ORIGINAL RESEARCH PAPER

Gynaecology

KEY WORDS:

MATERNAL AND PERINATAL OUTCOME IN WOMEN WITH GESTATIONAL DIABETES MELLITUS

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INTRODUCTION

Definition:

Gestational Diabetes was defined as carbohydrate intolerance of variable severity with its onset or first recognition during pregnancy.

- Gestational diabetes mellitus should be diagnosed at any time in pregnancy if one or more of the following criteria are met:
- fasting plasma glucose(92 -125 mg/dl) . Ø 1-hr plasma glucose(180 mg/dl) .
- hr plasma glucose (153 -199 mg/dl) following a 75g oral glucose load .

The considerable effects on carbohydrate metabolism particularly the lowered renal threshold for glucose and the diminishing sensitivity to insulin as pregnancy advances render the control of diabetes more difficult, so more insulin needed to achieve metabolic control.

Poor control increases the incidence of maternal and fetal complications and is the single most important factor influencing the outcome of pregnancy.

Effect of Diabetes on the mother.

- Spontaneous abortion
- Due to poor glycemic control in Ist trimester.
- Monilial vaginitis and vulvitis
- Pre eclampsia
- Affects 10-25% of all pregnant diabetics
- Infection
- Polyhydramnios
- Post partum haemorrhage
- Caesarean section

Effects of diabetes on the fetus

- Congenital abnormalities
- Macrosomia.
- Hyaline membrane disease.
- Unexplained fetal death.
- Hypoglycemia
- Hyperviscosity syndrome
- Hypocalcemia
- Apnoea, bradycardia
- Traumatic delivery

Consequences Of Diabetes On The Placental Function:

- Placenta is situated in between the maternal and fetal circulation. In diabetes maternal and fetal hyperglycemia affects placental metabolism and growth. In diabetes, villous stroma is edematous with overexpression of hofbauer cells which causes release of placental cytokines. These causes placentomegaly which is correlated with fetal macrosomia.

Medical Nutrition Therapy(mnt): Calorie Allotment :

- BMI
- 19 to 27: 30 kcal/kg per day
- 27 to 29: 25 kcal/kg per day

> 30: 12 to 15 kcal/kg per day

< 19: 35 kcal/kg per day

INSULIN THERAPY:

Intermediate acting:

- 40% of total daily dose -Peak action- 4- 8 hours
- Duration of action-12- 18hours

Regular Insulin:

- 60% of total daily dose -peak action-2-3 hrs
- duration of action-8-10 hrs

Short acting insulin analogues:

- Insulin lispro and aspart, currently used in pregnancy
- Acceptable safety profiles
- Minimal transfer across the placenta
- No evidence of teratogenesis
- Improve postprandial glucose excursions
- Lower risk of delayed postprandial hyperglycemia.

CARBOHYDRATE METABOLISM IN NON DIABETIC PREGNANCY: Factors contributing to insulin resistance

- Production of placental somatomammotrophin, increased production of estrogen, progesterone, increased insulin destruction by placental enzyme like insulinase.

Changes in Gluconeogenesis

- Fetus continuously uses fuels from the mother.It uses alanine and other amino acids and depletes the mother of a major gluconeogenic source.

Increased Lipolysis

The mother uses fat for caloric needs and saves glucose for the fetus.

BACKGROUND

- The prevalence of GDM is increasing in India with increasing obesity and lifestyle and dietary changes.
- Gestational diabetes mellitus (GDM) is amongst the most common medical complications of pregnancy associated with adverse maternal and perinatal outcome.

INCIDENCE

- Worldwide:13.2%
- Indiawide:

Urban areas:4.6%-14%.Rural areas:1.7%-13.2%AIM

Aims and Objectives

1. To know the incidence of Gestational diabetes mellitus.
2. To know the Perinatal Mortality and Morbidity in DM complicating pregnancy.
3. To know the maternal outcome in GDM.

INCLUSION CRITERIA

- All antenatal patients who were diagnosed as GDM and who delivered during the study period available from the record section at our hospital - DR PSIMS and RF chinnaavutapally, Andhra Pradesh.

EXCLUSION CRITERIA

Antenatal women who were diagnosed as pregestational diabetes mellitus /overt diabetes mellitus.

MATERIALS AND METHODS

This is a retrospective study, aimed to review the obstetric and perinatal outcomes of women with GDM who were cared for and delivered at Dr PSIMS&RF for a period of august 2017 to 2019 june.

- Patients attending the antenatal clinic were included in screening for Gestational diabetes mellitus. At the first visit the patients were counseled for screening and asked to come after three days of unrestricted diet in a fasting state (8-10 hrs of overnight fasting) for a 75 gm oral glucose tolerance test.
- Two samples of about 2cc blood were taken from each patient in fasting and two hours after a load of 75 gm of glucose in 200 ml of water. These samples were analysed by a semi automatic analyzer in the laboratory.
- 75 GM ORAL GLUCOSE TOLERANCE TEST Gestational diabetes mellitus diagnosis based on 2 hr 75 gm oral glucose tolerance test defined by either WHO or ADA predicts adverse pregnancy outcome.
- One step procedure of WHO (2 hr PPG greater than or equal to 140 mg/dl) serves dual purpose of both screening and diagnosis. Seshiah et al stated that diagnosis of GDM by OGTT based on initial glucose challenge test screening leaves 21.5% undiagnosed.

O'SULLIVAN& MAHAN'S ORAL GLUCOSE TOLERANCE TEST [OGTT]

- This test serves as the Gold standard for the diagnosis of gestational diabetes mellitus. In O'Sullivan's studies, whole blood was tested using the Somogyi
- Nelson method for measuring reducing substances. Plasma Glucose values have been shown to be 14% higher than those in whole blood obtained from the same sample using the same assay method. Hence, NDDG adopted O'Sullivan's values to plasma glucose.
- Later NDDG reinterpreted O'Sullivan's data for glucose oxidase method on plasma by increasing O'Sullivan criteria by 15%. This criteria reaffirmed by American Diabetic Association in 1985, stated that the glucose oxidase method is specific for glucose and generally result in 5 mg / dl decrease in measured values in the range of glucose concentration (Carpenter and coustan).

DIAGNOSTIC CRITERIAS FOR GDM

	Glucose Load		Fasting (mg%)	1 hr (mg%)	2 hr (mg%)	3 hr (mg%)
O Sullivan and Mahan	100gm	Whole blood	90	165	145	125
Carpenter & Coustan	100gm	Plasma	95	180	155	140
NDDG	100gm	Plasma	105	190	165	145
Langer et al	100gm	Plasma	105	190	165	145

RESULTS:

The incidence of GDM in our hospital was 4%.(80 out of 2000) . Most of the patients could be controlled on diet alone(37.5%). Patients requiring oral hypoglycemic drug ,diabetic diet and also insulin are 12.5%. Patients requiring only oral hypoglycemic drug and diabetic diet(12%).

The rate of mode of delivery was almost same caesarean section 42% and vaginal 58 %respectively.Patients who had family history of diabetes was 42%.

Incidence of polyhydraminos in patients with GDM(7%).Incidence of hypothyroidism in GDM was(30%).Incidence of preecclampsia in GDM was 7.5%.

Other associated conditions

- Family history of diabetes mellitus -42%.
- Previous history of GDM-5%.
- Previous history of Macrosomia -2.5% -

AGEWISE DISTRIBUTION

Age in years(N=80)	No of patients	%
<20	10	12.5
20-25	28	35
25-30	30	37.5
30-35	9	11.25
35	3	3.75

In our study majority of patients were distributed in age group of 25-30 yrs.

Age in years(N=80)	No of patients	%
Diabetic diet	30	37.5%
Diabetic diet+OHA+Insulin	10	12.5%
Diabetic diet+OHA	12	15%
Diabetic diet+Insulin	28	35%

In the present study, majority of women (GDM) were controlled on diabetic diet alone,and patients with uncontrolled sugars were 12.5%Associated maternal complications

	No of cases(80)	%
Preecclampsia	6	
Polyhydraminos	6	7.5%
Preterm labor	18	22.5
Hypothyroidism	24	30%

Perinatal complications

	No of cases(80)	%
Fetal distress	20	25%
Macrosomia	5	7%
IUGR	8	10%
Hyperbilirubinemia	14	17.%
Hypoglycemia	8	10%

Mode of delivery

No of cases(80)	%	
Vaginal delivery	46	46
Instrumental delivery(forceps/vaccum)	3	3.75%

Cesarean section	No of cases(34)	%
Preterm	16	47%
Term	18	53%

Body Mass Index(BMI)
IDEAL(27.27%)
OVERWEIGHT(14.54%)
OBESE(10.9%)

Neonatal complications:

- Incidence of IUGR in patients with GDM (10%). ØIncidence of fetal distress with GDM (25%).
- Incidence of hyperbilirubinemia was (60%).
- Incidence of macrosomia /Large for gestational in GDM(5%).

DISCUSSION

- Presently in our study there is significant association of family history.Recognition of GDM in early stages may lead to a lower threshold for surgical delivery that mitigates the potential benefits of treatment.
- In our study Family history of diabetes mellitus - 42%,previous history of GDM were 5% and previous history of Macrosomia were 2.5%.
- In our study majority of patients were distributed in age

group of 25-30 yrs -37.5%.

PREVALENCE OF GDM

Study	Prevalence
Beischer et al	15%
Benchimol et al	15.65%
Dr. Anjalakshi	15%
Seshiah et al	16.2%
Schmidt et al	7.2%
Our Study	3.89%

In the present study, majority of women (GDM) were controlled on diabetic diet alone(37.5%),and patients with uncontrolled sugars were 12.5% those are on MNT+OHA+Insulin.

In our study Majority are delivered vaginally -46% and among patients who underwent C-section majority are delivered at Term 53%.

- In our study majority of GDM patients were of ideal weight(27%).

Among neonatal complications

- Incidence of IUGR in patients with GDM (10%).Incidence of fetal distress with GDM (25%).Incidence of hyperbilirubinemia was (60%).Incidence of macrosomia /Large for gestational in GDM(5%).
- Perinatal complications seen commonly in these infants are macrosomia, , shoulder dystocia, hyperbilirubinemia, hypoglycemia, respiratory distress syndrome
- These complication increase the risk of perinatal morbidity and mortality. Neonates born to GDM mothers are not at higher risk for congenital anomalies unless they have overt diabetes.

CONCLUSION

- Women with gestaional diabetes mellitus have a higher risk of developing antenatal complications - preecclampsia,polyhydraminos and more chances of preterm delivery and more percentage of caesarean section .
- The adverse outcomes are due to hyperglycemia and coexisting antenatal complications.
- Outcomes for the fetus and the neonate are improved by multidisciplinary approach ,goal to control blood sugar and appropriate fetal surveillance.
- Pre conceptional glycemic control and control around the critical period of organogenesis (7th – 8th week) though done at present needs to be carried out vigorously and effectively so as to help in lowering the incidence of congenital malformation.
- The incidence of caesarian section can be reduced in Diabetes Mellitus complicating pregnancy to an extent by carefully monitoring the glycemic control, which in turn will lower the macrosomia rate, and by minimizing primary section.

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