ORIGINAL ARTICLE

A comparative study of metformin versus insulin on the maternal and neonatal outcome in women of gestational diabetes mellitus

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ABSTRACT

Background: GDM increases the risk of pregnancy complications and adverse neonatal outcomes. Gestational diabetes mellitus has become an important high-risk pregnancy in the modern era. It is on the rise especially in South Asian countries like India. This study was designed to evaluating and comparing the maternal and fetal effects of metformin and insulin in GDM. **Methods** : The present hospital based prospective observational study was conducted in the Dept of Gynae and Obstetrics, Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal, India between March 2020 to July 2021. Sample size for Metformin was 27 and for Insulin sample size was 29 after fulfilling the inclusion criteria, Statistical data were analysed by using Microsoft Excel and SPSS V.24 software. **Results** : In the present study 29 (51.8%) of the patients were treated with insulin and rest 27 (48.2%) of the patients were treated with metformin. Oligohydraminos was equally distributed among the patients of the two groups. proportion of Polyhydraminos among the patients treated with insulin (6.9%) which was higher than that of the patients treated with Metformin (3.8%). Proportion of Preterm delivery among the patients treated with insulin (17.2%) which was higher than that of the patients treated with Metformin (11.2%). Proportion of ND among the patients treated with insulin (48.2%) which was higher than that of the patients treated with Metformin (44.5%). Only 1 (3.4%) case of IUFD among the patients treated with insulin which was higher than that of the patients treated with Metformin (0.0%). Proportion of Neonatal hypoglycaemia of the babies among the patients treated with insulin (6.9%) which was lower than that of the patients treated with Metformin (11.1%). **Conclusion** : Metforrnin can be used as an alternative to insulin for the management of gestational diabetes mellitus.

Keywords – Gestational diabetes mellitus, Insulin, Metformin, Maternal and neonatal outcomes

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Introduction

The word gestational diabetes implies that diabetes is induced by pregnancy— ostensibly because of exaggerated physiological changes in glucose metabolism. Gestational diabetes mellitus (GDM) is the most frequent medical complication of pregnancy and becoming a major global public health issue with the increasing prevalence in recent years due to the epidemic of obesity and type 2 diabetes. Gestational Diabetes Mellitus is defined as impaired glucose intolerance with onset or first recognition during pregnancy. Worldwide one in 10 pregnancy is associated with diabetes, 90% of which are GDM.[1] The reason for the rise in the prevalence of diabetes in pregnancy are mainly changes in lifestyle, dietary habits, older age at first conception, polycystic ovarian syndrome, obesity and more so due to the increased awareness and changing methodology in testing for the condition.[2] Family history of diabetes, past history of gestational diabetes and ethnicity, such as non-caucasians, Asian, African Americans, Mexican Americans, American Indians, native Hawaiians, etc, are also risk factors for Gestational Diabetes Mellitus.[3]

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GDM is related to insulin resistance in pregnancy which is usually characterized by a post-receptor defect , resulting in the decreased ability of insulin to bring about mobilization of SLC2A4 [GLUT4] from the interior of the cell to cell surface. This could result from an increase in the plasma levels of one or more of the pregnancy associated hormones such as oestrogen, progesterone, cortisol and placental lactogen, produced mainly from the fetoplacental unit.

The prevalence of GDM in India varies from 3.8 to 21% in different parts of the country, depending on the geographical locations and diagnostic method used. In India it is difficult to predict any uniform prevalence levels because of wide difference in living conditions, socio economic status, dietary habits and maternal age. Use of the term gestational diabetes has been encouraged to communicate the need for enhanced surveillance and to stimulate women to seek further testing postpartum.

For those at normal risk screening is recommended between 24-28 weeks of gestation by IADPSG criteria.[4] But India being diabetic capital screening is done at first antenatal check up.

Undiagnosed or inadequately treated GDM can lead to significant maternal and fetal complications. Maternal risk of GDM include polyhydramnios, preeclampsia, prolonged labour, obstructed labour, caesarean section, uterine atony, postpartum haemorrhage, infection and progression of retinopathy which are the leading causes of maternal morbidity and mortality. Fetal risks include spontaneous abortion, intrauterine death, stillbirth, dystocia, birth injuries, neonatal hypoglycaemia and infant respiratory distress syndrome. Moreover, women with GDM and their offsprings are at increased risk of developing type 2 diabetes later in life.

So, the management of GDM is aimed at controlling glycaemic level to reduce the incidence of adverse pregnancy outcomes. Oral hypoglycemic agents or insulin are necessary to reduce the complications when an appropriate diet alone or associated with physical exercise doesn't suffice to control blood glucose level in pregnant women. Subcutaneous insulin therapy has been onsidered as the gold standard for GDM. However, it has several disadvantage including multiple daily injections, maternal weight gain, risk pf hypoglycaemia. It requires modification based on patient's body mass index, glucose level and lifestyle. Therefore, detailed guidance for dose change of insulin necessary to ensure self-administration of insulin.

So safe and effective oral therapy would be more acceptable. Metformin as the first line medication for T2 DM sits in candidate list. It improves insulin sensitivity by activating AMPkinase and is not associated with weight gain and hypoglycaemia. Recent studies have shown that Metformin is cheaper, accessible, user friendly and safer in pregnancy.

With this background the present study aims at evaluating and comparing the maternal and fetal effects of metformin and insulin in GDM.

Materials and Methods

Present hospital based prospective international study was conducted in the Dept of Gynae and Obstetrics, Nil Ratan Sircar medical College and Hospital, Kolkata, West Bengal, India between March 2020 to July 2021.
After applying inclusion and exclusion criteria, pregnant mothers attending Antenatal outdoor patient department, obstetrics and gynaecology, NRSMCH, Kolkata divided into 2 groups as per randomization Group-I consist of odd numbers treated with Metformin till delivery and Group-II consist of even numbers treated with Insulin till delivery. Taking references from a previous study[5] the prevalence of hypoglycemia is 14% sample size was calculated 27 in metformin group and 29 in insulin group.

Inclusion criteria :

- Singleton pregnancy
- Women of 18 to 35 years
- Pregnancy between 24-34 wks of gestation
- Abnormal plasma glucose value
- at least one abnormal value at screening OGTT as per IADPSG criteria after overnight fast of > 8 hours.

Exclusion criteria :

- Diagnosis of diabetes before 24 weeks of pregnancy
- Prepregnancy diagnosis of diabetes (T1DM or T2DM) and HbAl c >6.5%
- Renal, hepatic ,thyroid or cardiac disease and other major systemic disease
- Pregnancy with multiple fetuses and Bad obstetric history
- Previous history of preeclampsia and eclampsia, chronic hypertension
- Other major comorbid illness that alters the blood glucose levels
- Drugs which can alter the glycemic status and affects the outcome (steroids etc
- Women who denies to give consent

General examination was done at the time of visit to assess general condition of the patient, especially maternal pulse and temperature, blood pressure,

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height and weight were noted to calculate body mass index, pallor, edema was noted. Systemic examination included cardiovascular, respiratory system and central nervous system.

Blood glucose was monitored by venous plasma glucose every 2 weeks. Capillary glucose by glucometer (SMBG) was done at home at least weekly and a chart of that maintained by the patients was evaluated at the 2nd visit. HbAlC was assessed at the baseline and at 36 weeks. Routine USG was done to assess the feto-placental profile. They were followed up in their subsequent antenatal visit in the OPD. Obstetric examinations included Per abdominal examination (done after emptying the bladder and patient lying in supine position with knees flexed) — Uterine height, symphysio-fundal height, fetal lie, presentation and position of fetus, Fetal heart sounds (FHS) was auscultated and its rate, rhythm were noted.

Two groups were formed, one group received metformin and other group received insulin. Both group were followed up and compared clinically

Method of Data Analysis Plan : Descriptive statistical analysis was carried out with StatisticalPackage for Social Sciences (SPSS Complex Samples) Version 24.0 for windows, SPSS, Inc., Chicago, IL, USA, and analyzed with SPSS V.24 software. The data were tabulated with Microsoft Word and Excel being used to generate graphs and tables.

Independent t test and Chi square test were used for the comparisons between the groups. Independent t-test was used to find the significance of study parameters between two groups of patients. Chi-square test was used to find the significance of study parameters on qualitative or categorical scale between two or more variables. The p value <0.05 was considered as statistically significant

Ethical considerations- Study was initiated after obtaining the informed consents from the participants and ethical clearance from the institutional ethical committee.

Results

Table-1: Distribution of patients in the two groups

Group	Number	Percentage (%)
Insulin	29	51.8
Metformin	27	48.2
Total	**56**	**100**

In the present study 29 (51.8%)of the patients were treated with insulin and rest 27 (48.2%) of the patients were treated with metformin. (Table 1)

Table 2. Age distribution of patients

Age group	Number	Percentage (%)	P value
<20 years	1	0.8	0.000*
20-24 years	20	35.7	
25-29 years	24	21.624	
30-35 years	11	42.9	

In the present study 1 (1.8%) mother was <20 year, 20 (35.7%) mothers were in 20-24 age group, 24 (42.9%) mothers were in 25-29 age group, 11 (19.6%) mothers were in 30-35 age group. So most of the GDM mothers were in 25-29 years age group. (Table 2)

Table 3. Distribution of gravida and Family History of DM between two groups

Gravida	Metformin		Insulin		P value
	Number	(%)	Number	(%)	
Multi	15	55.60	15	51.80	0.773
Para	12	44.50	14	48.30	
History of DM					
Yes	11	40.80	12	41.4	0.961
No	16	59.30	17	58.7	

Corrected Chi-square test (x^2) test showed that there was no significant association between Gravida of patients of the two groups (p= 0.773). Thus the two groups were comparable for gravida. Corrected x^2 test showed that there was no significant association between family history of DM and patients of the two groups (p= 0.96). Thus the two groups were comparable for family history. (Table 3)

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Table 4. Comparison of different parameters between the groups

BMI	N	Mean	SD	Mean difference	t value	p value
Metformin	27	28.00	2.51	0.31	0.370	0.713
Insulin	29	27.69	3.61			
OGTT FASTING						
Metformin	27	97.15	7.34	6.37	0.621	0.433
Insulin	29	103.5	7.94			
OGTT 1HR (PPBS 1HR) at 1st visit						
Metformin	27	188.22	6.11	6.23	0.973	0.094
Insulin	29	194.45	12.63			
OGTT 2HR (PPBS 2HR) at 1st visit						
Metformin	27	166.78	11.18	4.94	0.226	0.147
Insulin	29	171.72	13.74			
HbAlc						
Metformin	27	5.85	0.33	0.01	0.024	0.960
Insulin	29	5.86	0.34			
Mean Levels of FBS 2 weeks after Starting of treatment						
Metformin	27	99.07	6.70	1.07	0.636	0.528
Insulin	29	98.00	5.92			
Mean levels of PPBS 2 weeks after starting of treatment						
Metformin	27	162.81	12.87	2.64	0.724	0.472
Insulin	29	160.17	14.31			
Mean levels of FBS at term						
Metformin	27	87.37	2.83	1.44	1.832	0.072
Insulin	29	85.93	3.03			
Mean levels of PPBS at term						
Metformin	27	114.52	6.36	0.49	0.375	0.709
Insulin	29	114.03	2.69			
Mean levels of HbAl C at 36 weeks						
Metformin	27	5.93	0.26	0.23	1.287	0.096
Insulin	29	5.79	0.47			
Total weight gain (kg)						
Metformin	27	10.88	1.62	0.68	0.198	0.670
Insulin	29	11.56	2.14			

Corrected Chi-square (x^2) test showed that there was no significant association between BMI and patients of the two groups (p 0.713). Corrected x^2 test showed that there was no significant association between OGTT FASTING at 1st visit of patients of the two groups (p 0.433). Corrected x^2 test showed that there was no significant association between OGTT (PPBS 1 HOUR) at visit of patients of the two groups (p=0.094). Corrected x^2 test showed that there was no significant association between OGTT 2 hours at 1st visit of patients of the two groups (p 0.147). Corrected x^2 test showed that there was no significant association between HbAlc of patients of the two groups (p=0.96). Corrected x^2 test showed that there was no significant association between mean level of FBS 2 weeks after treatment of patients of the two groups (p=0.528). Corrected x^2 test showed that there was no significant association between mean levels of PPBS 2 weeks after treatment start of patients of the two groups (p=0.472). Corrected x^2 test showed that there was no significant association of FBS at term of patients of the two groups (p 0.072). Corrected x^2 test showed that there was no significant association between PPBS at term of patients of the two groups (p=0.709). Corrected x^2 test showed that there was no significant association between HbAlc at 36 weeks of patients of the two groups (p=0.096). Corrected x^2 test showed that there was no significant association of total weight gain of patients of the two groups (p=0.670). Corrected x^2 test showed that there was no significant association between oligohydraminos of the patients of the two groups (p=0.596). (Table 4

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Table 5. Comparison of different parameters between the groups

Oligohydraminos	Metformin		Insulin		Chi square value	P value
	Number	(%)	Number	(%)		
Yes	1	3.8	0	0	1.093	0.295
No	26	96.3	29	100		
Polyhydraminos						
Yes	1	3.8	2	6.9	0.281	0.596
No	26	96.3	27	93.2		
Preterm delivery						
Yes	3	11.2	5	17.2	0.42	0.51
No	24	88.9	24	82.8		
PROM						
Yes	6	22.2	3	10.3	0.71	0.396
No	21	77.8	26	89.7		
Mode of delivery						
ND	12	44.5	14	48.3	0.082	0.959
LUCS	13	48.2	13	44.9		
Forcep	2	7.5	2	6.9		
Prematurity						
Yes	3	11.2	4	13.8	0.091	0.761
No	24	88.9	25	86.3		
IUGR						
Yes	1	3.8	2	6.9	0.281	0.596
No	26	96.3	27	93.2		
IUFD						
Yes	0	0.0	1	3.4%		0.51
No	27	100%	28	96.6%		
NICU Admission						
No	24	88.9	27	93.2	0.438	0.802
2 days	1	3.8	1	3.5		
3 days	2	7.5	1	3.5		
Neonatal Hypoglycemia						
Yes	3	112	2	6.9	0.305	0.581
No	24	88.9	27	93.2		
Neonatal Hyperbilirubinemia						
Yes	3	11.2	2	6.9	0.305	0.581
No	24	88.9	27	93.2		

Oligohydraminos was equally distributed among the patients of the two groups. However, proportion of oligohydraminos among the patients treated with insulin was lower than that of the patients treated with Metformin (3.8%). Polyhydraminos was equally distributed among the patients of the two groups. However, proportion of Polyhydraminos among the patients treated with insulin (6.9%) which was higher than that of the patients treated with Metformin (3.8%). Proportion of Preterm delivery among the patients treated with insulin (17.2%) which was higher than that of the patients treated with Metformin (11.2%). Proportion of PROM among the patients treated with insulin (10.3%) which was lower than that of the patients treated with Metformin (22.2%). Proportion of ND among the patients treated with insulin (48.2%) which was higher than that of the patients treated with Metformin (44.5%). Proportion of prematurity among the patients treated with insulin (13.8%) which was higher than that of the patients treated with Metformin (11.2%). Proportion of IUGR among the patients treated with insulin (6.9%) which was higher than that of the patients treated with Metformin (3.8%). Only 1 (3.4%) case of IUFD among the patients treated with insulin which was higher than that of the patients treated with Metformin (0.0%). Since one of the cell frequencies was zero, Corrected x2 test could not be applied. Corrected x2 test showed that there was no significant association between NICU admission and patients of the two groups (p-0.802). Proportion of Neonatal hypoglycaemia of the babies among the patients treated with insulin (6.9%) which was lower than that of the patients treated with Metformin (11.1%). Proportion of Neonatal Hyperbilirubinaemia of the babies among the patients treated with insulin (6.9%) which was lower than that of the patients treated with Metfonnin (11.1%). (Table 5)

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Table 6. Comparison of different parameters between the groups

Period of Gestation at delivery	N	Mean	SD	Mean difference	t value	p value
Metformin	27	38.63	1.33	0.53	0468	0.148
Insulin	29	38.10	1.34			
Birth weight (in kg)						
Metformin	27	2.93	0.47	0.10	0.775	0.442
Insulin	29	103	0.56			
Abdominal circumference of the fetus at term						
Metformin	27	29.41	1.92	0.10	0.199	0.843
Insulin	29	29.31	1.71			
APGAR score at l min						
Metformin	27	7.70	0.60	0.08	0.481	0.632
Insulin	29	7.62	0.67			
APGAR score at 5 min						
Metformin	27	8.59	0.50	0.11	0.716	0.477
Insulin	29	8.48	0.63			

Corrected Chi-square (x2) test showed that there was no significant association between period of gestation at delivery of patients of the two groups (p 0.148). Corrected x2 test showed that there was no significant association between Birth weight of newborns of patients of the two groups (p 0.442). Corrected x2 test showed that there was no significant association between abdominal circumference of fetus at term of patients of the two groups (p=0.843). Corrected x2 test showed that there was no significant association between APGAR score at 1 min of babies of patients of the two groups (p=0.632). Corrected x2 test showed that there was no significant association between APGAR score at 5 min of babies of patients of the two groups (p 0.477). (Table 6)

Discussion:

In our study 1 (1.8%) mother was <20 year, 20(35.7%) mothers were in 20-24 age group, 24 (42.9%) mothers were in 25-29 age group, 11 (19.6%) mothers were in 30-35 age group. So most of the GDM mothers were in 25-29 years age group. The mean age of Metformin group is 25.85±4.12 and in the insulin groupis 26.28±4.09. Therefore, the mean age was not significantly different between treatment groups (p 1).43) and this suggests that in this study there was probably no confounding effect of age on the control of diabetes in pregnancy.

Mean maternal age in the study by Ghomian et al was 28.3 and 28.4 years in the insulin group and metformin group respectively (p value = 0.87) keeping up with our results.[6,7] Khan et al observed that the mean age of the cases was 24.92±2.57 years and 28.01±2.53 years in the metformin and insulin group respectively.[8] In the study by Niromanesh et al. the mean age was 30.7 ± 5.5.[9]

In present study Metformin group, 55.6% of patients were multigravida and 44.5% of patients were primigravida. In Insulin group, 51.8% of patients were multigravida and 48.3% of patients were primigravida. Thus the patients of the two groups were comparable for gravida (p 0.77).

We found that 40.8% of patients of Metformin group and 41.4% of patients of Insulin group were associated with Family history of DM in 1st degree relatives. Thus the patients of the two groups were comparable for their Family history of DM (p 0.96).

In our study, the mean BMI of patients at enrolment in Insulin group was 28.00 ±2.51 and the IDC311 BMI of patients at enrolment in Metformin group was 27.69 ±3.61. There was no significant difference between the mean BMI of the two groups. Thus the patients of the two groups were matched for BMI.

In our study, OGTT at first visit of Metformin group and insulin group were comparable. The mean level of FBS at first visit of Metformin group was 97.15 + 7.34 and of Insulin group was 103.52 ±7.94, showing no significant difference (p=0.433). The mean level of PPBS after 1hr of first visit of Metformin group was 188.22 ± 6.11 and of Insulin group was 194.45 ±12.63, showing no significant difference (p-0.094). The mean level of PPBS after 2 hr of 651 visit of Metformin group was 166.78 + 11.18 and of Insulin group was 171.72 ± 13.74, dowsing no significant difference.

In present study mean level of FBS 2 weeks after starting treatment of Metformin group was 99.07 +GA ad of Insulin group was 98.00 ± 5.92 with no significant difference(p=0.528). The aeon level of PPBS 2 weeks after starting treatment of Metformin group was 162.74 ±

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12.97 awl al insulin group was 160.17 ± 14.31 with no significant difference (p 0.47).

In our study mean level of FBS at the term of Metformin group was 87.37 ± 2.83 and of Insulin group was 85.93 + 3.03, showing no significance difference (p=0.072). The mean level of PPBS at the term of Metformin group was 114.52 ± 6.36 and of insulin group was 114.03 +2.69, showing no significant difference. (p 0.709).

In our study mean levels of HbAlC at baseline in Metformin group 5.85 ± 0.33 and in Insulin group was 5.86 ± 0.34 showing no significant clinical difference (p= 0.96). The mean level of HbAlc at 36 weeks in the Metformin group was 5.93 ± 0.26 and in Insulin group 5.79 ± 0.47, showing no significant clinical difference.

Khan et al observed significant differences for FBS at entry (p=0.000), FBS after treatment (p=0.000), HBA1c at entry (p=0.000) and HBA1c after treatment (p=0.000), with significantly between sugar control with metformin as compared to insulin.[8]

In our study the mean of total weight gain in Metformin group was 10.88 ± 1.62 and in the Insulin group was 11.56 ± 2.14 with no significant clinical difference.
Most of our patients (41.3%) had a weight gain between 6 and 10 kg while on metformin therapy. These data were comparable to the results of Kitwitee et al.[10]

In pour study only one case of oligohydramnios (3.8%) was noted among the patients related with Metformin. In among the patients of two groups (p=0.295).

In our study, proportion of polyhydramnios among the patients treated with Insulin (6.9%) which was higher than that of the patients treated with Metformin (3.8%). But there was no significant association between polyhydramnios and the patients of two groups (p 3.596).

In present study there were 3 preterm deliveries in Metformin group accounting for 11.1% and 5 preterm deliveries in insulin group accounting for 17.2%. However, percentage of preterm delivery was high in Insulin group but there was no significant association between preterm delivery and patients of two groups. Thus preterm delivery was equally distributed among the patients of the two groups.

In our study 6 cases of premature rupture of membrane in Metformin group accounting for 25% and 3 cases of premature rupture of membrane in Insulin group accounting for 10.3%. The proportion of PROM among Insulin group was lower than of Metformin group. But there is no significant association between PROM and patients of two groups as (p-9.596). Thus MOM was equally distributed among the patients of two groups.

In present study, in Insulin group- 6.9% of patients were delivered by forceps, 44.9% had LUCS had spontaneous vaginal delivery. In Metformin group 7.5% were delivered by 481% had LUCS and 44.5% had spontaneous vaginal delivery. So there was no association mode of delivery and patients of two groups.

Similarly, in the study by Hamid et al, no significant difference was observed between insulin and metformin group with respect to mode of delivery.[6] Ghomian et al observed that eighty-seven (60.8%) pregnant women in the metformin group and 78 (54.5%) pregnant women in insulin group experienced vaginal delivery (p=0.281).[7]

In our study in Metformin group, the mean age of period of gestation at delivery was 38.63 ± 1.33 and in Insulin group, the mean age of period of gestation at delivery was 38.10±1.34. There was no significant difference in mean period of gestation at delivery of the patients treated with insulin and that of the patients treated with metformin (p 0.148).

In our study the mean baby weight of Metformin group was 2.93 ± 0.47 kg and of Insulin group was 3.03 ± 0.56 kg with no significant difference(p-0.442). The mean abdominal circumference of metformin group was 29.41 ± 1.92 cm and of Insulin group was 29.31 +1.71 an with no significant difference(p 0.843).

In our study the mean APGAR score at 1 minute of neonates was 7.81±0.68 in Metformin poop and 7.75±0.68 in Insulin group. The mean APGAR score at 5 minute of neonates was 1131*. 050 in Metformin group and 8.55±0.57 in Insulin group. There was no significant ice in mean APGAR score at 1 minute and APGAR score at 5 minute of neonates of imprimis of the two groups (p 0.51, p-0.58).

In our study there were 11.1% (D_1- 3.8% & D_2 7.5%) of NICU admissions of babies among the patient treated with Metformin and 6.9% (D_1- 3.5% & D_2 - 3.5%) of NICU admission of babies among the patient treated with Insulin. The admission rate was higher in Metformin group but there was no significant association between NICU admissions of babies among the patient of two groups(p=0.802).

Picon-Cesar et al and Mohebbi M et al found no differences were observed between groups regarding

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perinatal outcomes (stay in NICU, respiratory distress syndrome, neonatal hypoglycemia, and jaundice requiring phototherapy).[11,12]

In our study there was one case of RDS in Metformin group accounting for 3.8%. There were two cases of RDS in Insulin group accounting for 6.9%. There was no significant association between RDS and patients of the two groups (p=0.59).

In our study there were 3 cases of Neonatal hypoglycaemia accounting for 11.2% in Metformin group and 2 cases of Neonatal hypoglycaemia in Insulin group accounting for 6.9%. There was no significant association between Neonatal hypoglycaemia and the patients of the two groups.
he incidence of neonatal hypoglycemia and hyperbilirubinemia in our study was similar to that seen in the study by George et al.[15]

In this study there were 3 cases (11.2%) of neonatal hyperbilirubinaemia in Metformin pomp and 2 cases (6.9%) in Insulin group. It was associated with no significant statistical difference between 2 groups. (p = 0.581).

Conclusions

Glycerine control of GDM can be done with combination of MNT (medical nutrition therapy), exercise and using the oral drug metformin. Metformin is safe and equally effective in treatment of gestational diabetes mellitus. Acceptability of metformin is better than insulin as it is noninjectable and with negligible risk of hypoglycaemia and home based management is possible. Prospective randomized controlled studies with large sample sized will be required to support this and also to fully evaluate the long term effects of metformin therapy on both offspring and mother in GDM.

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References:

1. Diagnosis and management of gestational Diabetes Mellitus- technical and operational guideline, February 2018
2. Metzger BE, Gabbe SG, Persson B, et al. International Association of Diabetes and Pregnancy study Group recommendations on the diagnosis and classification of hyperglycemia in pregnancy. Diabetes Care 2010;33: 676682.
3. Metzger BE, Lowe LP, Dyer AR,etal. Hyperglycemia and Adverse pregnancy outcomes, NEng J Med.2008;358: 1991-2002
4. Metzger BE, Gabbe SG, Persson B, et al. International Association of Diabetes and Pregnancy study Group consensus panel, IADPSG recommendations on the diagnosis and classifiation of hyperglycemia in pregnancy, Diabetes Care 2010;33: 676-82
5. National Collaborating Centre for Women's and Children's Health (UK) (2015) Diabetes in pregnancy: management from preconception to the postnatal period.
6. Hamid AN, Abd El-Gayed AM, Seif-Elnasr IA, Soliman MH. Comparison the efficacy and safety between Insulin and Metformin in gestational diabetes mellitus management. Menoufia Med J. 2019;32(4): 1376
7. Ghomian N, Vahed SH, Firouz S, Yaghoubi MA, Mohebbi M, Sahebkar A. The efficacy of metformin compared with insulin in regulating blood glucose levels during gestational diabetes mellitus: a randomized clinical trial. J Cellular Physiol. 2019; 234(4):4695-701
8. Khan RM, Mukhtar A, Khawar A. Comparison of metformin with insulin in the management of gestational diabetes. Med Forum. 2017;28(11):105-9
9. Niromanesh S, Alavi A, Sharbaf FR, Amjadi N, Moosavi S, Akbari S. Metformin compared with insulin in the management of gestational diabetes mellitus: a randomized clinical trial. Dia-betes Res Clin Pract. 2012;98:422–9.
10. Kitwitee P, Limwattananon S, Limwattananon C, Waleekachonlert O, Ratanachotpanich T, Phimphilai M, Nguyen TV, Pongchai-yakul C. Metformin for the treatment of gestational diabetes: an updated meta-analysis. Diabetes Res Clin Pract. 2015;109:521–32
11. Picón-César MJ, Molina-Vega M, Suárez-Arana M, González-Mesa E, Sola-Moyano AP, Roldan-López R, et al. Metformin for gestational diabetes study: metformin vs insulin in gestational diabetes: glycemic control and obstetrical and perinatal outcomes: randomized prospective trial. Am J Obstet Gynecol. 2021;225(5):517
12. Mohebbi M, Sahebkar A. FIGO initiative on gestational diabetes. Int J Gynecol Obstet. 2015;131: S173-211.
13. George A, Mathews JE, Sam D, Beck M, Benjamin SJ, Abraham A, Antonisamy B, Jana AK, Thomas N. Comparison of neonatal outcomes in women with gestational diabetes with moderate hyperglycemia on metformin or glibenclamide: a randomized controlled trial. Aust N Z J Obstet Gynaecol. 2015;55:47–52

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