

Metformin in mild gestational diabetes mellitus: a double-blind placebo-controlled randomised trial

Submission date 30/10/2017	Recruitment status No longer recruiting	☒ Prospectively registered ☐ Protocol
Registration date 07/11/2017	Overall study status Completed	☐ Statistical analysis plan ☒ Results
Last Edited 27/10/2022	Condition category Nutritional, Metabolic, Endocrine	☐ Individual participant data

Plain English summary of protocol

Background and study aims

Gestational diabetes mellitus (GDM) is glucose intolerance (high blood sugar) first recognized in pregnancy. It occurs as the body is not able to produce enough insulin to control the blood sugar levels needed during pregnancy. The risk of adverse pregnancy outcomes increases with increases in the mother's blood sugar level. This correlation is present even at maternal blood sugar levels within the normal range. GDM is usually managed by lifestyle control (mainly diet and exercise) and regular monitoring of blood sugar levels. Metformin is often the first line medical treatment if lifestyle change is insufficient. It is not known if preemptive use of metformin in combination with the standard lifestyle advisory compared to lifestyle advisory alone is better at lowering blood glucose in mild GDM cases. It could be possible that a combination will lower average blood glucose level and hence reduce the glycated haemoglobin (HbA1c) reading when assessed at 36 weeks of gestation in a placebo controlled trial. HbA1c reflects the average blood glucose in the preceding 2-3 months. The aim of this study is to examine if preemptive use of metformin by reducing maternal blood glucose level may reduce adverse maternal and baby outcome.

Who can participate?

Adults aged 18 to 45 years old who are diagnosed with gestational diabetes.

What does the study involve?

Participants provide blood sample for glycosylated haemoglobin (HbA1c) (a protein in the red blood cells that carries oxygen throughout the blood) when they join the study. They are then randomly allocated to one of two groups. Those in the first group take a 500 mg metformin pill. Those in the second group take an identical looking placebo or "dummy" pill twice daily by mouth after breakfast and dinner. Participants are provided with a blood glucose monitor and test strips to monitor their BSP four times per day (before breakfast, two hours after lunch and dinner, before bed) at least weekly until delivery. If the BSP suggests that medical treatment is needed, open label metformin (up to 500 mg thrice daily) can be added. Insulin injection is added if control remains inadequate. Standard gestational diabetes care will be provided to all participants. Participants receive allocated study drug from recruitment, up until delivery.

What are the possible benefits and risks of participating?

Participants may benefit from better blood sugar control with metformin reducing adverse pregnancy outcomes like preterm birth, need for labour induction, big baby and maternal or baby injury. Common side effects of metformin are maternal gastrointestinal disturbances (diarrhoea, nausea and vomiting).

Where is the study run from?

University Malaya Medical Centre (Malaysia)

When is the study starting and how long is it expected to run for?

June 2017 to January 2019

Who is funding the study?

Obstetric and Gynaecology Department, University Malaya Medical Centre (Malaysia)

Who is the main contact?

1. Miss Min Ping Tew (Scientific)
2. Professor Peng Chiong Tan (Scientific)
3. Dr Rahmah Saaid (Scientific)

Contact information

Type(s)

Scientific

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Additional identifiers

Protocol serial number
2017813-5489

Study information

Scientific Title
Metformin in Mild Gestational Diabetes Mellitus : a double-blind placebo-controlled randomised trial

Acronym
MIMGDM

Study objectives
Metformin compared to placebo in mild gestational diabetes reduces HbA1c by 0.2% by 36 weeks gestation.

Ethics approval required
Old ethics approval format

Ethics approval(s)
University Malaya Medical Centre, 11/10/2017, ref: 2017813-5489

Primary study design
Interventional

Study design
Randomised double-blind placebo-controlled trial

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Mild gestational diabetes mellitus

Interventions

Participants who are diagnosed as gestational diabetes and fulfilled the inclusion and exclusion criteria will be recruited. Blood samples for HbA1c are obtained and analysed by centre's laboratory.

Participants are then randomised to either the metformin at a dose of 500 mg (1 tablet) twice daily or identical looking placebo tablet twice daily taken by mouth after breakfast and dinner. Trial interventions continue to delivery.

Randomisation sequence is generated using a random number generator by a co-investigator who is not involved in recruitment, numbered and with strict sequential allocation by recruitment order. Participants and investigators are blinded.

Both arms receive the same advice on diet and lifestyle modification. Participants are followed up in antenatal clinic at least biweekly and monitored with weekly 4 points blood sugar profile consisting of fasting pre breakfast and 2-hour post meals. Open label metformin to a maximum dose of 1500 mg daily in divided doses can be added if needed based on above target BSP readings with treatment threshold according to local practice. The open label metformin are from a different manufacturer and visually distinct from trial metformin/placebo tablets.

Standard institutional care for gestational diabetes applies to both arms. Blood is drawn at 36 weeks or as soon as possible thereafter to determine HbA1c level. Outcomes will be collected from participants' hospital and laboratory records.

Intervention Type

Drug

Phase

Not Specified

Drug/device/biological/vaccine name(s)

Metformin

Primary outcome(s)

HbA1c is measured using blood samples at baseline and 36 weeks

Key secondary outcome(s)

1. Tolerability is measured using a symptom questionnaire at four weeks after recruitment and at 36 weeks gestation
2. Open label metformin use in pregnancy is measured by checking participants' hospital records after delivery
3. Insulin use in pregnancy is measured by checking participants' hospital records after delivery
4. Pregnancy induced hypertension is defined as blood pressure more than 140/90mmHg on 2 occasions with 4 hours apart after 20 weeks of gestation and established by checking participants' hospital records after delivery
5. Gestational age at delivery (preterm labour < 37 weeks)
6. Intervention to delivery interval is measured by checking participants' hospital records after delivery
7. Induction of labour is measured by checking participants' hospital records after delivery
8. Epidural analgesia in labour is measured by checking participants' hospital records after delivery

9. Mode of delivery

9.1. Indication for Caesarean delivery

10. Blood loss at delivery is measured as:

10.1. Postpartum haemorrhage ≥ 500 ml

10.2. Major postpartum haemorrhage ≥ 1000 ml

11. Third or fourth degree perineal tear as reported at birth

12. Reported shoulder dystocia

13. Birth weight is measured by checking participants' hospital records after delivery

14. Placenta weight is measured by checking participants' hospital records after delivery

15. Umbilical cord arterial pH at birth

16. Neonatal birth injury

17. Neonatal jaundice

18. Neonatal admission and indication

Completion date

31/01/2019

Eligibility

Key inclusion criteria

Current inclusion criteria as of 11/12/2017:

1. Aged 18 to 45 years

2. Singleton pregnancy

3. Gestational age at recruitment 16-30 weeks

4. Confirmed GDM: Fasting plasma glucose ≥ 5.1 mmol/L and/or the 2-hour ≥ 7.8 mmol/L by 75g OGTT

5. Normal 4-point blood sugar profile (BSP) in the preceding 2 weeks: fasting/pre-prandial ≤ 5.3 , post prandial 1 hour of ≤ 7.8 or post prandial 2 hours of ≤ 6.7 mmol/L

6. Not on any hypoglycaemic drug treatment

Previous inclusion criteria:

1. Aged 18 to 45 years

2. Singleton pregnancy

3. Gestational age at recruitment 16-30 weeks

4. Confirmed GDM: Fasting plasma glucose ≥ 5.1 mmol/L and/or the 2-hour ≥ 7.8 mmol/L by 75g OGTT ≥ 16 weeks of pregnancy

5. Normal 4-point blood sugar profile (BSP) in the preceding 2 weeks: fasting/pre-prandial ≤ 5.3 , post prandial 1 hour of ≤ 7.8 or post prandial 2 hours of ≤ 6.7 mmol/L

6. Not on any hypoglycaemic drug treatment

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Lower age limit

18 Years

Sex

Female

Total final enrolment

106

Key exclusion criteria

1. Any contraindication to metformin
2. History of prepregnant hyperglycaemia
 - 2.1. Type 2 diabetes,
 - 2.2. Impaired glucose tolerance
 - 2.3. Fasting glycaemia
3. Diagnostic 75g OGTT: fasting plasma glucose ≥ 7 or 2-hour glucose ≥ 11.1 mmol/L

Date of first enrolment

13/11/2017

Date of final enrolment

30/07/2018

Locations**Countries of recruitment**

Malaysia

Study participating centre

University Malaya Medical Centre

Lembah Pantai

Kuala Lumpur

Malaysia

59100

Sponsor information**Organisation**

University Malaya Medical Centre

ROR

<https://ror.org/00vkrxq08>

Funder(s)

Funder type

Hospital/treatment centre

Funder Name

Obstetric and Gynaecology Department, University Malaya Medical Centre

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are/will be available upon request from Dr. Tew Min Ping at loistew2@gmail.com.

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		01/03/2022	27/10/2022	Yes	No