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Original Research Article

Analysis of maternal and fetal outcome in gestational diabetes mellitus

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ABSTRACT

Background: Diabetes is the most common medical complication of pregnancy. Glycemic control throughout pregnancy and a late-pregnancy HbA1c level <6.5 percent leads to reduced rates of adverse obstetrical and neonatal outcomes.
Methods: A retrospective observational study was conducted in the Department of Obstetrics and Gynaecology, Shri Lal Bahadur Shastri medical college Mandi, Himachal Pradesh for a period of one and half years from 1st January 2023 to 30th June 2024. All the pregnant women with gestational diabetes mellitus were included in the study.
Results: The prevalence of gestational diabetes mellitus was 128 (2.02%). The most common age group was 26-30 years. There were 7.8% obese and 90.6% over weight patients. Most of the patients (54.68%) were treated by medical nutrition therapy (MNT) followed by insulin (34.3%). The most common maternal complication was hypertension (15.6%) and 31.25% babies had admission in neonatal care unit. 10 (7.8%) babies had birth asphyxia and neonatal death.
Conclusions: Single step screening with 75 gm OGTT is being followed in our state and the universal screening has improved the maternal and neonatal outcomes with GDM. Enhanced screening, timely intervention and motivation of the GDM patients on diet control, metformin or insulin to achieve euglycaemia can reduce maternal, fetal and neonatal complications.

Keywords: Gestational diabetes mellitus, OGTT 75 gm, Glycosylated hemoglobin

INTRODUCTION

Diabetes is the most common medical complication of pregnancy.[1] Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance of variable severity with onset or first recognition during pregnancy [1] Type 1 diabetes mellitus results from a cellular mediated autoimmune destruction of the beta cells of the pancreas. Type 2 diabetes is caused by an abnormality in insulin secretion and peripheral insulin resistance.[2] Women can be separated into those diagnosed with diabetes before pregnancy-pregestational or overt diabetes and those diagnosed during pregnancy-gestational diabetes.[1] Risk factors for impaired carbohydrate metabolism in pregnant women include a strong familial history of diabetes, prior delivery of a large newborn, persistent glycosuria, or unexplained fetal losses.[1] The risk of developing type 1 diabetes if either parent is affected is 3 to 5 percent.[1] Type 2 diabetes has a much stronger genetic component. If both parents have type 2 diabetes, the risk of their offspring developing it approaches 40 percent.[3] Both gestational and pregestational diabetes are associated with an increased incidence of macrosomia, preeclampsia, preterm births and increased perinatal mortality.[4] This rising risk may be related to oxidative stress, which plays a key role in the pathogenesis of diabetic complications and preeclampsia.[1] The cornerstone of treatment for GDM is dietary therapy.[4] Allotted carbohydrates are distributed throughout the day in three small- to moderate-sized meals and two to four snack.[1] An ideal dietary composition is 55 percent carbohydrate, 20 percent protein, and 25 percent fat, of

which <10 percent is saturated fat.[1] Insulin and oral agents are reserved for individuals who manifest significant fasting hyperglycemia or postprandial glucose elevations despite dietary intervention.[4] Glycemic control throughout pregnancy and a late-pregnancy HbA1c level <6.5 percent leads to reduced rates of adverse obstetrical and neonatal outcomes.[5] Aim of the study is to the sociodemographic factors, maternal and fetal outcome of gestational diabetes mellitus.

METHODS

A retrospective observational study was conducted in the Department of Obstetrics and Gynaecology, Shri Lal Bahadur Shastri medical college Mandi, Himachal Pradesh for period of one and half years from 1st January 2023 to 30th June 2024. All the pregnant women with gestational diabetes mellitus were included in the study. A total 6,319 women delivered in the tertiary care hospital during the study period. Only 128 (2.02%) out of 6,319 pregnant women in the study period had diabetes mellitus. Clinical data of the patients presenting with diabetes mellitus was obtained from the delivery records and analysed.The detailed records of clinical history, gestational age, maternal and perinatal outcomes were collected from hospital delivery register and case files. Age of the patient, occupation, place of residence, education level, socio economic status, booking status, parity, BMI, previous history of stillbirth or abortion, Single step 75 gm OGTT values, glycosylated hemoglobin values, Renal function tests, 24-hour urine protein, fundus examination records, ultrasound growth parameters, treatment, mode of delivery were recorded on performa. APGAR score, birth weight of babies, complications resulting in the admission in NICU were also recorded. The fetal outcome included incidence of congenital anomalies, macrosomia, fetal growth restriction, antepartum IUD, fresh still birth, admission in neonatal intensive care units and neonatal deaths.

Statistical analysis

Data was entered in excel and analysed by using software SPSS 17.

RESULTS

A total 6319 women delivered in the tertiary care hospital during the study period of 1.5 years. The prevalence of gestational diabetes mellitus was 128 (2.02%). Most common age group was 26-30 years affecting 48 (37.5%) cases followed by 31-35 years affecting 44 (34.37%) pregnancies (Table 1).

There were 10 (7.8%) obese and 116 (90.6%) overweight patients (Table 2).

Majority of the patients were multi para (78.125%) (Table 3).

Table 1: Age distribution.

Age group (year)	n=128	Percentage
<20	2	1.56
20-25	10	7.8
26-30	48	37.5
31-35	44	34.37
36-40	17	13.28
>40	7	5.46

Table 2: BMI.

BMI	n=128	Percentage
Normal weight	2	1.56
Overweight	116	90.6
Obese	10	7.8

Table 3: Parity.

Parity	n=128	Percentage
Primigravida	28	21.87
Multipara	100	78.125

Table 4: Treatment pattern.

Treatment pattern	n=128	Percentage
MNT	70	54.68
Metformin	10	7.8
Insulin	44	34.37
Both	4	3.12

Table 5: Maternal outcome.

Maternal complications	n=128	Percentage
Vulvo-vaginal infection	10	7.8
Hypertension	20	15.6
Polyhydroamnios	4	3.12
APH	2	1.56
PROM	4	3.12
Wound sepsis	4	3.12
Hypoglycaemia	2	1.56
DKA	2	1.56
Uneventful outcome	80	62.5

Most of the patients (54.68%) were treated by medical nutrition therapy (MNT) followed by insulin (34.3%) (Table 4).

The most common maternal complication was hypertensive disorder of pregnancy (15.6%) whereas 7.8% of the patients had vulvovaginitis (Table 5).

Table 6: Mode of delivery.

	n=128	Percentage
Vaginal delivery	98	76.57
Caesarean section	30	23.43

A total 30 (23.43%) patients had caesarean section (Table 6).

Table 7: Fetal and neonatal outcome.

	n=128	Percentage
Congenital anomalies	7	5.4
Miscarriage	5	3.9
Macrosomia	30	23.43
FGR	2	1.56
Antapartum IUD	4	3.12
Fresh stillbirth	1	0.78
Normal APGAR	59	46.09
Birth asphyxia	10	7.8
Neonatal death	10	7.8

Macrosomia was observed in 30 (23.43%) babies. 40 (31.25%) babies had admission in neonatal care unit. 10 (7.8%) babies had birth asphyxia and neonatal death (Table 7).

DISCUSSION

One of the most prevalent pregnancy problems, gestational diabetes mellitus (GDM) affects about 14% of pregnancies worldwide.[6] The prevalence of GDM in present study is 2.02% while the prevalence was 4.326% in the study by Poothavi et al.[7] The most affected age group in our study was 26 to 30 years which is similar to the study by Dharamvijaya MN et al (26.6±4.45 years).[8] Various authors have confirmed that not only obesity, but also overweight women have greatly increased risk of developing gestational diabetes.[9,10] In our study, 54.68% patients were on medical nutrition therapy and 34.3% patients were on insulin whereas the incidence was 52.3% and 21% respectively in the study by Poothavi et al.[7] Diet therapy is critical to successful regulation of maternal diabetes.[4] In the present study, hypertension was observed in 15.6% which is similar to other studies Ganguly et al.[11] In the present study, 7.8% patients had vulvovaginal infection. The rates of many infections are higher in diabetic pregnant women. Common ones include candidal vulvovaginitis, bacterial urinary and respiratory tract infections, and puerperal pelvic sepsis.[1] In our study polyhydroamnios was present in 3.12%. In a study from Parkland Hospital, Dashe and coworkers found that the AFI parallels the amniotic fluid glucose level among women with diabetes.[12] In our study, only 23.43% patients had caesarean section while incidence was 35% in the study by Gunjan et al.[13] In our study wound sepsis was observed in 3.12% cases. Johnston and colleagues reported that 16.5 percent of women with pre gestational diabetes had postoperative wound complications following caesarean delivery.[14] In the present study, the incidence of congenital anomalies in the fetus was 5.4%. The incidence of major malformations in fetuses of women with type 1 diabetes approximates 11 percent and is at least double the rate in fetuses of nondiabetic mothers.[15] In our study, macrosomia was observed in 23.43% babies. Maternal hyperglycemia prompts fetal hyperinsulinemia, and this in turn stimulates excessive somatic growth.[1] In our study, incidence of antepartum IUD and fresh stillbirth was 3.12% and 0.78% respectively. These stillbirths are "unexplained" because common factors such as obvious placental insufficiency, placental abruption, fetal-growth restriction, or oligohydramnios are not identified.[1]

Limitations

The limitations of the study are that the study population was not categorised into pregestational and gestational diabetes mellitus. There is no comparison group.

CONCLUSION

The incidence of gestational diabetes mellitus has increased with rise in sedentary life style, increase in BMI and elderly pregnancies. We follow the national guidelines for diagnosis and management of gestational diabetes mellitus, the single step test recommended by WHO using a 75-gm oral glucose tolerance test irrespective of last meal with a threshold value of 2-hour blood glucose>140 mg/dl. Guidelines advocate for universal screening of all pregnant women. If test is negative then second test should be done at 24-28 weeks. Single step screening 75 gm OGTT is being followed in our state and the universal screening has improved the maternal and fetal outcomes with GDM. Enhanced screening, timely intervention and motivation of the GDM patients on diet control, metformin or insulin to achieve euglycaemia can reduce maternal, fetal and neonatal complications.

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