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ORIGINAL RESEARCH

Assessment of glycemic status of gestational diabetic women on anti-hyperglycemic medication and neonatal outcome of their off spring

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ABSTRACT

Background: The present study was conducted for assessing glycemic status of gestational diabetic women on anti-hyperglycemic medication and neonatal outcome of their off spring.

Materials & methods: Total subjects enrolled in the present study were 50. Out of these 50 subjects, 25 subjects were treated with Insulin while the remaining 25 were managed with Metformin. The study subjects were followed up until delivery and details regarding fetal outcome like birth weight, blood sugar level etc were recorded assessed. All the results were recorded and analysed using SPSS software.

Results: Mean HbA1c levels post treatment among patients of metformin group and insulin group was 5.9% and 5.1% respectively. Although non-significant, mean HbA1c levels were slightly better among patients of the insulin group. Metformin was found to cause less neonatal complications when compared to that of the insulin treatment group.

Conclusion: Metformin wasfound as slightly more effective as Insulin in the management of GDM.

Key words: Glycemic status, Gestational diabetes mellitus

INTRODUCTION

Any degree of glucose intolerance with the onset or first recognition during pregnancy is defined as Gestational Diabetes Mellitus (GDM). Women with history of GDM are at an increased risk of adverse maternal and perinatal outcome and also at increased risk of future diabetes predominantly Type II including their children and therefore there are two generations at risk.[1, 2]

Recommendations regarding OADs in pregnancy are based on effectiveness and short-term outcomes, including glycaemic control and perinatal outcomes. Unlike insulin, some OADs (including glibenclamide, metformin, tolbutamide and chlorpropamide) cross the placenta. Metformin concentrations in the umbilical cord have been found to be similar or even higher than concentrations in maternal blood. Meta-analysis of human cohort studies report no increased risks of major malformations. The placental passage of OADs can potentially have direct and permanent effects on the foetus's developing physiology, which in turn could affect the offspring's health in childhood and later life.[3- 5] Hence; the present study was

conducted for assessing glycemic status of gestational diabetic women on anti-hyperglycemic medication and neonatal outcome of their off spring.

MATERIALS & METHODS

The present study was conducted for assessing glycemic status of gestational diabetic women on anti-hyperglycemic medication and neonatal outcome of their off spring. Only confirmed cases of GDM as per guidelines given by American diabetic association were enrolled. Blood investigations were carried out in all the patients. Patients with presence of abnormal fasting blood sugar (FBS) and postprandial blood sugar (PPBS)were put on antihyperglycemic medication therapy. Total subjects enrolled in the present study were 50. Out of these 50 subjects, 25 subjects were treated with Insulin while the remaining 25 were managed with Metformin. The study subjects were followed up until delivery and details regarding fetal outcome like birth weight, blood sugar level etc were recorded assessed. All the results were recorded and analysed using SPSS software.

RESULTS

Mean age of the patients of the metformin group and insulin group was 31.5 years and 30.9 years respectively. Mean HbA1c levels post treatment among patients of metformin group and insulin group was 5.9% and 5.1% respectively. Although non-significant, mean HbA1c levels were slightly better among patients of the insulin group. Metformin was found to cause less neonatal complications when compared to that of the insulin treatment group.

Table 1: Age-wise distribution of patients

Age group (years)	Metformin group		Insulin group	
18 to 25	8	32	8	32
26 to 30	7	28	8	32
More than 30	10	40	9	36
Total	25	100	25	100

Table 2: HbA1c levels post treatment

HbA1c levels (%)	Metformin group	Insulin group
Mean	5.9	5.1
SD	0.8	0.9
p- value	0.785	

Table 3: Neonatal outcome

Neonatal outcome	Metformin group	Insulin group
Incidence of macrosomia among neonates (n)	1	3
APGAR score at 5 minutes	8.6	8.5
Umbilical artery pH	7.35	7.31
Incidence of birth injuries	2	4

DISCUSSION

GDM is defined as glucose intolerance with onset or first recognition during pregnancy. The definition does not require any return to normal glucose levels following delivery. Thus, GDM simply represents relatively high glucose levels at one point in the life of a young woman.Outside of pregnancy, screening for clinically important levels of hyperglycaemia is generally recommended only for individuals with specific risk profiles.[6- 8]

Insulin resistance is a state in which normal concentrations of insulin fail to achieve an appropriate biological response downstream of the insulin receptor. As a result, the β-cells

have to release more insulin than usual to regulate maternal blood glucose levels. In a healthy pregnancy, a condition of progressive insulin resistance occurs in the mother, triggered by placental hormones to ensure the fetus receives adequate nutrients for healthy growth and development. In order to maintain glucose homeostasis despite insulin resistance, the maternal β-cells compensate by increasing total cell number, insulin synthesis, and insulin secretion. However, when the maternal β-cells are unable to adapt to the metabolic changes accompanying pregnancy, hyperglycemia of GDM occurs.[7- 9]Hence; the present study was conducted for assessing glycemic status of gestational diabetic women on anti-hyperglycemic medication and neonatal outcome of their off spring.

Mean age of the patients of the metformin group and insulin group was 31.5 years and 30.9 years respectively. Mean HbA1c levels post treatment among patients of metformin group and insulin group was 5.9% and 5.1% respectively. Although non-significant, mean HbA1c levels were slightly better among patients of the insulin group. Our results were in concordance with the study conducted by Yu et al who also reported similar findings. In their study, data regarding glycemic control and neonatal safety were collected and analyzed in pairwise and network meta-analyses.A total of 4533 individuals from 23 trials were included. Compared with glyburide, metformin reduced 2-h postprandial blood glucose (2HPG) to a greater extent. There were significantly lower prevalence of neonatal hypoglycemia and preeclampsiain the metformin group than in the insulin group. The metformin group had significantly lower birth weight and maternal weight gain compared with the insulin group. Network meta-analysis suggested that metformin had the highest probability of successfully controlling glycemia and preventing neonatal complications. Their meta-analysis suggested that metformin may be as effective as insulin for glycemic control and is the most promising drug for the prevention of neonatal and maternal complications.[10]

In the present study, metoformin was found to cause less neonatal complications when compared to that of the insulin treatment group.In another similar study conducted by van Weelden W et al, authors summarized the evidence of follow-up studies of randomised controlled trials (RCTs) reporting on long-term effects of prenatal exposure to OADs on offspring. Ten studies were included, with a maximal follow-up duration of 9 years, comprising 778 children of mothers with GDM or PCOS who were randomised to either metformin or insulin/placebo during pregnancy. Individual small studies reported that prenatal exposure to metformin was associated with greater mid-upper arm, head and waist circumferences, biceps skin folds, waist-to-height ratio, more arm fat, higher fasting glucose, ferritin and lower LDL cholesterol in offspring.Prenatal exposure to metformin is associated with increased offspring weight, but not with height or BMI.[11]Jiang YF et al, in another similar study conducted a network meta-analysis to evaluate the efficacy and safety of oral antidiabetic drugs (OADs) for gestational diabetes. They searched PubMed, the Cochrane Library, ClinicalTrials.gov, and related reviews from inception. They concluded that Both metformin and glyburide are suitable for use in the management of gestational diabetes because of good glycemic control. However, glyburide treatment is associated with increased risk of neonatal hypoglycemia, high maternal weight gain, high neonatal birth weight, and macrosomia.[12]

CONCLUSION

Metformin wasfound as slightly more effective as Insulin in the management of GDM.

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