Research Article

Obstetric and neonatal outcome in gestational diabetes mellitus

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Abstract

Objective: To assess the maternal, neonatal complications and outcome in pregnancy with gestational diabetes mellitus. **Materials and Methods**: A total of 72 GDM cases were studied retrospectively at MIMS Mandya over a period of 3yrs. Antenatal and perinatal data were obtained from patient's medical records. All diabetic pregnant women also suffering from other disorders which directly or indirectly may affect the outcome of pregnancy were excluded from the study. **Results**: Out of total 20,468 deliveries, GDM was seen in 72cases(0.35%). 62% of the patients were above 25yrs of age and 68% were multiparous. 69% of the patients required insulin for glycemic control. Higher incidence of preeclampsia (44.4%), polyhydramnions(23.6%), PROM(8.3%) and preterm delivery(8.3%) was noted. Common neonatal complications were macrosomia (29.17%) and hypoglycaemia (9.7%). Increased rate of caesarean section was also noted (62%). **Conclusion**: GDM is recognised to be associated with increased rates of adverse maternal and neonatal outcomes, which are supported by the findings of our study. Even mild form of GDM seems to have significant consequences for women and their offspring and is recommended to be aggressively treated. Early diagnosis and strict control of blood sugar levels throughout the pregnancy can significantly reduce maternal and neonatal complications.

Keywords: Gestational diabetes mellitus, complications, maternal outcome, neonatal outcome.

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INTRODUCTION

GDM is defined as glucose intolerance diagnosed for the first time during pregnancy and usually disappears during the puerperium. The prevalence of GDM in some ethnic groups ranges from 1 to 14% depending on different screening methods, diagnostic criteria and the population screened.[1,2] Most women who have GDM give birth to healthy neonates, especially when the blood glucose level are well controlled with a diabetic diet, exercise and an appropriate body weight. In some cases, GDM can negatively affect the pregnancy and result in adverse perinatal outcome like macrosomia, birth trauma, shoulder dystocia and higher rates of caesarean section.[3,4] Gestational diabetes does recur in about 60% of subsequent pregnancy and 40% of these will develop non insulin dependent diabetes mellitus within 15 years after delivery.[5] The objective of our study was to assess the maternal, neonatal complications and outcome in pregnancy with gestational diabetes mellitus.

MATERIALS AND METHODS

Retrospective study was carried out in, MIMS, Mandya, a tertiary care referral teaching hospital from July 2011 to June 2014 over a period of 3 years. A total of 72 GDM cases were studied out of 20,468 deliveries. Antenatal and perinatal data obtained from patient's medical records and hospital data base included: Age, parity, BMI, gestational age at delivery, antenatal complications, mode of delivery and birth weight of the baby, as well as maternal and neonatal morbidity and mortality. Screening for GDM was performed between 24 and 28 weeks by 50gm glucose challenge test given orally to the patient at anytime of the day, with serum glucose measured 1 hr later. If the value was >140 mg/dl, patient was subjected

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to OGTT. Oral glucose tolerance test (OGTT) was done according to the national diabetes data group. After an overnight fasting of 10 to 12hrs, venous plasma glucose concentration were measured in fasting, 1hr, 2hr and 3hrs samples after giving 100gm of glucose in 250 ml of water orally. Patient was diagnosed as a case of GDM if 2 or more readings exceeded the levels of fasting 105 mg/dl, 1hr 190mg/dl, 2hr 165mg/dl, 3hrs 145mg/dl.[6] Patients with raised fasting ≥126mg/dl, postprandial ≥200mg/dl were also included in this study without performing OGTT.[7] All diabetic pregnant women also suffering from other disorders which directly or indirectly may affect the outcome of pregnancy (eg asthma, epilepsy, severe anaemia, thyroid disorders, heart disease) were excluded from the study. Labour was induced at 40 weeks in well controlled GDM patients if spontaneous labour has not occurred. Some patients required earlier induction of labour due to pre eclamptic toxaemia. Blood sugar was measured in newborns 30mins after delivery in all cases. In cases of hypoglycaemia, babies were monitored in NICU for a minimum of 48hrs.

RESULTS

A total of 20,468 women were delivered during the study period. 72(0.35%) cases were diagnosed as GDM through OGTT or FBS and PPBS. Age was measured as a continuous variable in our study and for the purpose of analysis; it was categorised into <25yrs and ≥25yrs. Mean age was 28.3yrs. More than half of the subjects were ≥25yrs, while percentage of primi gravida and multipara were 32% and 68% respectively. 36% of the women were illiterate and belonged to low socioeconomic status, 64% belonged to middle socioeconomic status. 39% of the patients (28 cases), were diagnosed to have GDM before 28 weeks, and 61% (44 cases) were diagnosed after 28 weeks. 31% of the GDM cases were on diabetic diet only, whereas 69 % of the cases required insulin for glycemic control. It was observed that despite good glycemic control, 31% percent of the patients had no complications while the remaining did; multiple complications were observed in 18 cases. Regarding frequency of the complications PIH occured in 44.4% of the cases followed by polyhydramions (23.6%) which were most common maternal complications noted (Table 1). 82% (59) of the cases delivered between 37 to 40 weeks, while 15.2% (11) delivered between 32 to 36 weeks, 2.6% (2) between 28 to 32 weeks and 1.3% (1) had abortion. A total of 44 cases (62%) underwent caesarean section. Elective caesarean section was done in 11 cases (15.4%), emergency caesarean section for 33 cases (46.4%). Among 27 vaginal deliveries (38%), 24 cases (33.8%) had spontaneous vaginal delivery, and 3 (4.2%) cases had vaccum delivery. (Table 2) It was observed that out of 72 cases 24 babies (33.3%) had neonatal complications. Among neonatal complications, macrosomia was observed in 21 cases (29.17%), hypoglycemia in 7 babies (9.7%), hyperbiliribinemia and congenital anomaly in 3 cases each (4.2%). Shoulder dystocia was seen in 1 case which lead to Erb's palsy. Respiratory distress was seen in 4 cases (5.5%). (Table 3) Apgar score at 1st and 5th minute were noted, initial resuscitation was required in 10 neonates. 69 (95.8%) babies were delivered alive, 2 (2.7%) neonatal deaths and 1(1.38%) spontaneous abortion was noted. Neonatal weight was categorised as < 2.5 kgs, 2.5 - 4 kgs and >4kgs. It was observed that 14 babies (19.4%) were < 2.5 kgs, 37 babies (51.4%) were between 2.5 - 4 kgs and 21 (29.16%) babies were macrosomic. (Table 4)

DISCUSSION

In our study 62% of the diabetic pregnant women were > 25 yrs of age and 38% were < 25 yrs. Increasing maternal age was associated with higher frequency of GDM, which was in accordance with many studies,[8,9] showing that carbohydrate tolerance deteriorates progressively with age especially in females. Increasing parity as an associated risk factor for GDM was well demonstrated in our study where 68% of the patients were multiparous which correlates with other study in which 80% of the patients were multiparous.[9] Presence of illiteracy and poverty adversely affect the outcomes. In our study 36% of the patients were illiterate and belonged to low socioeconomic status. Minor abnormalities in carbohydrate metabolism during pregnancy can adversely affect pregnancy outcome. Glucose intolerance increases as pregnancy advances.[10] This trend was also demonstrated by our study where 61% of the patients were diagnosed as cases of GDM after 28 weeks of gestation. This result can be compared with other study conducted by Samad N *et al*.[11] Management of GDM is one of the most rewarding clinical experiences. Current management advocates outpatient care and effective treatment regimen consists of dietary therapy, self blood glucose monitoring and administration of insulin if the target blood glucose values are not met with the di*et al*one. Approximately 15% of women with GDM require insulin therapy.[12] In our study 69% of the patients were on insulin for glycemic control. Such a high number was due to illiteracy and lack of awareness about the diet therapy. Several obstetric problems occur in diabetic pregnancy, their frequency being directly related to the quality of the diabetic control achieved.[13] Despite good glycemic control the maternal complications were 69% in the present study. Pregnancy induced hypertension was the commonest maternal complication (44.4%) followed by polyhydramnions (23.6%) which has got an incidence

of 3 to 32%.[14,15] Preterm labour occurs in about 20% of the diabetic pregnancies.[13] About 8.3% of the deliveries in the present study were preterm. The reason might be that preterm labour, occasionally associated with polyhydramions and the presence of illiteracy and poverty adversely affect this problem. Women with good glycemic control and no other complications of pregnancy will ideally be delivered at 39 to 40 weeks of gestation as confirmed by a study done by Perveen N and Saeed M.[10] The results were comparable to the current study, where 82% of the deliveries occured between 37 to 40 weeks. The rate of congenital anomalies were 4.2% in the present study, which correlates well with other studies.[10,16,17] Women in whom glucose intolerance develops after mid pregnancy do not expose the developing embryo to hyperglycaemia and these infants do not have any increase in malformations, the low rate in this study could be due to the fact that 61% of the cases developed diabetes after 28 weeks. The reported incidence of macrosomia is 25 to 40%[14] which is comparable to our study(29%), but was more in another study(46.6%).[18] This may be due to the fact that hyperglycemia which largely manifested in third trimester leading to fetal overgrowth. Majority of women with GDM proceed to term and deliver spontaneously. The known relationship between hyperglycaemia and fetal growth and the reported increased risk of shoulder dystocia results in an increased rate of caesarean delivery.[19] Woon in their study reported 41.8% caesarean rate.[18] Our study showed 62% caesarean rate quite similar to other study done by Mannan and others.[17] The high percentage of caesarean deliveries in our study is due to high incidence of macrosomia, history of previous caesarean section and presence of multiple risk factors. Hypoglycaemia during first few hours of life occurred in 25 – 40%[14] of infants of diabetic mother which is much higher than that of our study (9.7%). Good maternal glycemic control during pregnancy and labour decrease the risk of neonatal hypoglycaemia as shown in the current study. 4 babies had respiratory distress out of which 2 babies died. The join clinic reported an incidence of 31% of respiratory distress syndrome in infant of diabetic mothers declining to an average of 5.5% in the same clinic with better glycemic control.[20,21] Other neonatal complications noted were hyperbilirubinemia (4.2%), shoulder dystocia leading to Erb's palsy (1.38%). Minor metabolic disturbances in pregnancy, labour and delivery put mother and baby at high risk of developing certain complications and result in long term morbidity. These minor metabolic disturbances need to be screened and treated at the appropriate time to reduce social and financial burdens. These patients should be cared in those centres where obstetrician, physician and neonatologist with special experience in the field are available with adequate facilities.

Table 2: Mode of delivery

Mode of delivery	Total no. of deliveries (71)	Percentage (%)
Vaginal	27	38
Caesarean	44	62

Table 3: Neonatal complications

Complications	No. of cases	Percentage (%)
Macrosomia	21	29.16
Hypoglycaemia	07	9.7
Respiratory distress	04	5.5
Hyperbilirubinimia	03	4.2
Congenital anomalies	03	4.2
Shoulder dystocia	01	1.38

*13 babies had multiple complications (>1)

CONCLUSION

GDM is a common condition affecting 1 to 14% of all pregnancies. GDM is recognised to be associated with increased rates of adverse maternal and neonatal outcomes, which are supported by the findings of our study. Even mild form of GDM seems to have significant consequences for women and their offspring and is recommended to be aggressively treated. Early diagnosis and strict control of blood sugar levels throughout the pregnancy can significantly reduce maternal and neonatal complications.

Table 1: Maternal complications

Complications	No. of cases	Percentage (%)
PIH	32	44.4
Polyhyramnios	17	23.6
Preterm labour	06	8.3
PROM	06	8.3
Anaemia	05	6.9
Malpresentations	01	1.38
Abortion	01	1.38

*18 patients had multiple complications (>1)

Table 4: Fetal outcome

	Variables	Number	Percentage (%)
Outcome (n=72)	Alive	69	95.8
	Miscarriages	01	1.38
	Neonatal death	02	2.7
Birth weight (n=72)	<2.5kgs	14	19.4
	2.5-3.9kgs	37	51.38
	≥4kgs	21	29.16

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