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Original Research Article

Fetal complications associated with GDM: a matter to worry?

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ABSTRACT

Background: The consequences of GDM to the fetus are more serious than those to mother. Amongst fetal effects, incidence of fetal macrosomia is increased in women with GDM and DM type 2. Study was conducted to study prevalence of gestational diabetes mellitus using diabetes in pregnancy study group India (DIPSI) criteria in our hospital and to study fetal outcome in pregnancy with Gestational diabetes mellitus.
Methods: Case control study was conducted on 500 females between 24-28 weeks of pregnancy. 31 (6.2%) were diagnosed as gestational diabetes mellitus (GDM). 31 other pregnant females between 24-28 not having diabetes were taken in control group. Follow up of all pregnant females was done. Babies were evaluated for any gross anomaly, birthweight of babies were taken, APGAR score was noted.
Results: Maximum females (38.7%) with GDM were in age group of 25-29 years. Mean Basal Metabolic Index in GDM was 26.74 while in NGDM it was 22.48. Perinatal loss in GDM was 90.3%. Post-partum haemorrhage was seen in 9.7%. Intrauterine growth retardation (IUGR) in GDM was seen in 12.9%. Macrosomia was seen in 16.1%, preterm delivery in 9.7%, APGAR score <7 at 5 min in 6.5%, birth injury in 3.2%GDM. Mean weight in GDM was seen in 2.944 kgs and NGDM in 2.726 kgs.
Conclusions: Postpartum screening should be at regular interval to detect recurrence of future diabetes. With effective screening and management of GDM, from "diabetes capital of the world," we (INDIA) can lay claim to be "diabetes care capital of world."

Keywords: Birthweight, GDM, IUGR, Macrosomia

INTRODUCTION

GDM is an important public health problem in India. In India, the prevalence of GDM is steadily increasing from 2% in 1982 to 7.2% in 1991 and 16.5% in 2002.[1,2] Majority of women with GDM revert to normal carbohydrate tolerance by the end of puerperium. Few women having abnormal carbohydrate tolerance beyond puerperium probably have type II Diabetes mellitus. There is also a higher incidence of unexplained stillbirth, macrosomia and preterm births in both gestational and pre-gestational diabetic pregnancies.[3,4] The incidence of complications are more in cases of women requiring insulin for their treatment.[5] GDM develops after the process of organogenesis is complete therefore the risk of congenital anomaly is not increased.[6] Perinatal outcome also depends on the ethnicity of the mother especially the incidence of macrosomia.[7] The intensity of problem increases in the area where the blood sugar levels are not monitored properly and where the medical helped is not seeked in time. India being a developing country and as there are many fetal complications associated with GDM, this study was undertaken to study the prevalence of gestational diabetes mellitus using diabetes in pregnancy

study group India (DIPSI) criteria in our hospital and to study the fetal outcome in pregnancy with gestational diabetes mellitus.

METHODS

Sample size, study type and duration

Current study was a case control study conducted on 500 patients at ESI-PGIMSR, Andheri Mumbai from January 2015 to September 2015. Sample size was calculated by flowing formula;

$$n = Z\alpha 2\, pq/d2$$

Inclusion and exclusion criteria

Inclusion criteria for current study were; women attending antenatal clinic with singleton pregnancy between 24-28 weeks of gestation. Exclusion criteria for current study were; multiple pregnancy, preexisting diabetes mellitus, cardiac disease, renal diseases, liver diseases.

Method of data collection

A standardized questionnaire was used, and details pertaining to family history, medical and obstetric history were collected. Body mass index (BMI) and blood pressure (BP) were also recorded. Informed consent was taken from the patients. Pregnant women were given 75 g oral glucose load irrespective of their last meal timing and venous blood sample was drawn at 2 h. The plasma glucose was estimated in the central laboratory by the glucose oxidase-peroxidase (GOD-POD) method.

Statistical analysis

Data analysis was done with the help of SPSS Software version 15. The criterion used for labelling the patient as GDM was if the 2 h venous plasma glucose measured after 75 g oral glucose load was ≥140 mg/dl (DIPSI criteria). The rest were classified as the normal glucose tolerant or the non-GDM group. GDM women were advised medical nutrition therapy (MNT) for 2 weeks. Those who did not respond by maintaining fasting plasma glucose (FPG)<95mg/dl and peak post-meal glucose<120mg/dl i.e. after 2 hours were advised insulin. All of them were followed until delivery. The antenatal and the postnatal course of the women and the perinatal outcome were studied. Preterm Delivery: the delivery before 37th week of gestation - PIH: PIH was diagnosed with systolic blood pressure ≥140 mm of Hg and or diastolic blood pressure ≥90 mm of Hg. The patients diagnosed as GDM were called for frequent antenatal check-ups. They were asked to keep a count of daily fetal movements. Fundoscopy was done at diagnosis and repeated in each trimester. HbA1c was measured to know the glycemic control over the past 6-8 weeks. USG was done at 24 weeks to rule out any cardiac anomaly in those attending the antenatal clinic early in gestation. USG was repeated in third trimester to know the fetal growth (macrosomia/IUGR), quantity of amniotic fluid (polyhydramnios/oligohydramnios). NST was done weekly after 34 weeks of gestation. Biophysical profile (BPP) was done if associated preeclampsia was present or NST was equivocal. Doppler umbilical artery velocimetry was done in suspected IUGR or associated PIH cases. Labor was induced at 40weeks in cases with good glycemic control achieved by MNT. Patients on insulin were induced early at 38 to 39 weeks of gestation. Those cases complicated by PIH, IUGR were induced early. Steroid prophylaxis was given in cases of preterm delivery. LSCS was done for obstetric indications. Insulin was skipped on the day of labor. Hourly blood glucose level was determined in gestational diabetes mellitus on insulin. 5% dextrose was started at the rate of 125 ml/hour. An insulin infusion consisting of 50 units of regular insulin added to 50 ml of normal saline & transfused at the rate of 1 ml/hour. Aim was to keep the blood sugar level between 80-110 mg/dl. Details of the labor were plotted on a partogram. Intrapartum and postpartum events like instrumental delivery, shoulder dystocia, PPH were noted. Shoulder dystocia was diagnosed in presence of difficult shoulder delivery in spite of downward traction, liberal episiotomy and gentle suprapubic pressure. Gestational diabetics on diet do not require insulin during labor, their glucose was checked once during admission in labor. Insulin requirement in the postnatal period was again based on blood sugar level. All newborn babies were attended by pediatrician. The babies were evaluated for any gross anomaly, the birthweight of the babies were taken, Apgar score was noted. The need for NICU admission for the baby was decided by the pediatrician. All patients were asked to get OGTT done 6 weeks after delivery.

RESULTS

Out of 500 subjects evaluated for GDM according to DIPSI recommended method, 31 (6.2%) were diagnosed as GDM. Thus, the present study showed the prevalence of GDM to be 6.2%. 31 pregnant cases not having diabetes were considered as control group.

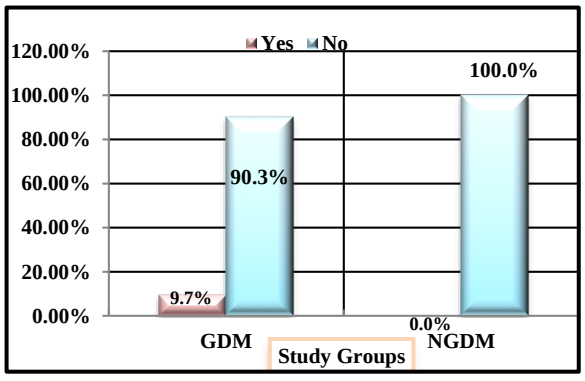

Figure 1: Comparison of history of GDM with perinatal loss in GDM and Non GDM group.

Mean age of incidence of GDM was 27.32± 4.385 years as against 26.19±4.183 years in control group, p>0.05. There is no statistically significant difference in the mean age between the study groups. The mean BMI in the GDM group and the Non GDM group was 26.74 and 22.48 respectively.

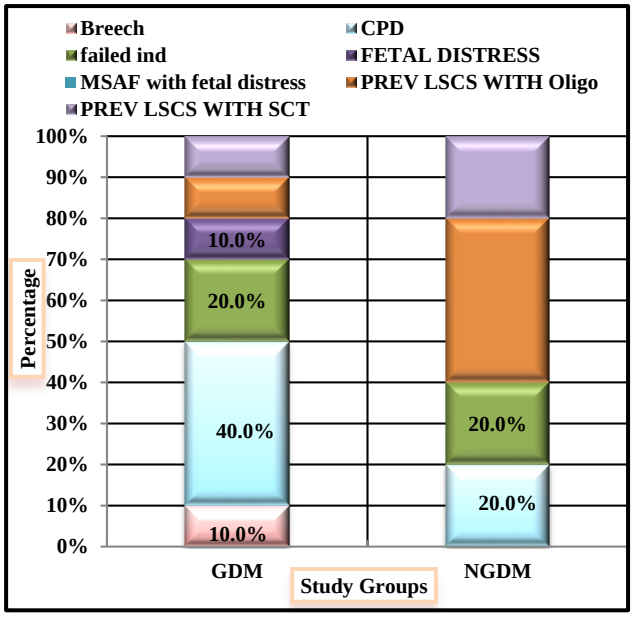

Figure 2: Comparison of indications of LSCS amongst study group.

Table 1: Comparison of intrapartum events in GDM and non GDM group.

Intrapartum events	GDM (%)	Non GDM (%)
Shoulder Dystocia	3.2	0
Postpartum hemorrhage	9.7	0

Table 2: Comparison of IUGR (intrauterine growth restriction) in GDM and Non GDM group.

IUGR	GDM (%)	Non GDM (%)
Yes	12.9	3.2
No	87.1	96.8

Positive family history of diabetes mellitus was found in 19.4% cases of GDM whereas none of the patients in non GDM group had positive family history of diabetes mellitus. p=0.554 which is >0.05 and therefore no statistically significant difference was found. 32.3% of GDM cases were delivered by LSCS. Out of which, 40% cases underwent LSCS for cephalopelvic disproportion, 20% for failed induction,20% cases had previous LSCS 10% each for fetal distress and malpresentation. There was one case of instrumental vaginal delivery. On the other hand, in the non GDM group 16.1 cases underwent LSCS. The incidence of postpartum hemorrhage and shoulder dystocia was higher in the GDM group as compared to the Non GDM group but still did not reach statistical significance (p>0.05). The prevalence of IUGR is higher in the GDM group as compared to the Non GDM group though it did not reach statistical significance (p=0.169 which is >0.05). Thus, babies born to the GDM mothers had significantly had higher birthweight as compared to the babies born to the Non GDM Mothers, p<0.05 which corresponds to the significant statistical correlation.

Table 3: Comparison of fetal complication in GDM group and Non GDM group.

Fetal complication	GDM (%)	Non GDM (%)
Still birth	0	0
Birth Injury	3.2	0
Perinatal death	0	0
Congenital anomaly	0	0
Apgar score <7 at 5 minutes	6.5	3.2
Macrosomia	16.1	nil
Preterm	9.7	0

Table 4: Mean weight in kg in GDM and non GDM group.

Parameter	GDM	Non GDM
Mean birth weight (kg)	2.944	2.726

DISCUSSION

Prevalence of Gestational Diabetes Mellitus in our study was 6.2%. Similar prevalence was seen in the study of Wahi et al (6.51%), Sudhanshu et al (5.2%).[8,9] Most of the women (70.9%) with gestational diabetes were above 25 years with mean age being 27.3±4.38 years in the present study. Similar study from South India conducted by Seshiah et al showed age >25 years as a risk factor for GDM.[10] In the study by Kalra et al in Rajasthan compared with non GDM, GDM patients were older, with mean age of the two groups being 24.7±3.11 years and 27.1±2.44 years.[11] In the study by Wahi et al compared with women of normal OGTT, women with GDM were older. Mean age±SD in GDM group was 27.2±2.3 years, while in control group it was 26.2±2.3 years.[8] In the current study, though the incidence of GDM showed an increasing trend with advancing age i.e., beyond 25 years of age**.** In the study by Wahi et al a significant proportion of subjects with GDM were overweight; 19 (30.65%) and obese; 16 (25.8%).[8] Nilofer et al found obesity as a risk factor in 88.89% of GDM patients.[12] In the present study about 19.4% of GDM cases had positive family history of DM whereas none of the patients in the control group had positive family history of DM though it was higher it was not statistically significant owing to the small sample size. In the study by Sudhanshu et al positive family history of Diabetes in GDM was 61.53% as compared to 9.91% in controls.[9] In the study by Kalra et al positive family history of Diabetes in GDM was 33.33% as compared to 5.35% in controls.[11] In the study by Nilofer et al positive family history of Diabetes in GDM was

77.7% as compared to 37.6% in controls.[12] Thus positive family history is a significant risk factor in the development of GDM. 67.7% of the GDM cases delivered vaginally and 32.3% of GDM cases delivered by LSCS. In GDM cases, 40% cases underwent LSCS for cephalopelvic disproportion, 20% for failed induction and 10% each for fetal distress, breech, previous LSCS with oligohydramnios and previous LSCS with scar tenderness. There was one case of instrumental vaginal delivery in GDM group. On the other hand in the non GDM group 16.1% delivered by LSCS and 83.9% delivered vaginally. In Non GDM group, 40% cases underwent LSCS in view of previous LSCS with oligohydramnios,20% each for failed induction, breech and cephalopelvic disproportion. Kalyani et al noted incidence of 56% LSCS in GDM group and 31.27% in non GDM group.[13] Kalra et al noted 30% LSCS rate in GDM group and 79% in the non GDM group.[11]Though the LSCS rate was higher in GDM group as compared to the non GDM group it was still lower as compared to other studies owing to the better intrapartum fetal monitoring and good follow up of the patient till term. The present study had one case of shoulder dystocia making the incidence to be 3.2%. Langer Oded et al. noticed it to be 2.5%.[14] None of the patient in control group had shoulder dystocia. Kristina et al observed this to be 1.3%.[15] Landon Mark found it to be 0.6% and Ingrid et al also found it to be 0.9%.[16,17] None of the babies in the present study had adverse pregnancy outcome like IUFD and stillbirth. This was achieved due to early diagnosis and intervention in our GDM patients. The study done by Diitakarn et al showed to it be as low as 0.6%.[18] Macrosomia was found in 16.1% of GDM cases whereas none of the babies in non GDM group had macrosomia. Four of the macrosomic babies were delivered by LSCS and one baby was delivered by instrumental vaginal delivery. None of the babies in non GDM group had macrosomia. Nanda et al showed macrosomia complicates 19.23% of GDM pregnancies which was comparable with other studies.[9]

Limitations

The limitation of our study was, it was conducted for a very short duration, if duration could have increased the study would have been more impactful. Second limitation was, this was conducted in metro city of Mumbai, so we could not comment on the status of GDM and fetal complications in rural area.

CONCLUSION

Although eradication of GDM is impossible, we can definitely prevent its adverse effect on pregnancy. The postpartum screening should be at regular interval to detect the recurrence of future diabetes. These potential diabetic women can be warned of the future of happenings and advised to adopt preventive measures to halt or delay the process. This will in turn shed load from health care resources responsible to take care of the diabetic patients in the long run. With effective screening and management of GDM, from "the diabetes capital of the world," we (INDIA) can lay claim to be the "diabetes care capital of world."

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