

FETO MATERNAL OUTCOME IN PREGNANT PATIENTS WITH DIABETES

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Abstract

Objective: To compare the fetomaternal outcomes in terms of congenital anomalies, miscarriage, macrosomia, polyhydramnios, preterm labor, IUGR, still birth, early neonatal death and operative delivery between known diabetic and gestational diabetic patients (GDM). The effect of glycemic control on these complications was also studied.

Methods: It was a two year comparative analytic study done at Gynae unit III, SIMS, Services Hospital Lahore from Jan 2013 to Dec 2014. Patients were divided into two groups, patients with pre-existing type 1 or 2 diabetes and those having GDM.

Results: A total of 124 patients were found to be diabetic over 2 year study period, out of which 61.3% had gestational diabetes. Family history of diabetes was present in 58% of GDM patients and 42% of known diabetic patients ($P > 0.05$). 52.6% of GDM patients

had no complication and delivered uneventfully ($p < 0.05$). Macrosomia was most frequent complication (26.3%) of GDM group and 29% of known diabetic patients. No congenital anomaly and miscarriage occurred in GDM group ($P < 0.05$). Operative delivery was high 44% in known diabetic patients as compared to 33% of GDM patients but not statistically significant. Perinatal outcome was comparable in both groups. Optimum glycemic control ($HbA_{1c} \leq 6\%$) was significantly associated with fewer complications $p = 0.001$.

Conclusion: GDM is an increasing health problem and has been associated with fetomaternal complications. Screening is recommended for general pregnant population. Early diagnosis, patient education, proper follow up in close liaison with physician results in better glycemic control and improved maternal and perinatal outcome in diabetic pregnant patients.

Introduction

Diabetes is a disorder of carbohydrate metabolism having long term complications. Diabetes in pregnancy is classified into two groups i.e. pre-existing (known) diabetes (type 1 and type 2) and gestational diabetes mellitus. Gestational diabetes mellitus (GDM) is carbohydrate intolerance of variable severity recognized first time during pregnancy. GDM shares same pathophysiology as type 2 diabetes. Various risk factors have been implicated in the development of GDM, including age > 35 years, obesity, family history of

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diabetes, macrosomic baby (> 4.5 kg) and history of perinatal deaths. Incidence of both GDM and preexisting diabetes has increased worldwide.^{1,2} Up to 20% of affected women manifest type 2 diabetes mellitus within in next 10 years.^{3, 4} Diabetes mellitus during pregnancy is associated with macrosomia, polyhydramnios, pre term labour, high rates of operative delivery, shoulder dystocia, neonatal hypoglycemia, respiratory distress syndrome and perinatal death.^{5,6} Good metabolic control maintained throughout pregnancy reduces the complication rate.

The aim of my study was to compare the fetomaternal outcomes in terms of congenital anomalies, miscarriage, macrosomia, polyhydramnios, preterm labor, IUGR, still birth, early neonatal death and operative delivery between known diabetic and gestational diabetic patients. The effect of glycemic control ($HbA_{1c} \leq 6$) on the occurrence of complications was also studied.

Material and Methods

It was a two year comparative analytic study done at Gynae unit III, SIMS, Services Hospital Lahore from Jan 2013 to Dec 2014.

All patients coming to outdoor or emergency with pre-existing type 1 or 2 in first trimester were included in the study. In addition, patients with previous H/O gestational diabetes, poor obstetrical outcome, baby > 4 kg, BMI > 30m² and family H/O diabetes were subjected to a two step 75 gm GTT at booking in first trimester and if had normal blood sugar levels GTT was repeated at 24 – 28 weeks of gestation. GDM was defined as fasting blood sugar levels > 100 mg% and two hour post GTT sugar levels ≥ 140 mg%.¹⁰

All patients labeled as diabetic (gestational or otherwise) were admitted and blood sugar managed in collaboration with physician. All patients had their HbA_{1c} checked at admission and again at 36 weeks for assessment of previous glycemic control (normal value of 4 – 6%). Patients with minimally deranged fasting sugar levels and those with GDM were first put on dietary restrictions, failing that they were put on thrice daily regular insulin before meals and additional NPH insulin at night, with an aim to control fasting hyperglycemia and to have a 24 hour controlled blood sugar levels. After achieving a 24 hour control of blood sugar patients were discharged.

Obstetric management included frequent antenatal visits, early dating scan, scan for congenital anomalies

at 22 weeks and growth scans fortnightly. Patients not having any contraindication to vaginal delivery were allowed to go into spontaneous labor. Patients controlled on diet alone were induced at 40 weeks, if they failed to do so spontaneously, while patients controlled on insulin were induced at 38 – 39 weeks. Elective caesarean section was planned in patients with previous caesarean section, macrosomia, mal presentations and previous bad obstetric outcomes. Labor was attended by a pediatrician; all babies were admitted to neonatal ICU for evaluation and blood sugar monitoring.

Obstetric complications like miscarriage, congenital anomalies, macrosomia, polyhydramnios, preterm labor and IUGR were noted. Perinatal out come in terms of still birth and early neonatal death were recorded. Association of HbA_{1c} with pregnancy complications was noted. Mode of delivery was also studied in both groups.

Results

A total of 124 patients were diagnosed to have diabetes. Of these, 61.3% were GDM and 38.7% were known diabetic patients. Family history of diabetes was present in 58% of gestational diabetics and 41.6% of known diabetic patients making it statistically insignificant. 52.6% patients with GDM had no complications and had a normal vaginal delivery at term which was statistically significant in comparison with known diabetic patients. No congenital malformation / miscarriage were seen in GDM group while found in 12% of diabetics giving a significant score of < 0.05. Amongst complications, Macrosomia was the most common complication in both groups, present in 29% of known diabetics and 26.3% of GDM patients although not statistically significant. Other complications of Polyhydramnios, pre term labour and IUGR were comparable in both groups (Table 1). Four perinatal deaths occurred in known diabetic group and three deaths occurred in GDM group and were not statistically significant. Caesarean Section rate were higher in known diabetic group (44%) as compared to GDM (33%), although not statistically significant. Commonest indications for caesarean section were macrosomia, previous caesarean section and previous history of perinatal deaths.

Good glycemic control ($HbA_{1c} \leq 6\%$) was seen in 46 patients with GDM and 20 known diabetics. Out of these 66 patients, 50 (75.7%) did not had any compli-

Table 1: Comparison of complication in both groups.

Complications/Outcomes	Gestational Diabetes (N = 76)		Known Diabetes (N=48)		Statistical Analysis P value for Chi-square /Fisher's Exact test
	No	%	No	%	
No complications	40	52.6	16	33.3	0.035, (Chi-Square) P < 0.05
Need for C-Sections	25	32.9	12	25.0	0.349, (Chi-Square) P > 0.05
Macrosomia	20	26.3	14	29.1	0.74, (Chi-Square) P > 0.05
Polyhydramnios	18	23.7	10	20.8	0.7, (Chi-Square) P > 0.05
Pre-term labor	10	13.2	6	12.5	0.9, (Fisher exact) P > 0.05
Miscarriage	-	0.0	6	12.5	0.002, (Fisher exact) P < 0.05
Congenital malformations	-	0.0	4	8.3	0.02, (Fisher exact) P < 0.05
IUGR	-	0.0	3	6.3	0.055, (Fisher exact) P > 0.05
Perinatal deaths	3	3.9	4	12.5	0.428, (Fisher exact) P > 0.05

Table 2: Comparison of complications in GDM and known Diabetics in relation to HbA_{1c}.

	GDM Complications		Known Diabetes Complications		Total
	Yes	No	Yes	No	
HbA _{1c} ≤ 6	8	38	8	12	66
HbA _{1c} > 6	28	2	24	4	58
Total	36	40	32	16	124

Table 3: Statistical analysis of complications in controlled and uncontrolled diabetes among GDM and Known diabetics.

Complication	Hb A _{1c} ≤ 6		HbA _{1c} > 6		Total		P value for Chi-square / Fisher Exact
	No	Percentage	No	Percentage	No	Percentage	
Complication with GDM (N= 76)	8	10.5%	28	36.8%	36	47.3%	Chi-square value 30.0 P = 0.001
Complication with known diabetes (N = 48)	8	16.6%	24	50%	32	66.6%	Chi-square = 10.0 P = 0.001
Total (N = 124)	16	12.9%	52	42%	68	54.8%	

cation. On the other hand, 90% of patients having HbA_{1c} > 6 ended up developing some complications (table 2). Statistical analysis and comparison of complications in the two groups is shown in table 3.

Discussion

Diabetes mellitus during pregnancy is one of the most

common medical complications of pregnancy. Incidence of GDM has increased worldwide. Out of all diabetic patients, 61% of patients in our study were of GDM. Similar proportion of GDM has been reported in other studies,^{7,8} GDM is an increasing health problem and as our country falls into high risk ethnic group, all pregnant patients should be screened to find prevalence in our set-up.

Family history is a strong risk factor in gestational and type II diabetics.⁹ Same was seen in our study with 58% of GDM and 42% of type 2 diabetic patients having a positive family history.

In our study, patients with GDM had significantly less Fetomaternal complications as compared to known diabetic patients. These were the ones who had good glycemic control and mostly controlled on diet. Similar results have been reported from KSA¹⁰ and Bangladesh.¹¹ Early diagnosis, better glycaemic control from the start and compliance of patient, plays key role in successful outcome. Patient with GDM had no congenital malformation in our study. Hyperglycemia during the period of organogenesis is responsible for congenital malformations and miscarriage peculiar to known diabetic patients. GDM usually develops in the second half of the pregnancy and the period of organogenesis is over so it is unlikely that patients manifest such problem. Pregnancy in women with the known diabetes should be planned and pre pregnancy counseling should be offered to these patients. They should be given folic acid supplementations and target should be optimum glycaemic control during period of organogenesis.¹²

Macrosomia was the most common complication in both groups in our study, although not statistically significant. In addition to being a reason for neonatal morbidity, macrosomia is a risk factor for increased c/section rate as well as shoulder dystocia. Macrosomia as a significant complication is also reported in other studies, mostly seen in patients with poor glycemic control and in patients with a prior macrosomic baby.¹¹⁻¹³ Improved glycemic control in third trimester has shown lower birth weight and reduced risk of macrosomia.

Polyhydramnios reflecting poor glycaemic control is a common problem worldwide^{13,14} and was seen in both groups in our study. Pre term labor accounted for 12.5% of patients in both groups which included spontaneous preterm labour due to the polyhydramnios and induced labour because of fetal compromise. Prematurity added to the perinatal morbidity as lung maturity is already delayed in diabetic patients due to antagonistic effect of insulin on surfactant production.

High operative delivery rate of 44% was seen in known diabetic group as compared to 32% of GDM patients, although not statistically significant. High rates of 60 – 80% have been reported in other studies too.¹³⁻¹⁵ Indications of C/Section were bad obstetrical history, previous C/S and macrosomia.

Diabetics in pregnancy are known for adverse

perinatal outcomes. Four babies of known diabetic group expired including two still births and two early neonatal deaths and three perinatal deaths occurred in GDM group. All these patients had poorly controlled diabetes and HbA_{1c} > 6. Perinatal mortality was comparable in both groups in our study although studies report higher perinatal morbidity in preexisting diabetic patients.^{12,13} Perinatal outcome in our study is better than that of studies from developing world.^{13,14} The reason was that patients presented early, were meticulously followed up, close collaboration with diabetic physicians and pediatrician was kept at all times. Moreover better glycemic control at delivery, targeting delivery at term and early detection of fetal anomalies all contributed to better perinatal outcome.

Glycemic control was single most important underlying factor which was related to the development of complications in our patients. Almost every patient (90%), having an elevated HbA_{1c} levels ended up developing one or another complication. Good glycemic control is associated with optimum maternal and fetal outcome.¹⁵⁻¹⁷ Poor control was mostly seen in patients taking insulin in both groups. Lack of education, noncompliance and infrequent follow-up of patients poses difficulty in better glycemic control.

Conclusion

GDM is an increasing health problem, screening is recommended for general pregnant population to make early diagnosis. Patients with GDM and preexisting Diabetes has high incidence of Fetomaternal complications. Early diagnosis, patient education, multidisciplinary approach and better glycemic control is the key to successful Fetomaternal outcome.

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