Document No: 2121097

TITLE: Diabetes in Pregnancy – Gestational Diabetes
Induction, Labour, Birth, Elective Caesarean Section and Postnatal Care

Contents

1. Statement/Purpose

The purpose of this guideline is to standardise the intrapartum (spontaneous birth, induction of labour, elective caesarean section) and postnatal care and to optimise glycaemic control for women with Gestational Diabetes Mellitus (GDM) in their pregnancy.

In recognition of Te Tiriti o Waitangi (the Treaty of Waitangi) and the Crown's special relationship with Maori, Te Whatu Ora – Lakes, is committed to acknowledging the Treaty by working in partnership with Maori. Staff involved in implementing this policy should be aware of the Tiriti o Waitangi Policy (EDMS 40583).

2. Scope

All Te Whatu Ora Lakes staff members (medical, nursing and midwifery) and Lead Maternity Carers (LMC's) who are providing care for pregnant women with Gestational Diabetes Mellitus.

3. Definitions

Gestational Diabetes Mellitus	A disorder characterised by hyperglycaemia *first* recognised during pregnancy due to increased insulin resistance and relative insulin deficiency, usually resolving after birth. GDM can impact fetal development as well as the current and future health of the mother and neonate. Appropriate treatment of diabetes in pregnancy has been shown to reduce adverse perinatal outcomes.
FBC	Full Blood Count
CTG	Cardiotocography
GIK	Glucose, Insulin and Potassium (IV infusion)
IOL	Induction of Labour
BSL	Blood Sugar Level
GTT	Glucose Tolerance Test
HbA1c	Glycated Haemoglobin
NBM	Nil by mouth
UECs	Urea, Electrolytes and Creatinine (blood tests)
SC	Subcutaneous
GDM	Gestational Diabetes Mellitus
BMI	Body Mass Index (calculated by weight / [height]^2)
IV	Intravenous
CBG	Capillary Blood Glucose
Hypo	Hypoglycaemia

4. Procedure/Management

- **Intrapartum Care**

FOR INDUCTION OF LABOUR (IOL) OR SPONTANEOUS LABOUR

- Continue usual diet and rapid acting insulin (ie Novorapid®, Apidra®, Humalog®) and/or metformin until labour is established.
- The dose of longer acting insulins i.e. Protaphane®, Humulin NPH®, Glargine® (Lantus) or Determir ® (Levemir) should be halved (*½)* on the evening prior to IOL AND withhold morning insulin of Protaphane®, Humulin NPH®, Glargine® (Lantus) or Determir ® (Levemir)
- Perform admission cardiotocography (CTG) as there is an increased risk of fetal hypoxia during labour.
- Inform the Obstetric Team Senior House Officer (SHO), Paediatric Team SHO and Special Care Baby Unit (SCBU) of admission
- For women on insulin: Establish IV access. Take bloods for group and hold and FBC.
- If labour is not established that day, again halve (1/2) the dose of long acting insulin that evening and withhold the morning dose of long acting insulin until labour is established.

ONCE LABOUR IS ESTABLISHED

- Commence partogram
- Discontinue subcutaneous insulin and/or metformin.
- Women with GDM can eat as clinically appropriate.
- For women not on insulin or on metformin: IV access is not required unless needed for interventions.
- For women with diet controlled GDM or on metformin, continuous CTG should be individualised in discussion with the woman, LMC and O&G team with regard to the full clinical picture.
- For women on insulin, close fetal heart monitoring in labour is recommended.
- Avoid glucose/dextrose containing intravenous fluids unless requiring treatment infusions as per below.
- Monitor capillary blood glucose levels two hourly.
- Treat hypoglycaemia **(≤3.5mmol/l)** initially with 1 sachet of Hypo-Fit® sachet (18g carbohydrate), this is expected to raise maternal blood glucose level by 2-3mmol/l over 10 minutes, the response is dependent on maternal weight.
    - Repeat after 15 minutes if required. If no response after 30 minutes commence intravenous Plasma-Lyte 148 + 5% glucose infusion at a rate of 125ml/hr via an infusion pump with hourly blood glucose monitoring.
    - Cease infusion when capillary blood glucose reading is above 5 mmol/l and recheck capillary blood glucose at hourly intervals
- If capillary blood glucose **>7 mmol/L** commence the *IV Insulin/ Glucose Infusion Sliding Scale* with hourly blood glucose monitoring - see APPENDIX A
- Women on diet alone or diet and metformin have no risk of hypoglycaemia and only very rarely require active management of hyperglycaemia in labour.

FOR CAESAREAN SECTION (ELECTIVE)

Women booked on **morning** surgical list:

- The usual evening insulin and/or metformin dose is given on the day prior to the elective caesarean section, **EXCEPT** for women taking Protaphane®, Humulin NPH®, Glargine® (Lantus) or Determir® (Levemir), where the evening dose should be halved(*½)* the night before surgery.
- **Withhold** morning insulin and/or metformin on day of elective caesarean section.

Women booked on **afternoon** surgical list:

- Usual evening insulin and/or metformin the day prior to elective caesarean section.
- On the day of elective caesarean section: Light breakfast & usual metformin dose and/or usual rapid acting insulin (i.e. Novorapid®, Apidra®, Humalog®).
- **Withhold** morning long acting insulin (i.e. Protophane®, Humulin NPH®, Lantus®)
- Nil by mouth from 0600hrs

Preparation for **both** surgical lists:

- Establish IV access and avoid any glucose containing intravenous fluids except for Plasma-Lyte 148 + 5% glucose.
- Monitor capillary blood glucose levels hourly.
- If capillary blood glucose:
  a) **< 4 mmol/L** commence intravenous *IV Insulin/ Glucose Infusion Sliding Scale* with hourly blood glucose monitoring - see APPENDIX B
  b) **>7 mmol/L** commence intravenous *IV Insulin/ Glucose Infusion Sliding Scale* with hourly blood glucose monitoring - see APPENDIX B

- **Following Birth and Postnatal Care**

IMMEDIATELY FOLLOWING BIRTH

- If an intravenous management protocol has been used stop the infusions immediately following birth.
- Order a normal diet
- Antenatal treatment should not be recommenced (insulin and/or metformin). If the woman has had her routine insulin injection shortly before birth she should eat as soon as possible after birth.
- If the woman has had recent insulin/ cannot eat for any reason:
  a) Continue to monitor capillary blood glucose levels hourly
  b) Treat hypoglycaemia **(< 4 mmol/l)** as per the flowchart in the Hypo kit in the Birthing Unit dispensary and in APPENDIX A.
- For women treated antenatally with metformin and/or insulin, monitor blood glucose levels before breakfast and two hours after all meals for 24 hours.
- If hyperglycaemia persists (fasting > 7 mmol/L and/or postprandial > 11.1 mmol/L), please advise SHO to consider a Physician/Diabetes team referral before discharge as the woman may have Type 1 or Type 2 diabetes.

BREASTFEEDING

- Encourage all women to breastfeed their babies and if possible collect colostrum antenatally.
- Colostrum raises infant glucose levels and should be given via breast/cup/syringe as soon as possible, preferably within 30mins of birth and during uninterrupted skin to skin with mother.
- Follow the Screening and Management of Neonatal Hypoglycaemia guideline (56076) in regards the monitoring of a baby's blood sugars and frequency of feeds as babies of mothers with diabetes in their pregnancy are at a higher risk of hypoglycaemia.

- **Follow Up**

  All women with gestational diabetes should have postpartum follow-up for persisting impaired glucose tolerance or diabetes. It is recommended that women have serial HbA1c measurements beginning at three months post-partum and then annually thereafter, to be arranged via their general practitioner.

5. Related Documentation

- Appendix A: Diabetes in Pregnancy prescription and monitoring chart (includes Insulin/ Glucose Infusion Sliding Scale)
- Diabetes in Pregnancy: *Type 2 Diabetes Mellitus*. Induction, Labour, Birth, Elective Caesarean section & Postnatal Care
- Diabetes in Pregnancy: *Type 1 Diabetes Mellitus*. Induction, Labour, Birth, Elective Caesarean section & Postnatal Care
- Diabetes in Pregnancy: *Insulin Infusion following Betamethasone Injections*
- Te Whatu Ora Lakes Guideline: Screening and Management of Neonatal Hypoglycaemia (EDMS 56076**)**

6. References

- National Institute for Health and Care Excellence (NICE) guideline (2011): CG63 Diabetes in pregnancy http://www.nice.org.uk/nicemedia/live/11946/41320/41320.pdf
- This document is based on the Te Whatu Ora Waitaha Canterbury *"Gestational Diabetes (diet/insulin/metformin) Care of women in birthing suite Guideline"*

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Authorised by: **Maternity Continuous Quality Improvement (CQI) Meeting**

Appendix A. Adult Hypoglycaemia ("Hypo") Treatment

Adult Hypoglycaemia ("Hypo") Treatment (Glucose <3.5mmol/l)
Conscious women only.

BGL below 3.5mmol/l

⇩

Woman to drink 1x Hypo-Fit® sachet
(18g carbohydrate)
If woman declines the Hypo-Fit® sachet - give 3 heaped teaspoons of sugar dissolved in warm water.

⇩

Wait 10 minutes and repeat blood glucose.

⇩

Is Repeat BGL above 4mmol/l?

⇩ ⇩

Yes	NO
⇩	⇩
Give woman one packet of biscuits (longer acting carbohydrate) supplied in "Hypo Kit". Gluten free option: 300mls of standard milk.	Give woman another Hypo-Fit® sachet and repeat instructions above.
⇩	⇩

If no response after 30 minutes run 100mls of 10% Dextrose IV

If Woman is Unconscious or Nil by Mouth

1. **Emergency call for help.**
2. **Obtain "Hypokit" from BU dispensary.**
3. **Liquids should not be force fed because of the danger of aspirating liquid.**
4. **Treat with "Glucagen Hypokit 1mg" (orange case) or IV glucose 100ml of 10% dextrose IV stat**.

See hypoglycaemia guideline in kit.

Appendix B. Diabetes in Pregnancy Insulin/Glucose Infusion Sliding Scale

Diabetes in Pregnancy Insulin/Glucose Infusion Sliding Scale

NB: The aim of this scale is to ensure a steady/stable blood sugar level. Two intravenous lines are to be sited; one for insulin/Plasma-Lyte 148 + 5% glucose infusion and one for oxytocin/anaesthetic/analgesic requirements.

- No glucose containing infusions, other than the fixed rate of Plasma-Lyte 148 + 5% glucose should be administered.
- Blood glucose should be checked immediately prior to starting the infusions and then hourly until the surgeon/O&G team has directed the woman is ready to eat.
- Document capillary blood glucose level on the Diabetes in Pregnancy Prescription and Monitoring Chart (next page).
- Document accurately fluid input, in the EDMS 928832 Fluid Balance Chart in the Fluid Balance Monitoring Guideline.

Prepare The Prescribed Sliding Scale Infusion

Using the Nexiva™ IV catheter system, the Plasma-Lyte 148 + 5% glucose is mainlined to the woman, with the insulin infusion via Y-site.

Plasma-Lyte 148 + 5% glucose preparation:

1. Prime the main line with Plasma-Lyte 148 + 5% glucose solution.
2. Run one litre of Plasma-Lyte 148 + 5% glucose at a rate dependant on **type of Diabetes in Pregnancy** – see below, per hour via a Baxter infusion pump. DO NOT ALTER

Diabetes in Pregnancy Type	Rate of Plasma-Lyte 148 + 5% glucose infusion
Type 1 or Type 2 Diabetes	125mls/hr.
Gestational Diabetes Mellitus (GDM)	75mls/hr.

Actrapid® Insulin preparation:

1. Obtain an Alaris syringe driver from the Clinical Equipment Pool (CEP).
2. Take 50 units (0.5 mL) of Actrapid® insulin and make up to 50 mL in a syringe with 0.9% sodium chloride to make a 1 unit/mL solution.
3. Flush the tubing then connect to Y-site of Nexiva™ IV catheter system
4. Run according to the prescribed Sliding Scale over page.

Te Whatu Ora
Health New Zealand
Lakes

Place Patient label here
Please ensure you attach the correct patient label

MATERNITY SERVICES

Diabetes in Pregnancy Insulin/Glucose Infusion Sliding Scale

Measure CBG immediately prior to starting infusion, then hourly until the women is ready to eat

INSULIN / PLASMA-LYTE 148 + 5% GLUCOSE INFUSION SLIDING SCALE PRESCRIPTION CHART	
Capillary Blood Glucose Level mmol/L	**Insulin infusion rate in mLs per hour (= units of Actrapid insulin per hour)**
< 3.5	**No insulin** **Increase the rate of Plasma-Lyte 148 + 5% glucose to 125 mLs/hour** **Check BSL every 15 minutes - Call SHO for advice**
3.5 – 5.0	**0.5**
5.1 – 7.0	**1**
7.1 – 9.0	**2**
9.1 – 11.0	**3**
11.1 – 13.0	**4**
13.1 -15.0	**5** **Stop the Plasma-Lyte 148 + 5% glucose**
> 15.0	**6** **Stop the Plasma-Lyte 148 + 5% glucose - Call SHO for advice**

Diabetes in pregnancy type: (write)	Rate of Plasma-Lyte 148 + 5% glucose infusion: _____ mLs/hr
Prescribing Doctor (print name)	Date:
Prescribing Doctor (signature)	Time:

Hourly Monitoring Chart

Date	Time	CBG	Insulin rate	Date	Time	CBG	Insulin rate

DO NOT WRITE IN THIS BINDING MARGIN

DIABETES IN PREGNANCY INSULIN/GLUCOSE INFUSION SLIDING SCALE

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