MEDICAL DISORDERS ASSOCIATED WITH PREGNANCY

DIABETES IN PREGNANCY

INTRAPARTUM MANAGEMENT OF TYPE 1 DIABETES MELLITUS – INCLUDES PLANNING FOR INDUCTION OF LABOUR/CAESAREAN SECTION

PURPOSE

Women with diabetes will maintain blood glucose control (4 – 7 mmol/L) during labour/Caesarean birth, to avoid hypo / hyperglycaemia.

KEY POINTS

- All women with TYPE 1 DIABETES require insulin and dextrose for labour or Caesarean section.
- All women with TYPE 1 DIABETES for induction of labour or caesarean section shall have the plan for their intrapartum and postpartum management discussed and documented on the MR 004 during antenatal clinic visits at 34 – 36 weeks.

PROCEDURE

INDUCTION OF LABOUR

- Measure Blood Glucose Level (BGL) at usual times until fasting.
- **Evening prior**
  - **Meal time treatment**
    Continue normal meal time insulin and diet until obstetrician determines fasting should commence.
  - **Night time treatment**
    Insulin:  Reduce night time insulin by 50% - usually insulin detemir *(Levemir)* or insulin glargine *(Lantus)* and less commonly humanised isophane insulin *(Protaphane or Humulin NPH)*.

- **With onset of fasting**
  - Commence IV Dextrose/ insulin infusion according to protocol (see below) if blood glucose level is greater than 7.0 mmol/l
  - The physician must be notified if an insulin infusion is commenced

- **Continuous Subcutaneous Insulin Infusion (CSII) Pumps**
  - Women with their own insulin pumps are to be individually managed by the physician. (See below)
  - The physician must be notified if a woman with an insulin pump is labouring.
In the event of unstable BGL’s, inability of patient to self-manage the pump or uncertainty or unfamiliarity with pumps, consider early conversion to intravenous insulin/dextrose infusion.

**ELECTIVE CAESAREAN SECTION**

- Book the woman’s Caesarean section first on the theatre list.

- **Evening Prior:**
  - Women with Type 1 diabetes should be admitted the evening before surgery in case of hypoglycaemia during overnight fast.
  - Measure BGL at usual times (fasting and 2 hours post meals) unless insulin infusion in progress.

- **Meal time treatment**
  - Continue normal meal time insulin and diet until fasting commences.

- **Night time treatment**
  - Insulin: Reduce night time insulin by 50% - usually insulin detemir (Levemir) or insulin glargine (Lantus) and less commonly humanised isophane insulin (Protaphane or Humulin NPH) (See MR 004)

**On Admission:**

- An intravenous cannula should be in situ once fasting commences in case of a hypoglycaemic episode during the overnight fast.
- No insulin infusion is necessary unless BGL is above 7 mmol/L two hours post evening meal.
- If BGL is below 7 mmol/L, leave the woman to sleep unless hypoglycaemia is suspected and check BGL next at 0600 hours.
- If BGL greater than 7 mmol/L commence IV Dextrose/ insulin infusion, as in INSULIN DOSE TITRATION (Table 1 on page 3).
- If BGL is 5 to 7 mmol/L, repeat at 0600.
- For women admitted on the day of surgery check BGL on admission and if BGL greater than 7 mmol/L, commence insulin/ dextrose infusion, as in INSULIN DOSE TITRATION (Table 1)

**SUBCUTANEOUS INSULIN PUMPS**

**Subcutaneous Insulin Pump use prior to and following caesarean section**

- Check BGL 2 hours prior to caesarean section and if < 8.0 mmol/L the woman should SUSPEND pump insulin delivery and DISCONNECT the pump from the sensor or remove line and sensor completely.

  **NOTE:** If BGL >8.0 mmol/L DO NOT SUSPEND the pump. Check with on-call Physician regarding continuing management plan.
• Check BGL and repeat each 30 minutes. IF BGL >7.0 mmol/L commence I.V Dextrose/insulin infusion according to Table 1.
• The woman should now set the pump basal rate to pre-pregnancy levels as already determined by the Physician (see MR 004).
• The woman should reconnect and restart the insulin pump once in theatre recovery area. Will need a new sensor and line if this has been removed (patient to supply).
• **NOTE:** If IV Dextrose/insulin infusion has been commenced **DO NOT RESTART SUBCUTANEOUS INSULIN PUMP.** Continue to follow IV Dextrose/insulin infusion protocol. Notify Physician.

**INSULIN INFUSION SET UP**

• Commence an **intravenous infusion of 10% dextrose at 50mL / hour** via an infusion pump once intravenous insulin is required - see INSULIN DOSE TITRATION –Table 1.

• **Potassium Chloride (KCl) supplementation is generally not required but may be commenced at the medical staff’s discretion.** Baseline serum potassium should be measured and rechecked if I.V therapy continues for more than 12 hours or patient is vomiting.

• Commence **50 units of Actrapid® (short-acting) insulin in 50mL of 0.9% Normal Saline** (i.e. 1 unit per mL) via a 50mL syringe pump, if required – see INSULIN DOSE TITRATION  Table-1.

• Titrate insulin dosage to BGL as shown in the Table 2.

**NOTE:** Before attaching the intravenous line, run the insulin / saline solution through the length of tubing twice to saturate the insulin binding sites on the plastic tubing.

This guideline is intended to apply on the morning of induction / caesarean section. Please note, this protocol SHOULD NOT be used in the event of a hyperglycaemic crisis such as ketoacidosis, coma or hyperosmolar hyperglycaemic syndrome. Instead, contact the on call physician or obstetric medicine registrar.
INSULIN DOSE TITRATION

This guideline is intended to apply on the morning of Induction / Caesarean section.

TABLE 1- RATE TO COMMENCE INSULIN INFUSION

<table>
<thead>
<tr>
<th>Blood glucose level</th>
<th>Rate of Insulin Infusion</th>
<th>Measure BGL in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 7 mmol/L</td>
<td>Withhold insulin</td>
<td>1 hours</td>
</tr>
<tr>
<td>7 to 8 mmol/L</td>
<td>1mL/hour (i.e. 1 unit/hour)</td>
<td>2 hours</td>
</tr>
<tr>
<td>Greater than 8 mmol/L</td>
<td>2mL / hour</td>
<td>1 hour</td>
</tr>
</tbody>
</table>
### TABLE 2 - RATE TO \textit{MAINTAIN} INSULIN INFUSION

<table>
<thead>
<tr>
<th>BGL IN MMOL/L</th>
<th>ACTION REQUIRED</th>
<th>FREQUENCY OF BGLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;15mmol/L</td>
<td>Give 4mL (=4 units) bolus. Increase infusion rate by 1mL (=1 unit) per hour.</td>
<td>Retest BGL in 1 hour. (If BGL remains &gt;15mmol/L notify Physician)</td>
</tr>
<tr>
<td>7-15mmol/L</td>
<td>Increase insulin rate by 1mL (= 1 unit) per hour. If &gt; 4mL (= 4 units) per hour, notify the physician on call</td>
<td>Retest BGL in 1 hour.</td>
</tr>
<tr>
<td>5-7mmol/L \textit{AND recent increase} to insulin infusion rate in the last hour.</td>
<td>Reduce insulin rate by 1mL (= 1 unit) per hour.</td>
<td>Retest BGL in 1 hour.</td>
</tr>
<tr>
<td>5-7mmol/L \textit{AND NO increase} to insulin infusion rate in the last hour.</td>
<td>Maintain infusion rate.</td>
<td>Retest BGL in 1 hour. If BGL stable for 3 hours, retest BGL 2 hourly instead.</td>
</tr>
<tr>
<td>4-5mmol/L</td>
<td>Halve insulin infusion rate.</td>
<td>Retest BGL in 1 hour.</td>
</tr>
<tr>
<td>&lt;4mmol/L</td>
<td>Stop Insulin infusion. Give 50mL bolus of 10% Dextrose IV. If still &lt;4 mmol/L, leave infusion off and consult with physician. If BGL 4-6 mmol/L leave infusion off. Once BGL &gt; 6.0 mmol/L, recommence infusion at \textit{HALF} the previous rate.</td>
<td>Retest BGL in 15 minutes. Retest BGL in 15 minutes. Retest BGL in 1 hour and follow Table 2 (if BGL remains &lt;4 mmol/L notify Physician)</td>
</tr>
</tbody>
</table>
POSTPARTUM MANAGEMENT OF TYPE 1 DM

On delivery of the placenta or soon after

• Decrease insulin infusion rate by 50% and continue as per INSULIN DOSE TITRATION until subcutaneous insulin is commenced with the first meal post-partum.
• Continue with intravenous 10% dextrose at 50 mL/hour until the first meal following the birth.
• Monitor BGL 2 hourly until subcutaneous insulin recommenced.

With the first meal i.e. full diet tolerated by the woman:

• Commence subcutaneous insulin as charted on the MR265. Contact the On Call Diabetes Physician if this is not charted or documented on the MR004.
• Maintain intravenous access for 4 hours.
• Return to 4 point BGL profile (fasting and 2 hours post each meal)

Ongoing management of diabetes mellitus

• Ongoing management for Women with type 1 DM should be with an Endocrinologist / Physician or Specialist Diabetes Team. Obstetric team RMO should confirm follow up arrangements prior to discharge.

REFERENCES (STANDARDS)