Original Article

DIABETES MELLITUS DURING PREGNANCY: A study of fifty cases

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ABSTARACT

Objective: To review and critically evaluate the incidence, epidemiology, clinical pattern, diagnosis, management, complications & outcome of diabetes mellitus during pregnancy in hospital based study.

Setting: A study of 50 cases of diabetes mellitus during pregnancy studied during the period 1ST June 2001 to 1st June 2003 at Department of Obstetrics & Gynecology Unit-II, Jinnah Hospital, Lahore.

Main outcome measures: Maternal and fetal outcome.

Results: Total number of women delivered were 11271. Fifty cases of diabetes mellitus during pregnancy were studied. Mostly the patients were more then 30 years of age, multiparous ladies with gestational diabetes in 80% of cases, Type-II diabetes in 16% and only in 4% Type-I diabetes was reported. Insulin was required in 40% of patients. Eight women out of 50 had spontaneous miscarriage, 5 underwent preterm delivery while 36 reached term with one intrauterine death. Total number of babies delivered alive were 41. There was one stillbirth and 3 neonatal deaths.

Conclusion: Management of diabetes mellitus in pregnancy involves teamwork of Obstetricians,Physicians and Neonatologists.

KEYWORDS: Diabetes Mellitus, Pregnancy, Gestational diabetes.

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INTRODUCTION

Before the discovery of insulin in 1921, Pregnancy in diabetic women was uncommon and was accompanied by high maternal and fetal mortality rates[1]. Diabetes mellitus may develop during pregnancy (Gestational diabetes) or may pre-exist in a woman who becomes pregnant subsequently. However 90% of pregnancies complicated by diabetes are due to gestational diabetes.

The 'gold standard' of screening for gestational diabetes is generally accepted as the 50 gm oral glucose challenge test. The American Diabetic Association (ADA) recommends glucose load to be given with no dietary preparation, to all pregnant women at 24-28 weeks of gestation. If one hour plasma glucose exceeds 140mg/dl the patient should have oral Glucose Tolerance Test (GTT).[2] Women with potential diabetic features such as family history

of diabetes, previous still birth, congenitally malformed babies, presence of significant glycosurea, polyhydramnios and macrosomic fetus in the current pregnancy need ETT.[3]

Pregnancy is a diabetogenic state[4] and there is rapid increase in the insulin requirement particularly between 28 and 32 weeks gestation.[5] There may be an elevation of blood pressure with or without proteinurea[6]. There could be increased risk of development and progression of diabetic retinopathy[7]. Diabetic ketoacidosis is rare whereas hypoglycemic attacks are more common[8]. The risk of congenital abnormalities, miscarriages and unexplained intrauterine death is well known Mode and timing of delivery in pregnancies complicated by diabetes mellitus is crucial. Selective induction of labour and elective Caesarean section have important place if evaluation justifies.[9] Though a well controlled disease with normal fetal growth and no other complications of pregnancy may be allowed to reach the term.

PATIENTS AND METHODS

This study was conducted at the department of Obstetrics and Gynecology Unit-II Jinnah Hospital, Lahore over two year period. Fifty cases of diabetic pregnant ladies were managed. Detailed history, physical examination and necessary investigations were carried out. Investigations including, hemoglobin, total and differential counts, grouping and cross matching, urine analysis, timed blood sugar levels, serum urea and creatinine to have base line renal profile. Routine ophthalmoscopy is performed in all patients with long standing diabetes. In high risk patients ECG, echocardiography was also performed. HbA1c was done in all patients for assessing the glycemic control in the last two months. For screening Glucose Challenge Test (GCT) followed by Glucose Tolerance Test (GTT according to WHO criteria) was used between 28-32 weeks.

For fetal assessment dating scan was done in first trimester. To screen for congenital abnormalities scan was repeated at 18-20 weeks. When cardiac abnormality was suspected then scan was repeated along with echocardiography at 22 weeks. Fetal growth pattern was monitored ultrasonographically throughout gestation. Non-Stress Test (NST) was done to monitor fetal heart rate twice weekly and Bio-Physical profile (BPP) weekly after 32 weeks in high-risk cases especially in vasculopathy. When these two parameters were suspicious, fetal umbilical artery Doppler studies were considered to decide about the timing of delivery.

Physicians were closely involved in managing diabetes. Initially dietary advice was given. Insulin is required if pre-prandial blood glucose levels were >6 mmol/lt. (108 mg/dl). Because of wellknown increased risk of still birth in these cases, we planned induction of labour at 38 weeks of gestation. Elective lower segment caesarean section was planned if suspected fetal weight was >4000 grams. Macrosmina is indicative of poor glycemic control during antenatal period.

Throughout labour regular monitoring of blood sugar levels was done two hourly. Aim was to keep blood sugar levels of 4-6 mmol/lt (100mg/dl). Continuous fetal heart rate monitoring was done. During first stage of labour analgesia was provided by I/M pethidine 50 mg or by an epidural analgesia. During second stage, shoulder dystocia was anticipated in macrosomic babies. Assissted delivery by vacuum extraction or outlet forceps was carried out to shorten the second stage of labour. Lower segment caesarean section was performed for obstetric indications under general or spinal anaesthesia. Antibiotics were given to all patients prophylactically. Breast feeding was promoted. Insulin requirement was adjusted in liaison with the physician postnatally. Contraception was advised at the time of discharge.

OBSERVATION AND RESULTS

A total of 11271 pregnant patients were admitted during the two-year period and 50 cases of diabetic pregnant ladies were managed.

Relation to age, gravidity and parity (Table-I) shows that diabetic pregnant ladies are mostly in the age group 30 and above and are multigravida. Table-II shows the percentage of different types of diabetes and their control during pregnancy. Diabetes in pregnancy affects both mother and fetus (Table III-a & b). Preeclampsia and hypoglycemia were the commonest complications in diabetic pregnant ladies seen in 20% of the cases. Macrosomia was seen in 40% of cases and growth retardation was observed in babies of mothers with established vasculopathy due to long standing diabetes. Analysis of outcome of pregnancy and mode of delivery is shown in Table IV-a & b. Almost three quarter reached term and 8 patients

Table -I
Relation to age and parity
(n=50)

Age (Years)	*Number*	*Percentage*	*Gravidity and parity*	*Number*	*Percentage*
<20	1	2	Primigravida	6	12
21-30	22	44	Second gravida	4	8
31-40	25	50	Third gravida	10	20
>40	2	4	Fourth gravida	30	60

Table -II
Classification of diabetes &
Control of Diabetes in Pregnancy
(n=50)

Type of diabetes	*Number*	*Percentage*	*Glycemic control*	*Number*	*Percentage*
Type I	2	4	Exercise	5	10
Type II	8	16	Diet	25	50
Gestational	40	80	Insulin	20	40

Table III-A
Maternal Complications
(n=50)

Complications	*Number*	*Percentage*
Retinopathy	1	2
Nephropathy	1	2
Hypoglycemia	6	12
Polyhydramnios	2	4
Ketoacidosis	0	0
Eclampsia	2	4
Pre-eclampsia	6	12
infections	5	10
Ischemic heart disease	0	0
Maternal death	0	0

Table III-B
Fetal Complications
(n=50)

Complications	*Number*	*Percentage*
Congenital anomalies	5	10
Large for gestational age babies	20	40
Intrauterine growth retarded babies	10	20

Table IV-A
Outcome of Pregnancy
(n=50)

Outcome of Pregnancy	*Number*	*Percentage*
Spontaneous miscarriage	8	16
Therapeutic miscarriage	0	0
Gestational trophoblastic neoplasm	0	0
Preterm delivery	5	10
Full term delivery	36	72
Intrauterine death	1	2

Table IV-B
Mode of Delivery
(n=42)

Mode of Delivery	*Number*	*Percentage*
Spontaneous vaginal delivery	18	42.8
Forceps delivery	1	2.4
Vacuum extraction	2	4.8
Emergency lower segment caesarean section (EmLSCS)	12	28.6
Elective lower segment caesarean section (ElLSCS)	7	16.6
Emergecy elective lower segment caesarean section (EmElLCSC)	2	4.8

Table-V
Postpartum Contraception
(n=50)

Contraception	*Number*	*Percentage*
Hormones	6	12
Barrier method	32	64
Tubal ligation	7	14
Vasectomy	1	2
No Contraception	4	8

Table-VI
Fetal Outcome
(n=42)

State at birth	*Number*	*Percentage*
Alive	41	82
Fresh still birth	1	2
Macerated still birth	0	0
Apgar Score		
Apgar score 4-6	10	24.4
Apgar score 8-10	31	75.6
Birth Weight (kg)		
1.5-2	2	4.7
2.1-2.5	6	14.2
2.6-3	4	9.5
3.1-3.5	4	9.5
3.6-4	9	21.42
>4	17	40.4

underwent spontaneous miscarriage. In 50% of the patients, mode of delivery was by lower segment caesarean section.

Barrier method specifically condoms, was the commonest contraception. Hormonal contraception was only advised in 12%(Table-V). Most of these patients delivered healthy, alive babies with only one stillbirth in later half of pregnancy in our unbooked patient (Table-VI). Twenty-two newborn babies (52%) needed admission in the neonatal ward. Hypoglycemia was the commonest complication, followed by respiratory distress syndrome and hyperbilirubinemia. Three babies had early neonatal deaths (Table-VII).

Table-VII
Neonatal Complications
(n=22)

Complications	*Number*	*Percentage*
Hypoglycemia	10	45.5
Hypomagnesaemia	1	4.5
Hypocalcaemia	1	4.5
Hyperbilirubinaemia	4	18.2
Respiratory distress syndrome	4	18.2
Sepsis	2	9.1
Early neonatal deaths	3	13.6
Causes of Death		
Respiratory distress syndrome + Septicemia	1	33.3
Congenital malformations	1	33.3
Preterm birth	1	33.3

DISCUSSION

The incidence of diabetes in our hospital population was 4.4/1000, which is in accordance with international data by WHO[10]. In our study population 80% of the patients have gestational diabetes, comparable to the series by Ventura et al[11]. Fifty percent of the patients were over 30 years of age. The incidence of Type II diabetes was more than that of Type I while in U.K the reverse ratio is seen. The reasons are firstly, the incidence of Type II diabetes is high in Asian population and secondly, better treatment facilities enable more women with Type I diabetes to reach the child-bearing age in U.K. This can be explained by the study by Aziz Ur Rehman stating that" NIDDM is highly prevalent in our population[12]."

As gestational diabetes and Type II diabetes is more common in obese women with sedentary lifestyle,[13] we offered diet and exercise as first line management in gestational diabetes. In 60% of the patients blood sugar was controlled by diet and light exercise. In 40% of

patients with gestational diabetes who exhibited fasting hyperglycemia >108mg/dl, insulin was started[14].

One woman was found to have diabetic nephropathy, which deteriorated during pregnancy. Her pregnancy was also complicated by pre-eclampsia, which is comparable to study by Kitzmiller[15]. Diabetic retinopathy developed in 2%[16]. Hypoglycemic attacks and pre-eclmpsia developed in 12% of pregnancies. Overall maternal complications were 56%.[17] Sixteen percent of the women had miscarriage[18]. The congenital anomalies were increased upto 10-fold and perinatal mortality upto 5-fold[19]. The incidence of macrosomia was 40%. Intrauterine growth retardation was 20%[19] and preterm deliveries was 10%. The caesarean section rate was 50%. This is 20% higher than caesarean section rate in our unit. In 25% of caesarean sections; indication was fetal distress.[20] There was one sudden fetal death at 36 weeks of gestation which can be explained by the study "unexplained fetal death remain unchanged by medical intervention[21]. Fortyeight percent of the newborn babies needed admission in the neonatal ward, comparable to study by Pettit et al, showing a relation between blood glucose concentration and neonatal mortality and morbidity.[22]

Regarding contraception, Barrier method specifically condoms, was the commonest contraception practiced by 65% of the population but it is associated with high failure rates. Low dose estrogen pills were prescribed to only those women who were non-smokers and developed gestational diabetes before 30 years of age. This practice can be explained in the study by Kjos and colleague.[23]

In the light of above mentioned results it can be concluded that the St. Vincent's declaration target of adverse pregnancy outcome in diabetics being of a similar level to that of non-diabetic women is not being achieved[24]. Internationally reports from individual tertiary centers suggest that perinatal mortality can be reduced to levels similar to that found in non-diabetic women[25] and congenital malformations reduced significantly.[26]

To improve the fetomaternal outcome in diabetic pregnancies, joint pregnancy diabetic clinics need to be established. Pre-pregnancy counseling should be promoted to reduce the incidence of congenital malformations.

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