Gestational Diabetes Mellitus Guideline

Guideline information

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Summary of document:
Guidelines for management of Gestational Diabetes mellitus. The guideline provides guidance to all health professionals in the care provision for women and birthing people who develop diabetes in pregnancy within all locations of Hywel Dda University Health board.

Scope:
Designed to set out quality care guidelines for identification of GDM by screening and guidance on the management of women and birthing people who develop diabetes during pregnancy to support clinical decisions.

Please Note: The guidance below uses the term 'woman' (pronouns she or her) to describe individuals whose sex assigned at birth was female, whether they identify as female, male or non-binary. It is important to acknowledge it is not only people who identify as women for whom it is necessary to access women's health and reproductive services. Therefore, this should include people who do not identify themselves as women but who are pregnant or have recently given birth. Obstetric and Midwifery services and delivery of care must therefore be appropriate, inclusive and sensitive to the needs of those individuals whose gender identify does not align with the sex that they were assigned at birth.

To be read in conjunction with:
Adult Diabetic ketoacidosis (DKA) care bundle
Neonatal hypoglycaemic guidance

Patient information:
Include links to Patient Information Library

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1.0 – New Guideline

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Management of Gestational Diabetes Mellitus, Diabetes in Pregnancy

Glossary of terms

ANC	Antenatal Clinic
ARM	Artificial Rupture of Membranes
BG	Blood Glucose
BMI	Body Mass Index
CBG	Capillary Blood Glucose
CGM	Continuous Glucose Monitor
CTG	Cardiotocography
DKA	Diabetic Ketoacidosis

DSM	Diabetic Specialist Midwife
DSN	Diabetic Specialist Nurse
DVLA	Driver and Vehicle Licencing Agency
EDD	Estimated Due Date
EBM	Expressed Breast Milk
FBG	Fasting Blood Glucose
GDM	Gestational Diabetes Mellitus
GA	General Anaesthesia
GP	General Practitioner
IOL	Induction of Labour
IV	Intravenous
MLC	Midwife Led Care
MW	Midwife
OGTT	Oral Glucose Tolerance Test
PCOS	Polycystic Ovary Syndrome
TSH	Thyroid Stimulating Hormone
U&E	Urea & electrolyte
VE	Vaginal Examination

Contents

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Aim

The aim of this document is to:

- To provide guidance to all health professionals in the care provision of women with diabetes in pregnancy within all locations of Hywel Dda University Health board

Objectives

The aim of this document will be achieved by the following objectives:

- To identify GDM in patients with risk factors at booking, or where features of concern develop.
- To give optimum care to women with diabetes during pregnancy through monitoring of maternal and fetal well-being.
- To make appropriate decisions regarding timing and mode of birth, taking maternal preferences into account.
- To support management of glycaemic control when pregnant patients with diabetes are admitted to the obstetric unit.
- To offer support to patients regarding infant feeding choices and to reduce the incidence of neonatal hypoglycaemia.
- To advise and support the diabetes patient in making choices and decisions to optimise their long-term health.

Target Personnel

All staff involved in the care provision of diabetes in pregnancy within Hywel Dda University Health Board.

Introduction

The pregnancy of patients with diabetes is considered ‘high risk’ and therefore most of the antenatal care will be in the hospital setting. However, these patients should continue to receive routine care with their community midwife. Diabetes increases risks during and after pregnancy for mother, fetus and new-born. For this reason, this is a multidisciplinary document involving Obstetric, Diabetology, Neonatology and Midwifery staff. The incidence of GDM has increased in recent years and is considered a result of higher rates of obesity in the general population and increased pregnancies in older patients.

Diabetes in pregnancy is associated with risks to the patient and to the developing fetus-

- Pre-term birth
- Macrosomia
- Induction of labour or caesarean birth
- Birth trauma to mother and baby
- Stillbirth
- Pre-eclampsia
- Transient neonatal morbidity
- Neonatal death
- Obesity and/or diabetes developing later in the baby's life
- Diabetes developing after a diagnosis of GDM

Organisation of Antenatal Care Provision by Multidisciplinary Team

Patients with confirmed GDM should be offered contact with the multidisciplinary specialist team comprising of Consultant Obstetrician, Consultant Diabetologist, Diabetes Specialist Midwives (DSM), Diabetes Specialist Nurses (DSN) and Diabetes Specialist Dietician (DSD).
DiabetesSpecialistMidwives.hdd@wales.nhs.uk

Screening for Gestational Diabetes Mellitus (GDM)

GDM is defined as any degree of glucose intolerance with the onset or first recognition during pregnancy. GDM occurs in a pregnant patient who does not already have diabetes, often developing in the 2nd trimester of pregnancy.

A progressive insulin resistance develops during pregnancy due to the effects of hormones produced by the placenta. The aim is to reduce the amount of glucose that is absorbed by the maternal cells so that the growing fetus has enough 'fuel' for development. GDM develops when pancreatic β cell function is not sufficient to overcome the increased insulin resistance. Following birth, we expect GDM to disappear.

Any pregnant patient can develop GDM but the chance of developing GDM is higher for some patients if they have certain risk factors.

Risk Assessment

At the booking appointment, a risk assessment for GDM should be carried out. If one or more of the following criteria are met, then testing for GDM should be offered.

- Previous history of GDM or history of Type 2 DM in remission/Pre-diabetes (These women require early GTT)
- BMI >30 kg/m^2 at booking
- Previous macrosomic baby weighing > 4.5kg or babies >97th centile of personalised growth chart
- First degree relative with diabetes (sibling or parent)
- Family origin with a high prevalence of diabetes:
    - South Asian (specifically women whose country of family origin is India, Pakistan or Bangladesh)
    - Afro - Caribbean
    - Middle Eastern (specifically women whose country of family origin is Saudi Arabia, United Arab Emirates, Iraq, Jordan, Syria, Oman, Qatar, Kuwait, Lebanon or Egypt)

- Polycystic ovarian syndrome (PCOS)
- Women on antipsychotic medications

Midwife at viability/dating scan to book Oral Glucose Tolerance Test (OGTT) between 24 – 28 weeks in women with risk factors and provide information on having an OGTT (See appendix 1).

Certain risk factors for GDM may only become apparent during the pregnancy. Once identified the appropriate screening test should be undertaken within 5 working days irrespective of gestation if under 34 weeks gestation.

These factors include:

- Glycosuria of 2+ or more on 1 occasion or 1+ on 2 occasions
- Fetal macrosomia >4.5kg or estimated fetal weight from USS > 97th centile of personalised growth chart
- Polyhydramnios (moderate/severe)

Criteria for mild, moderate, and severe polyhydramnios

	Mild	Moderate	Severe
Single deepest pocket	8.0 to 11.9 cm	12.0 to 15.9 cm	≥16.0 cm
Amniotic fluid index	24.0 to 29.9 cm	30.0 to 34.9 cm	≥35.0 cm

Patients with Previous GDM

Patients who have had GDM in a previous pregnancy and in patients with type 2 diabetes in remission or pre diabetes the OGTT should be performed at the earliest opportunity in the pregnancy before 16 weeks of gestation. Alternatively, the patient can choose to commence a week of capillary blood glucose (CBG) monitoring following dating scan.

If OGTT or week of testing is normal, these patients are encouraged to have a repeat test between 24 and 28 weeks.

Patients with one or more Risk Factors for GDM at Booking should be Offered OGTT as follows

- Between 24 – 28 weeks
- Patients on metformin for non-diabetes reasons (e.g., PCOS) should stop metformin for 5 – 7 days prior to OGTT.
- Patients having/had high dose of steroids for fetal lung maturity should postpone the OGTT by one week for a reliable result.
- Patients who are unwell or unable to eat and drink normally (e.g., due to vomiting) should have their OGTT delayed, as the result will not be reliable, until they have a minimum of 3 days of normal diet.

OGTT can be repeated if risk factors develop during the pregnancy. There should be a 4-week interval between tests and no more than two OGTTs performed during a pregnancy.

Patients who have had gastric bypass surgery (excluding gastric band) should not be offered an OGTT. Instead, it is advised to refer to the diabetes team for a week of CBG. Testing after the dating scan, but < 16 weeks gestation. Consider positive for GDM if raised fasting blood glucose or >3 abnormal post

prandial readings. If levels not consistent with GDM repeat between 24- 28 weeks to enable a decision on diagnosis. Ensure referral to dietetics is made at dating scan as specialised nutrition advice and monitoring is required.

OGTT's at a later Gestation i.t, after 34 weeks

Patients with features suggestive of diabetes at or after 34 weeks should **not** have an OGTT as the test is not validated at this gestation.

The following options could be considered:

- **Preferred option-** HbA1c (>39 mmol/mol) along with Fasting Blood Glucose (>5.3mmol/L).
- Or
- Referral to DSM for a period of blood glucose monitoring to enable a decision on diagnosis. Consider positive for GDM if raised fasting plasma glucose or > 3 abnormal post prandial readings.

If 2 OGTT completed at intervals are reported as normal and the risk persists, discuss with the DSM prior to conducting further screening tests.

Non Attenders

Patients who do not attend for their OGTT should be contacted by telephone or letter to discuss rescheduling the appointment.

Complications of undiagnosed and untreated diabetes within pregnancy should be discussed.

Should the test be declined – documentation to be completed in the All Wales handheld notes and on hospital identification pregnancy notes.

Procedure for OGTT

The midwife booking the test will ensure the patient is made aware of the instructions for the OGTT:

- Normal diet on day preceding test.
- No food, smoking, chewing gum or antacids from 10p.m the night before the test.
- Plain water only may be consumed.
- Discuss regular medication with your Health Professional, it is likely you will be required to stop medications prior to the test to gain a valid result.

The Midwife/Phlebotomist/Midwifery Support Worker Will

- Ensure the patient has followed the instructions prior to the test: -
    - Unrestricted diet 3 days prior to the test.
    - No medications taken prior to this test that could cause a false positive result.
    - Overnight fasting from 10p.m the night before the test, only plain water consumed.
- Offer information about the test and obtain verbal consent.
- Collect fasting blood glucose sample in a grey top fluoride oxalate blood bottle and label it with the patient's details including the time.
- Give the patient 75g anhydrous glucose, which is the equivalent to 113mls of Polycal liquid, diluted with water to a total volume of 200mls. This is followed 5 minutes later by a further 100mls of water.

- Inform the patient not to eat, drink or smoke until the second blood test.
- Inform the patient to rest and preferably remain in the Hospital/clinic during the test.
- Collect a second blood glucose sample in 2 hours' time and label it with the patient's details including the time.
- Patients must be advised that should the result of the OGTT indicate raised glucose levels, a diagnosis of GDM would be made. Contact will be made informing of the result by either DSM/Midwife within 48 hours of the test.

Interpretation of OGTT

Diagnose GDM if the patient has either/both:

- A fasting plasma glucose of ≥ 5.6mmol/l or
- A 2-hour plasma glucose level of ≥7.8mmol/l

Immediate same day referral to diabetes specialist midwives

- Fasting plasma glucose > 10mmol/l
- Random plasma glucose > 14mmol/l
- Presence of ketones (capillary ketones >0.6mmol/l)

Management of GDM

Offer patients with a new diagnosis of GDM a review with the DSM within 1 week of obtaining the results and refer to Obstetric Led Care.

At First Visit

First

1. Discuss with the patient both the long and short-term implications a diagnosis of GDM has to them and their baby and that good glycaemic control throughout pregnancy will reduce the risks of-
    - Fetal Macrosomia
    - Induction of labour
    - Caesarean Birth
    - Birth Trauma (Fetal and Maternal)
    - Neonatal Hypoglycaemia
    - Perinatal Death
2. Provide Hywel Dda UHB GDM information booklet (appendix 2).
3. Teach the patient about self-monitoring of CBG levels. Patients will be required to test fasting and one hour post each meal (post prandial) levels with the following CBG targets-
    - Fasting Blood Glucose (FBG) <5.3mmol/L.
    - Post prandial blood glucose levels at one hour <7.8mmol/L (two hour post prandial target below 6.4mmol/L).
        - Patients who are on multiple daily insulin injection regimes may be required to test additional times, pre-meal in addition to post-meal and bedtime CBG levels.
4. HbA1c should be taken to exclude pre-existing diabetes (>48 mmol/mol)

Ongoing care

1. Review CBG levels on a 1 – 2 weekly basis, telephone or face to face.
2. Where diet/lifestyle changes fail to achieve the above glycaemic levels, initiate the appropriate oral hypoglycaemic/insulin treatment.

Treatment

- FBG <7mmol/l at diagnosis with no other risk factors, consider trial of changes in diet and exercise.
- FBG of between 6.0 and 6.9mmol/l at diagnosis with complications such as macrosomia or polyhydramnios, consider immediate treatment with insulin, with or without metformin, including changes with diet and exercises.
- FBG ≥7.0mmol/l, consider immediate treatment with insulin, with or without metformin, including changes with diet and exercise.

Medications must be tailored to individual blood glucose profiles and the personal preferences of the patient with GDM.

- Patients who are on multiple daily doses of insulin may be offered intermittently scanned continuous glucose monitor (isCGM / Flash) or real time continuous glucose monitor (rtCGM) if problematic hypoglycaemia occurs or they have unstable blood glucose levels that are causing concern.

Metformin
Consider starting metformin if blood glucose targets are not being met using changes in diet and exercise within 1-2 weeks.

Offer insulin therapy if metformin is contraindicated or declined by the patient.

Offer insulin in addition to metformin, diet and exercise if blood glucose levels remain above target.

Hypoglycaemia safety measures – Metformin
Metformin does not cause hypoglycaemia.

Patients with a CBG of <4mmol/L while being treated with metformin alone should be reassured that this is normal, and the body will itself be able to raise the BG back into normal range without specific treatment for hypoglycaemia.

If the patient is feeling symptoms, such as dizziness, hunger, trembling or tiredness along with a CBG <4mmol/L, again they should be reassured but advised to eat a small snack. There is no requirement to repeat testing if symptoms resolve.

Insulin
Consider treatment with insulin, with or without metformin, for patients who have a FBG level of ≥7mmol/l at diagnosis, or if blood glucose targets are not being met using changes in diet or exercise within 1 week.

Hypoglycaemia safety measures – Insulin
Advise all patients started on insulin of hypoglycaemia safety.

Discuss the signs and symptoms of hypoglycaemia and advise patients to test their CBG level in these situations.

A CBG of <4 mmol/L is considered hypoglycaemia and needs to be treated with a suitable fast acting carbohydrate. At home this could be either 5 jelly babies or 200mls of Lucozade. Advise patients to have these available at all times. In hospital, follow the hypoglycaemia pathway.

A CBG should be repeated after 15 mins to ensure BG level has risen above 4mmol/L. If still <4mmol/L the treatment should be repeated until a CBG level above 4mmol/L is achieved.

Once above 4mmol/L a slow acting carbohydrate should be consumed to maintain BG levels.

Driving
Advise patients with insulin treated diabetes to –

- Inform the DVLA if insulin is used to treat their diabetes for 12 weeks or more.
- Inform their insurance company that they have been commenced on insulin.
- Check their BG level before driving. If <5mmol/L a snack should be eaten before driving.
- Test at least every 2 hours on long journeys.
- Not to drive if BG < 4mmol/L or if they feel hypoglycaemic.

Fetal Echo Referral (Welsh Criteria, January 2021)

- GDM patients on insulin, prior to, and at the time of Anomaly scan gestation, are eligible for a referral to Fetal Medicine for a fetal echocardiogram.

Fetal Growth and Wellbeing

Arrange ultrasound monitoring of fetal growth and amniotic fluid volume every 4 weeks from 28 to 36 weeks.

Provide an individual approach to monitoring fetal growth and wellbeing for patients with diabetes at risk of fetal growth restriction.

Routine monitoring of fetal wellbeing (fetal umbilical artery Doppler, fetal heart rate recording and biophysical profile) before 38 weeks is not recommended unless there is a risk of fetal growth restriction.

Antenatal Admission

- During medical or obstetric admissions, diabetes/obstetric team should be informed at the earliest opportunity.
- If admitted unwell in pregnancy assess to exclude DKA (Commence Diabetes in pregnancy in-patient care bundle. Appendix 3)
- If admitted with threatened pre-term labour and steroids are prescribed, then increased CBG monitoring and review for additional insulin will be required. Diabetes and insulin are not a contraindication to steroids.

Antenatal Corticosteriods to Aid Fetal Lung Maturity

- **Offer** antenatal corticosteroids to patients presenting with suspected preterm labour before 34^{+6} weeks gestation.
- **Consider** antenatal corticosteroids if planned caesarean birth between 35 and 36^{+6} weeks gestation.

- **Do not** routinely offer antenatal corticosteroids for planned caesarean birth between 37 and 38^{+6} weeks gestation.

The decision around steroid administration for patients with diabetes needs to be individualised. The use of steroid therapy for lung maturation can substantially increase insulin requirement and place these patients at risk of developing DKA. Therefore, although diabetes should not be considered a contraindication to having antenatal corticosteroids, careful consideration needs to be given to ensure that the intended benefits will outweigh the effects of glycaemic impairment.

An informed discussion with the patient about the risks and benefits of steroid therapy needs to take place prior to administration.

Intravenous Insulin Infusion Preparation

Please see Diabetes in Pregnancy Inpatient Care Bundle for guidance on preparing and intravenous insulin infusion.

Timings and Mode of Birth

- Obstetrician to discuss timing and mode of birth with patient during antenatal appointment around 36 week's gestation.
- Birth by 40^{+6} weeks is recommended for GDM patients treated with diet or Metformin and no other pregnancy complications.
- Consider birth between 37^{+0} and 38^{+6} for patients treated with insulin or if other risk factors are also present.
- Consider planned caesarean birth after 38^{+0} weeks for women with complicated GDM (poor glycaemic control, on insulin treatment, evidence of macrosomia and other risk factors for fetal growth restriction).
- All patients with GDM treated with insulin are advised to birth in the Obstetric Unit at Glangwili Hospital.
- All patients treated with diet and / or metformin can choose to birth in Glangwili Hospital or Bronglais Hospital.
- The national guidelines do not recommend home birth/MLU for labour/birth for patients with GDM. A referral to birth choice clinic is required if a patient requests this option.
- Offer monitoring of fetal wellbeing (using methods such as fetal umbilical artery Doppler recording, fetal heart rate recording), if pregnancy is continued beyond 38 weeks in patients with complicated GDM or beyond 41 weeks in women with uncomplicated GDM.

Colostrum Harvesting and Breastfeeding

Colostrum harvesting and breastfeeding should be discussed and encouraged in all women with GDM from 36 weeks gestation.

Breastfeeding has long and short-term benefits for both mother and baby.

Mother

- Reduced chance of breast cancer and ovarian cancer.
- Reduced risk of developing type 2 diabetes.

Baby

- Improved mother and baby bonding.
- Improves normoglycaemia more effectively than formula milk.
- Protection against infection and necrotising enterocolitis.
- Improved intelligence and lifestyle achievements.
- A reduction in the rate of obesity in childhood and adolescence.
- A reduction in type 2 diabetes in childhood, adolescence and adulthood.
- A reduction in the risk of type 1 diabetes.

Induction of Labour

Patients with GDM should be booked for IOL as a high priority case, reducing the chance of being delayed.

On admission, follow routine IOL protocol.

During IOL

- FBG and 1 hour post prandial CBG levels need to be monitored using hospital Glucometer. Targets – FBG <5.3mmol/l, 1 hour post prandial <7.8mmol/l.
- All diabetes medications to continue. Patients should be encouraged to continue to self-administer their medications.
- Patients can eat and drink as normal. Advised patients that they can order a low carb 'diabetes breakfast' when placing food order.

Intrapartum Care

- Commence Diabetes in Pregnancy Inpatient Care Bundle.
- Patients can eat and drink as normal during labour.
- **Stop Bolus insulin** (mealtime) **and Metformin** once in established labour or when active management has begun.
- **Continue Basal insulin** (long acting) throughout labour.
- Monitor CBG levels hourly on hospital Glucometer and document on the CBG monitoring chart. The target CBG range during labour is 5 - 8 mmol/l. If CBG ≥11.0mmol check blood ketones (BK). If BK >0.6mmol/L follow DKA guidance in the care bundle.
- If GA is required for birth, CBG must be tested at 30-minute intervals until patient has regained full consciousness.

Planned Caesarean Birth (AM Surgery)

Once booked for planned caesarean birth the DSM will advise the patient about medication administration prior to surgery.

- **Metformin**- should be taken as usual the day before surgery.
- **Bolus Insulin**- should be taken as usual with meals the day before surgery.
- **Basal Insulin-** should be taken as usual the night before surgery.

Patients are advised to be NIL BY MOUTH from 10pm the night before surgery. Once NMB, no further diabetes medications should be administered.

On Admission

- Commence Diabetes in Pregnancy in-patient care bundle (appendix 3).
- Check CBG within an hour of admission. Target parameters 5 - 8mmol/L.
- CBG <5mmol/L but >4mmol/L, recheck CBG in one hour.
- CBG <4.0mmol/l, treat as per hypoglycaemic pathway (in care bundle).
- CBG >8.0mmol/L on 2 consecutive occasions with a 30-minute interval, treat with variable rate intravenous insulin infusion (VRIII) as per Diabetes in pregnancy in-patient care bundle.
- If GA is required for birth, CBG must be tested at 30-minute intervals until patient has regained full consciousness.

Neonatal Care

To help avoid neonatal hypoglycaemia, aim for maternal CBG to be maintained between 5 - 8mmol/L during labour and birth.

- Babies of patients with diabetes should be cared for on the obstetric postnatal ward.
- Diabetes in pregnancy carries the risk of hypoglycaemia, respiratory distress syndrome, polycythaemia, jaundice and hypothermia in the neonate.
- Babies should be fed within an hour of birth and the hypoglycaemia pathway guidance commenced.
- Advise patients that breast milk restores normoglycaemia more effectively than formula milk.
- Observation of the clinical and neurological status should be documented.

Postnatal Care

On birth of the placenta follow guidance in the Diabetes in Pregnancy in-patient care bundle (appendix 3).

Information and Follow Up After Birth

- All patients should be offered a postnatal assessment of glycaemia to determine whether glucose tolerance has normalised (women are provided with a FBG request to be performed with their practice nurse and reviewed in primary care).
    - FBG <6.0mmol/l (HbA1c<39mmol/mol or 5.7%) - moderate risk of future type 2 diabetes – recommended to follow lifestyle advice and have an annual test for diabetes.
    - FBG 6.0 - 6.9mmol/l (HbA1c 39 – 47 mmol/mol or 5.7 – 6.4%) - high risk of future diabetes, recommended to follow lifestyle advice and have an annual test for diabetes.
    - FBG 7.0mmol/l or above (HbA1c 48 mmol/mol, 6.5% or above) - likely to have diabetes and needs a diagnostic test for confirmation.
- All patients should be offered an annual HbA1c in primary care.
- Inform patients of their increased risk of developing type 2 diabetes in the future and explain this risk can be reduced by lifestyle changes i.e., diet, exercise and weight control.
- All patients will be provided with the Baby steps App – walking yourself away from type 2 DM.
- Provide patients with information of the increased risk of GDM in future pregnancies.
- Offer self-referral to DSM in consecutive pregnancies.
- Discuss contraception and the risks of uncontrolled diabetes to pregnancy.

Auditable Standards:

Appropriate referral for screening for Gestational Diabetes for women identified to be at an increased risk

References

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