

**MATERNITY UNIT
GUIDELINE:**

INSULIN THERAPY IN GESTATIONAL DIABETES

AUTHOR:

Diabetes in pregnancy working group

SCOPE:

Obstetricians, midwives and nurses working in antenatal clinic, community and maternity unit.

PURPOSE:

To provide guidance on appropriate insulin therapy during pregnancy for women with insulin dependent diabetes.

DEFINITIONS:

GESTATIONAL DIABETES MELLITUS (GDM)

GDM is defined as “any degree of glucose intolerance with onset or first recognition during pregnancy”. The definition applies whether or not insulin is used for treatment or hyperglycaemia persists after pregnancy. It does not exclude the possibility that unrecognised glucose intolerance may have predated the pregnancy.

GDM occurs in 1 to 14 percent of all pregnancies, depending on the population and diagnostic criteria used. It is associated with significant risk of maternal and perinatal complications.

GDM is more likely to be present if there is a history of:-

- Obesity
- Previous large babies
- Previous GDM
- Previous unexplained perinatal loss, miscarriage and premature deliveries.

Glucose tolerance often returns to normal after birth, but there is a high risk of subsequently developing type 2 diabetes (up to at least 50 percent).

TYPE 1 DIABETES

Type 1 diabetes is of auto-immune or viral aetiology with other environmental and genetic factors involved. Incidence of type 1 diabetes peaks in childhood and in the elderly. It usually presents acutely. Islet cell antibodies, IA2 antibodies and/or glutamic acid decarboxylase (GAD) antibodies are often present. Individuals with type 1 diabetes cannot produce adequate insulin levels and consequently are dependent upon insulin injections to control their blood sugar. If their blood sugars are not controlled they are at risk for coma and death.

TYPE 2 DIABETES

The cause of type 2 diabetes remains unknown although an inherited predisposition and lifestyle factors such as obesity contribute. It is more common for members of families with a history of diabetes. However, it is less likely among those of European descent. There is a general increase in the prevalence of **Type 2 diabetes worldwide. Type 2 diabetes is associated with significant morbidity and mortality.** The goal of treatment is to prevent long term complications and symptoms of diabetes.

Women with type 2 diabetes are frequently first diagnosed with this condition during pregnancy. It can be difficult to differentiate between gestational diabetes and previously undiagnosed type 2 diabetes. A definitive diagnosis can only be made after delivery.

Women with type 2 diabetes may be able to control their blood sugars with diet alone but most will also need oral medications and/or insulin. The pancreas produces insulin however the cells are resistant to the action of insulin. Consequently they often need oral medications to sensitize them to insulin, such as Metformin or Glibenclamide, or insulin itself. They rarely suffer from DKA though it is not impossible.

GUIDELINE:

If insulin therapy is required in pregnancy it should be managed under the supervision of the diabetes physician, Diabetes Team e.g. Diabetes CNS and obstetrician involved in the Antenatal Clinic (ANC), with education/review of the diabetic diet by the dietitian.

Review by the diabetes team/Diabetes CNS/Obstetrician will be made in the following situations: -

1. Laboratory fasting plasma glucose >5.5mmol/l.
2. Laboratory post-prandial glucose >6.5 mmol/l.
3. Mean home blood glucose monitoring = 6.0 mmol.
4. Advancing macrosomia.
5. Those women who are only just maintaining acceptable blood glucose levels, by low dietary intake resulting in weight loss or inadequate weight gain.

The woman will be under secondary care as a level 3 referral and should be seen regularly by the physician, obstetrician and diabetic educator.

COMMENCING INSULIN

The type of insulin and dose are individualised to each woman.

Adjustments in the doses are based upon the results of blood sugar level (BSL) monitoring which is documented in the record book by the woman and/or downloaded from their glucose meter.

Insulin resistance increases as the pregnancy proceeds, therefore requiring an increase in insulin dose. Intensive therapy using up to 3-5 injections per day is usually required to maintain blood glucose levels at 4 - 6.5mmol. The insulins most commonly used are a combination of:

- Novorapid and PROTOPHANE
- Humalog and Humulin N
- In some cases Lantus/Glargine as per Diabetes team.

These are given at the following times:

Before breakfast : short acting and intermediate acting insulin.
 Before lunch and dinner : short acting insulin.
 Before bed (about 10pm) : intermediate acting insulin and long acting insulin.

A small starting dose of insulin is recommended, tailored to the need of the patient e.g.

	Breakfast	Lunch	Dinner	Bed
Novorapid/Humalog	2 -6	2-6	2-6	
Protophane/Humulin N/Lantus				2-6+

From this small starting dose the insulin is titrated by 2+ U/day until good glycaemic control is achieved. Initially this increase may be on a daily basis under the direction of the Diabetes Team or Diabetes CNS. Communication with the woman is by frequent phone calls, email, text or clinic visits as required.

MONITORING IN PREGNANCY

Some women, particularly those with Type 1 diabetes, will require greater tailoring of their insulin to carbohydrate consumption, and therefore require intensive counselling for carbohydrate counting to improve glycaemic control, [with a recommended g of carbohydrate per unit of insulin, often commencing at 10g: 1 unit and to glucose excursions ("correction factor" of extra insulin for mmol/l above target glucose often commences at 1unit:2mmol/l)]. Appointments with the dietitian should be made according to individual requirements.

Even when good glycaemic control is achieved, increases in insulin will still be required as the pregnancy progresses due to increasing insulin resistance.

Towards the end of the pregnancy, **a sudden reduction in insulin requirements may indicate pending placental failure.**

ALL episodes of hypoglycaemia need to be assessed by the diabetes nurse educator in order to implement insulin or lifestyle changes or for further education for the woman to treat hypoglycaemia effectively.

ASSOCIATED DOCUMENTS:

All Hauora Tairawhiti Maternity specific diabetic guidelines

REFERENCES:

Acknowledgement to ADHB Diabetes in Pregnancy (2013)

Acknowledgements to Auckland Women's Hospital Diabetes Guidelines (2013)

Acknowledgements to Waikato District Health Board Diabetes Guidelines (2012)

Ministry of Health (2014) Guidance for Healthy Weight Gain in Pregnancy

Ministry of Health (2014) Screening, Diagnosis and Management of Gestational Diabetes in New Zealand

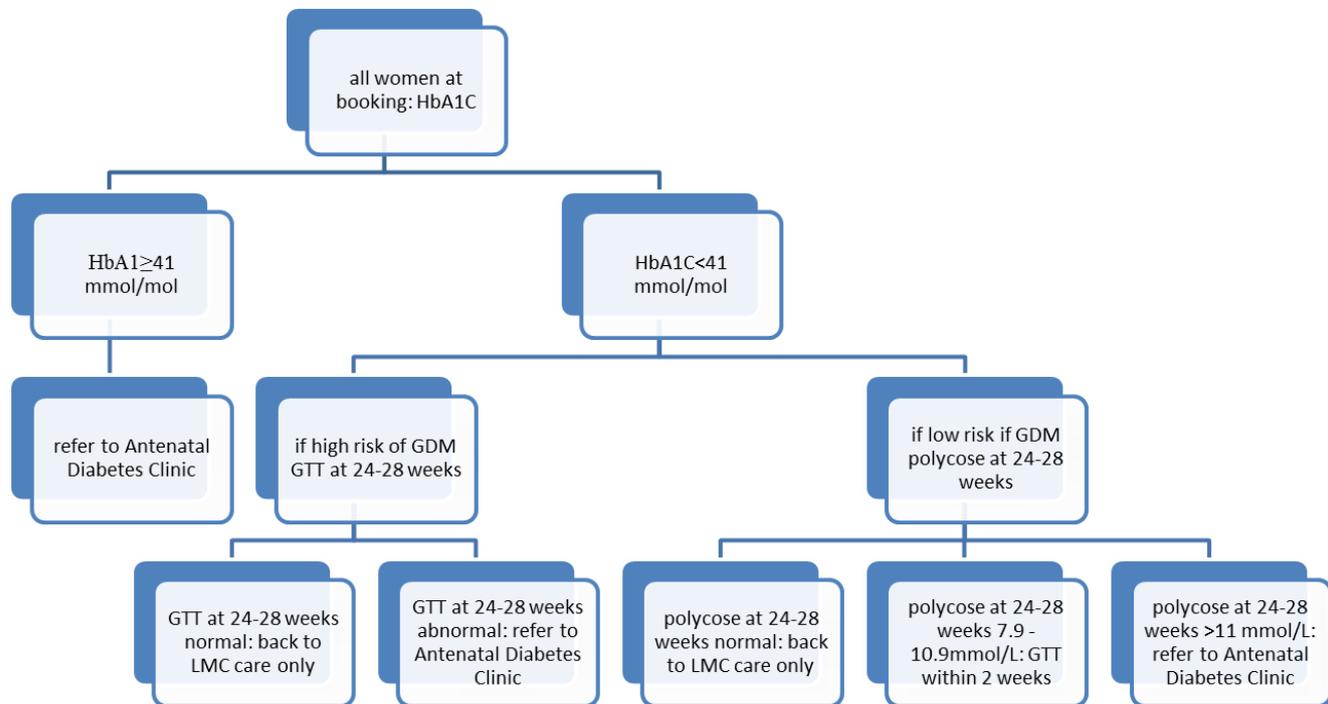
EVALUATION:

By audit for compliancy.

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Appendix 1: Screening for Diabetes in Pregnancy Flowchart



Risk Factors for Diabetes (adapted from ADHB flowchart):

- Previous GDM
- Previous macrosomia
- Age >40 years
- Morbid obesity (Indian/Asian BMI ≥ 32, Polynesian BMI ≥ 37, everyone else BMI ≥ 35)
- PCOS
- Glycosuria
- Two 1st degree relatives with diabetes
- On antipsychotic medication or prednisone

Ctrl and Click on link below for a larger view of the flowchart above.

[Screening for Diabetes in Pregnancy Flowchart](#)

Appendix 2: Treatment of hypoglycaemia

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18. Resources for midwives caring for women with diabetes

a) Hypoglycaemia

This protocol is for women who are treated with insulin and or sulphonylureas (e.g. glibenclamide). If a woman is treated with diet or metformin alone she is not at risk of hypoglycaemia and does not require treatment.

- i. Firstly document that the woman does have hypoglycaemia. If she has symptoms, hypoglycaemia should be confirmed with a blood glucose reading:
 - Blood glucose < 3.5 mmol/l (< 4.0mmol/l for woman with type 1 diabetes)
 - Symptomatic – e.g. sweating, dizziness, rapid heart rate, shaking, anxiety, weakness/fatigue, confused, irritability, hunger, pins and needles of lips and tongue, impaired vision, headache (she may have some or all of these symptoms)

Occasionally women on insulin have hypoglycaemia documented but no symptoms. It should still be treated especially in women with type 1 diabetes who sometimes lose their symptoms of hypoglycaemia. Instead they may present with feeling suddenly very tired or yawning a lot, mild confusion or inability to concentrate, or irritability. Severe hypoglycaemia can present if the woman is difficult to rouse, or if she is unconscious or fitting. Severe hypoglycaemia is an emergency and help should be summoned as an emergency.

- ii. If able to manage oral treatment:
 - 3 or 4 glucose tablets or woman may have her own glucose treatment that she may prefer (e.g. 6 - 8 jelly beans, small juicebox etc, aim 15g sugar)
 - Repeat blood glucose every 15 minutes and repeat glucose tablets if necessary until blood glucose > 4 mmol/L
 - More recent evidence suggests treating hypoglycaemia is most effective if 0.3g/kg of glucose is given initially. If glucose reading is in low 2s or lower, giving a double dose of glucose initially is recommended
- iii. If unable to swallow and cooperate with oral treatment:
 - Ask a colleague to phone for doctor assistance
 - Give Glucagon 1 mg IM. This takes 10 minutes to work but may avoid need for IV treatment
 - If has luer in situ, may be asked to give 100 - 150 mL of 10% IV dextrose
 - Aim to site luer if not already sited
- iv. Once blood glucose above 3.5 - 4.0mmol/l, the woman should have small snack with complex carbohydrate and protein e.g.:
 - Crackers/cheese
 - Glass of milk
- v. Then if meal time and woman recovered, the woman should have meal and usual insulin unless dose adjusted by doctor.

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[Treatment of hypoglycaemia](#)