The number of NICU admissions in neonates delivered by mothers with GDM was 2, whereas, the number of neonates with hypoglycemia and macrosomia were 1 each. On comparing the results with other groups, i.e., patients with gestational glucose tolerance and patients with normal glucose tolerance, the results were statistically non-significant.

Conclusion: The screening of pregnant patients for GDM gives us opportunity to diagnose the GDM cases early and timely intervention and treatment can prevent all fetal complication.

Keywords: Gestational diabetes, glucose intolerance, neonatal complications

Introduction

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with the onset or first recognition during pregnancy with or without remission after the end of pregnancy. GDM is important in that it poses a risk to the pregnant woman and her baby ^[1, 2]. GDM is associated with higher incidence of maternal mellitus later in life. The major morbidities associated with infants of diabetic mothers include respiratory distress, growth restriction, polycythemia, hypoglycemia, hypocalcemia, and hypomagnesemia, and congenital malformations ^[3, 4]. Perinatal outcomes associated with poor glycemic control in mothers are associated with as high as 42.9% mortality. As the incidence of diabetes is rising in epidemic proportion, more women of childbearing age are at increased risk of diabetes during pregnancy. In fact, a high prevalence of gestational diabetes mellitus (GDM) of the order of 18% has been reported from India ^[5]. Women with GDM are at high risk for developing diabetes later in life. Thus, GDM provides a unique opportunity to study the early pathogenesis of diabetes and to develop interventions to prevent the disease ^[6]. Hence, the present study was performed to assess neonatal complications with mothers diagnosed with gestational diabetes mellitus.

Materials and methods

The present study was conducted in the Department of Obstetrics and Gynaecology of the medical institute. We selected a total of 70 cases for the study and these cases were followed throughout their antenatal period in all three trimesters.

Exclusion criteria:

- Pregestational diabetes mellitus
- Intake of drugs that alter glucose metabolism
- Cardiac, respiratory, or hepatic disorder
- Multiple pregnancy

The study subjects were challenged with 75 gm of oral anhydrous glucose at their 1st antenatal

Correspondence

Mamta Joshi

Associate professor, Department of
Obstetrics and Gynaecology, Era's
Lucknow medical University
Lucknow, U.P., India

visit, irrespective of their fasting status followed by measuring of their venous plasma glucose levels after 2 hours. If blood sugar level is >140 mg/dl, then it is considered to be screening and diagnosis of Gestational Diabetes Mellitus (GDM). Repeat testing was done in women who were found negative for GDM at 1st visit in their 2nd trimester at 24-28 weeks and in 3rd trimester at 32-34 weeks gestational age. Women with positive GDM test were treated with medical nutritional therapy (MNT) for two weeks. If MNT failed to achieve controlled blood sugar, then insulin was initiated. The patients were followed from antenatal period up to delivery. Any maternal complications such as polyhydrominos, oligohydromnios, preeclampsia, IUGR, gestational hypertension, or macrosomia were noted along with mode of delivery and neonatal outcome with associated complications such as low APGAR score, hypoglycaemia, prematurity, IUD, or still birth. The statistical analysis of the data was done using SPSS version

11.0 for windows. Chi-square and Student’s t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

Results

Table 1 shows the number of patients with various diagnosis on the basis of DIPDI criteria. We observed that 12 cases were diagnosed as having Gestational diabetes mellitus, 7 cases as Gestational Glucose intolerance and rest of the patients were normal [Fig 1]. Table 2 shows the frequency of neonatal complications in the study group. The number of NICU admissions in neomates delivered by mothers with GDM was 2, whereas, the number of neonates with hypoglycemia and macrosomia were 1 each. On comparing the results with other groups, i.e., patients with gestational glucose tolerance and patients with normal glucose tolerance, the results were statistically non-significant [Fig 2].

Table 1: Number of patients with various diagnosis on the basis of DIPDI criteria

Diagnosis on the basis of DIPSI criteria	Number of cases	Percentage (%)
Gestational diabetes mellitus	12	17.1
Gestational Glucose intolerance	7	10
Normal glucose tolerance	51	72.8

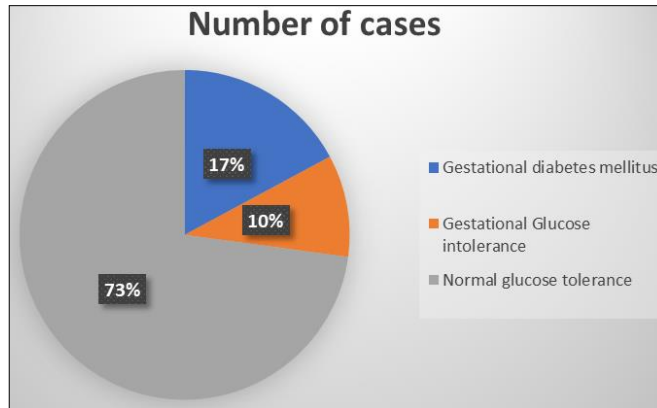


Fig 1: Frequency of GDM in study subjects

Table 2: Frequency of neonatal complications in the study group

Neonatal complications	Number of patients			p-value
	Gestational diabetes mellitus (n=12)	Gestational Glucose intolerance(n=7)	Normal glucose tolerance (n=51)	
NICU admissions	2	1	2	0.21
Hypoglycemia	1	0	0	0.98
Macrosomia	1	1	0	0.8
Still birth	0	0	1	0.7

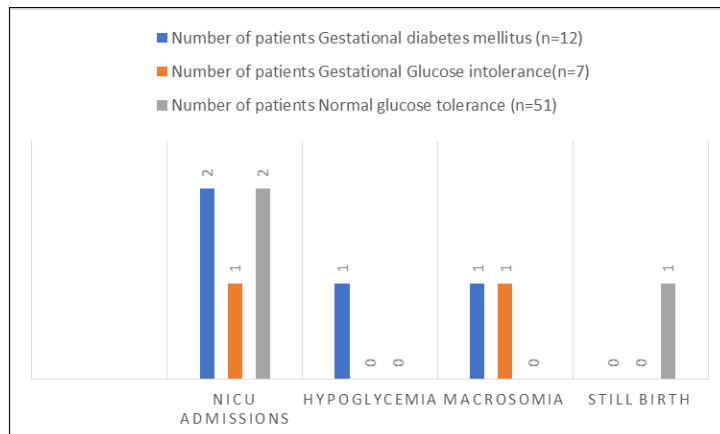


Fig 2: Neonatal complications

Discussion

The WHO expert group recommended that all pregnant women or those with risk factors should be screened at the beginning of third trimester of pregnancy using oral glucose tolerance test (OGTT), that is, blood glucose 2-hr after 75g oral glucose load. This is recommended both for screening and diagnosis [8]. The results are interpreted according to WHO criteria for diabetes. The present study was conducted to evaluate the neonatal complications in mothers with gestational diabetes mellitus. We observed that the number of NICU admissions, hypoglycemia and macrosomia were comparable to normal patients and was statistically non-significant. The results were compared to previous studies from the literature and were consistent. Gasim T *et al* assessed the maternal and fetal complications of pregnancy in mothers with gestational diabetes mellitus (GDM) compared with non-diabetic patients who delivered in the hospital during the study period. The outcome of pregnancy in 220 Saudi patients with GDM identified from the delivery register/hospital database and matched for age, parity and body mass index with 220 non-diabetic controls were studied retrospectively from their case files. Patients with multiple pregnancies and abnormal presentation of the fetus were excluded from the study. Patients with GDM had a significantly higher incidence of pre-eclampsia; preterm delivery; induction of labor; cesarean section; higher mean birth weight of babies; large for gestational age infants; macrosomia; and admission to the neonatal intensive care unit, compared with the control group. It was concluded that even the mild form of GDM seems to have significant consequences for women and their offspring and is recommended to be aggressively treated. Tanir HM *et al* analyzed a 10-year retrospective cohort of gestational diabetes mellitus (GDM) cases, elucidating the maternal complications and perinatal morbidity and mortality. The study participants were 110 diabetic singleton pregnancies receiving obstetric care at the Department of Obstetrics and Gynecology, Osmangazi University School of Medicine in Eskisehir, Turkey from January 1995 to December 2004. In 70 of the GDM cases, mean age, diagnostic criteria used to define GDM, gestational age at delivery, presence of additional risk factors, method of clinical management, mode of delivery, fetal birthweights and newborn characteristics were assessed. More than half of the cases (57.1%) revealed controlled glucose homeostasis on diet, while 30 (42.9%) pregnant women needed insulin therapy to control blood glucose levels to within normal physiologic limits. Fetal macrosomia was present in 18 (25.7%) pregnancies. Meanwhile, most of the fetuses (62.9%) were within the normal growth percentiles throughout the pregnancy. There was no difference detected in body mass index (BMI) of women undergoing cesarean section and spontaneous vaginal births. Vacuum extraction and forceps applications were indicated in 10% of all GDM groups. Fetuses born to women having cesarean section were heavier at birth compared to those of women having vaginal births. They concluded that early diagnosis, patient education, proper follow-up and postpartum testing in women with GDM will certainly decrease poor perinatal outcomes, enabling also a secondary prevention of type 2 diabetes in the long term [7,8].

Kale SD *et al* compared clinical and metabolic features of mothers with gestational diabetes (GDM) and their offspring with those in non-diabetic pregnancies at the King Edward Memorial Hospital, Pune, India. Antenatal information was obtained from hospital records. GDM was diagnosed by 75 g OGTT (Oral Glucose Tolerance Test) in clinically high-risk women. Anthropometric measurements of mother and the babies

were recorded within 24h of delivery and a maternal blood sample collected for hematological and biochemical measurements. Compared to non-diabetic mothers (n=215) GDM mothers were older, more obese, centrally obese, adipose and had higher blood pressure. GDM mothers had higher concentrations of plasma triglycerides; blood hemoglobin and higher platelet count but lower concentration of HDL cholesterol and albumin. Sixty percent GDM mothers and 34% of non-diabetic mothers were delivered by caesarean-section, 23% of GDM mothers delivered pre term (<37 wk). Despite the smaller gestation, babies of GDM mothers were heavier, longer and more adipose. Only 5% of babies born to GDM mothers weighed > 4000 g but 30% were >90th centile of birth weight of babies born to non-diabetic mothers. Babies of GDM mothers suffered higher neonatal morbidity. It was concluded that GDM mothers in urban India are more obese and more adipose than non-diabetic mothers, frequently have a family history of diabetes and show metabolic features of insulin resistance syndrome, suggesting high cardiovascular risk. Kjos SL *et al* compared management based on maternal glycemic criteria with management based on relaxed glycemic criteria and fetal abdominal circumference (AC) measurements in order to select patients for insulin treatment of gestational diabetes mellitus (GDM) with fasting hyperglycemia. In a pilot study, 98 women with fasting plasma glucose (FPG) concentrations of 105-120 mg/dl were randomized. The experimental group received insulin if the AC, measured monthly, was > or =70th percentile and/or if any venous FPG measurement was >120 mg/dl. After initiation of protocol, venous FPG and capillary blood glucose levels were significantly lower in the standard group. Birth weights, frequencies of birth weights >90th percentile, and neonatal morbidity did not differ significantly between the standard and experimental groups, respectively. The cesarean delivery rate was significantly lower in the standard group; this difference was not explained by birth weights. They concluded that in women with GDM and fasting hyperglycemia, glucose plus fetal AC measurements identified pregnancies at low risk for macrosomia and resulted in the avoidance of insulin therapy in 38% of patients without increasing rates of neonatal morbidity [9, 10].

Conclusion

From the results of present study, we conclude that screening of pregnant patients for GDM gives us opportunity to diagnose the GDM cases early and timely intervention and treatment can prevent all fetal complication.

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