The Libyan International Medical University

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Metformin versus Insulin for the Treatment of Gestational Diabetes Mellitus

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Abstract:

To examine if oral metformin is as effective as insulin in the prevention of hyperglycemia in pregnancies complicated with gestational diabetes mellitus (GDM). Metformin is a logical treatment for women with gestational diabetes mellitus, but many studies seems to be weak to show which the best treatment for GDM due to their small sample that show no significant differences.

Introduction:

GDM has been outlined as any degree of glucose intolerance with onset or 1st recognition throughout pregnancy. though most cases resolve with delivery, the definition applied whether or not the condition persisted once pregnancy and didn't exclude the chance that unrecognized glucose intolerance might have antedated or begun concomitantly with the pregnancy. [1] GDM, the most frequent medical complication of pregnancy, is associated with several adverse outcomes over the short- and long-term for both mother and offspring. Standard treatment for GDM consists of insulin injections. Oral hypoglycemic agents (OHAs), on the other hand, are still the subject of controversy. Although OHAs are seemingly as efficient as insulin and may provide better quality of life, congenital malformations and unknown long-term effects are still feared. [2]

Aim of the study:

Nowadays, there have been increasing studies comparing metformin with insulin. But the use of metformin in pregnant women is still controversial, therefore, the aim of this research to find which treatment is more safe and effective for pregnant woman and her fetus.

Materials and Methods:

All information of this research collected from available sources on Internet.

Results:

Statistical review for five studies involving 1270 participants found:
Average weight gains after enrollment were much lower in the metformin group, Preterm birth was significantly more in metformin group, the incidence of pregnancy induced hypertension was significantly less in the metformin group, the fasting blood sugar levels of OGTT were significantly lower in the metformin only group than in the supplemental insulin group, average weight gains after enrollment were much lower in the metformin group, average birth weights were reported in 5 studies. There was no significant heterogeneity between these studies, average birth weights were slightly lower in the metformin group as compared with the insulin group, but the difference was not statistically significant. Rowan (one of the five studies) reported one fetal death in the insulin group. Moore (one of the five studies) reported one intrauterine fetal death because of acute asphyxia probably induced by a cord accident in the metformin group.

Discussion:

When an appropriate diet, alone or associated with physical exercise, does not suffice to control blood glucose levels in pregnant women, subcutaneous insulin therapy has been considered the standard for management of GDM. However, insulin has several disadvantages including multiple daily injections, the risk of hypoglycemia and maternal weight gain. It requires modification based on the patient's body mass index, glucose levels and lifestyle [3-4]. Therefore, detailed guidance for dose change of insulin is necessary to ensure the safe self-administration of insulin. Meanwhile, substantial costs of health education on the safe use of insulin as well as the cost of the drug itself are followed. Naturally, safe and effective oral therapy would be more acceptable even highly desired for women with GDM [2-5]. However, it is essential to comprehend the effects of oral hypoglycemic agents on both maternal and neonatal outcomes for the women with GDM. Metformin, as the first line medication for Type two Diabetes mellitus. Given that metformin has been found to have a maternal-to-fetal transfer rate of

10–16% [6-7] which might be associated with fetal anomalies, potential adverse effects for mothers and the newborns after delivery.

Conclusion:

Nowadays, increasing studies focus on examining the efficiency and safety of metformin in the management of GDM. However, some are case-control trials, some are observational studies, others are randomized controlled trials but with small samples lacking the power to draw confirmative conclusions on the relative risks and benefits of metformin for GDM. So the use of metformin is still controversial in pregnant women.

References:

1-American Diabetes Association (2010). Diagnosis and classification of diabetes mellitus. Diabetes care, 33 Suppl 1(Suppl 1), S62–S69. https://doi.org/10.2337/dc10-S062 [Accessed 9 March 2020]

2- Taylor & Francis. 2020. Oral Hypoglycemic Agents For Gestational Diabetes Mellitus?. [online] Available at: <https://www.tandfonline.com/doi/abs/10.1517/14740338.2011.521740?journalCode=ieds20> [Accessed 11 March 2020].

3- Nicholson W, Baptiste-Roberts K (2011) Oral hypoglycaemic agents during pregnancy: The evidence for effectiveness and safety. Best Pract Res Clin Obstet Gynaecol. [Accessed 10 March 2020]

4- Norman RJ, Wang JX, Hague W (2004) Should we continue or stop insulin sensitizing drugs during pregnancy? Curr Opin Obstet Gynecol. [Accessed 11 March 2020]

5- Ijas H, Vaarasmaki M, Morin-Papunen L, Keravuo R, Ebeling T, et al. (2011) Metformin should be considered in the treatment of gestational diabetes: a prospective randomised study. [Accessed 11 March 2020]

6-Nanovskaya TN, Nekhayeva IA, Patrikeeva SL, Hankins GD, Ahmed MS (2006) Transfer of metformin across the dually perfused human placental lobule. Am J Obstet Gynecol [Accessed 11 March 2020]

7- Kovo M, Haroutiunian S, Feldman N, Hoffman A, Glezerman M (2008) Determination of metformin transfer across the human placenta using a dually perfused ex vivo placental cotyledon model. Eur J Obstet Gynecol Reprod Biol. [Accessed 11 March 2020]