

Shared care: Gestational diabetes

BACKGROUND Gestational diabetes (GD) is a common problem in pregnancy with potentially serious adverse outcomes for the baby. The diagnosis also identifies women at increased risk of subsequently developing type 2 diabetes.

OBJECTIVE The uncertainty surrounding the level of glucose intolerance that should be treated as GD is highlighted. Strategies for screening are discussed, and the public health importance of GD as identifying women at increased risk of developing type 2 diabetes is raised and discussed. A simple strategy for the delivery of these interventions to women with a past history of GD is outlined.

DISCUSSION Gestational diabetes offers an ideal opportunity to identify one high risk group at risk of developing type 2 diabetes. Type 2 diabetes can be prevented or delayed in high risk groups by attention to weight control, exercise and by modifying other risk factors. This can be effectively and efficiently done through primary care, however, monitoring follow up of women is the challenge.

Gestational diabetes (GD) is a common, potentially serious complication of pregnancy. The controversy which exists around its diagnosis relates to the threshold of glucose intolerance in pregnancy that should be labelled and treated as GD.¹ At present, an Australian study funded by the NHMRC (ACHOIS: the Australian Carbohydrate Intolerance in Pregnancy Study) and a multinational study funded by the NIH (HAPO: Hyperglycaemic Adverse Pregnancy Outcomes) are addressing this issue. These studies, funded by national research organisations, indicate the diagnostic threshold for GD is uncertain and that no evidence based position can be justified at this time. At the Royal North Shore Hospital (RNSH) we use the consensus criteria from the 4th International Workshop Conference on Gestational Diabetes Mellitus (Table 1).

The argument surrounding the need to treat milder degrees of glucose intolerance should not obscure the idea that more severe degrees of glucose intolerance (ie. hyperglycaemia which

Table 1. Criteria* for the diagnosis of gestational diabetes

Time	Venous plasma glucose (mmol/L)
Fasting	5.3
1 hour postprandial	10
2 hours postprandial	8.6

* 2 or more values must be met or exceeded

would be diagnosed as diabetic outside of pregnancy) are harmful in pregnancy and associated with adverse fetal outcomes.² In nonmodern obstetric practice lesser degrees of GD are associated with increased perinatal mortality.^{2,3}

Screening

The arguments surrounding diagnostic threshold should not stand in the way of screening to detect more severe cases. Even in the presence of severe hyperglycaemia, most cases cannot be detected by

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Table 2. Risk factors that identify women as at higher risk of gestational diabetes

Obesity	BMI ≥ 30
Age	≥ 35 years
Previous glucose intolerance	Any abnormality in glucose metabolism
Family history	Type 2 diabetes in first degree relative
Ethnic group	Indigenous Australian, Pacific Islander, South or East Asian
Poor obstetric history	

history or physical examination although women at greater or lesser risk of having the abnormality can be identified. This has implications for screening (defined as performing a test in asymptomatic women to place them in low or high risk subgroups).

'Low risk' women

There are those who think it reasonable not to screen women who are clinically at low risk, or in women under 25 years of age, who are thin, with no family or personal history of glucose intolerance, from a low risk ethnic group and with good obstetric history;⁴ although personally I do not believe this is worthwhile given that women who meet all these criteria are uncommon. However, the alternate strategy needs to be highlighted.

'High risk' women

Risk factors identifying women at increased risk of GD are listed in Table 2. A 41 year old woman weighing 101 kg from a high risk ethnic group and with a past history of GD does not need a screening test. This woman is easily classified as at high risk of having GD on clinical criteria. She needs the 75 g GTT diagnostic test which requires a three day preparatory diet. High risk patients need a diagnostic test at booking in and then again at 24–28 weeks gestation.

Screening: which test?

The ideal screening test has yet to be discovered. Glycosuria is unhelpful as it is frequent in pregnancy and lacks specificity. A formal random plasma glucose has been shown to miss most women with GD.⁵ At the RNSH we use the 50 g

Spot check

Women with a past history of gestational diabetes need regular routine review of their glucose tolerance status.

glucose challenge test ideally performed in the morning⁶ in either the fasting or nonfasting state. This is not an ideal test as it misses at least 16%⁵ of women who have GD.

Women who are identified as high risk clinically or in whom diabetes is suspected clinically should not have a screening test but rather the 75 g GTT diagnostic test.

Treatment

Commonly, pregnancy management is delivered by shared care. Referral guidelines when a diagnosis of GD is made will vary. The following are general principles for the treatment of GD.

Treatment of GD consists of encouraging women to eat a healthy diet with multiple small meals throughout the day containing enough kilojoules to allow proper fetal growth. There is no outcome data to support this or any other diet although pragmatically foods with a low glycaemic index are helpful in controlling blood sugar levels. This dietary advice is accompanied by home glucose monitoring so that the small (<30%) percentage of women whose mild glucose intolerance progresses to more severe disease can be identified and treated appropriately with insulin.

Healthy eating, not dieting

There is one potential problem with dietary treatment which must be highlighted. Most of the general public are aware that diabetes is treated with diet, meaning to most, restricted food intake. Many women with a new diagnosis of GD have already commenced dieting (ie. restricted their food intake) when recalled for review of their GD. This dieting can result in ketonuria and/or ketonaemia to which pregnant women are susceptible. Ketonaemia has proven adverse effects on fetal development.⁷ Specific explicit advice ('do not restrict intake, eat healthy choices in six small meals per day until seen by a dietician') should be given at the time of diagnosis to prevent such dieting. If dieting is suspected, the patient should be instructed to test for ketonuria. She should understand that ketonuria is a sign that food intake is not appropriate.

Home monitoring

Target glucose levels for home glucose monitoring in pregnancy are listed in Table 3. Women whose blood glucose levels are repeatedly above these targets require reassessment. If this relates to dietary indiscretions these should be avoided. A walk after meals can reduce postprandial hyperglycaemia. If diet review and exercise are unhelpful insulin is indicated.

Fetal monitoring

Fetal monitoring is somewhat beyond this article but briefly, movement and growth should be monitored. This monitoring could be clinical (by an experienced observer) in women with good glycaemic control but should involve cardiotocograph and ultrasound in the minority of women with poor control, clinical macrosomia or other obstetric indications.

Gestational diabetes and type 2 diabetes

Diabetes mellitus is a major health issue both in Australia and globally. It is common, associated with significant morbidity and increased mortality. Appropriate therapeutic interventions can prevent or delay diabetes and reduce morbidity and mortality. It is also worth noting that in Australia 1 in 2 patients who have diabetes are not diagnosed⁸ and therefore cannot be managed appropriately to minimise the development of complications.

The public health implications of these facts are already being addressed with improved strategies to diagnose patients with type 2 diabetes⁹ and recognition of the need to develop a series of health measures designed to prevent type 2 diabetes. These will need to be targeted at various levels. We will require population strategies to improve diet and exercise generally and more targeted strategies for high risk individuals to whom known preventive measures, either lifestyle and/or pharmacological, can be individually applied.

Monitoring at risk women

A pregnancy complicated by GD provides an excellent marker of a high risk of developing type 2 diabetes. Therefore a routine screening test, already performed in pregnancy for other pregnancy related reasons, identifies a group of women to whom:

- the preventive strategies can be specifically targeted

Spot check

Women with a past history of gestational diabetes need regular and reinforcing health advice about diet and exercise.

Table 3. HGM Targets in gestational diabetes

Time	Target (mmol/L)
Fasting	<5.3
1 hour postprandial	<8.0
2 hours postprandial	<6.7

Women should monitor four times per day initially, fasting and after each meal. If values are normal, monitoring in the fasting state can be reduced to once per week

Table 4. Steps to prevent or detect type 2 diabetes

Screening⁹

- Screening or diagnosis should only be made on a laboratory sample, not a glucometer reading
- For screening, a random or fasting plasma glucose of <5.5 mmol/L makes the diagnosis of diabetes unlikely at that time
- A fasting plasma glucose ≥ 7 mmol/L or a random ≥ 11.1 establishes a diagnosis of diabetes if reproducible on another day
- Individuals with intermediate values should undergo a formal 75 g glucose tolerance test (GTT)

Diet and exercise

- Target 5% weight loss
 - <30% fat
 - <10% saturated fat
 - fibre 15 g per 1000 kJ
- Exercise target
 - a total of 30 minutes per day (walk, cycle or exercise lightly) to halve risk of type 2 diabetes

Other risk factors

- Remember other risk factors for diabetes, eg. smoking and possibly beta blockers
- Remember therapy for comorbidities of hypertension and dyslipidaemia may reduce risk of diabetes, eg. ramapril

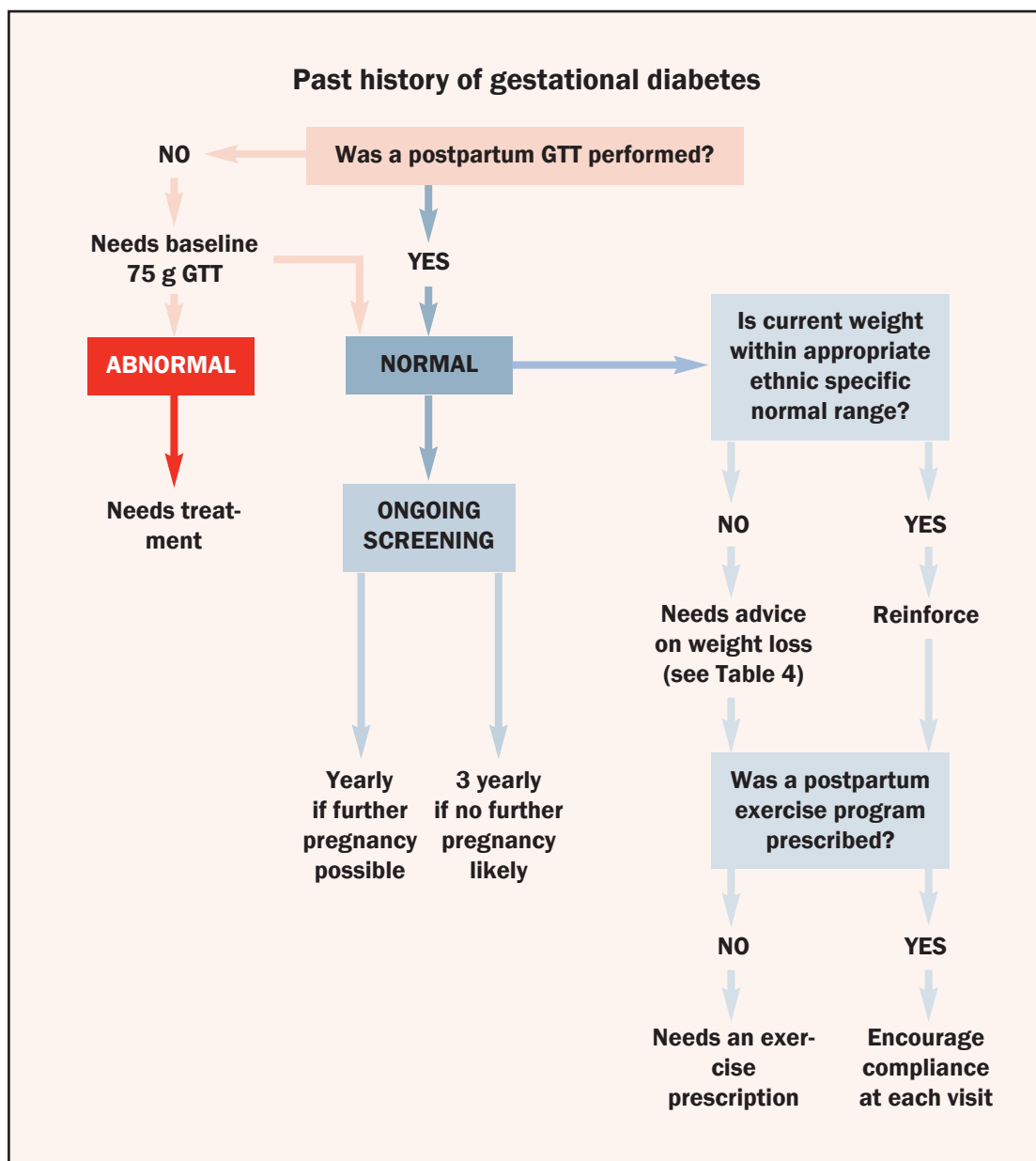


Figure 1. Steps to prevent or detect type 2 diabetes

- regular screening to detect diabetes can be undertaken⁹
- this is particularly important if another pregnancy is a possibility.

For this to work effectively a shared care approach to the management of the immediate postpartum is required; while long term follow up will be in the hands of general practitioners. The main limiting factor in the implementation of these strategies is the inability to clearly, rapidly and simply identify women with a past history of GD when they have contact with the medical profession following pregnancy. Such contact is often with a new GP or with a

GP who is caring for the baby rather than the mother. Anyone who has ever tried to follow up a population with a diagnosis of GD will realise how mobile this group of women are. One strategy to rapidly identify mothers with a past history of GD is to highlight this in the child's health record. At the RNSH we stick a yellow dot with GD written on it on the back cover of the record. This should draw these mothers to the attention of the GP as the baby attends for periodic reviews/immunisations. This will allow the implementation of a few simple steps which should help prevent or detect type 2 diabetes.^{10,11} This simple memory aid is shown in Figure 1 and Table 4.

Conclusion

Gestational diabetes has caused controversy because of arguments surrounding diagnostic thresholds. This should not prevent appropriate detection and treatment of more severe, asymptomatic cases. The diagnosis provides an opportunity in the longer term to initiate targeted interventions to a group at high risk of developing type 2 diabetes while still young. The benefits of such interventions could be a significant reduction in the prevalence of type 2 diabetes and its chronic complications.

SUMMARY OF IMPORTANT POINTS

- There is controversy surrounding the level of glucose intolerance in pregnancy that constitutes gestational diabetes.
- High levels of glucose intolerance in pregnancy are associated with adverse fetal outcomes.
- Dieting, ie. restricting total food intake can be harmful to the fetus.
- Healthy choices in six small meals per day is an appropriate regimen for women with gestational diabetes.
- Patients with GD are at high risk of developing type 2 diabetes and require ongoing three yearly diabetic screening (yearly if still fertile) and monitoring of weight and exercise.
- An alert on the child's health record stating that the mother had gestational diabetes may assist in identifying these high risk women to their GPs.

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Conflict of interest: none declared.

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