ISRCTN10741667 https://doi.org/10.1186/ISRCTN10741667

Different concentration solutions for the oxytocin drip to treat slow progress during the labour of obese first-time mothers

Submission date
02/01/2025

Recruitment status
Recruiting

Registration date
07/01/2025

Overall study status
Ongoing

Last Edited
06/01/2025

Condition category
Pregnancy and Childbirth

[X] Prospectively registered
[X] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[_] Record updated in last year

Plain English summary of protocol

Background and study aims

By 2014, in many countries, more than half of pregnant women were overweight, and nearly a third of women were obese. Malaysian data from 2014 indicate that at booking for antenatal care the maternal obesity rate was 28.1%. Obese women were more likely to have cesarean deliveries and labor inductions, and greater lengths of stay after their deliveries. They were also more likely to have pregnancy-related complications like high blood pressure, diabetes, premature rupture of the forewaters, womb infection, serious blockage of blood vessels, big babies, slower labour (especially early labour) and difficult births. Obese women are equally able to achieve adequate womb contractions but obese nulliparas need more powerful contractions to reach the active stage of labour (> 6 cm cervical dilation) thus reaching the active stage of labour is more difficult. For each body mass index (BMI) increment of 1 kg/m2, the risk of Caesarean delivery is increased by a relative 10%. Oxytocin is a self-produced natural agent (hormone) that plays a key role in labor. Oxytocin is also administered as a medication to initiate (induce labour) or strengthen womb contractions (to overcome inadequate labour progress). Oxytocin has a short plasma half-life of 6 minutes 53 seconds in female serum indicating its effect should not last long after the infusion is stopped. The oxytocin drip rate is decided according to the womb contraction response. The current ideal is to achieve 3 to 4 contractions each lasting about 30-60 seconds every 10 minutes. It is suggested that oxytocin dosing should be individualized to each patient and not be based on arbitrary limits because a predictable dose response for womb contractions or labor does not exist.

Oxytocin can cause more frequent contractions but can also shorten the length of labor by up to 2 hours and reduce the incidence of womb infection. High-dose oxytocin regimens do not appear to cause the baby's heartbeat to become abnormal during labour, heavy blood loss at birth for the mother, increased requirement for epidural pain relief or newborns to be born in a poor condition. High-dose oxytocin may be associated with a lower cesarean delivery rate in first-time mothers but this finding is not consistently reported. Body function changes caused by obesity can impact the absorption, distribution, metabolism and elimination of medicines. In a 2024 study, in obese patients who underwent induction of labour, a high versus standard of a labour induction medicine (misoprostol) shortens the time to birth without additional adverse consequences showing the potential benefit of higher medicine doses in obese mothers.

This study assesses two different concentrations of oxytocin drip solution. A standard solution containing 10 units of oxytocin in 500 ml of fluid (the longstanding standard concentration at our centre) to another 1.5 times stronger, containing 15 units of oxytocin in 500 ml of the same fluid. The strength of the solutions used will be assigned by computer and neither the care provider nor the patient will know which strength is used. Adjustments to the drip rate according to womb contraction response will be according to usual practice.

Who can participate?
Obese patients at term with a single baby requiring an oxytocin drip to treat slow labour

What does the study involve?
The participants will be treated the same way except that their oxytocin drip will contain 10 units of oxytocin in 500 ml of fluid (the longstanding standard concentration at our centre) or another 1.5 times stronger, containing 15 units of oxytocin in 500 ml of the same fluid. In both arms, the regimen for adjusting the oxytocin drip rate will be the usual care regimen of doubling the infusion rate (from 6 ml hr to 12 ml/hr to 24 ml/hr hour to 48 ml/hr to 96 ml/hr as needed) every 30 minutes until 3-4 moderate-to-strong contractions are achieved following which the drip rate will be maintained until delivery if there are no interim events to warrant further adjustment.

What are the possible benefits and risks of participating?
Plausible benefit: A higher concentration solution regimen hastens birth, reduces infection and caesarean delivery

Plausible risks: A higher concentration solution regimen increases womb contractions and hence can increase pain; epidural use may thus increase. If increases in womb contractions cause abnormalities in the baby's heartbeat, this may result in caesarean delivery although there are measures available to reduce womb contractions.

Where is the study run from?
University Malaya Medical Centre

When is the study starting?
01/03/2024 (to

Who is funding the study?
Internally funded by the Department of Obstetrics and Gynaecology, Faculty of Medicine, University Malaya Medical Centre.

Who is the main contact?
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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
Nil known

Study information

Scientific Title
Different oxytocin concentration for labour dystocia in obese nulliparas: a double-blind randomized controlled trial

Study objectives
We hypothesise that obese patients (BMI ≥ 27.5 by Asian criteria) managed with a higher concentration oxytocin solution regimen (hence higher initial, escalation and maximum allowable dose of oxytocin) in augmentation of labour will have their birth hastened in comparison with our current standard regimen.

Ethics approval required
Ethics approval required

Ethics approval(s)
approved 20/11/2024, UMMC Medical Research Ethics Committee (University of Malaya Medical Centre Lembah Pantai, Kuala Lumpur, 59100, Malaysia; +60 03-79493209/2251; ummc-mrec@ummc.edu.my), ref: 2024823-14116

Study design
Double-blind randomized controlled trial

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Labour dystocia in obese nulliparas

Interventions
Recruitment
Potentially eligible nulliparas in spontaneous labour and labour dystocia with the decision made to augment labour with oxytocin will be further screened for eligibility for trial participation. The Participant Information Sheet with be given. Queries about the study will be encouraged and answered by the recruiting care provider. Informed written consent will be obtained.

Randomisation
The randomisation sequence will be generated by an investigator not involved in the recruiting or care process in random blocks of 4 or 8 using an online randomiser (https://www. sealedenvelope. com/simple-randomiser/v1/lists).

Prepared oxytocin-Hartmann solution to the allocated concentration will be enclosed in sealed numbered boxes as randomly allocated. The lowest numbered box still available will be allocated to the newest participant. A co-numbered sealed opaque envelope with external writing of “UNBLINDING INFORMATION: Open Only If Necessary” and containing a card with “Study Number xxx, OXYTOCIN STUDY DRUG 10 IU (Standard concentration) in 500 ml Hartmann” or “Study Number xxx, OXYTOCIN STUDY DRUG 15 IU (High concentration) in 500 ml Hartmann” pasted to the box to facilitate timely indicated unblinding. The reason for unblinding will be recorded. The content of the numbered boxes that are unused will be discarded and replaced every 24 hours with freshly made solutions by a researcher not involved in study recruitment or patient care. The numbered trial boxes will be stored in an air-conditioned delivery suite with an ambient temperature set at 22-24 0C.

Interventions
The interventions are:
a) Higher starting dose and higher maximum infusion dose rate (oxytocin 15 IU in 500 ml Hartmann)
Starting dose (3 mIU/min), increases as needed to a maximum of 48 mIU/min (infusion rate of 6 ml/hr to a maximum rate of 96 ml/hr)
OR
b) Standard starting dose and standard maximum infusion dose rate (oxytocin 10 IU in 500 ml Hartmann’s solution)

Starting dose (2 mIU/min), increases as needed to a maximum of 32mIU/min (infusion rate of 6 ml /hr to a maximum rate of 96 ml/hr)
An electric pump will be used for oxytocin infusion. Total volume infused, duration of infusion and maximum rate of infusion will be recorded.
In both arms, the regimen for titrating the oxytocin infusion rate will be the usual care regimen of doubling the infusion rate (from 6 ml hr to 12 ml/hr to 24 ml/hr hour to 48 ml/hr to 96 ml/hr as needed) every 30 minutes until 3-4 moderate-to-strong contractions are achieved following which the infusion rate will be maintained until delivery if there is no interim event. Tocolysis use when needed will be recorded.
In the event of cardiotocograph abnormalities or other clinical concerns, the care provider has full discretion to pause, restart, vary or discontinue the oxytocin infusion.

Intervention Type
Drug

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
Oxytocin

Primary outcome(s)
The time interval from the start of oxytocin augmentation to the birth measured using data collected from the patient's electronic medical record at one timepoint

Key secondary outcome(s))
Performance and safety secondary outcomes partly derived from the core outcome set for reporting trials on induction of labour (CROWN)

Maternal secondary outcomes:
1. Maximum oxytocin infusion rate used measured using data collected from the patient's electronic medical record after delivery
2. Duration of oxytocin infusion measured using data collected from the patient's electronic medical record after delivery
3. Total volume infused measured using data collected from the infusion pump record or patient's electronic medical record after delivery
4. Cardiotocographic abnormality through the first stage of labour as defined below measured using data from a blinded assessor after delivery, as follows:
4.1. Tachysystole (contractions ≥6 in 10 minutes)
4.2. Hypertonus (sustained contraction ≥2 minutes)
4.3 Hyperstimulation syndrome (tachysystole and/or hypertonus with concurrent fetal deceleration [defined as a decrease in fetal heart rate of ≥15 bpm from baseline for ≥15 seconds])
5. Number of doses of tocolytic given if any measured using data collected from the patient's electronic medical record after delivery
6. Mode of delivery measured using data collected from the patient's electronic medical record after delivery, as follows:
6.1. Spontaneous
6.2. Vacuum
6.3. Forceps
6.4. Caesarean section
7. Indication for the Caesarean section measured using data collected from the patient's electronic medical record after delivery
8. Indication for instrumental vaginal delivery measured using data collected from the patient's electronic medical record after delivery
9. Maternal satisfaction with the birth process measured using the 11-point 0-10 numerical rating scale [NRS] after delivery
10. Blood loss during delivery measured using data collected from the patient's electronic medical record after delivery
11. Third- or fourth-degree tear measured using data collected from the patient's electronic medical record after delivery
12. Maternal fever measured using data collected from the patient's electronic medical record after delivery
13. Intrapartum therapeutic antibiotics excluding prophylactic antibiotics measured using data collected from the patient's electronic medical record at hospital discharge)
14. Epidural analgesia in labour measured using data collected from the patient's electronic medical record after delivery
15. Length of hospital stay measured using data collected from the patient's electronic medical record at hospital discharge
16. ICU admission measured using data collected from the patient's electronic medical record at hospital discharge
17. Cardiorespiratory arrest measured using data collected from the patient's electronic medical record at hospital discharge
18. Needing hysterectomy measured using data collected from the patient's electronic medical record at hospital discharge

Neonatal outcomes are measured using data collected from the patient's electronic medical record at one timepoint:
1. Apgar score at 1 and 5 minutes after delivery
2. NICU admission after delivery
3. Umbilical cord artery blood pH after delivery

4. Neonatal sepsis at hospital discharge
5. Birth weight after delivery
6. Birth trauma at hospital discharge
7. Hypoxic ischaemic encephalopathy/need for therapeutic hypothermia at hospital discharge)

Completion date
30/03/2026

Eligibility

Key inclusion criteria
1. BMI ≥27.5 kg/m2
2. Spontaneous labour (contraction >2:10 minutes and cervical dilatation ≥3cm)
3. Inadequate progress as clinically determined
4. Nulliparous (no previous pregnancy ≥22 weeks)
5. Term ≥37 weeks
6. Age 18-45 years old
7. Membranes ruptured (including prelabour rupture of membranes)
8. Singleton pregnancy
9. Cephalic presentation
10. Reassuring fetal heart rate tracing at initiation of oxytocin infusion

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Upper age limit
45 years

Sex
Female

Key exclusion criteria
1. Induced labour (prior Foley, prostaglandin or oxytocin for labour induction)
2. Previous uterine scar (caesarean/myomectomy/perforation)
3. Known major fetal anomaly
4. Fetal weight clinically estimated to be ≤2 kg and ≥4 kg and confirmed by ultrasound

Date of first enrolment
01/02/2025

Date of final enrolment

30/03/2026

Locations

Countries of recruitment
Malaysia

Study participating centre
University of 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
Universiti Malaya Medical Centre

Alternative Name(s)
University of Malaya, University Malaya, Malayan University, King Edward VII College of Medicine, Raffles College, University of Malaya in Singapore, , , , UM

Funding Body Type
Government organisation

Funding Body Subtype
Universities (academic only)

Location
Malaysia

Results and Publications

Individual participant data (IPD) sharing plan

The data-sharing plans for the current study are unknown and will be made available at a later date

IPD sharing plan summary

Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	version 1	01/08/2024	06/01/2025	No	Yes
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes
Protocol file	version 1	01/08/2024	06/01/2025	No	No