Document No: 2656754

TITLE: Diabetes in Pregnancy – Type 1 and Type 2 Diabetes
Induction, Labour, Birth, Elective Caesarean Section and Postnatal Care

Contents

1. Statement/Purpose

The purpose of these guidelines is to standardise the intrapartum (spontaneous birth, induction of labour, elective caesarean section) and postnatal care and to optimise glycaemic control for women with Type 1 and Type 2 Diabetes in their pregnancy.

Type 1 and Type 2 Diabetes 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.

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 Type 1 and Type 2 Diabetes.

3. Definitions

Type 1 Diabetes	A disorder characterised by hyperglycaemia due to insulin deficiency, requiring lifelong insulin treatment.
Type 2 Diabetes	A disorder characterised by hyperglycaemia due to increased insulin resistance and relative insulin deficiency, requiring treatment with lifestyle modification, oral medications and sometimes insulin.

Definitions cont'd

BGL	Blood Glucose Level
BMI	Body Mass Index (Calculated By Weight / [Height]^2)
CBG	Capillary Blood Glucose
CTG	Cardiotocography
FBC	Full Blood Count
GDM	Gestational Diabetes Mellitus
GIK	Glucose, Insulin And Potassium (IV Infusion)
GTT	Glucose Tolerance Test
HbA1c	Glycosylated Haemoglobin
Hypo	Hypoglycaemia
IOL	Induction of labour
IV	Intravenous
NBM	Nil by mouth
SC	Subcutaneous
UECs	Urea, Electrolytes and Creatinine (blood tests)

4. 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.
- Give half the morning dose of Protaphane®, Humulin NPH®, Lantus®, or Levemir® on the morning of IOL.
- 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 blood for group and hold and FBC.
- If labour is not established during that day, again halve (1/2) the dose of long acting insulin that evening and the next morning until labour is established.

ONCE LABOUR IS ESTABLISHED

- Commence partogram
- Discontinue subcutaneous insulin and/or metformin.
- For women not on insulin or metformin: IV access is not required unless needed for interventions.
- 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 hourly.
- Women on diet and metformin have no risk of hypoglycaemia and only very rarely require active management of hyperglycaemia in labour.
- If capillary blood glucose (CBG) **>7 mmol/L** commence the *IV Insulin/ Glucose Infusion Sliding Scale* with hourly blood glucose monitoring (APPENDIX B)
- If CBG ≤ 3.5 treat for hypoglycaemia (APPENDIX A)

FOR CAESAREAN SECTION (ELECTIVE)

Women booked on **morning** surgical list:

- The usual evening metformin dose and/or rapid acting insulin (Novorapid, Apidra, Humalog) is given on the day prior to the elective caesarean section. For women taking Glargine (Lantus®) Protaphane®, Humulin NPH®, or Determir (Levemir®), the evening dose should be halved(*½)* the night before surgery. If taking it in the morning this dose should be halved also.
- **Withhold** morning rapid actng insulin and/or metformin on day of elective caesarean section.

Women booked on **afternoon** surgical list:

- Give usual evening insulin and/or metformin the day prior to elective caesarean section, except for glargine (Lantus) or detemir (Levemir) where the dose should be halved (*½)* the evening before.
- On the day of elective caesarean section: Light breakfast & usual metformin dose and/or usual rapid acting insulin (i.e. Novorapid®, Apidra®, Humalog®).
- **Give half of the** usual morning dose of long acting insulin (i.e. Protaphane®, Humulin NPH®, Glargine (Lantus®), or Determir (Levemir®))

Preparation for **both** surgical lists continued:

- 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:
  - **< 3.5 mmol/L** treat for hypoglycaemia as per *Adult Hypoglycaemia ("Hypo") Treatment - see* APPENDIX A
  - **>7 mmol/L** commence intravenous *IV Insulin/ Glucose Infusion Sliding Scale* with hourly blood glucose monitoring - see APPENDIX B

5. Following Birth & Postnatal Care

IMMEDIATELY FOLLOWING BIRTH

5.1 **For women on an insulin infusion:** Insulin requirements fall rapidly. The insulin infusion rate is halved immediately following birth (postpartum rate). The Plasma-Lyte 148 + 5% glucose infusion rate remains unchanged.

- Once the blood glucose is > 7 mmol/l, restart insulin infusion at postpartum rate ***less 50%**** OR if the woman is going to eat then she can administer her usual rapid acting insulin at her ***pre-pregnancy dose less 30%.***
- Daily monitoring of electrolytes is required for infusions extending beyond 24 hours* (risk of hypokalaemia and hyponatremia).
- The infusion is continued until the woman is ready to eat – for Type 1 diabetes a one-hour overlap is required between giving the subcutaneous insulin and stopping the intravenous insulin/Plasma-Lyte 148 + 5% glucose infusion.
- Rapid acting pre-meal insulin can be commenced at the pre-pregnancy dose less 30%. Long acting insulin should be continued at their usual time at the pregnancy dose less 50%.

The woman may be transferred to the postnatal ward after ceasing the Plasma-Lyte 148 + 5% glucose/insulin infusion.

For women on a personal insulin pump consult a physician regarding insulin dosage (or the diabetes delivery plan).

*NB: intravenous insulin solutions need to be replaced every 24 hours

5.2 **For women not on an insulin infusion:**

- Monitor blood glucose 2 hourly.
- Once ready to eat, continue diabetes diet and monitor blood glucose before and 2 hours after all meals.
- Women taking Metformin before pregnancy can recommence this on day 2 postpartum (at pre-pregnancy dose).
- Women taking insulin before pregnancy will need to recommence insulin but at a reduced dose, e.g. 30-50% reduction or see diabetes delivery plan.

BREASTFEEDING AND CARE OF THE NEONATE

- 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 un-interrupted skin to skin with mother.
- Follow the Screening and Management of Neonatal Hypoglycaemia Guideline (EDMS #56076) in regards the monitoring of baby's blood sugars and frequency of feeds as babies of mothers with diabetes in their pregnancy are at a higher risk of hypoglycaemia.

6. Related Documentation

- Diabetes in Pregnancy Prescription and Monitoring Chart (includes Insulin/ Glucose Infusion Sliding Scale)
- Diabetes in Pregnancy: Gestational Diabetes Mellitus Induction, Labour, Birth, Elective Caesarean Section and Postnatal Care 2121097
- Diabetes in Pregnancy: Insulin Infusion following Betamethasone Injections
- Screening and Management of Neonatal Hypoglycaemia Guideline 56076

7. 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 Canterbury DHB *Type 1 and Type 2 Diabetes: Care of women in Birthing Suite Guideline"*

Prepared by: Dr Esther O'Sullivan, Endocrinologist

Authorised by: …….
Medication Safety Committee

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

EDMS # 2121097 Version 2.2 Date April 2023