SIMPSON CENTRE FOR REPRODUCTIVE HEALTH
ROYAL INFIRMARY of EDINBURGH

Clinical Protocol

DIABETES IN PREGNANCY

Diabetes;
Management of GlycaemicControl in labour and in the antenatal period.

Document Information	
Title:	Diabetes: management of glycaemic control.
Review Date:	November 2005
Reference No:	Repromed 006
Description:	Current clinical guideline for glycaemic control in women with diabetes in labour and in the antenatal period.

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INDEX

MANAGEMENT OF PREGNANT WOMEN WITH DIABETES WHO ARE IN-PATIENTS

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. An increasing number of women are being seen with Type 2 Diabetes, especially in ethnic minority groups. These women are not insulin dependent but will almost all be on insulin in pregnancy.

Women with Gestational Diabetes (GDM) have been diagnosed as having diabetes during pregnancy and will be treated either with diet or diet and insulin. Ketoacidosis is very unlikely in this group, 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 available from the Department of Diabetes during the day and in the evening 7 days a week and these guidelines assume that all patients will be referred early so that appropriate advice may be given:

CONTACT NUMBERS

Diabetes Registrar **Bleep #6800**

The diabetes registrar is currently on call from 09.00-21.00weekdays and from 09.00-19.00 at the weekends. Outwith these times the SHO on call for Ward 207 should be contacted via switchboard. There is no diabetes on call rota at consultant level, but Dr Jaap and Dr Patrick will always be prepared to give advice if a available. If neither is available the on-call medical consultant can be contacted via switchboard

Dr Alan Jaap	Bleep 5082
	Work phone 242 1483
	Home Phone 447 5422
Dr AW Patrick	Bleep 5641
	Work phone 242 1474/1479
	Home Phone 447 9402

Consultant Obstetricians:

Dr Claire Alexander	Bleep #6400
	Work Phone 242 2520
Dr Corrine Love	Bleep #6320
	Work Phone 242 2524

MANAGEMENT STRATEGIES DURING ANTENATAL ADMISSION

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

In all women on admission

- check capillary blood glucose using a Capillary BG 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/ or advise regarding management and alterations from the protocol below.
- Inform on call obstetric senior registrar of admission. They will se the patient and inform the consultant obstetrician of admission

If **betamethasone** is to be administered then see separate guideline on page 9

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)

BG (mmol/l)	Insulin infusion (Units actrapid/hour = ml/hour)
>16.0	6 (test urine for ketones, call Dr, the sliding scale may need revision)
13.0 - 15.9	5
10.0 - 12.9	4
9.0 - 9.9	3
7.0 - 8.9	2
5.0 – 6.9	1.0
3.5 – 4.9	0.5 (call Dr, the sliding scale may need revision)

WOMEN WITH GESTATIONAL DIABETES ADMITTED DURING PREGNANCY FOR WHATEVER REASON

In all women on admission

- check capillary blood glucose using Capillary BG 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/or advise regarding management and alterations from the protocol below.

If **betamethasone** is to be administered then see separate guideline (page 9)

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 contact Diabetes Registrar as previously detailed.

MANAGEMENT STRATEGIES DURING LABOUR AND DELIVERY

Pre-labour e.g. following cervical priming with prostaglandins

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.

In Labour

In women in labour 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 not keen to eat or unable to eat due to risk factors precluding eating in labour (risk of GA etc) then intravenous insulin will be necessary i.e. most patients will require i.v. insulin

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 Caesarean section** then i.v. insulin infusion should start at 0800 on the day of delivery
In women with **emergency Caesarean 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 will no longer need any 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. Refer to yellow sheet in case notes/ICP for post natal management plan.

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 <u>eating normally</u> 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)

BG (mmol/l)	Insulin infusion (Units actrapid/hour = ml/hour)
>16	6 (test urine for ketones, call Dr the sliding scale may need revision)
13-15.9	4
10-12.9	3
7.0 – 9.9	2
5.0 – 6.9	1
4.0 – 4.9	0.5
<4	off (call Dr, the sliding scale may need revision)

- 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

- **If additional i.v. fluids are required then this should be Normal Saline.**

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

Protocol prepared by Dr Alan Patrick and Dr Claire Alexander. Sept 2005.

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