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Original Research Article

Gestational diabetes mellitus: does treatment modality predict the obstetric and neonatal outcome?

Lopamudra B. John*, Reddi Rani P., Seetesh Ghose

Department of Obstetrics and Gynecology, Mahatma Gandhi Medical College and Research Institute, Pondicherry, India

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***Correspondence:**
Dr. Lopamudra B. John,
E-mail: drlopamdpondy@yahoo.com

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ABSTRACT

Background: Gestational diabetes mellitus (GDM) may be controlled with dietary modifications alone or may require insulin treatment. This study aims to find out the impact of these two treatment modalities on the maternal and neonatal outcomes.
Methods: This retrospective observational study divided the GDM patients into two groups, A and B, treated with diet and insulin therapy respectively and the maternal and neonatal outcome parameters were compared.
Results: 299 (6.7%) GDM patients over a period of two years were divided into group A (n=222) and group B (n=77). Need for induction of labour was significantly higher in group B (p=0.02). More number of history of previous abortions were seen in group A (p=0.1) and higher number of emergency Caesarean sections were observed in group B (p=0.1). Previous history of intrauterine deaths, gestational hypertension and hypothyroidism in the present pregnancy, meconium stained liquor, large for gestational age babies and need for neonatal intensive care were comparable in the two groups.
Conclusions: There are no significant differences in the pregnancy outcomes of GDM treated with diet therapy alone or insulin except for a higher number of induced labours in the insulin treated group.

Keywords: Diet, GDM, Insulin, Outcome

INTRODUCTION

There is an increasing trend worldwide in the incidence of diabetes mellitus. India contributes substantially to this due to the changing socio demographic characteristics of the population with sedentary life style, obesity and increase in life expectancy. Indian women are at a higher risk of developing both pre gestational and gestational diabetes mellitus (GDM) due to their ethnicity and genetic predisposition.[1] According to World Health Organisation, GDM is defined to be carbohydrate intolerance of varying severity with onset or first recognition during pregnancy. Prevalence of GDM is reported to be as high as 18 % in India compared to the global standards of 14%.[2]

GDM has been associated with higher number of adverse maternal outcomes like abortions, preterm deliveries, gestational hypertension, increased need for Caesarean sections, as well macrosomia, stillbirth and congenital malformations in babies.[3]

Regarding management of this condition, the treatment guidelines are followed which stress the importance of good glycaemic control for a favourable outcome for the mother and baby. The well accepted first line of management for this condition is dietary advice and if this modality alone fails to achieve a satisfactory glycaemic control, then treatment with insulin is given to get the required results. However, there are very few studies comparing the pregnancy outcomes of diet alone

and insulin therapy in GDM cases. The present study was conducted to find out whether a higher degree of carbohydrate intolerance which requires insulin treatment has more severe effects on the maternal and neonatal outcome when compared to milder forms of GDM which can be managed by diet alone.

METHODS

The study was conducted in a tertiary care centre and was designed to be a retrospective observational study. Total number of 299 cases were found to be pregnancy complicated with GDM over a period of two years. Inclusion criteria were patients with singleton pregnancies who were diagnosed to be gestational diabetes by universal screening of pregnant women by 75gram oral glucose tolerance test following the Diabetes in Pregnancy Study Group of India (DIPSI) recommendations. Exclusion criteria were cases of pre gestational diabetes and multiple gestations.

The pregnant women diagnosed to have GDM were initiated with dietary modifications and followed up with fasting and post prandial sugar values till delivery. If required glycemic control was achieved with diet therapy alone, patients were continued on the same, and they formed the first study group or group A. Patients who failed to achieve benefit by dietary therapy were switched over to insulin and they formed the second study group or group B. These two groups were compared regarding the pregnancy outcomes.

The maternal parameters studied were previous history of abortions and intrauterine deaths, associated medical disorders like hypothyroidism and gestational hypertension, delivery outcomes such as need for emergency Caesarean section and it's indication. The neonatal parameters studied were birth weight, presence of meconium stained liquor, need for neonatal intensive care unit admission and presence of any congenital anomalies. The data were statistically analysed using Epidata software.

RESULTS

In this study, over a period of two years 299 cases of GDM were found which constituted 6.7% of the total number of deliveries. Out of these, 222 (74.2%) cases were managed by dietary modifications alone till delivery which formed the first study group or group A and the rest 77 (25.8%) cases required insulin therapy comprising the second study group or group B. The mean age of patients in group A was 26.8±3.7 years whereas in group B it was 28.7±4.8 years. Previous history of abortion was present in 51 (17%) cases in group A and 21 ((21%) cases in group B (Table 1). There was a strong association of history of previous abortions in group A compared to group B (p=0.1). A previous history of stillbirth was not found to be significantly different in the two groups of GDM patients. Regarding associated medical disorders, lack of statistical difference in the two groups was observed in occurrence of hypothyroidism and gestational hypertension.

Table 1: History of previous abortions in the two groups.

No. of abortions	GDM on diet (group A)	%	GDM on insulin (group B)	%	Total
1	44	86.3	14	66.7	58
2	6	11.8	6	28.6	12
3	0	0.0	1	4.8	1
5	1	2.0	0	0.0	1
Total	51	100	21	100	72

As far as the delivery outcomes are concerned, more cases of induction of labour was there in the group treated with insulin compared to group A which was statistically significant (p=0.02). A total number of 60 (34.6%) patients in group A required emergency Caesarean section compared to 29 (48%) in group B (Table 2). All cases of previous Caesarean section, 50 in group A and 15 in group B were excluded which were taken up as elective Caesarean section in the present pregnancy. There was a stronger association of need for emergency Caesarean sections in group B (p=0.1). However, the indication of foetal distress for Caesarean section was higher in group A (p=0.2).

Table 2: Indications of emergency Caesarean sections in the two groups.

Indication	GDM on diet (group A)	GDM on insulin (group B)	Total
Foetal distress	39	15	54
Cephalopelvic disproportion	17	9	26
Failed induction	2	2	4
Breech/transverse	2	2	4
Maternal request	0	1	1

Table 3: Baby weights in the two groups.

Baby wt. (kg)	GDM on diet (group A)	%	GDM on insulin (group B)	%
<2.5	14	6.3	7	9.0
2.5-2.9	77	34.7	27	35.1
3.0-3.4	88	39.7	32	41.6
3.5-3.9	38	17.1	9	11.7
4.0-4.4	5	2.2	2	2.6
Total	222	100	77	100

Regarding the neonatal outcome, 43 (19.4%) large for gestational age (LGA) babies were in group A compared to 11(14.3%) in group B (Table 3). Hence, no significant differences were observed in the number of LGA babies in the two groups (p=0.3) (Table 4). No case of shoulder dystocia was encountered. The need for neonatal

intensive care was comparable in both the groups. There was one stillbirth in the group B. The occurrence of meconium stained liquor was also not significantly different in the two groups. One case of congenital malformation was encountered in the group treated by diet therapy alone where the baby had bilateral congenital talipes equinovarus.

Table 4: Comparison of maternal and foetal parameters in the two groups.

Parameter	GDM on diet (group A) (n=222)	GDM on insulin (group B) (n=77)	P value
Previous abortions	51	21	0.1
Previous intrauterine death	10	5	0.48
Gestational hypertension	18	10	0.2
Hypothyroidism	21	8	0.8
Induction of labour	87	21	0.02
Emergency Caesarean section	60	29	0.1
Foetal distress	39	15	0.2
Large for gestational age baby	43	11	0.3
Meconium stained liquor	23	7	0.7

DISCUSSION

Gestational diabetes mellitus was found to be present in 6.7 in the present study which was similar to 6.3% in an American study by Jovanovic et al.[3] Previous bad obstetric history in the form of recurrent abortions and intrauterine deaths were significantly higher in patients with GDM when compared to those with overt diabetes in an Indian study by Uma et al.[1] In another study by Koning et al where they have compared the obstetric history in patients with GDM on diet and insulin respectively, a stronger association was found with intrauterine foetal death in cases of GDM treated with insulin.[4] Similar results were found by Feleke in his study of determinants of gestational diabetes mellitus.[5] In the present study there was no association of previous intrauterine death with diet or insulin treatment in GDM , however history of previous abortions were more in the group controlled with diet modifications or group A.

GDM was found to be significantly associated with pre-ecclampsia in the study by Gasim done on 220 pregnant Saudi women.[6] Similar results were reported in the French study by Billionet et al and they commented that GDM women on insulin are at a higher risk for hypertensive disorders in pregnancy than those on diet mono therapy alone.[7] However, in their study conducted in Netherlands, Koning et al did not find any significant difference in the two groups regarding occurrence of gestational hypertension which was supported by our present study.[4]

In a study by Mannisto et al it was observed that hypothyroid pregnant women have increased odds for developing GDM.[8] Similar results were found in their study by Gudovic et al.[9] However, no comparison is available on the occurrence of this medical disorder in GDM pregnancies treated by diet therapy alone and those requiring insulin. In our present study no, significant difference was observed between the two GDM groups regarding development of this complication.

Need for induction of labour was reported to be higher in the GDM patients as such by Gasim et al and more frequently in the insulin treated group in the study by Koning et al.[6,4] In the present study also a statistically significant number of GDM patients treated with insulin required induction of labour (p=0.02). The need for emergency Caesarean sections was significantly higher in the GDM women in the study by Jovanovic et al.[3] Similar results were obtained in their study by Gasim et al and Billionet et al.[6,7] The French study has commented that GDM women requiring insulin therapy underwent emergency Caesarean sections more frequently compared to the diet therapy group. Our present study also shows similar results, however the indication of foetal distress was higher in group A compared to group B. In their study by Koning et al planned Caesarean sections were higher in the insulin group.[4]

Foetal macrosomia was found to be associated significantly with GDM by Gasim et al.[6] Similar results were reported by Billionet et al with a higher incidence of macrosomic babies in insulin treated GDM patients.[7] Weilandt et al in their study on primigravid GDM patients, found that majority of the babies had birth weight in the normal range with only 4.6% babies who were large for gestational age.[10] In their study by Koning et al, there was no statistically significant difference between diet and insulin treated GDM patients regarding the occurrence of large for gestational age babies.[4] In present study also, there was no association between LGA babies and GDM patients in the two groups.

Regarding the need for neonatal intensive care for the babies born to these GDM patients, no significant differences were found between the diet and insulin treated groups in the study by Koning et al.[4] In this study also the two groups were comparable regarding this aspect.

CONCLUSION

The obstetric and neonatal outcomes in GDM patients do not show any significant differences between groups treated with diet alone and insulin therapy respectively except for the need for induction of labour in the insulin group. However, an association exists between the insulin treated group and need for emergency Caesarean sections in the present pregnancy. Similar association was present between the diet therapy group and history of abortions and intrapartum foetal distress in the present pregnancy.

Future studies are required with comparison of these two groups with a third one treated with oral hypoglycaemic agents.

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