MANAGEMENT OF PREGNANT WOMEN WITH DIABETES WHO ARE IN-PATIENTS IN THE ROYAL INFIRMARY

Background
Management is different in different groups of women with diabetes.

Women with Type 1 Diabetes (previously termed insulin dependent diabetes mellitus or IDDM) have an absolute requirement for insulin and quickly become ketotic without insulin.

Women with Gestational Diabetes (GDM) have been diagnosed as diabetic during pregnancy and will be treated either with diet or diet and insulin. Ketoacidosis is unlikely but can be precipitated with betamethasone.

The Standard
The absolute requirement is that

- women are maintained with blood glucose between 4 and 8 mmol/l most of the time
- hypoglycaemia is avoided as much as possible
- no woman develops ketoacidosis
- the Diabetes and Obstetric teams are fully involved with the management

These guidelines give guidance only. The patient will always require careful clinical assessment. Management may differ from the guidelines in individual cases; indeed management will be individualised as much as possible to suit the needs of the individual woman.

In all women treated with intravenous fluids regular (at least daily) monitoring of U&Es and venous plasma glucose will be necessary and the addition of potassium to intravenous fluids will almost always be necessary.

Intravenous insulin is most easily administered by syringe driver. Add 50 units of ACTRAPID to 50ml of NaCl 0.9% in a 50ml syringe (1 unit per 1 ml), label and ‘piggy back’ into cannula with other infusions.
Advice is always available from the Department of Diabetes and these guidelines assume that all patients will be referred early so that appropriate advice may be given:

**Diabetes Registrar**

**Consultants Diabetologists:**

Dr Alan Jaap  
Bleep 5082  
Work phone 242 1483  
Home phone 447 5422

Dr Alan Patrick  
Bleep 5641  
Work phone 242 1474  
Home Phone 447 9402

**Consultants Obstetricians:**

Dr Claire Alexander  
Bleep 6400  
Work phone 242 2520  
Home phone 477 9582

Dr Hilary Macpherson  
Bleep 6565  
Work phone 242 2521  
Home phone 552 0627

**MANAGEMENT STRATEGIES DURING PREGNANCY**

*Women with Type 1 and Type 2 diabetes admitted during pregnancy for whatever reason*

In all women on admission

- check capillary blood glucose using Advantage™ meter and test urine for ketones
- If urinary ketones are present (moderate or large) **OR** blood glucose > 15 mmol/l inform diabetic registrar *immediately* and check venous plasma glucose and U and Es.
• If vomiting inform diabetic registrar immediately, check venous plasma glucose and U and Es and commence an i.v. infusion of N/Saline.

• Let diabetic registrar know of admission, they will see the patient and advise regarding management and alterations from the protocol below.

If **betamethasone** is to be administered then see separate guideline

*If able to eat normally then*

• Continue s/c insulin as usual and adjust doses as necessary

• Check capillary blood glucose (BG) 4 times daily (pre-breakfast, before each main meal and pre-bed)

• Target values are between 4 and 8 mmol/l most of the time

*If not able to eat normally*

• check BG 2 hourly initially – may be able to stretch to 4 hourly if stable

• start iv dextrose 5% 500ml 4 hourly

• start i.v. insulin by sliding scale (50 Units of Actrapid insulin in 50 ml of Normal Saline = 1 unit per 1 ml)

<table>
<thead>
<tr>
<th>BG (mmol/l)</th>
<th>Insulin infusion (Units actrapid/hour = ml/hour)</th>
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<tbody>
<tr>
<td>&gt;16.0</td>
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<tr>
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</tr>
<tr>
<td>7.0 - 8.9</td>
<td>2</td>
</tr>
<tr>
<td>5.0 – 6.9</td>
<td>1.0</td>
</tr>
<tr>
<td>3.5 – 4.9</td>
<td>0.5 (call Dr, the sliding scale may need revision)</td>
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</table>

*Women with Gestational Diabetes admitted during pregnancy for whatever reason*

In all women on admission

• check capillary blood glucose using Advantage™ meter and test urine for ketones
If urinary ketones are present (moderate or large) OR blood glucose > 15 mmol/l inform diabetic registrar immediately, check venous plasma glucose and U and Es and commence an i.v. infusion of N/Saline.

- If vomiting inform diabetic registrar immediately and check venous plasma glucose and U and Es.
- Let diabetic registrar know of admission, they will see the patient and advise regarding management and alterations from the protocol below.

If betamethasone is to be administered then see separate guideline.

If able to eat normally then

- Continue s/c insulin as usual if on insulin
- Check BG 4 times daily (pre-breakfast, before each main meal and pre-bed)
- Target values are between 4 and 8 mmol/l most of the time

If not able to eat normally

Call Diabetes Registrar on #6800.

MANAGEMENT STRATEGIES DURING PRE-LABOUR AND DELIVERY

Pre-labour

Try to maintain all women (Type 1, Type 2 and GDM) on their usual regimen for as long as possible with usual insulins and meals/snacks.
Test capillary blood glucose four times a day unless instructed otherwise.

During Delivery

In women having a normal vaginal delivery maintaining good glucose control (blood glucose levels between 4 and 10 mmol/l) with s/c insulin may be possible throughout
the labour HOWEVER if the labour is prolonged or the women vomits or is unkeen to eat then intravenous insulin will be necessary.

I.V. insulin using the sliding scale is necessary for Type 1 women if:

- the blood glucose exceeds 10 mmol/l or if unable to eat, or vomiting, and not later than 6 hours after their last short acting insulin injection

I.V. insulin using the sliding scale is necessary for Type 2 women or women with GDM if:

- the blood glucose exceeds 10 mmol/l during labour

In women with elective Caesarian section then i.v. insulin infusion should start at 0800 on the day of delivery

In women with emergency Caesarian section i.v. insulin infusion will begin immediately decision is made to operate.
Intravenous fluids (N/Saline/5% Dextrose) will need to be co-administered

After delivery

Insulin requirements fall immediately after delivery of the placenta thus all women will need less insulin and those with GDM no insulin.

For those who have been maintained on s/c insulin during labour

- Write up pre-pregnancy doses having discussed these with the woman concerned to agree doses and regimen

For those who have been maintained on i.v. insulin during labour

- Reduce insulin infusion rate after third stage by 50% initially
• Continue iv fluids as necessary
• monitor BG 2 hourly initially
• restart s/c insulin using pre-pregnancy doses when eating normally and
  OVERLAP with i.v. insulin infusion for AT LEAST 1 HOUR.

Remember insulin requirements fall dramatically after delivery of the placenta
and insulin doses will need to be reduced.
Women with gestational diabetes should require no insulin after delivery

GUIDELINE FOR ALL WOMEN WITH DIABETES IN PREGNANCY
RECEIVING BETAMETHASONE

Administration of betamethasone, while having beneficial effects on maturation of
fetal organs, in particular the lung, frequently precipitates ketoacidosis in women
with diabetes during pregnancy. This guideline applies to all women with Type 1
and Type 2 diabetes in pregnancy as well as all women known to have gestational
diabetes.

When betamethasone is to be administered:
• Check baseline U&E’s, plasma glucose and urinary ketones
• Inform Diabetes Registrar, Diabetes Consultant and Supervising Obstetric
  Consultant prior to administration of Betamethasone

After betamethasone has been given:
• The usual dose of s.c. insulin should be continued and i.v. insulin used to
  supplement this to maintain blood glucose levels between 4 and 8 mmol/l with
  no ketonuria or acidosis (serum bicarbonate should above 21 mmol/l at all
times).
• start insulin by sliding scale (50 Units of Actrapid insulin in 50 ml of Normal
  Saline = 1 unit per 1 ml)
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- Check for urinary ketones at each void
- Venous plasma glucose and U and Es to be checked every 6 hours
- BM 2 hourly
- Start iv dextrose 10% 500ml 4 hourly
- Additional i.v. Normal saline is usually necessary

The diabetes registrar will advise when infusions can be stopped (this is usually 24-48 hours after the betamethasone dose).

Protocol prepared by Alan Patrick and James Walker 1/10/01.
Updated by Alan Jaap 10/03