Birdem Medical Journal
Vol. 5, No. 1, January 2015

Maternal and Fetal Outcome in Patients with Pre-gestational Diabetes Mellitus and Gestational Diabetes Mellitus and Their Comparison with Non-diabetic Pregnancy

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Abstract

Objectives: ***To describe the maternal and fetal outcome in pre-gestational diabetes mellitus and gestational diabetes mellitus and to compare with that of non-diabetic pregnancies.***

Methods: ***This cross-sectional study was done in the Department of Obstetrics and Gynaecology of BIRDEM over one year period. Study population were divided in three groups; Group A – pre-gestational diabetes, Group B – gestational diabetes and Group C – non-diabetic patients.***

Results: ***Each group had 50 patients. Majority of the patients were multigravida and delivery was at term. Caesarean section was common, 84% in group A, 76% in group B and 72% in group C. Post-partum haemorrage was the commonest maternal complication occurring in 24%, 22% and 22% cases in group A, B and C respectively. Common neonatal complications were respiratory distress syndrome (59.6%, 59.2% and 35% cases of group A, B and C respectively) and hyperbilirubinaemia (95.7%, 73.5% and 85% of cases of group A, B and C respectively). Neonatal hypoglycaemia occurred in 27.7% cases of group A and 18.4% cases of group B. No neonatal hypoglycaemia occurred in non-diabetic group.***

Conlusion: ***Incidence of post-partum haemorrhage, respiratory distress syndrome, neonatal hyperbilirubinaemia and hypoglycaemia were more in pre-gestational diabetes group than GDM group than non-diabetic group.***

Key words: ***gestational diabetes mellitus, maternal, neonatal, pre-gestational diabetes mellitus, outcome.***

(Birdem Med J 2015; 5(1): 9-13)

Introduction

Diabetes mellitus (DM) is a group of metabolic disorders characterized by a state of hyperglycaemia resulting from defects in insulin secretion, insulin action or both.[1] Gestational diabetes mellitus (GDM) is defined as glucose intolerance that is first detected during pregnancy.[2] Prevalence of GDM is increasing and varies between 1 to 14% depending up on population screened, screening methods and diagnostic criteria used.[3,4] Type 2 diabetes is also increasing and increased number of cases are being detected at an earlier age. Pregnancy and DM affect each other adversely. Pregnancy implies increased nutritional demands and increasing insulin resistance resulting from action of placental hormones accentuates the risk of maternal morbidity and fetal mortality. Diabetic patients have poor pregnancy outcome in terms of Caesarean section, gestational hypertension, macrosomia, neonatal hypoglycaemia, respiratory distress syndrome (RDS), pre-term delivery and neonatal intensive care unit (NICU) admissions.[5,6] GDM, though not to the same extent for DM, affects pregnancy outcome adversely.[7-10] This study was designed to evaluate the pregnancy outcome of patients with pre-gestational diabetes and GDM, and compare with those of non-diabetic pregnant patients.

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Received: 10 October, 2013, **Accepted:** 22 December 2014

Materials and Methods

This cross-sectional study was done in the Department of Obstetrics and Gynaecology, Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM), Dhaka, Bangladesh during the period of July 2006 to June 2007.

A total of 150 pregnant patients were evaluated during this period. They were divided in 3 groups; patients with pre-gestational diabetes were in Group A, patients with GDM were in Group B and non-diabetic patients were in Group C. Patients with pre-gestational diabetes and GDM requiring insulin in 3rd trimester were included in the study and patients on medical nutrition therapy were excluded.The study protocol was approved by Bangladesh College of Physicians and Surgeons (BCPS) and informed consent was taken from every patient before enrolment for the study.

Results

In this cross-sectional study, a total of 150 pregnant patients were evaluated. Fifty patient had pre-gestational diabetes mellitus (Group A), 50 had GDM (Group B) and 50 patients were non-diabetic (Group C). Age distribution of the study subjects are shown in Table I.

Table I

Age distribution of the study subjects

Age group (years)	Group A (N=50) n (%)	Group B (N=50) n (%)	Group C (N=50) n (%)
<25	7 (14)	6 (12)	10 (20)
26-30	13 (26)	25 (50)	26 (52)
31-35	20 (40)	16 (32)	12 (24)
>35	10 (20)	3 (6)	2 (4)

Most of the patients were multigravida (82%, 74% and 64% in Group A, B and C respectively) and on regular ante-natal check-up (80%, 80% and 90% in Group A, B and C respectively). Mean BP of patients of Group A, B and C were 116/73.8 mm Hg, 112.6/71.6 mm Hg and 107.6/69.3 mm Hg respectively. Most of the patient's delivery was at term (80%, 74% and 88% in Group A, B and C respectively). Most of the delivery was done by Caesarean section (84%, 76% and 72% in Group A, B and C respectively) and the indications for Caesarean section are shown in Table II.

Post-partum haemorrhage (PPH) was the most common maternal complication in all three groups and other complications are shown in Table III. Birth weight of the babies were normal in 48 (96%), 46 (92%) and 44 (88%) in group A, B and C respectively.

Common neonatal complications were respiratory distress syndrome (RDS) and hyperbilirubinaemia and hypoglycaemia in diabetic and GDM cases (group A and B) (Table IV). Six (12.8%), 7 (14.3%) and 6 (30%) of neonates with complications in group A, B and C respectively required neonatal care unit admission.

The insulin requirement of pre-gestational diabetes patients and patients with GDM are presented in table V. The relationship of required insulin dose and maternal and neonatal complications are presented in table VI and VII respectively.

Table II

Indication of Caesarean section of study subjects

Indication for Caesarean section	Group A (N=42) n (%)	Group B (N=38) n (%)	Group C (N=36) n (%)	*p* value
History of previous Caesarean section	19 (45.2)	18 (47.4)	18 (50)	
Ante-partum haemorrhage	1 (2.4)	0 (0)	2 (5.6)	
Failed induction	13 (31)	10 (26.3)	9 (25)	
Bad obstetric history	2 (4.8)	1 (2.6)	2 (5.6)	>0.05
Malpresentation	3 (7.1)	0 (0)	3 (8.3)	
Fetal distress	4 (9.5)	9 (23.7)	0 (0)	
Premature rupture of membrane	0 (0)	0 (0)	2 (5.6)	

Table III

Maternal complications of the study subjects

Complications	Group A (N=50)	Group B (N=50)	Group C (N-50)	P value
PPH	12 (24)	11 (22)	11 (22)	
Wound infection	3 (6)	1 (2)	0 (0)	>0.10
Urinary tract infection (UTI)	1 (2)	6 (12)	2 (4)	

Table IV

Neonatal complications of the study subjects

Complications	Groups A (N=50)	Group B (N=50)	Group C (N=50)	P value
Present	47 (94)	49 (98)	20 (40)	
Absent	3 (6)	1 (2)	30 (60)	<0.001
RDS	28 (59.6)	29 (59.2)	7 (35)	
Hyperbilirubinaemia	45 (95.7)	36 (73.5)	17 (85)	
Hypoglycaemia	13 (27.7)	9 (18.4)	0 (0)	
Hypocalcaemia	0 (0)	2 (4.1)	0 (0)	

Table V

Insulin requirement of diabetic and GDM pregnancies

Insulin requirement (unit/day)	Group A (N=50)	Group B (N=50)
<30	14 (28)	31 (62)
30-75	27 (54)	15 (30)
>75	9 (18)	4 (8)

Table VI

Effect of insulin dose on maternal outcome

Daily insulin requirement	<30 units/day	30-75 units/day	>75 units/day	P value
Maternal complications (Group A)	N=14	N=27	N=9	
PPH	7 (50)	3 (11.1)	2(22.2)	
Wound infection	0 (0)	2 (7.4)	1 (11.1)	>0.10
UTI	0 (0)	1 (3.7)	0 (0)	
Maternal complications (Group B)	N=31	N=15	N=4	
PPH	7 (22.6)	3 (20)	1 (25)	
Wound infection	1 (3.2)	0 (0)	0 (0)	>0.50
UTI	4 (12.9)	2 (13.3)	0 (0)	

Table VII

Effect of insulin dose on neonatal complications

Daily insulin requirement	<30 units/day	30-75 units/day	>75 units/day
Neonatal complications			
Group A	N=13	N=25	N=9
Group B	N=31	N=15	N=3
RDS			
Group A	9 (69.2)	14 (56)	5 (55.6)
Group B	16 (51.6)	11 (73.3)	2 (66.7)
Hyperbilirubinaemia			
Group A	11 (84.6)	25 (100)	9 (100)
Group B	25 (80.6)	10 (66.7)	1 (33.3)
Hypoglycaemia			
Group A	5 (38.5)	6 (24)	2 (22.2)
Group B	5 (16.1)	3 (20)	1 (33.3)
Hypocalcaemia			
Group A	0 (0)	0 (0)	0 (0)
Group B	1 (3.2)	1 (6.7)	0 (0)

Discussion

Good glycaemic control by medical nutrition therapy (MNT) and insulin, when required, along with proper ante-natal checkup can make diabetic and GDM pregnancies as safe as non-diabetic pregnancy. Generally maternal and neonatal complications are much more common in diabetic and GDM preganacies.

The rate of Caesarean section was more in pre-gestational diabetic group and past history of Caesarean section was the commonest indication in all 3 groups. Jerin J et al. in a study found that 82% of GDM cases required Caesarean section.[11] Low birth weight was not a major concern in this current study.

PPH was the commonest maternal complication in this study, which was more in pre-gestational pregnant group. PPH was less common in previous study.[11] Wound infection was also more in pre-pregnancy diabetes group.

Neonatal complications were also much more common in pre-pregnancy diabetes and GDM groups specially RDS and hyperbilirubinaemia. Neonatal hypoglycaemia was more in pre-gestational diabetes group than GDM group. Several studies showed that good glycaemic control reduces neonatal complications.[9,10,12-15]

Our study had some limitations. Limited number of patients were included in this study. Status of glycaemic control and accordingly pregnancy outcomes were not evaluated. In many cases neonatal follow up was not possible beyond 72 hours.

From the current study it can be concluded that maternal and fetal outcome in pre-gestational diabetes and GDM is worse in comparison with non-diabetic pregnancies. It can further be concluded that neonatal hyperbilirubinaemia and hypoglycaemia were more in pre-gestational diabetes group than GDM group.

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