

Checking for diabetes

The 'F' words: fat, forties and family

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This series is aimed at helping the busy GP diagnose and manage patients with diabetes and its complications. How would you assess this patient's glucose metabolism?

Case history

Peter has all three of the major risk factors for type 2 diabetes: he is overweight (his body mass index is 26.5 kg/m²), he is aged 47 years and his father and mother both have type 2 diabetes. According to your desktop blood glucose meter, Peter's blood glucose level is 8.7 mmol/L.

What should you consider?

Given Peter's history and his blood glucose reading, consider the following:

- How would you interpret this result?
- Are further investigations indicated?
- What are the implications if Peter's oral glucose tolerance test (OGTT) gives values of, say, 5.9 mmol/L on fasting and 9.4 mmol/L 2 hours after a glucose load?
- What are the implications if his OGTT gives values of, say, 6.8 mmol/L on fasting and 7.6 mmol/L at 2 hours?
- What action would you and he take in the above two situations?

Interpreting this result

Peter's blood glucose value of 8.7 mmol/L is abnormal, but it needs to be confirmed. Normal values are <6.1 mmol/L fasting and <7.8 mmol/L two hours after a carbohydrate load.

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meters should not be used for the diagnosis of abnormal glucose tolerance.¹ They suggest that this diagnosis is made on the basis of laboratory measurements using samples stored appropriately (i.e. in fluoride containers to prevent glucose breakdown and avoid spuriously low values). The flowchart on this page summarises a strategy for testing a patient's glucose metabolism and interpreting OGTT results. Some doctors check patients' fasting glucose levels – for example, at the same time as checking the lipid profile.

The most important points at this stage are that you recognise the risk and check the blood glucose value.

Interpreting OGTT results

A fasting blood glucose level of 5.9 mmol/L

Deciding on further investigations

A random blood sample taken at the time of consultation is most convenient, but it may not give a definitive answer. The RACGP and Diabetes Australia guidelines recommend that desktop blood glucose

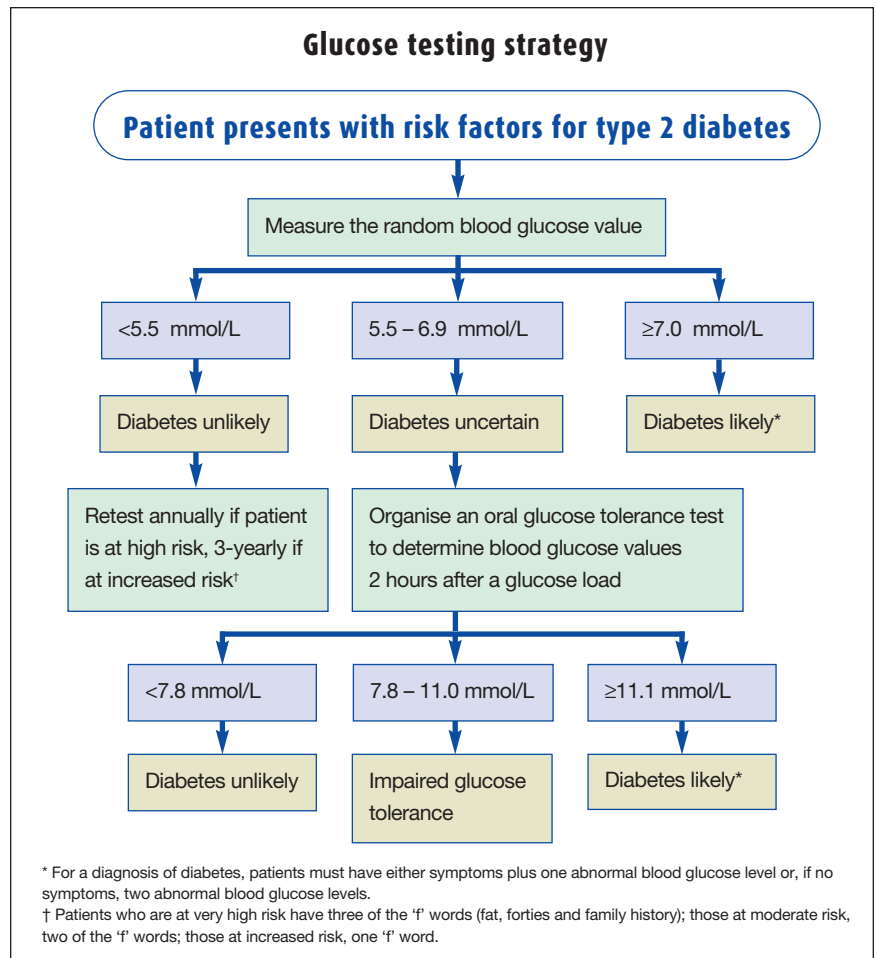


Table. Assessing blood glucose concentrations

	Fasting blood glucose (mmol/L)	2-hour post-glucose load (mmol/L)
Normal	<6.1	<7.8
Diabetes	≥7.0	≥11.1
IGT	<7.0	7.8 – 11.0
IFG	6.1 – 6.9	<7.8

IGT = impaired glucose tolerance; IFG = impaired fasting glucose.

and a 2-hour value of 9.4 mmol/L on OGTT indicate that Peter has abnormal glucose metabolism, since one or more of the values are abnormal (see Table and the flowchart on page 81). The fasting value is normal; however, the 2-hour value exceeds the normal level but is less than the level that is diagnostic for diabetes. This reflects impaired glucose tolerance (IGT) and is associated with a high risk of developing diabetes over the next few years (each year roughly 10% of patients with IGT will go on to develop diabetes if they have no intervention).²

IGT is also a marker of high cardiovascular risk and suggests that Peter might have other components of Syndrome X. (This is also known as the metabolic syndrome, the insulin resistance syndrome or the deadly quartet of vascular risk factors associated with central obesity – i.e. the combination of hyperglycaemia, hypertension, dyslipidaemia and thrombogenesis.) The level of cardiovascular risk for Peter may not be as high as that for patients with diabetes (who have an overall 20% risk of having a cardiovascular event over five years),³ but it is significantly higher than those with normal glucose tolerance.

Likewise, a fasting blood glucose level of 6.8 mmol/L and 2-hour value of 7.6 mmol/L also indicates abnormal glucose metabolism. In this case, however, Peter has impaired fasting glucose (IFG) because the fasting value exceeds the normal limit but is not diagnostic for diabetes, and the 2-hour value is normal.

The abnormality of IFG has only recently been identified specifically and its full implications are not as well understood as those for IGT. However, IFG is also associated with increased risk of developing diabetes and cardiovascular disease, but the risk may not be as high as that for IGT.

Interestingly, IFG is more common than IGT in some populations, but less common in others, implying differences in the pathophysiology of glucose metabolism. In Australia, IGT is more common in women and IFG in men.

Acting on abnormal glucose metabolism

The increased risk of developing diabetes and cardiovascular disease should be both fully assessed and addressed. Recent trials in IGT (for example, the Diabetes Prevention Program in the USA³) have shown that very intensive lifestyle programs can reduce significantly the risk of developing diabetes (reducing the three-year risk by 58%).

It may not be possible to duplicate exactly these intensive programs, but Peter should consider changing his lifestyle to 'eat less, walk more'.⁴ He may not be able to make all the recommended dietary changes, meet the target of 30 to 60 minutes of brisk walking or equivalent per day, or reach his ideal weight. However, smaller changes are additive and, in any event, the healthy lifestyle will help to reduce his cardiovascular risk.

You might suggest that Peter seek advice

from a dietitian and/or exercise therapist. It is important to follow up your recommendations and monitor his lifestyle changes, weight and blood glucose values.

Other cardiovascular risk factors should be assessed (including family history, smoking history, blood pressure and lipid profile) and appropriate interventions implemented. Since Peter has one marker of cardiovascular risk, intervention is appropriate at lower levels of other cardiovascular risk factors (e.g. at a systolic blood pressure of 130 mmHg rather than 140 mmHg). If Peter had two or more other risk factors he might consider taking low dose aspirin (75 to 150 mg/day) for cardiovascular protection if there were no contraindication. Once again, you would follow up and check that modifiable risk factors were below target (i.e. ideally total cholesterol <4 mmol/L, systolic blood pressure <130 mmHg, smoking cessation).

Summary

With early intervention Peter may be able to reduce his cardiovascular risk and improve his glucose metabolism. Monitoring lifestyle changes, weight, cardiovascular risk and blood glucose and encouragement in achieving these aims are important components of Peter's medical care. **MT**

References

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