Impact of gestational diabetes mellitus on maternal & fetal outcome

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Abstract

Background: Women with GDM are at increased risk for adverse obstetric and perinatal outcome. Hence, it is imperative that an early detection and management of the disease is done to ensure better maternal and fetal outcomes.

Aims: To determine the incidence of gestational diabetes mellitus using single step diagnostic test at our centre and to evaluate the maternal & fetal outcome and complications.

Materials and Methods: This study was carried out in 200 patients attending the antenatal outdoor. These patients were given 75 g oral glucose irrespective of the meals and their plasma glucose was estimated at 2 h. Patients with plasma glucose values > 140 mg/dl were labelled as GDM. All GDM patients were followed up and treated with diet and/or insulin therapy till delivery to know maternal and fetal outcomes.

Results: The prevalence of GDM in this study was 13.5%. Maternal and fetal complications in the GDM group were much higher than non-GDM group. Polyhydromnios, oligohydromnios, Hypertension, were the common maternal complications, while fetal distress, NICU admission, macrosomia and stillbirths occurred in the fetuses.

Conclusion: GDM as a disease entity adversely affects maternal and fetal outcomes. This also builds a strong case for following DIPSI guidelines in diagnosis and management of GDM.

Keywords: Gestational diabetes mellitus, Glucose intolerance, Diabetes in pregnancy study group India criteria, Macrosomia.

Introduction

In developing countries like India, prevalence of GDM ranges from 0.6 to 18.9%.[(1)] Gestational Diabetes Mellitus (GDM) is defined by WHO as "Carbohydrate intolerance resulting in hyperglycemia of variable severity with onset or first recognition during pregnancy".[(2)] Normal pregnancy is a Diabetogenic state due to changes in pattern of insulin secretion and sensitivity, thus pregnancy induces progressive changes in maternal carbohydrate metabolism. There is insulin resistance in normal pregnancy due to placental hormones (Human Placental Lactogen, Cortisol, Estriol, Progesterone). There is a wide variation in the prevalence rate of GDM mainly due to ethnic differences, demographic profile, different screening procedures, maternal age, parity, pre-pregnant BMI. Ethnically Indian women have high prevalence of diabetes and the relative risk of developing GDM in Indian women is 11.3 times compared to white women necessitating universal screening for glucose intolerance during pregnancy in India. GDM has both short term and long term consequences on both baby and the mother, including a predisposition to obesity, metabolic syndrome, Type-2 diabetes and cardiovascular diseases later in life. Early detection and intervention can greatly improve outcome for women and their babies. Aim of our study is to determine the incidence of gestational diabetes mellitus using single step diagnostic test at our centre and to evaluate the maternal & fetal outcome and complications.

Material and Methods

It was a prospective clinical study, conducted in Department of Obstetrics and Gynaecology, Mahatma Gandhi Medical College and Hospital, Jaipur during the year 2015-2016. Sample size of the study was 200 cases and these cases were followed throughout their antenatal period in all three trimesters. Women with history of pregestational diabetes mellitus, intake of drugs that alter glucose metabolism, cardiac, respiratory, hepatic disorder, multiple pregnancy were excluded from the study. These pregnant women were challenged with 75 gm of oral anhydrous glucose at their 1st antenatal visit, irrespective of their fasting status and then measuring venous plasma glucose levels after 2 hrs if blood sugar level is >140 mg/dl then it is considered as screening and diagnostic of Gestational Diabetes Mellitus (GDM) and repeat testing was done in women who were found negative for GDM at 1st visit in their 2nd trimester at 24-28 wks and in 3rd trimester at 32-34 wks gestational age. Women with positive test were treated with medical nutritional therapy for two weeks and if MNT failed to achieve control then insulin was initiated. The patients were followed in antenatal period up to delivery. Any maternal complications such as polyhydrominos, oligohydromnios, preeclampsia, IUGR, gestational hypertension, macrosomia were noted along with mode of delivery and neonatal outcome with associated complication as low APGAR score, hypoglycaemia, prematurity, IUD, still birth. Statistical analysis was performed by using Chi-square test.

Result

Out of 200 women 13.5% were diagnosed with GDM, 8% GGI and 78.5% had normal glucose tolerance (Table 1)

DIPSI Criteria	Cases	%
Gestational Diabetes Mellitus	27	13.5
Gestational Glucose Intolerance	16	8
Normal Glucose Tolerance	157	78.5
Total	200	100

Distribution of cases using a Single step Diagnostic test (DIPSI Criteria)[3]

15(55.56%) cases of GDM and 9 cases of GGI and 48 cases of NGT were found between age group of 25-29 years. There was a significant positive correlation of age with development of GDM ($p < 0.005$) in our study (Table 2).

Age	GDM		GGI		NGT		Total
	No	%	No	%	No	%	No
15 to 19	0	0	0	0	2	1.27	2
20 to 24	5	18.52	4	25	88	56.05	97
25 to 29	15	55.56	9	56.25	48	30.57	72
≥30	7	25.93	3	18.75	19	12.10	29
Total	27	100	16	100	157	100.00	200

Distribution of cases according to the age group

Out of 27 GDM cases 29.63% had polyhydromnios, 22% gestational HTN, 11% had oligohydromnios & prematurity followed by pre eclampsia & IUGR (Table 3).

	GDM(N=27)		GGI(N=16)		NGT(N=157)		Total(N=200)		Chi square test
Any Obstetric Complication	No	%	No	%	No	%	No	%	P Value LS
Oligohydromnios	3	11	0	0	14	8.92	17	8.5	0.386NS
Polyhydromnios	8	29.63	5	31.3	10	6.37	23	11.5	<0.001S
IUGR	2	7.4	0	0	5	3.18	7	3.5	0.390NS
Gestational HTN	6	22	2	12.5	16	10.19	24	12	0.206NS
Preeclampsia	2	7.4	0	0	9	5.73	11	5.5	0.567NS
Prematurity	3	11	1	6.25	9	5.73	13	6.5	0.560NS
IUFD	0	0	0	0	1	0.637	1	0.5	0.870NS

Distribution of cases according to Obstetric Complications

	GDM(N=27)		GGI(N=16)		NGT(N=157)		Total(N=200)		Chi square test
Any Fetal Complications	No	%	No	%	No	%	No	%	P value LS
Fetal Distress	8	29.63	5	31.3	17	10.83	30	15	0.007S
IUFD	0	0.00	0	0	1	0.64	1	0.5	0.57NS
Macrosomia	1	3.7	2	12.5	5	3.18	8	4	0.72NS
Prematurity	1	3.70	1	6.25	10	6.37	12	6	0.86NS
IUGR	2	7.41	0	0	4	2.55	6	3	0.30NS

Most common fetal complication was fetal distress 29.63% in GDM, 31% IN GGI & 10.83% IN NGT followed by IUGR, macrosomia & prematurity. Fetal distress has been significantly associated with glycaemic status of the patient (Table 4)

Distribution of cases according to Fetal Complications

Most common neonatal complication was NICU admission (29.63%) followed by hypoglycaemia (11.11%) which was statistical significance (Table 5).

	GDM(N=27)		GGI(N=16)		NGT(N=157)		Total(N=200)		Chi square test
Any neonatal Complications	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**P value LS**
NICU Admission	8	29.63	1	6.25	15	9.5	24	12	< 0.009 S
Hypoglycemia	3	11.11	0	0	0	0.00	2	1	<0.001S
Macrosomia	2	7.41	2	12.5	6	3.82	10	5	0.26NS
Still Birth	0	0.00	0	0	2	1.27	1	0.5	0.75NS

Distribution of cases according to neonatal Complications

Cesarian section were more in GDM &GGI (66.67 &37.5%) as compared to normal delivery (Table 6).

	GDM(N=27)		GGI(N=16)		NGT(N=157)		Total(N=200)	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**
C.S	18	66.67	6	37.5	41	25.72	65	32.5
FTNVD	9	33.37	10	62.5	116	73.88	135	67.5
PPH	0	0	0	0	1	0.5	1	0.5
Wound Sepsis	0	0	0	0	3	1.5	3	1.5

Delivery outcome and postpartum complications

Discussion

GDM is the common endocrine disorder in pregnancy which involves multiple organs and have adverse effects on maternal and fetal outcome. The prevalence of GDM ranges from 0.2%-12% depending on the population studied. By using single step diagnostic test, the prevalence of GDM in our study was 13.5% which is Similar to the study conducted by V Balaji et al (2009), they found prevalence rate of 13.4%[4] while Wahi *et al* (2011) found the prevalence rate of 6.94%[5] which is less than our study. Variation among these prevalence rates could be because of geographical, racial, socio-demographic differences in the studied population.

In our study 37% cases were diagnosed in first trimester, 33.33% in second trimester & 29% in third trimester, which is similar to the study conducted by Walter Placensia et al (2011) who found 85 cases of GDM out of which 27(31.76%) cases were detected at 6-14 wks and 47(55.29%) cases at 20-30 wks of gestation, which again signifies the need of early screening.[6] In our study 55.55% cases were >25 yrs of age &18.52% cases were <25yrs of age, which is similar to the study conducted by V Seshiah et al (2005) who found 14.50% cases in 15-19 yrs age group, 13.70% of GDM cases in 20-24 yrs age group, 19.50% of GDM cases in 25-29 yrs of age group and 25% of GDM cases in age group > 30 yrs.[7] In our study the most common complications of GDM was polyhydromnios (29.63%), followed by gestational hypertension (22%) then prematurity & oligohydromnios (11%), IUGR & preeclampsia(7.4%). In the study conducted by Kavyashree KS et al (2014)[8] most common complications of GDM was gestational hypertension (20%) followed by polyhydoamnios (16.5%). While K. Dahiya et al (2014)[9] found most common complication of GDM polyhydroamnios (17%), gestational hypertension(14.3%) followed by IUGR. In our study most common fetal complications in GDM was fetal distress (29.63%). Cesarean rate in our study was 66.6.8% amongst the GDM patients, with the most common indication being fetal distress followed by non-progress of labor. In study of Kavyashree KS et al(2011) & K. Dahiya et al(2014) C.S rate was 67% and 40% respectively which is similar to our study. NICU admission in our study was (29.60%) however Priyanka et al(2013)[10] & Turki et al[11] found frequency of 27.2% & 16.2% respectively. Macrosomia in our study was 7.4% which was lesser as compared to other studies like Priyanka et al & K dhayia et al found18% & 11.4% respectively due to good glycemic control. 25 (92.59%) cases of GDM maintained euglycaemia after MNT and 2 (7.41%) cases required insulin therapy to achieve adequate glycaemic control. Results of our study were comparable to the study done by V Balaji et al (2011) who identified 19 (9.7%) cases of GDM requiring insulin along with MNT. On the contrary Preeti Wahi et al (2011) identified 26 (38.09%) cases of GDM requiring insulin along with MNT.

Outcomes of pregnancy in women with GDM in this study showed raised incidences of hypertensive disorders, polyhydroamnios, CS, macrosomia and NICU admissions for >24 hours compared with the non-diabetic mothers who delivered at the hospital. These findings support the paradigm of increased rates of some maternal and neonatal complications in pregnant women with GDM.

Conclusion

The prevalence and tendency to acquire diabetes is high for Indian women. Screening tests which required

fasting blood glucose status of women are hard to implement as antenatal women are not always fasting when they come to the health facility. One step DIPSI test gives the advantage to be implement irrespective of fasting status. Screening of all pregnant women for glucose intolerance gives us opportunity to diagnose the GDM cases early and timely intervention and treatment can prevent all maternal and fetal complication. Thus reduction of complications can be significantly achieved by early diagnosis and aggressive treatment of GDM.[12]

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