Royal Berkshire NHS
NHS Foundation Trust

Diabetes – Emergency Caesarean section or other unplanned surgery (GL822)

i.e. insulin dependent diabetic having unplanned surgery e.g. a diabetic woman with pre-labour SROM prior to elective Caesarean section.
N.B. Insulin dependent diabetic women having emergency surgery during labour are covered by the Diabetes – Labour guideline

Approval

Approval Group	Job Title, Chair of Committee	Date
Maternity & Children's Services Clinical Governance Committee	Chair, Maternity Clinical Governance Committee	3rd October 2014

Change History

Version	Date	Author, job title	Reason
1.0	March 2009	Pat Street (Consult Obs), D Graham (Diabetes Spec. Midwife)	Trust requirement
2.0	Sept 2010	Deirdre Graham, Diabetes Specialist Midwife	Change to admission process
3.0	July 2011	Deirdre Graham, Diabetes Specialist Midwife	Review due
3.1	May 2012	Deirdre Graham, Diabetes Specialist Midwife	Introduction of Trust wide drugs chart inc. new sliding scale
4.0	July 2013	Deirdre Graham, Diabetes Specialist Midwife	Review due
5.0	August 2014	Deirdre Graham, Diabetes Specialist Midwife	Changes to remove information covered elsewhere

Overview: *Insulin dependent diabetics require diabetes management during a period of fasting before unplanned surgery. A Variable Rate Intravenous Insulin Infusion**, (VRIII) is used. The required insulin dose is titrated against the measured blood glucose, with a constant IV infusion of glucose. Diet and Metformin controlled diabetics do not need a VRIII** unless their blood glucoses are consistently above 7.0 mmol/L.*

In this document, the abbreviation VRIII will be used in place of the term, insulin sliding scale and the abbreviation CSII will be used in place of continuous subcutaneous insulin infusion**

Prior to surgery

- Follow the 'Think Glucose' procedures
- A blood glucose must be done within 1 hour of admission
- Ensure the patient has her own insulin pens and blood glucose meter with her. If not, send a relative to get them
- The woman should be admitted to the Delivery Suite
- Site an intravenous cannula and take appropriate bloods, which should include a U&E
- The woman should be nil by mouth
- An insulin dependent woman should have a VRIII** started at the commencement of fasting
- The VRIII** should be ascertained to be working effectively and run together with the CSII for 30 minutes before the CSII is removed
- Ranitidine 150 mg orally should be prescribed and given 6 hourly with sips of water only

VRIII**

- IV glucose 10%, 500 ml with KCl 10mmol, running constantly at 100 ml/hour (pre-mixed bags mandatory)

through same cannula:

- Intravenous insulin, 50 units Soluble Insulin in 49.5 ml 0.9% Sodium Chloride.
- This is available on Delivery Suite in pre-filled syringes.
- Check the expiry date carefully as the shelf-life is short.
- In case of non-availability of a pre-filled syringe, 50 units of Actrapid or Humulin S (soluble Insulin) may be drawn up in an insulin syringe and mixed into 49.5 ml of 0.9% sodium chloride, drawn up into a 50 ml Luer lock syringe.
- The rate of insulin infused is dependent on the blood glucose results, as per the table below

Blood glucose (mmol/l)	Metered IV Insulin (units/hr)
4.0 or below	Stop insulin, measure blood glucose in 30 min
4.1 – 7.0	1.5
7.1 – 9.0	2.5
9.1 – 11.0	4
>11.0	6

- The VRIII** regimen is pre-printed on the hospital drug chart
- Check blood glucose hourly if spinal or epidural anaesthetic
- If general anaesthetic check blood glucose ½ hourly
- Aim to maintain the glucose levels between 4-7 mmol/L
- For insulin dependent diabetics, continue VRIII** until the woman is ready to be transferred back to subcutaneous insulin. (See below recommendation according to type of diabetes)

Post surgery in antenatal and postnatal women

- Check the blood glucose hourly while the VRIII** is in situ
- If the insulin dependent woman has not tolerated a proper meal by 19.00 hours, she should be kept on the VRIII** overnight
- Prior to allowing an insulin dependent woman to self-administer insulin, the Trust 'Self Administration of Insulin' protocol should be followed. (link to RBH protocol – self administration of insulin)
- The woman should not self-administer insulin unsupervised for at least 24 hours if she has received morphine or other narcotic analgesia
- If blood glucose unstable/woman vomiting or unwell due to other complications refer to the diabetes specialist midwife or the obstetric team.
- Maintain VRIII** until the woman is allowed to have, and able to tolerate, food and drink. It is simplest to transfer back to subcutaneous insulin at a regular meal time but this is not mandatory
- Give a carbohydrate-rich meal (2 slices toast minimum) and follow the appropriate guidance below, according to type of diabetes and whether the women remains antenatal or is postnatal

Antenatal **Insulin dependent woman on individual insulin injections**

- The current insulin doses will be recorded on the most recent antenatal clinic page of the Diabetes Care Record. The woman herself should know the appropriate dose
- After the subcutaneous insulin has been given, the VRIII** should be continued for a further ½ hour after which it can be stopped

Antenatal Insulin dependent woman on CSII

- As soon as convenient after the surgery, with the VRIII** running, ask the woman to re-site and start her CSII
- At the next meal time, the bolus dose can be given with/after the meal, if it has been tolerated.
- The woman will be carbohydrate counting and have a ratio of insulin units to carbohydrate intake to calculate her bolus doses.
- There must be an overlap of not less than 60 minutes between starting the CSII and stopping the VRIII**

***Antenatal* Metformin controlled woman**

If a VRIII** has been required for surgery, maintain this until Metformin can be reintroduced at the appropriate meal when the lady is able to eat and drink

Post surgery in *postnatal* women

***Postnatal* Gestational Diabetics**

- If used, the VRIII**, it may be stopped as soon as convenient after delivery of the placenta
- Blood glucose monitoring should be hourly in recovery and, if stable and not causing concern, can be reduced to pre-meals/bed
- Subcutaneous insulin and or Metformin tablets should be stopped postnatally
- Rarely a gestational diabetic may be suspected of having developed type 1 diabetes during the pregnancy. The woman will need careful postnatal blood glucose monitoring **on the Delivery Suite** to assess her diabetic status. Individual postnatal monitoring instructions and management will be written in the Diabetes Care Record on the Delivery Management page

***Postnatal* type 1 diabetics or type 2 diabetics on individual insulin injections pre-pregnancy**

- Appropriate postnatal subcutaneous insulin doses are normally written on the Delivery Management page of the Diabetes Care Record. The woman should also have a copy of these doses
- If the Delivery Management page of the Diabetes Care Record is not completed (usually due to premature delivery at <36 weeks), reduce the pre-pregnancy doses by 1/3 rd on the first post-partum day. The pre-pregnancy doses will be found at the top of page 2 of the Diabetes Care Record. The doses may be gradually increased to the pre-pregnancy levels over the following days, according to the blood glucose readings.
- After the subcutaneous insulin has been given, the VRIII** should be continued for a further ½ hour, after which it may be stopped

Postnatal **type 1 diabetics on CSII (insulin pump)**

- As soon as convenient after the surgery, with the VRIII** running, ask the woman to re-site and start her CSII
- The woman should lower the pre-pregnancy continuous infusion rate and the bolus doses by 1/3rd postnatally. This normally will have been discussed with her antenatally
- The woman will be carbohydrate counting and have a ratio of insulin units to carbohydrate intake to calculate her bolus doses.
- At the next meal time, the bolus dose can be given with/after the meal, if it has been tolerated
- There must be an overlap of **not less than 60 minutes** between starting the CSII and stopping the VRIII**

NB All insulin dependent diabetic women who are allowed to eat should have ready access to fast-acting carbohydrate at their bedside

Postnatal type 2 diabetics on Metformin or Glibenclamide only during and or before pregnancy

Bottle feeding

- If the woman has been on Metformin during the pregnancy, the full pre-pregnancy dose may be resumed.
- Some of these medications, particularly, Metformin and Glibenclamide can cause gastric upset and, if they have been stopped in pregnancy, need to be reintroduced at the minimum dosage, increasing according to gastric tolerance, until the pre-pregnancy dose is achieved

Breast feeding

- Metformin may be used by breast feeding women. The BNF does not state absolutely that Glibenclamide is contra-indicated but advice should first be sought from the paediatricians. See notes under bottle feeding regarding the reintroduction of Metformin and Glibenclamide and gastric tolerance
- Many anti-diabetic medications are not appropriate for breast-feeding women and, in the presence of raised blood glucoses, insulin may have to be used for those whose pre-pregnancy medication is inappropriate
- If insulin is required, recommended doses of subcutaneous insulin may be documented in the yellow Diabetes Care Record on the Delivery Management page. If in doubt refer to the diabetes specialist midwife or the diabetes medical team

Caution! Many anti-diabetic medications are not appropriate for pregnancy and consideration should be given to the likelihood of the woman becoming pregnant again. If another pregnancy is likely in the near future, insulin may need to be reintroduced. In this case referral to the diabetes medical team should be considered

Treatment of Hypoglycaemia (blood glucose less than 4.0mmol/L)

The following products are available to correct severe hypoglycaemia:

- 20% IV glucose bags on Emergency Crash Trolley with instructions
- Glucagon (in fridge) normally only required in unconscious patients

For mild hypoglycaemia:

- Glucogel (Hypostop) oral gel (in orange 'Hypo Box') patient must be conscious, able to swallow and allowed to eat

Postnatal Follow-up:

- The Diabetes Specialist Midwife will decided whether a woman needs a 6-week postnatal diabetes review at RBH
- Most women will be discharged back to the care of their GP, including insulin dependent diabetics whose care is normally managed by their GP
- In gestational diabetics, postnatal follow-up at RBH will be decided according to the postnatal blood glucose readings on the ward
- Prior to leaving hospital, gestational diabetics, not booked for an oral glucose tolerance test, will be given a form for a fasting plasma glucose, to be done at 5 weeks postnatal with the result to be given by the GP at their 6-week postnatal appointment
- Gestational diabetics who are thought to be developing type 2 diabetes will have an oral glucose tolerance test arranged for 5-weeks postnatal. A postnatal appointment will normally be given for 6-weeks postnatal to give the result but some women may be asked to attend their GP to be given the result. The oral glucose tolerance test will be arranged by the diabetes specialist midwife
- Women who normally attend the RBH Diabetes Centre for their diabetes care will be offered a 6 week postnatal appointment at RBH for a postnatal diabetes review

On admission, follow the 'Think Glucose' procedures and when appropriate the Self Administration of Insulin and Self administration of Medicines protocols
All admitted diabetic women should be commenced on a Maternity Blood Glucose monitoring chart (see link below) and given a small sharps container for their bedside

Click here for printable version of Maternity Blood Glucose monitoring chart - see Maternity Blood Glucose Chart V2 July 2007.doc

Auditable standards:

1. All diabetic women admitted to the maternity unit will have a blood glucose done within one hour of admission
2. All diabetic women admitted to the maternity will have a "think glucose" referral completed and sent to the diabetes specialist midwife within 1 hour of admission
3. All diabetic women admitted to the maternity will be commenced on a Maternity Blood Glucose Monitoring chart and be given a small sharps container for their bedside table

References

1. NICE Guideline Diabetes in Pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period NICE clinical guideline no. 63 March 2008 Available from http://nice.org.uk
2. Catherine Nelson-Piercy, Handbook of Obstetric Medicine 2002;82-99

Monitoring:

The audit team that will audit the above auditable standards will be formed by:

- A midwife and/or a doctor and/or a maternity support worker
- Audit and quality midwife
- A clinical audit facilitator

The audit will compare results with previous audits, if applicable. The audit will review documentation stated in the maternal health records as evidence of compliance with standards.

The audit will be completed prospectively or retrospectively:

- For first-time audits: within the first 9 months of each financial year
- For repeat audits: within the timeframe stated by previous audit's *risk priority*.

Plan following audit results **for all standards** audited, this would subject to earlier re-audit if concerns are raised from risk management about this particular area.

Results	Plan	Risk Priority
If < 75% compliance	Implement action plan and re-audit within 3 months from completion of report	1
If ≥ 75% compliance and results ≤ than previous audit (when applicable)	Implement action plan and re-audit within 6 months from completion of report	2
If ≥ 75% compliance and results ≥ than previous audit (when applicable)	Implement action plan and re-audit next financial year from completion of report	3

The results will be disseminated depending on the *risk priority.*

Risk Priority	Dissemination
1	Presented in at least one of the following meetings: Maternity Audit Forum, Maternity Clinical Governance, Morbidity & Mortality, Combined anaesthetic team, midwifery services meeting or local ward forums. Uploaded in Datix for staff and patients access RBHFT Maternity Newsletter Special measures identified in action plan
2	Presented in one of the above meetings Uploaded in Datix for staff and patients access RBHFT Maternity Newsletter
3	Uploaded in Datix for staff and patients access RBHFT Maternity Newsletter

The dissemination on results and implementation of action plans and timely re-audit will be coordinated by the Audit and Quality Midwife and reported to the Maternity Clinical Audit Committee on a monthly basis. This committee reports to Maternity Clinical Governance monthly