TYPE 2 DIABETES MELLITIS (INSULIN AND/OR METFORMIN) – ANTENATAL, INTRAPARTUM AND POSTNATAL CARE

DEFINITION
Type 2 Diabetes is characterised by insulin resistance and relative impairment of insulin secretion leading to hyperglycaemia.

ANTENATAL CARE – BETAMETHASONE ADMINISTRATION
REFER TO: Insulin Infusion following Betamethasone Injections for Women with Diabetes in Pregnancy (C260117, Ref.6466)

MANAGEMENT FOR ALL ADMISSIONS
• Inform the Associate Charge Midwife Manager, Obstetric Team and Neonatal Registrar of the woman’s diabetic status.
• Ensure all current medications, including Insulin is charted on MedChart.
• Commence documenting blood glucose levels on the Antenatal Diabetes and Treatment Testing Form (Ref.8566) or Diabetes Testing and Treatment Form (Ref.2219).
It is important that despite self-monitoring and/or self-medicating, that all blood glucose levels and insulin doses are documented.

- Perform admission CTG as there is an increased risk of fetal hypoxia during labour.

**NOTE**
For women taking Insulin glargine (Lantus®) or detemir (Levemir®) halve the dose:
- a) If in spontaneous labour
- b) On the day of an induction of labour until birthed
- c) The evening prior to an elective caesarean section

**ELECTIVE CAESAREAN SECTION**
*(see Appendix A)*

**NOTE**
Women should be placed first on the theatre list.

- The normal evening insulin and/or metformin dose is given on the day prior to the elective caesarean section except for women on glargine (Lantus®) or detemir (Levemir®) where the dose should be halved the evening before.
- Withhold morning insulin and/or metformin on the day the woman is undergoing the elective caesarean section.
- Establish intravenous access and avoid giving glucose containing intravenous fluids except for Plasma-Lyte 148 + 5% glucose (obtain from supply not pharmacy).
- Monitor capillary blood glucose levels before surgery and then hourly and document on the Diabetes Testing and Treatment Form (Ref. 2219).
- If capillary blood glucose < 4 mmol/L or > 7 mmol/L commence intravenous Insulin / Plasma-Lyte 148 + 5% glucose infusion with hourly blood glucose monitoring (see Appendix C).

**INDUCTION OF LABOUR (IOL) OR SPONTANEOUS LABOUR**
*(see Appendix B)*

**PRIOR TO LABOUR ESTABLISHING**

- Continue usual insulin regime and/or metformin with meals until labour is established.
  
  For women taking insulin, glargine (Lantus®) or detemir (Levemir®) halve the dose on the day of the induction of labour and until birthed.

- Continue to monitor blood glucose levels and document on Antenatal Diabetes and Treatment Testing Form (Ref.8566).
ONCE LABOUR IS ESTABLISHED

- Discontinue subcutaneous insulin and/or metformin.
- The woman may eat – in this instance may require a small dose of subcutaneous insulin in consultation with the physician.
- Women may only drink water.
- Establish intravenous access. Take bloods for group and hold and CBC.
- Avoid dextrose containing intravenous fluids unless requiring infusions as below.
- Monitor capillary blood glucose levels hourly and document on the Diabetes Testing and Treatment Form (Ref. 2219).

  - If capillary blood glucose:
    - < 4 mmol/L – in a conscious patient this can be managed initially with Hypo-Fit (18 g carbohydrate). Give one sachet if weight < 90 kg or two sachets if weight ≥ 90 kg. Check capillary blood glucose after 10 minutes and repeat Hypo-fit treatment if required.
    - If no response after 30 minutes commence intravenous Plasma-Lyte 148 + 5% glucose infusion with hourly blood glucose monitoring (see Appendix C). Cease infusion when capillary blood glucose reading is above 5mmol/L and recheck capillary blood glucose at hourly intervals.
    - > 7 mmol/L commence intravenous Insulin/Plasma-Lyte 148 + 5% glucose infusion with hourly blood glucose monitoring (see Appendix C).

- Continuous electronic fetal monitoring (EFM).

POSTNATAL MANAGEMENT

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 remains unchanged.
- If the patient has blood glucose levels > 7 mmol/L after two consecutive readings, then double the infusion rate, i.e. return to the sliding scale for insulin used prior to birth (see Appendix C).
- If < 3.5 mmol/L, stop the insulin infusion and check capillary blood glucose level every 15 minutes until > 4mmol/L and hourly thereafter until eating and remain off insulin infusion.
- The insulin infusion is continued until the woman is ready to eat.
- The woman may be transferred to the postnatal ward after ceasing the insulin/Plasma-Lyte 148 + 5% glucose infusion.
- Contact the on-call physician if problems arise.

NOTE

Daily monitoring of electrolytes is required for infusions extending beyond 24 hours (risk of hyponatraemia and hypokalaemia).

Insulin infusions must be replaced every 24 hours.
For women NOT on an insulin infusion

- Monitor blood glucose 2 hourly and document on the Diabetes Testing and Treatment Form (Ref.2219).
- Once ready to eat, continue diabetic diet and monitor blood glucose before and after all meals.

FOR ALL WOMEN WITH TYPE 2 DIABETES

- Once eating, monitor blood glucose before and one hour after meals.
- Women on diet alone before pregnancy may not require additional treatment.
- Women taking metformin before pregnancy can recommence this day 2 postpartum.
- Women taking insulin before pregnancy will need consultation with the physician as insulin requirements vary in the immediate postpartum period.

REFERENCES

APPENDIX A  TYPE 2 DIABETES MELLITUS – ELECTIVE CAESAREAN SECTION INTRAPARTUM AND POSTNATAL MANAGEMENT

EVENING BEFORE CAESAREAN
- Normal insulin and/or Metformin dose
- If taking Glargine (Lantus®) or Determin (Levemir®) half dose

DAY OF CAESAREAN
- Withhold morning insulin and/or Metformin dose
- Establish IV access
- Avoid glucose containing IV fluids

- Hourly BSL measurements
- Document on Diabetes Testing and Treatment form (Ref. 2219)

  BSL < 4 mmol/L or BSL > 7 mmol/L

- Commence insulin/Plasma-Lyte 148 + 5% glucose sliding scale
- Continue to monitor blood glucose levels and document on Diabetes Testing and Treatment form (Ref. 2219)

  Has the woman birthed?

  YES

  - Halve the insulin infusion rate (Line 2) immediately after birth
  - Main Plasma-Lyte 148 + 5% glucose infusion (Line 1)

  - Hourly BSL measurements
  - Continue to document on Diabetes Testing and Treatment form (Ref. 2219)

  BSL > 7 mmol/L after two consecutive readings

  Increase insulin infusion rate used intrapartum

  BSL < 3.5 mmol/L

  Stop infusion rate
  Check BSL every 15 minutes until > 4 mmol/L

- Hourly BSL measurements
- Continue to document on Diabetes Testing and Treatment form (Ref. 2219)

  Is the woman eating?

  YES

  - Discontinue insulin infusion
  - Further treatment should be discussed with the physician
  FINISH

  NO

Ref. GLM0023
Type 2 Diabetes Mellitus (Insulin and/or Metformin) – Antenatal, Intrapartum and Postnatal Care

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Has labour been established?

- 1 hourly BSL measurements
- Continue to document on Diabetes Testing and Treatment form (Ref.2219)

BSL < 4 mmol/L

- In conscious patient manage initially with Hypo-Fit (18 g carbohydrate). If weight:
  - < 90 kg give 1 sachet
  - ≥ 90 kg give 2 sachets
- Check capillary blood glucose after 10 mins, repeat Hypo-fit treatment if required

BSL > 7 mmol/L

- Commence insulin/Plasma-Lyte 148 + 5% glucose sliding scale (Appendix C)
- Continue to monitor blood glucose levels, document on Diabetes Testing and Treatment form (Ref.2219)
- Cease infusion when BSL > 5 mmol/L

BSL < 4 mmol/L after 30 mins

- Commence insulin/Plasma-Lyte 148 + 5% glucose sliding scale (Appendix C)
- Continue to monitor blood glucose levels, document on Diabetes Testing and Treatment form (Ref.2219)
- Cease infusion when BSL > 5 mmol/L

Has the woman birthed?

- Halve the insulin infusion rate (Line 2) immediately after birth
- Maintain Plasma-Lyte 148 + 5% glucose infusion (Line 1)

BSL > 7 mmol/L after 2 consecutive readings

- Increase insulin infusion rate used intrapartum

BSL < 3.5 mmol/L

- Stop insulin infusion rate
- 15 min BSL until > 4 mmol/L

Is the woman eating?

- NO
  - Continue infusions

- YES
  - Discontinue insulin infusion
  - Further treatment should be discussed with Physician

Finish
APPENDIX C  INSULIN/PLASMA-LYTE 148 + 5% GLUCOSE SLIDING SCALE

INSULIN/PLASMA-LYTE 148 + 5% GLUCOSE SLIDING SCALE

- Two intravenous lines are to be sited. One for Insulin/Plasma-Lyte 148 + 5% glucose 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.
- The intravenous line for the Plasma-Lyte 148 + 5% glucose/insulin should be kept patent with a small amount of saline while the infusions are prepared.

Prepare the prescribed Insulin / Plasma-Lyte 148 + 5% glucose infusion as follows:

- The Plasma-Lyte 148 + 5% glucose is mainlined to the woman with the insulin infusion attached to the mainline via Y-site.
- Plasma-Lyte 148 + 5% glucose – mainline
  - Run one litre of Plasma-Lyte 148 + 5% glucose at a rate of 125 mLs per hour via an infusion pump. DO NOT ALTER.
- Insulin via Y-site on main line
  - Add 100 units Actrapid insulin using an insulin syringe to 100 mLs Saline and run via an Alaris infusion pump.
  - Run 10 mLs through the tubing before attaching the tubing to the mainline via the Y-site. This will prime the tubing and minimise subsequent binding of insulin to the plastic of the giving set.
  - The insulin is drawn up as directed by the Fluid and Medication Management Manual Volume 12 and checked by two midwives (one of whom must be intravenous certificated).
  - Run according to the Blood Glucose/Sliding Scale of Insulin Prior to Birth.

- Blood glucose should be checked immediately prior to starting the infusions and then hourly until the surgeon has directed the woman is ready to eat.
- Document blood glucose level on the Diabetes Testing and Treatment form (Ref.2219) and fluid input on the Fluid Balance 24-Hour Sheet (Ref.887).
<table>
<thead>
<tr>
<th>Capillary Blood Glucose Level (mmol/L)</th>
<th>Infusion rate in mLs per hour (units of Actrapid insulin per hour)</th>
</tr>
</thead>
</table>
| < 3.5                                | No insulin  
Increase the rate of Plasma-Lyte 148 + 5% glucose to 125 mLs/hour  
Check BSL every 15 minutes  
Call physician 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 physician for advice |