

Effectiveness of Metformin Versus Insulin in Gestational Diabetes

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Abstract

Objective: Gestational Diabetes is a growing concern worldwide due to pregnancy outcome risks. Along with Lifestyle modifications for the prevention and maintenance of euglycemia standard insulin supplementation and oral hypoglycemic drug Metformin is being used for the pharmacological management. This study aims to compare the efficacy of Metformin and Insulin treatment groups.

Methods: This is an Observational comparative study in maternal hyperglycemia subjects prescribed with insulin and metformin for atleast three months during their gestation period. Clinical parameters compared are Fasting blood glucose, Postprandial blood glucose, HbA1c, which are analysed and the data is represented in average with standard deviation.

Results: The mean difference between Group I treated with metformin and Group II treated with insulin of Fasting Blood glucose, Post Prandial Blood glucose, HbA1c in are -13.94 ± 18.22 mg/dl, -44.16 ± 8.99 mg/dl, $-1.4 \pm 0.2\%$ respectively.

Conclusion: Metformin is less effective than standard Insulin regimen, but is able to maintain Glycemic control.

Keywords: Gestational Diabetes, Metformin, Insulin, HbA1c, Maternal Outcomes, Metabolic syndrome.

Introduction

Maternal hyperglycemia due to insulin deficiency and sensitivity increases the risk of pregnancy outcomes and is a growing concern in gestation.¹⁻⁴ Prenatal outcomes depend on Identification, glycemic control with diet, exercise with or without pharmacological treatment.^{5,6}

Diabetes during pregnancy is increasing worldwide. Some of the important etiological factors are Poor physical activity, Obesity, Imbalanced diet and rising maternal age.⁷

Metformin is a FDA class B in pregnancy category which improves insulin sensitivity, reduce hepatic, increases peripheral glucose uptake and utilization. It readily crosses placenta but do not cause neonatal hypoglycemia as it acts as insulin sensitizer. Human and Animal studies have reported no teratogenic effects.⁸⁻¹³

Range of adverse outcomes in pregnancy are well documented due to hyperglycemia in both mother and offspring which are both short term and long term. Evidence has accumulated to support

offspring complications including Prediabetes, Higher BMI, Metabolic syndrome, Respiratory distress, Preterm birth, macrosomia, birth injury, shoulder dystocia, neonatal hypoglycemia, neonatal unit admission and maternal complications like Pre-eclampsia, Gestational hypertension, shoulder dystocia, polyhydramnios, Caesarean section.¹⁴

Diabetes greatly influences the additional risks during the pregnancy. Glycemic control targeting and measurement of fasting, postprandial blood glucose and HbA1c are to be individualised. To attain better glycemic control effective comparative evidence is required on available management therapeutic options. The aim of the study is to compare the efficacy of Metformin and Insulin in Gestational Diabetes.¹⁵

Materials and Methods

It is a Observational Prospective study carried out in Pregnant women from various OP and IP Departments for 6 months in 2022. The study subjects were included after obtaining verbal informed consent. All 423 Pregnant women diagnosed with gestational diabetes on either Metformin or Insulin for a minimum of three months were included out of which data of 200 subjects have been collected in to two groups. Group I-Parameters of Patients on Metformin treatment for 3 months, Group II - Parameters of Patients on Insulin treatment for 3 months. Clinical parameters included are Fasting, Postprandial blood glucose, Glycated Hemoglobin. The data was analysed using Unpaired t-test in SPSS version 1.0.0.1406 for significance and expressed in Average with standard deviation. A p-value of <0.001 is considered to be significant.

Table 1: Clinical parameters in two groups expressed in Average±SD

Parameter	Group-I	Group-II	Mean Difference	P-Value
Average Age	28.65±5.4	29.24±4.6	NA	-
Fasting Blood Sugars	130.75±30.9 mg/dl	116.81±12.68 mg/dl	-13.94±18.22 mg/dl	<0.001
Post Prandial blood sugars	192.35±45.78 mg/dl	148.19±36.79 mg/dl	-44.16±8.99 mg/dl	<0.001
HbA1C	8.8±1.3%	7.4±1.5%	-1.4±0.2%	<0.001

Results

Subjects on Metformin were considered to Group I and on Insulin to Group II. The average age of the subjects in Group I is 28.65±5.4 years, average Fasting Blood glucose is 130.75±30.9mg/dl, average Post-Prandial Blood glucose is 192.35±45.78mg/dl, The average HbA1c is 8.8±1.3%. The average age of the subjects in Group II is 29.24±4.6 years, average Fasting Blood glucose is 116.81±12.68 mg/dl, average Post Prandial Blood glucose is 148.19±36.79 mg/dl, The average HbA1c is 7.4±1.5%.

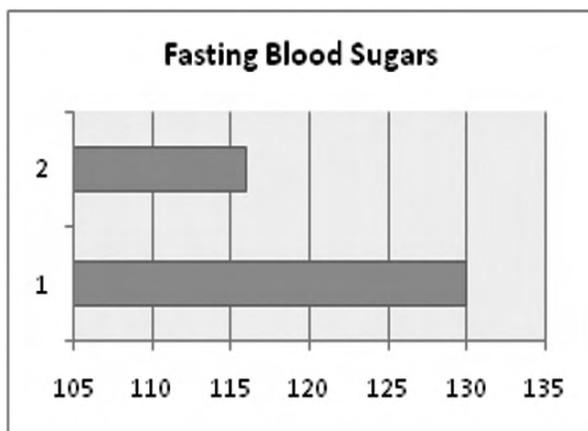


Fig. A: Mean difference of fasting blood glucose in both groups.

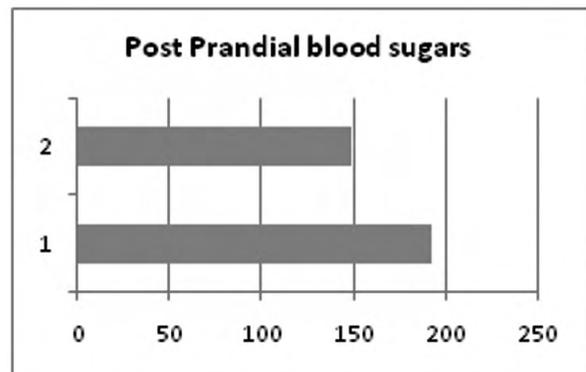


Fig. B: Mean difference of post prandial blood glucose in both groups.

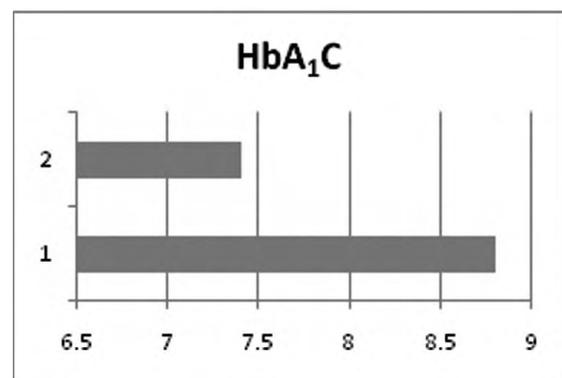


Fig. C: Mean difference of HbA1c in both groups.

The mean difference of Fasting Blood glucose, Post Prandial Blood glucose, HbA1c in Group I and II are -13.94 ± 18.22 mg/dl, -44.16 ± 8.99 mg/dl, $-1.4 \pm 0.2\%$ respectively.

Discussion

Our study results show that Metformin is able to maintain glycemic control but less effective when compared to that of standard insulin therapy.

A study on metformin treated pregnancies compared with insulin treated pregnancies concluded that Metformin is effective when compared to insulin and also reduces neonatal adverse outcome risks.¹⁶

Pharmacotherapeutic characteristics of a prospective randomized control open study revealed that with or without insulin supplementation metformin is an effective and cheap treatment option for gestational diabetes.¹⁷

As metformin crosses placenta, there is limited evidence about safety on the fetus. A retrospective study aimed to compare insulin and metformin pregnancy outcomes data show that when compared to standard insulin therapy there are no associated adverse outcomes due to metformin.¹⁸

According to the results of a systemic review and meta-analysis on randomized controlled trials, glibenclamide was associated with more macrosomia, neonatal hypoglycemia, metformin results were better relative to pregnancy induced hypertension, weight gain, less neonatal hypoglycemia.¹⁹

Limitations of the study includes exclusion of outcomes, short duration and sample size.

Conclusion

There is a need for well-established clinical data in gestational diabetes patient management which helps to control various maternal and fetal adverse outcomes. When compared to standard insulin therapy metformin therapy is less effective but is able to maintain target blood glucose levels.

Conflict of Interest and Financial resources: Nil

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