Worcestershire Acute Hospitals NHS Trust

Management of Women with Gestational Diabetes

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Key Documents Owner/Lead:	Athen Warren	Midwife
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Key Amendment

Date	Amendment	Approved by

Background:

A diagnosis of gestational diabetes is associated with an increased risk of fetal macrosomia, caesarean section, induction of labour, instrumental delivery, transient neonatal hypoglycaemia and increased risk of obesity and diabetes later in the baby's life (NICE, 2015).Up to 3% of women have pre-existing diabetes. Up to 50% of women may develop Type 2 diabetes within 5 years postpartum. Good glycaemic control throughout pregnancy reduces these risks but will not eliminate them.

Aim:

This clinical guideline aims to provide evidence based recommendations for the screening and management of Gestational Diabetes Mellitus (GDM) in order to achieve a pregnancy outcome in the diabetic that approximates to that of the non-diabetic pregnant women – St. Vincent declaration 1989.

These recommendations include guidance on:

- Screening criteria for GDM
- Interpretation of oral glucose tolerance test (OGTT) results
- Management of gestational diabetes – referral process to appropriate clinic
- Target ranges for glycaemic control and treatment thresholds
- The timetable of antenatal appointments to be offered to women with GDM
- The timing and mode of birth
- Intrapartum and postpartum care of women with gestational diabetes
- Neonatal care of babies born to gestational diabetic women

Guideline Scope:

This guideline applies to all women who develop gestational diabetes and who are booked and cared for by Worcestershire Acute Hospitals NHS Trust.

Definitions:

- Gestational Diabetes Mellitus is any degree of carbohydrate intolerance resulting in hyperglycaemia of variable severity with onset or first recognition during pregnancy.

- Multi-disciplinary Team (MDT): Consultant Obstetrician/Consultant Diabetologist, Diabetes link Midwife, Diabetes Specialist Nurse and Dietician.

Care Pathways

Screening:

At booking and all subsequent antenatal appointments, determine the need for an oral glucose tolerance test (OGTT). This test should be performed with a 75g-glucose load.

OGTT should be performed ideally at approximately 28/40, however if there is recurrent glycosuria prior to this then the OGTT must be performed earlier. The 75 gm of glucose is provided by Polycal in all the three sites. The OGTT can be performed up until 35^{+6} weeks. Depending on the urgency the OGTT can be performed in Day Assessment Unit (DAU) Trust wide if required.

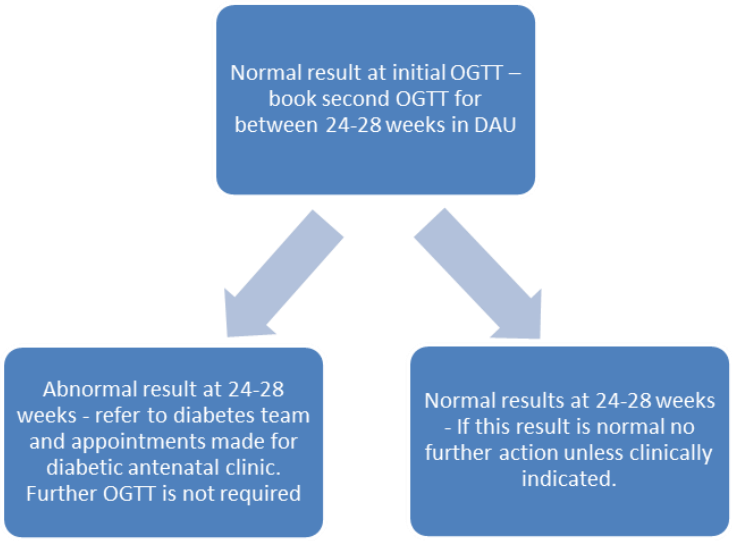
Indications for oral glucose tolerance testing:

- Glycosuria on more than one occasion /or Glycosuria of 2++ or more on one occasion.
- Suspected large-for-dates fetus confirmed by ultrasound measurement showing a fetal abdominal circumference >97^{th} centile (see individualised GROW chart) or polyhydramnios.
- First degree relative with a history of Type 1 or Type 2 diabetes (parent or sibling of the pregnant woman).
- Previous unexplained stillbirth.
- Maternal obesity BMI >30kg/m2
- Confirmed polycystic ovary disease.
- High risk ethnic group: Chinese, South Asia (India, Pakistan, Bangladesh), Black Caribbean or Middle East (Saudi Arabia, United Arab Emirates, Iraq, Jordan, Syria, Oman, Qatar, Kuwait, Lebanon, Egypt). People with dual heritage should not be offered an OGTT unless other risk factors exist.
- Previous baby >4.5Kg or >95^{th} Centile
- Polyhydramnios AND/OR fetal macrosomia >4000g or >95^{th} Centile an urgent screening for GDM should be arranged.

Women with previous gestational diabetes:

DAU referral for OGTT should be made to be performed as early as possible in the pregnancy. If the result is within normal parameters a repeat OGTT should be performed between 24-28 weeks which should be booked by DAU staff at time of first OGTT.

Abnormal results at initial OGTT refer to Diabetes Team and make appointments for Diabetic Antenatal Clinic. **A further OGTT is not required.**



Good practice states that all women with potential GDM should have a random glucose level prior to performing OGTT. Therefore this should be performed on the morning of the OGTT. If the blood sugar is >11.0mmol/l do not perform an OGTT. Refer urgently to the diabetic antenatal clinic.

Screening after 35+6:

- DO NOT perform an OGTT after 35+6 weeks gestation
- Women should be seen by the Day Assessment Unit at the respective site to establish CBG monitoring
- Women are asked to monitor their blood glucose levels for 3 days whilst continuing their normal diet
- Women will be advised who to contact within the respective sites with their results
- If ≥3 values above the target (see CBG monitoring form) assume the patient has GDM
- Arrange review by the MDT

Repeat OGTT:

- Generally, OGTT's should not be carried out more than twice in any one pregnancy. Individualised cases should be discussed with the Obstetric Consultant.
- Repeat OGTT should not be carried out within two weeks of the previous OGTT.
- Women, who present with persistent glycosuria **after 28/40**, having already completed at least two OGTT's for previous glycosuria, should not be offered further screening for GDM unless subsequent independent risk factors have developed.

Diagnosis of gestational diabetes via OGTT:

Women with a fasting venous blood glucose ≥5.6mmol/l or a 2 hour post prandial load ≥7.8 mmol/l should be referred to the Diabetes Antenatal Clinic.

Information for women on diagnosis:

Once identified as GDM, women should be given the following information so that they can make an informed decision regarding management.

- Some women will respond to changes in diet and exercise
- The majority of women may need oral hypoglycaemics or insulin therapy if changes in diet and exercise do not control blood glucose levels effectively
- If GDM is not controlled there is a small increased risk of serious adverse birth complications
- A diagnosis of GDM will lead to increased monitoring and may lead to increased interventions during pregnancy and labour
- Women who have had previous GDM are at risk (between 30-84%) of developing GDM in future pregnancies

Management and treatment for women with GDM:

- Following diagnosis refer to the diabetes link midwife.
- Discuss the implications of the diagnosis for the current pregnancy and recurrence in future pregnancies
- Advise on diet which is a crucial part of the management of women with gestational diabetes. Refined sugars and fatty foods should be limited and dietary fibre content increased. The aim is to have a moderate portion low glycaemic index carbohydrates.
- Women should be encouraged to take at least 30 minutes of exercise per day. A group session is held by the dietitians weekly on all sites to offer advice. Written information and contact details are given if further input is required.
- For women with diet GDM or on metformin commence 4x daily capillary blood glucose monitoring (i.e. before breakfast and 1hour after breakfast, lunch and dinner). Further monitoring depends on the individual patient and clinical needs.
- For women with multiple daily insulin injections test CBG 7 times per day (i.e. fasting, pre and 1 hour post each meal and at bedtime) (NICE 2015)

Ideal CBG target range is unknown in pregnant women with diabetes but the following can be used as a guide:

- **Pre-meal** **<5.3 mmol/L**
- **1 hour post-meal** **< 7.8 mmol/L**

When to start Metformin:

- Treatment should be offered to women following 1-2 weeks of lifestyle changes if the CBG targets are not met.
- If metformin is contraindicated or unacceptable, commence insulin.

When to start Insulin:

- Treatment should be commenced in those women for whom CBG readings remain outside the ideal target range despite appropriate lifestyle changes and trial of Metformin.
- If fasting glucose at OGTT is ≥7 mmol/L, offer immediate treatment with insulin (with or without metformin) in addition to lifestyle advice.

- Women with a fasting plasma glucose level between 6.0mmol/L and 6.9mmol/L, with complications such as macrosomia or polyhydramnios, insulin treatment, with or without metformin should be considered. Women who commence treatment immediately should be followed up in the Diabetes Antenatal Clinic
- **Insulin therapy should be decided by the diabetic team and tailored to the individual patient.**
- Explain that insulin will be discontinued post-delivery
- Insulin in hospital must be prescribed on the Maternity Trust CVRIII or subcutaneous insulin prescription chart as appropriate.

Hypoglycaemia

- Hypogylcaemia is defined as blood glucose level ≤4 mmols/L
- Women treated with insulin are at risk of hypoglycaemia during pregnancy. Nausea and vomiting contribute to this. Once insulin is commenced women should be informed of signs, symptoms and appropriate treatment of hypoglycaemia e.g. 15-20 grams of fast acting carbohydrate such as dextrose tablets/gel, orange juice or jelly babies. Follow Hypoglycaemia guideline WHAT-END-004.

Hyperglycaemia

- Hyperglycaemia is defined as blood glucose level of ≥7.8 mmols/L
- Women should be advised to avoid hyperglycaemia by appropriate diet and exercise. However, if the blood glucose levels are outside of target range they are advised to contact Diabetes Specialist Nurse.
- Women treated with insulin who become unwell or have persistent vomiting should be advised to seek urgent medical advice through Maternity Triage.

Obstetric management of women with GDM

Serial growth scans:

- These should be performed from 28 weeks (or from gestation of diagnosis) at approximately 4 weekly intervals.
- The frequency of these may be increased according to individual circumstances.

Monitoring fetal movements:

- **Women must be advised to monitor the baby's movements and the associated or reduced fetal movements with stillbirth.**
- **Women should urgently telephone and attend triage if there are any concerns. Women should be offered CTG monitoring and review via Triage.**

Corticosteroids for Suspected Preterm Delivery
Corticosteroids should be offered to women with GDM to aid fetal lung maturation if:

- Spontaneous delivery is likely to occur prior to 34+6 weeks gestation
- Prior to elective section performed earlier than 39 weeks gestation
- Or if patients have co-existent IUGR up to 35+6 weeks gestation

All women with GDM (diet/medicated) requiring steroids should be admitted to the antenatal ward for monitoring. Blood glucose should be monitored 2 hourly and if there are two consecutive readings of more than 7.0mmol/L a Continuous Variable Rate Intravenous Insulin Infusion (CVRIII) should be commenced.

Betamethasone (12 mg, 2 doses 12 hrs apart) is the steroid of choice if unavailable Dexamethasone (9.9mg 2 doses 12 hours apart) can be used.

Giving steroids:

- Administer Steroid and check Blood Glucose level
- Check blood glucose 2 hourly
- If blood glucose above 7.0mmol/L repeat after 1 hour
- If remains above 7mmol/L commence CVRIII
- If blood glucose below 7.0mmol/L continue 2 hour monitoring
- Monitoring should continue for 12 hours post second steroid administration

Plan for Birth:

- The mode of delivery should be reviewed at 36 weeks (or sooner if indicated).
- If diet controlled, without maternal or fetal complications delivery should be achieved no later than 40^{+6} (NICE 2015).
- Consider earlier delivery if any other metabolic complications.
- If the mother is insulin controlled or on Metformin aim for delivery by 38+6 weeks.
- If a woman on insulin or metformin chooses to continue her pregnancy beyond 39/40 weeks they should be made aware that there are no reliable tests to reassure regarding fetal wellbeing.
- Women should be advised to monitor fetal movements very carefully and to report any change in the usual way. An individualised care plan should be made by the supervising Consultant obstetrician.

Induction of Labour:

- If appropriate, continue normal subcutaneous insulin regime until in established labour and then manage diabetes as for spontaneous labour.

- If IV oxytocin is commenced following ARM a separate cannula must be inserted if a CVRIII is required.

- In women with GDM diagnosed after 36 weeks by 3 day monitoring, induction of labour should be planned with consultant input. The timing of the induction of labour depends on the scan findings and other associated clinical findings. These women are advised to continue to monitor

their blood glucose levels until delivery. When they are induced for high blood glucose with or without, macrosomia these women should be treated as somebody who is on treatment for glycaemic control.

Intrapartum care:

Management of glycaemic control in labour for women with diet controlled GDM or for those on Metformin

Labour Event	Diet and Medication	Care Plan
Induction of labour	Diet Controlled - To have normal diet. Metformin treated - Continue Metformin as per prescription and normal diet.	4x daily capillary blood glucose monitoring - Before breakfast and 1 hour after food.
Early labour (spontaneous onset/ IOL)	Diet Controlled - To have normal diet and mobilisation Metformin treated - Continue Metformin as per prescription and normal diet.	4x daily capillary blood glucose monitoring. Before breakfast and 1 hour after food.
Established labour After ARM in IOL	Diet Controlled - Avoid solid diet, encourage oral fluid intake + / - IV fluids Metformin treated - Omit if not eating solid diet.	Hourly capillary blood glucose levels (CBG) should be performed. Aim to maintain CBG levels between 4-7 mmol/L. If a CBG is >7 mmol/L, recheck after 30 minutes. A CVRIII and glucose regime is needed if capillary blood glucose levels >7.0mmol/L on 2 consecutive occasions 30 minutes apart.
Immediate post-partum	If commenced stop CVRIII following the delivery of the placenta. Encourage to eat and drink normally.	No need for further Capillary blood sugar checks. This baby may be at risk so follow neonatal pathway for babies WHAT-KD 015
Discharge	No further blood sugar monitoring.	Explain increased risk of type 2 diabetes in later life and advice regarding diet exercise and weight loss. Ensure GP aware to perform either a fasting glucose level or HbA1c at 6-12 weeks postpartum. Discuss contraception

Management of glycaemic control in labour for women with GDM on insulin (Also for non-medicated GDM women who are being induced for high blood sugars/macrosomia)

Labour Event	Diet and Medication	Care Plan
Induction of labour	Insulin treated GDM should have a normal diet and continue insulin as prescribed in pregnancy.	7x daily capillary blood glucose monitoring (fasting, i.e. before breakfast, pre-meal for every meal, 1 hour post-meal for every meal, and prior to bedtime).
	Non-medicated GDM (IOL for unstable blood glucose/ macrosomia) provide normal diet.	Before breakfast and 1hour after food.
Early labour (spontaneous onset)	Insulin treated GDM should have a normal diet and continue insulin as prescribed in pregnancy	7x daily capillary blood glucose monitoring (fasting, i.e. before breakfast, pre-meal for every meal, 1 hour post-meal for every meal, and prior to bedtime).
	Non-medicated GDM (IOL for unstable blood glucose/ macrosomia) should have a normal diet.	7x daily capillary blood glucose monitoring (fasting, i.e. before breakfast, pre-meal for every meal, 1 hour post-meal for every meal, and prior to bedtime).
Established labour (or after ARM in IOL)	Insulin treated GDM: • Avoid solid diet • Encourage oral fluid intake + / - IV fluids • Continue to administer their subcutaneous intermediate or long acting insulin. • Omit the short acting insulin.	Hourly capillary blood glucose levels (CBG) should be performed. Aim to maintain CBG levels between 4-7 mmol/L. If a CBG is >7 mmol/L, recheck after 30 minutes. A CVRIII and glucose regime is needed if capillary blood glucose levels >7.0mmol/L on 2 consecutive occasions 30 minutes apart.
	Non-medicated GDM (IOL for unstable blood glucose/ macrosomia) • Avoid solid diet, • Encourage oral fluid intake + / - IV fluids	Hourly capillary blood glucose levels (CBG) should be performed. Aim to maintain CBG levels between 4-7 mmol/L. If a CBG is >7 mmol/L, recheck after 30 minutes. A CVRIII and glucose regime is needed if capillary blood glucose levels >7.0mmol/L on 2 consecutive occasions 30 minutes apart.
Immediate post-partum	Stop CVRIII following the delivery of the placenta if it had been commenced. No further insulin treatment. Encourage to eat and drink normally.	No need for further Capillary blood glucose checks. Baby may be at risk - follow neonatal pathway for babies WAHT-KD 015
Discharge	No further insulin treatment	Explain increased risk of type 2 diabetes in later life and advice regarding diet exercise and weight loss. Ensure GP aware to perform either a fasting glucose level or HbA1c at 6-

		12 weeks postpartum. Discuss contraception

Titration of blood glucose during labour with CVRIII

- Use the **Maternity** Trust CVRIII prescription regime
- Aim for blood glucose between 4-7mmol/L
- If less than 4 stop the CVRIII manage as per hypoglycaemic pathway
- If CBG ≥7 mmol/L commence CVRIII on regime 1 with hourly CBG checks
- Aim to keep the CBG's <7
- If >7 mmol/L after 4 hours commence regime 2
- If after a further 4 hours CBG still >7 mmol/L commence regime 3
- Seek medical review if CBG's >11mmol/L and perform urinalysis for ketones

Women with GDM requiring elective Caesarean Section (C/S)

- When women require C/S for obstetric indication, the timing of caesarean section depends on growth scan, glycaemic control and treatment for GDM.
- Aim to offer elective C/S from 39 weeks gestation for women with **diet control GDM** with good glycaemic control and no evidence of maternal or fetal compromise. Delivery should be achieved no later than 39+6 weeks to minimise the risk of spontaneous labour.
- Elective C/S should be offered 38 -38^{+6} weeks gestation for women with **GDM who are on treatment** (i.e. Metformin or Insulin).
- Steroids should be offered to aid fetal lung maturation if a C/S is being planned prior to 39 weeks gestation
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Plan of care for women with GDM when they undergo caesarean section

El. C/S	Diet controlled or Metformin treated GDM	• Admit on the day of surgery • Aim for woman to be first on the list • Fast from 2am • Take usual dose of Metformin with evening meal if prescribed. • Omit Metformin dose (if prescribed) on the morning of the surgery • Record capillary blood glucose on admission. If fasting CBG is >7.0 mmol/L a CVRIII should be commenced.
	Insulin treated GDM	• Admit over night to ANW • Aim for woman to be first on the list • Fast from 2am • Take usual dose of intermediate or long acting insulin on the night before surgery • On the morning of surgery omit all insulins • Check capillary blood glucose hourly in the morning • If CBG >7.0 mmol/L commence CVRIII • If <7mmol/L monitor and record CBG hourly until delivery
Emergency C/S	Diet controlled or Metformin treated GDM	• May need CVRIII if CBG >7mmol/L in labour (see above) • Stop CVRIII after delivery • Ensure good hand over between the recovery staff and the postnatal midwife.

	Insulin treated GDM	• May need CVRIII if CBG >7mmol/L in labour • Stop CVRIII after delivery • Ensure good hand over between the recovery staff and the postnatal midwife

Duties and Responsibilities:

- All pregnant women should be encouraged to take control of their care and enjoy their pregnancy
- Members of the MDT should work in partnership with women.
- Women should be involved in decisions about their care and offered the opportunity to make informed choices through the provision of appropriate information.

Obstetrician should:

- Document previous medical and obstetric history
- Discuss and document an individual management plan for pregnancy, delivery and the post-natal period in the hospital case notes and also in the hand held notes.
- To communicate to the woman the details of the likely timetable of antenatal appointments, including maternal and fetal assessments.
- Review home blood glucose monitoring
- To communicate to the woman the risks of gestational diabetes to her and her pregnancy and confirm the targets for glycaemic control
- To discuss risks for future development of Type 2 Diabetes and the need for preconception care when planning future pregnancies.
- Ensure an individual plan of care is made to include maternal assessment, fetal assessment, treatment required, and frequency of investigations and timings of reviews. This should be clearly documented both the hospital and hand held notes.
- Arrange ultrasound scans (USS) to monitor fetal growth and well-being.
- Discuss the timing and mode of birth, including induction of labour, caesarean section, analgesia and anaesthesia with the woman.
- Book admission date for induction of labour. This should be after a full discussion with the woman and after gaining her consent; the woman should be provided with an induction of labour information leaflet and contact details.
- Advise on the importance of lifestyle changes to reduce the risk of developing type 2 diabetes for both the women and her baby in later life.

Diabetes Link Midwife should:

- Contact the women after initial diagnosis and arrange for appointment with DSN and dietitian.
- Provide information on the diagnosis and the plan of care that will commence.
- Perform full antenatal check at each visit and document
- Carry out antenatal care as specified by the Diabetes Multi-disciplinary Team (MDT)
- Refer to DSN or Obstetric Team if concerns regarding a woman's glycaemic control occur.
- Educate/ensure patients are disposing of sharps correctly and correct sharps disposal equipment is given.

- During third trimester to discuss benefits and importance of hand expressing breast milk. Antenatal hand expressing packs to be given.

Dietitian should:

- Review patient at earliest opportunity after diagnosis
- Agree plan of care regarding dietary changes with patient.
- Provide ongoing advice to the woman as required.

Diabetes Team (Diabetes Specialist Nurses and Consultant Endocrinologist) should:

- Give education on home blood glucose monitoring and provide equipment.
- Review home blood glucose monitoring
- To communicate with the woman the targets for glycaemic control
- Advise women treated with insulin the risks of hypoglycaemia and hyperglycaemia unawareness in pregnancy.
- Decide if/when to initiate insulin and /or metformin and review regimen and titrate doses as necessary.

Postnatal Care

Management of Mother:

- Review any postnatal plan documented in orange notes.
- All women should stop all diabetes medications and blood glucose monitoring postnatally
- If pre-existing diabetes is suspected plan of management to be advised by Diabetes Specialist Nurse.
- On discharge by community midwife, explain the benefits of low fat, low sugar, high fibre diet, exercise and avoidance of weight gain in terms of reducing maternal risk of future diabetes. Recommend early booking in future pregnancies.
- The GP should be informed about the need for 6 weeks postnatal glucose checks which can be either a fasting blood glucose or HbA1c performed 6-12 weeks postnatally. Annual glycaemic checks must be organised in primary care.

Management of Baby:

- Follow neonatal guideline on monitoring babies at risk of hypoglycaemia WAHT- KD 015
- Babies of women with diabetes should feed as soon as possible after birth (within 30 minutes) and then at frequent intervals no longer than 3 hours
- If not fed maternal hand expression should be encouraged if mother's choice is to breast feed

Breastfeeding and Diabetes:

- Infants of women with diabetes in pregnancy are at increased risk of hypoglycaemia, admission to a neonatal intensive care unit (NICU) and not being exclusively breastfed
- Early feeds are recommended and Colostrum can stabilise infant glucose concentrations more effectively than infant formula milk

- Mothers with diabetes should have a discussion with a midwife about infant feeding and the importance of giving breast milk
- Cows' milk (the main ingredient of formula milk) can trigger diabetes in some babies; therefore it is very important that mothers who are diabetic avoid giving their baby formula milk if at all possible, until the baby is at least 6 months old
- Worcestershire acute trust encourages exclusive breast milk for these babies
- A midwife in the antenatal period should discuss the importance of the hand expression of colostrum **after 36 weeks** or before if the mother is being induced
- Mothers with diabetes should receive a copy of 'Diabetes and feeding your baby' (Xerox code WR1940) and given an expression pack. The mother will be shown by a staff member how to hand express and store her colostrum

Considerations:

The antenatal expression of colostrum may be **contraindicated** in the following circumstances and should be considered on an individual basis:

- History of threatened premature labour
- Cervical incompetence
- Multiple pregnancies
- Cervical suture in situ

If she has gestational diabetes she is less likely to go on to develop diabetes in later life if she breastfeeds her baby.