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DIABETES IN PREGNANCY AND MATERNAL AND PERINATAL OUTCOME IN PREGNANCY

Obstetrics & Gynecology

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ABSTRACT

Objectives: This is a prospective study of Diabetes and maternal and perinatal outcome in pregnancy in Obstetric patients attending OPD of Mahavir Institute of Medical Sciences, Vikarabad from 1-1-2018 to 30-12-2019.

Material and Methods: This is a prospective study conducted in the Dept. of OBG, MIMS tertiary care hospital of Vikarabad, during a period of 2 yrs. All registered, unregistered and transferred patients tested for diabetes and hypothyroidism included in this study.

Results: 1000 cases tested at 24-28 weeks with single step after 2hrs of 75 gms glucose tolarence test, if it is more than 140mg/dl taken as diabetes (DIPSI).In our study 160 cases detected as diabetes. In these 92 cases GDM and 68 cases PGDM. In 92 cases of GDM 58 cases were booked and 102 unbooked. In PGDM of 68 cases20 booked and 48 unbooked cases. Cases monitored from 28 wks. onwards with FBS and PLBS weekly once to assess the glycaemic control, daily FKC, USG, BPP, Doppler at least weekly once for fetal well-being and growth monitoring for admitted cases. Most of the cases controlled with insulin, some with insulin and oral hypoglycaemic agents and some with diabetic diet alone. In GDM cases 26 delivered vaginally, 66 delivered by LSCS. The main indications for LSCS were previous LSCS, previous LSCS and PIH. All the babies admitted in NICU were recovered and discharged, our corrected perinatal survival almost 100%. In PGDM cases of 68, ten cases delivered vaginally and 58 delivered by LSCS. Main indications for LSCS were previous LSCS 30, preterm 11, PIH with abnormal doppler10.

Conclusion: By timely diagnosis and with good antenatal care and follow-up we can reduce the maternal morbidity, mortality and perinatal morbidity and mortality.

KEYWORDS

GDM-Gestational diabetes mellitus, PGDM-Pre-gestational diabetes mellitus, NICU-Neonatal intensive care unit, PIH-Pregnancy Induced Hypertension, LSCS-Lower Segment caesarean section, FKC- Fetal kick count, BPP-Biophysical profile, USG-Ultrasonography, FBS-Fasting blood sugar, PLBS-Post lunch blood sugar, MSL-Meconium stained liquor, IUD-Intra uterine death, HTN-Hypertension, IMR-Infant mortality rate.

INTRODUCTION:

Diabetes mellitus is a disorder of carbohydrate metabolism. It is caused by a combination of hereditary and environmental factors, characterized by either inadequate secretion or inadequate action of insulin. Gestational diabetes mellitus (GDM) is regarded as glucose intolerance with first onset in pregnancy.

The reasons for the rise in the prevalence of diabetes are mainly changes in life style, dietary habits, older age at first conception, polycystic ovarian disease, obesity and more so due to the increased awareness and changing methodology in testing for the condition.

Gestational diabetes mellitus (GDM) is regarded as glucose intolerance with first onset in pregnancy. The diagnosis of GDM infers an increased risk of both short and long term outcomes for the mother and fetus(1). The current guidelines of the International Federation of Gynecology and Obstetrics(FIGO) recommend universal screening of pregnant women for GDM with a 75g 2 hour oral glucose tolerance test(OGTT)(2). The lower thresholds recommended by FIGO are derived from the findings of the Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study. The HAPO study found that the adverse events associated with GDM increase along a continuum with increasing hyperglycemia (3). The estimated prevalence of GDM based on the FIGO guidelines varies between 11.1-44.3 %(4,5).

Universal screening for GDM has the advantage that all pregnant women are screened as part of routine antenatal care. However, this will place an added burden, both financial and personnel, on the health care system. Selective screening based on risk factors such as advanced maternal age, obesity, family history of diabetes, and previous adverse pregnancy outcomes such as recurrent or unexplained pregnancy losses, large-for-gestational-age babies, or congenital abnormalities has been proposed as a screening strategy for GDM. Selective screening based on risk factors performs poorly as a screening tool with up to one-sixth of women with GDM diabetes being missed [6]. As we belong to high ethnic group universal screening is recommended.

Risk factors considered were obesity, that is, a body mass index (BMI) ≥ 30 kg/m2, age ≥ 35 years, a family history of diabetes mellitus, a history of a delivery of a baby ≥ 4000 g in a prior pregnancy, glycosuria, a history of GDM in a prior pregnancy or a history of a baby with a congenital abnormality, and an unexplained stillbirth or recurrent pregnancy losses. Gestational age was based on the patient's last normal menstrual period, ultrasound-determined gestation, or by measuring of the symphysis to fundal height.

RESULTS:

In Mahavir Institute of Medical Sciences, Tertiary Care Hospital, Vikarabad, our OPD 1000 cases examined found 160 cases as GDM during the period from 1-1-2018 to 30-12-2019. In 160 cases 92 cases GDM and 68 cases PGDM. We used 75 gms oral glucose tolarence test and after 2hrs blood sugar values more than 140 mgs considered as diabetic. HbA1c 6-7% in 20 cases, 7-8% in 50 cases >8% in 22 cases among 92 GDM cases. Among the PGDM cases HbA1c <6 none, 6-7%- 13 cases, 7-8.5% were 40 cases, >8.5% were 15 in total of 68 cases.

In GDM cases of 92, booked cases were 58, unbooked were 102. Less than 20yrs age group were 12 cases, from 20-29 age 51 cases (55%), 30-39 age group 25 cases and more than 40 yrs 4 cases. Among the parity primigravida 35 cases, G2 were 30 cases, G3 were 23 cases, more than G4 were 4 cases. Hypothyroidism found in 75% of cases. Problems in previous pregnancies were H/o GDM in 20 cases, associated PIH and IUD in 10 cases, congenital heart disease in 5 cases, big baby in 5 cases. In IUD cases preterm 6, term 3 .History of PIH in 10 cases, spontaneous abortion 4, neonatal deaths 5.Obstetric complications observed in our GDM cases were PIH in 58(64%),PIH with Oligohydramnios in 8(8.6%), PIH with abnormal Doppler 30(32%), Hydramnios 30(32%), Preterm 22, PROM 5, Chronic HTN 6. Increased FBS and PLBS seen in 36 cases, and increased PLBS in 56 cases. GDM was controlled with insulin in 56 cases, with oral hypoglycemic agents in 28 cases rest controlled with diabetic diet alone.

In our GDM cases of 92, vaginal deliveries 26 and 66 delivered by LSCS. Indications for LSCS were Previous LSCS 23, previous LSCS with PIH 38, abnormal Doppler 6, Elderly primi 3, Malpresentations 2, decreased fetal movements 2, BOH with precious pregnancy 3, placenta praevia with abnormal presentations 2. Weight of babies <2 kgs were 22, 2-2.5 kgs 12 cases, 2.6 to 3 kgs were 20, 3.1 to 3.5 kgs were 35, > 3.5 kgs were 3. In our perinatal outcome prematurity 22 cases, IUGR 15, macrosomia 3, IUD 3, undescended testis with severe hypospadias is 4, MSL 10. All our NICU admissions were recovered well. Perinatal outcome only 3 IUDs.

Table 1:

Obstetric Complications in GDM cases	
PIH	58(64%)
PIH + Oligohydramnios	8(8.6%)
PIH + Abnormal Doppler	30 (32%)
Hydramnios	30 (32%)
Preterm	22
PROM	5
Chr.HTN	6

Table2:

INDICATIONS FOR LSCS IN GDM CASES	
Previous LSCS	23
Previous LSCS + PIH	38
Abnormal Doppler	6
Elderly primi	3
Malpresentation	2
Decreased fetal movements	2
BOH with precious pregnancy	3
Placenta praevia with abnormal Presentations	2

In our 160 cases of diabetes mellitus in pregnancy PGDM were 68 cases. Booked cases 20 and unbooked 48. Primigravida 2, G2 were 34, G3 were 22, >G4 were 10. In the age group of 20-29yrs were 5 cases, 30-39 yrs were 60 cases, >40 yrs 3 cases. 88% were between the 30-39 yrs age group. Associated obstetric complications observed were PIH with abnormal Doppler were 10 cases, PIH with oligohydramnios were 15 cases, Preterm 22 cases, PROM were 6 cases, polyhydramnios 15 cases. Obstetric risk factors noticed were elderly women 15, BOH 14, Previous LSCS 30, Postdates 4, Placenta praevia 5. The duration of diabetes mellitus was <5 yrs in 50 cases, 6-10 yrs in 10 cases, >10 yrs in 8 cases. Hypothyroidism noticed in 25% of PGDM cases. Previous pregnancy problems in PGDM cases were PIH in 20, Preterm IUD in 15 cases, Term IUD with abruption in 3 cases, Macrosomia in 10 cases, congenital heart diseases in 3 cases, spontaneous abortion in 3 cases, preterm and kernicterus in 6 cases. End organ damage like Chronic HTN seen in 8 cases, background diabetic retinopathy in 2 cases, diabetic macroangiopathy in 2 cases. Medical complications detected in uncontrolled diabetes mellitus in 15 cases, diabetic ketoacidosis in 2 cases, and hypoglycemia in 3 cases. Increased FBS+PLBS seen in 28 cases, Increased PLBS in 40 cases. 40 cases treated with insulin and 28 cases treated with insulin and oral hypoglycemic agents. After monitoring glucose levels most of the cases given Injection Betamethasone 12mg IM two doses with 24 hrs apart.

In 68 cases of PGDM 10 cases delivered vaginally and LSCS done in 58 cases. Indications for LSCS were previous LSCS 30, PIH with abnormal Doppler 20, Big baby 3, Decreased fetal movements in 3, PROM and oligohydramnios in 1, preterm 11. In our perinatal outcome Prematurity seen in 15 cases, IUGR 10, Macrosomia 3, IUD in 3 cases. 28 cases admitted in NICU all recovered. The corrected prenatal survival is 100%.

Table 3:

OBSTETRIC COMPLICATIONS IN PGDM CASES	
PIHwithAbnormalDoppler	10
PIHwithOligohydramnios	15
Preterm	22
PROM	6
Polyhydramnios	15

Table4:

Indications for LSCS in PGDM cases	
Previous LSCS	30
PIH with Abnormal Doppler	10
Big baby	3
Decreased fetal movements	3
PROM with Oligohydramnios	1
Preterm	11

DISCUSSION:

Diabetes mellitus (DM) increases the risk of adverse maternal and neonatal outcomes, and optimization of glycemic control during pregnancy can help mitigate risks associated with diabetes. GDM is characterized by pancreatic β-cell dysfunction and insulin resistance [10]. There is an association with GDM and obesity, family history of diabetes mellitus, previous stillbirth, previous macrosomic child, and age > 30 years in some sub-Saharan African populations [7].

The population is highly vulnerable for the development of type 2 diabetes with the alarming prevalence of other risk factors such as obesity, unhealthy dietary habits, sedentary lifestyle and a positive family history. Hence, the early detection and control of gestational diabetes become a mandate in controlling the unprecedented increase in the type 2 diabetes burden.

This study brings into light the various maternal and neonatal outcomes of gestational diabetes. Delivering the child through surgical intervention and progression to type 2 diabetes mellitus were the major maternal outcomes. Major neonatal outcomes included increased birth weight, Macrosomia, shoulder dystocia, NICU admissions, premature deliveries and abortions.

Women whose vitamin C intake was < 70 mg per day were found to be associated with a 1.8-times increased risk for GDM compared with higher intake (8).The maternal level of 25-hydroxyvitamin D < 20 ng/mL was found to be associated with a 2.66-times increased risk for GDM compared with the control group [9]. There is a significant correlation of high consumption of saturated fat consumption and risk of GDM, whereas high consumption of polyunsaturated fat was associated with decreased risk for GDM.

Role of Exercise:

Exercise is associated with improved insulin sensitivity which might improve both fasting and postprandial glucose levels avoiding the use of insulin in some women with GDM[10]. Exercise has been shown reduce the need of insulin in women with GDM compared with controls [11]. It is found that exercise reduces the risk of preeclampsia in pregnant women. Likewise, a case-control study showed that in women who underwent regular physical activity, the risk reduction of preeclampsia was 35% compared with controls [12].

It is a known fact that the intrauterine hyperglycemic status in gestational diabetes increases the risk for type 2 diabetes in future. Even the molecular aspect of progression to type 2 diabetes has been studied in detail among gestational diabetes patients. The endothelial irregularity found in diabetic vasculopthic patients was detected in the fetal placenta of gestational diabetic individuals. This suggests that the origin of diabetic complication is seen right from the fetus of gestational diabetic women.

The previous history of delivering a baby weighing ≥ 4000 g and elevated random blood glucose were independent predictors of developing GDM, big baby which is an outcome of gestational diabetes is an indication for caesarean section that women with gestational diabetes are more at risk for caesarean sections. More than half of those who underwent caesarean section were on insulin therapy for uncontrolled glycemic status. Regular monitoring of blood glucose and its strict control reduces the risk of surgical interventions and can facilitate normal deliveries. Metformin is the first-line medical therapy for all patients with GDM who do not respond to dietary control unless it is contraindicated, unacceptable to the patient or is not tolerated. Metformin has been shown similar to insulin results in achieving satisfactory glucose control, with no difference in perinatal outcome (13). When used alone, metformin was found to be associated with less maternal weight gain but with more risk of preterm birth compared with insulin treatment. Furthermore, compared with glyburide, metformin treatment was associated macrosomia and less maternal weight gain. Insulin is used as supplementary to metformin or solely if metformin was not tolerated or could not be used. GDM is not only related to adverse pregnancy outcomes but it is also associated with adverse long-term health effects on both mothers and their offspring. Identification of women at risk of GDM may allow early health monitoring and intervention.

Glyburide has also shown similar efficacy and outcomes with insulin. However, a recent meta-analysis of 15 studies, demonstrated an increased risk of macrosomia and neonatal hypoglycaemia in women treated with glyburide compared to insulin. Similarly, a recent retrospective study involved in women with GDM, showed that neonatal comorbidities were more frequently encountered when women were treated with glyburide compared with women who received insulin.

Hypertensive disorders during pregnancy are classified into three categories; chronic hypertension, preeclampsia and gestational hypertension. In the long-term hypertensive disorders carry the risk of developing T2DM, hypertension, metabolic syndrome and CVD [14].

Long-term metabolic comorbidities in the offspring:

The Pedersen hypothesis forms the basis for the current understanding of the effects of intrauterine hyperglycemia on foetal β-cell hypertrophy and adipose tissue and late development of obesity and T2DM in the offspring. Children born by women with GDM had an eight times increased risk of developing diabetes or pre-diabetes when they are 19-27 years old compared with children born from women without GDM[15].

A neonatal death takes up the major share of infant mortality. Preterm births are an important cause of neonatal mortality. The development of neonatal health care facilities is inevitable to further bring down the state's IMR.

CONCLUSION:

This study concludes that the major feto-maternal outcomes of gestational diabetes are long-term progression to type 2 diabetes, increased birth weight and increased NICU admissions for neonates. In the present health milieu of the state these findings are of utmost importance. The burden of gestational diabetes is only going to increase in the near future. Awareness to achieve good glycemic control and to prevent progression to type 2 diabetes must be given to these women. The Government should largely take up the responsibility of improving the neonatal care facilities of the state to handle the neonatal outcomes of gestational diabetes. With early diagnosis and good and regular antenatal care and good glycemic control we can have good maternal and perinatal outcome as in our study.

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