

Comparison of Metformin and Insulin for the Management of Gestational Diabetes

ABIDA RIAZ, RIAZ HUSSAIN, NAYYAR SULTANA

ABSTRACT

Aims: To Compare the efficacy of metformin versus insulin in term of glycaemic control for treatment of Gestational diabetes mellitus.

Study design: It was a descriptive study.

Duration: Six months from 1 Jan 2012 to 30 June 2012

Settings: Department of Obstetrics & Gynaecology.

Results: A total of 200 cases (100 in each group) were enrolled, 61(61%) in Group-A and 55(55%) in Group-B were between 20-30 years and 39(39%) in Group-A and 45(45%) in Group-B were between 31-35 years. Mean±SD: was calculated as 29.43±3.51 years. Comparison of glycaemic control was recorded as 72(72%) in Group-A and 56(56%) in Group-B while remaining 28(28%) in Group-A and 44(44%) were not recorded with glycaemic control. P value was calculated as 0.01 which is statistically significant.

Conclusion: Metformin in term of glycaemic control for treatment of Gestational diabetes mellitus is significantly better than insulin.

Keywords: Metformin, insulin, gestational diabetes

INTRODUCTION

Gestational diabetes or (gestational diabetes mellitus GDM) is defined as abnormal glucose tolerance which first develops or is recognized in pregnancy, this definition includes individuals with previously undiagnosed diabetes as well as those in whom high glucose levels are provoked by pregnancy. The prevalence of GDM is 10%¹. Gestational diabetes generally has few symptoms and it is most commonly diagnosed by screening during pregnancy. Diagnostic tests detect inappropriately high levels of glucose in blood samples².

Frequency of associated (or risk) potential factors in patients of GDM are maternal age 30 or more year is 71.6%, family history of diabetes mellitus is 50% and obesity is 29%³.

Diabetes mellitus is associated with macrosomia⁴ and shoulder dystocia and high risk of emergency cesarean section, macrosomic infants have more chances of admission to NICU⁴, respiratory distress, hypoglycemia and neonatal jaundice⁵.

Subcutaneous insulin therapy has been the mainstay of treatment of women with gestational diabetes not controlled by modification of diet. In reality, the use of insulin is often associated with hypoglycaemia and increased weight. Moreover, this treatment is inconvenient and expensive because it

requires refrigerated storage and skilled handling, which are not always available in low-resource countries⁶. On the other hand, controversy regarding metformin and insulin still exists^{7,8}. However, the current study was planned to clarify the controversy in previous literature.

MATERIAL AND METHODS

A total of 200 cases (100 in each group) having diagnosed cases of GDM after 75 gm OGTT and having poor control of blood sugar with diet were included in the study while known cases of D/M, contraindication to metformin and cases already on insulin were excluded from the study.

Patients were divided in to two groups A and B by random number table. After randomization patients in Group-A was given metformin and patients in Group-B were given insulin. Each patient was admitted as day case for six point bsl profile and dose of insulin and metformin was adjusted according to their requirements. Patients were then discharged with plan for 4 weekly follow up and advised to bring their home monitoring chart of blood sugar for assessment of glycaemic control.

The data was analyzed through SPSS version 14.0, the mean±sd was calculated for the age while frequency and percentages were calculated for glycaemic control. Chi square test was used to compare efficacy of Metformin versus insulin in both groups. P value ≤0.05 was considered as statistically significant.

*Department of Obstetrics & Gynaecology, Sheikh Zayed Hospital, Rahim Yar Khan
Correspondence to Dr. Abida Riaz*

RESULTS

In our study, 61(61%) in Group-A and 55(55%) in Group-B were between 20-30 years, and 39(39%) in Group-A and 45(45%) in Group-B were between 31-35 years, Mean±SD: was calculated as 29.43±3.51 years (Table 1). Comparison of glycemc control was recorded as 72(72%) in Group-A and 56(56%) in Group-B while remaining 28(28%) in Group-A and 44(44%) were not recorded with glycemc control, p value was calculated as 0.01 which is statistically significant (Table 2)

Table 1: Distribution of patients according to age

Age in years	Group A	Group B
20-30	61(61%)	55(55%)
31-35	39(39%)	45(45%)

Mean±SD: 29.43±3.51

Table 2: Comparison of Glycemc Control

Glycemc control	Group A	Group B
Yes	72(72%)	56(56%)
No	28(28%)	44(44%)

Pvalue=0.01

DISCUSSION

The findings of the current study are in agreement with a study by Lavanya Rai 2010 which proved that glycemc control was better with metformin i.e., 82%, as compared to insulin i.e. 54%, this difference was statistically significant. (p=.024)⁹.

Another recent study¹⁰ compared metformin with insulin as treatment of gestational diabetes mellitus (GDM). Furthermore, aimed to characterize metformin-treated patients needing additional insulin to achieve prespecified glucose targets and recorded that there were no significant differences in mean birth weight expressed in grams [+15 (90% confidence interval (CI): -121 to 89)] or SD units [+0.04 (90% CI: -0.27 to 0.18)] between the metformin and insulin groups. There were no significant differences in neonatal or maternal data between the groups. Only 23 (20.9%) of the 110 patients in the metformin group needed additional insulin, however, concluded that metformin is an effective alternative to insulin in the treatment of GDM patients which is in agreement with the findings of the current study.

In a meta-analysis, 3 studies measured fasting and postprandial blood sugar and 2 detected the HbA1c% to check the efficiency of metformin. The results are the same as the previous reviews¹¹⁻¹² that metformin is comparable with insulin in glycemc control. Metformin reduces hyperglycemia by suppressing hepatic glucose output (hepatic gluconeogenesis), increasing insulin sensitivity and enhancing peripheral glucose uptake.¹²

Faraci M and colleagues¹³ aimed to verify whether perinatal maternal glycemc control in gestational diabetes can only be achieved with insulin or with oral hypoglycaemic agents. They also evaluated the efficacy and safety of oral

hypoglycemic agents in the treatment of gestational diabetes and then they compared these results with those associated with the use of insulin. They were of the view that insulin is effective for glucose control, but its cost and the fact that it requires skilled handling may bar it from use in many places. The assurance that low-cost, oral, user-friendly medications are safe and effective for glucose control would therefore welcome them.

In addition it was shown that women treated with metformin had a greater weight loss than women in the insulin group. The oral hypoglycemic gives good control of maternal glycemc and good perinatal outcomes entirely comparable with those offered by the treatment with insulin.

However, we are of the view that the treatment with insulin is inconvenient and expensive because it requires refrigerated storage and skilled handling, which are not always available in low-resource countries like ours.

REFERENCES

- Fraser R, Heller SR. Gestational diabetes: aetiology & management. *Obstet & Gynaecol. Reproductive Health* 2007;17: 345-8.
- Dornhorst A, Williamson C. diabetes & endocrine disease in pregnancy. In: Edmonds K. Dewhurst's Textbook of Obstetrics & Gynaecology. 7th ed, London. Blackwell publishing 2007;246-59.
- Boriboonhirunsarn D, Talungjit P, Sunsaneevithayakul P, Sirisomboon R. Adverse pregnancy outcome sin gestational diabetes mellitus. *J Med Assoc Thai* 2006;89:23-8.
- Ju H, chadha Y, Donovan T, O' Rurke P. Fetal macrosomia and pregnancy outcomes. *Aust N ZJ Obstet Gynaecol* 2009;49:504-9.
- Khan SM, Sultan A. Feto maternal outcome in gestational diabetes mellitus. *Pak Postgrad Med J* 2007;18:35-8.
- Garcia-Bournissen F, Feig D, Koren G. Maternal-fetal transport of hypoglycaemic drug. *Clin Pharmacokinet.* 2003;42(4):303-13.
- Rowan JA, Hague WM, Gao W, Battin MR. Metformin versus insulin for the treatment of gestational diabetes. *N Engl J Med* 2008;358:2003-15.
- Rai L, meenakshi D, Kamath A. Metformin---a convenient alternative to insulin for Indian women with diabetes in pregnancy. *Ind J Med Sci* 2009;63:491-7
- Rai L, meenakshi D, Kamath A. Metformin---a convenient alternative to insulin for Indian women with diabetes in pregnancy. *Ind J Med Sci* 2009;63:491-7
- Tertti1 K, Ekblad U, Koskinen P, Vahlberg T, Rönnemaa T. Metformin vs. insulin in gestational diabetes. A randomized study characterizing metformin patients needing additional insulin. *Diabetes, Obesity and Metabolism* 2013;15:246-51.
- Nicholson W, Baptiste-Roberts K. Oral hypoglycaemic agents during pregnancy: The evidence for effectiveness and safety. *Best Pract Res Clin Obstet Gynaecol* 2011;25: 51-63.
- Dhulkotia JS, Ola B, Fraser R, Farrell T. Oral hypoglycemic agents vs insulin in management of gestational diabetes: a systematic review and metaanalysis. *Am J Obstet Gynecol* 2010;203:e451-9.
- Kirpichnikov D, McFarlane SI, Sowers JR. Metformin: an update. *Ann Intern Med* 2002;137:25-33.

