

Laboratory Testing in Diabetes



Quiz Feedback



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Laboratory Testing in Diabetes Quiz Feedback

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Key Points

- Fasting morning venous glucose is the best initial test for diagnosing diabetes.
- An oral glucose tolerance test is reserved for people with equivocal fasting glucose results.
- Patients with impaired glucose tolerance or impaired fasting glucose benefit from lifestyle intervention and annual review.
- HbA_{1c} is the best test of glycaemic control in diabetes.
- Patients with diabetes benefit from aggressive monitoring and management of all cardiovascular risk factors.

Laboratory Testing in Diabetes Quiz

1. A 50 year-old European woman comes in for her 3 yearly cervical smear. She has no other complaints and is in good health. Would you recommend a cardiovascular risk assessment, including a fasting glucose?

Yes
 No
2. A 42 year-old man with polyuria, thirst, and a lack of energy has a fasting glucose of 18.8 mmol/L. Would you request an oral glucose tolerance test (OGTT)?

Yes
 No
3. A 38 year-old woman has had two fasting glucose results, on two separate days, of 7.2 mmol/L and 7.6 mmol/L. What further diagnostic tests would you request?

No further tests
 OGTT
 Fasting glucose
 Random Glucose
4. A 57 year-old man of Indian descent presents to you. You decide to perform a cardiovascular risk assessment including a fasting glucose test. The patient requests to have all the tests collected today because he lives an hour from the surgery and doesn't own a car. Do you recommend an alternative to the fasting glucose level?

Random glucose
 Capillary glucose
 HbA_{1c}
 No alternative
5. A 57 year-old woman has a fasting glucose of 5.4 mmol/L. She has no risk factors for diabetes. When would you recommend rechecking the fasting glucose?

6 months
 1 year
 3 years
 5 years
 Probably would not recheck
6. A 43 year-old women presents, she is a Pacific Islander and her mother died of diabetes related problems. She is physically inactive and has a BMI of 26.5. The result of a fasting glucose test is 5.7 mmol/L, how would you follow this up?

Fasting glucose
 OGTT
 HbA_{1c}
 No followup
7. A person with diabetes and on metformin has been well controlled for the last year, as judged by six monthly HbA_{1c} tests. How often would you request fasting glucose tests?

Monthly
 6 monthly
 Annually
 Would not retest
8. A diabetic patient previously on lifestyle control has just started metformin. When would you next check his HbA_{1c}?

1 month
 3 months
 6 months
 12 months

Feedback

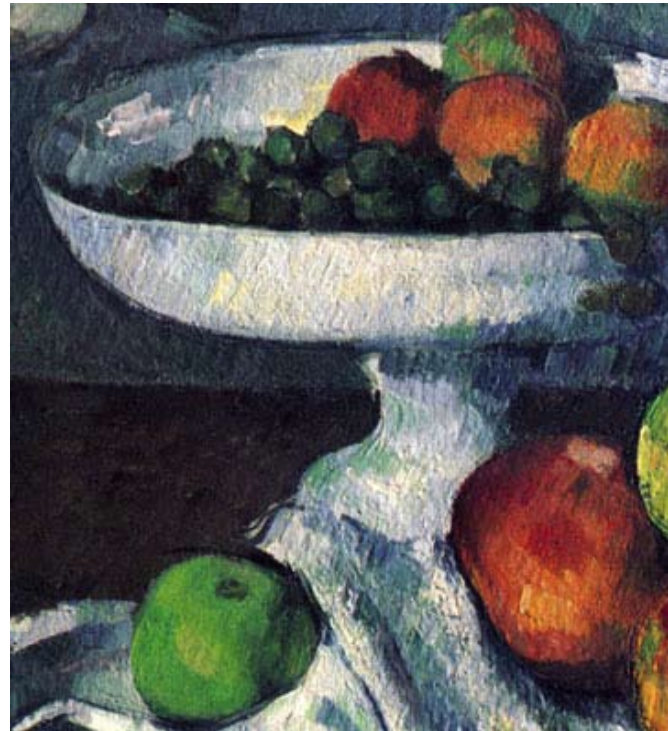
We are sorry you did not return a quiz to us. This group of scenarios were designed to demonstrate the range of situations encountered when diagnosing and monitoring a diabetic patient.

Please let us know if there is any way we can make our case studies more useful to you. We want our resources to be helpful with your day-to-day clinical practice. We would be pleased to receive any suggestions that you have.

If you have any questions please email these to us and we will answer via the 'Your Questions Answered' section of our web site.

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Quiz feedback

Responses from colleagues, GP Panel and specialist

1. A 50 year-old European woman comes in for her 3 yearly cervical smear. She has no other complaints and is in good health. Would you recommend a cardiovascular risk assessment, including a fasting glucose?

	You	Your Peers	GP Panel
Yes		40 %	+/-
No		60 %	+/-

2. A 42 year-old man with polyuria, thirst, and lack of energy has a fasting glucose of 18.8 mmol/L. Would you request an oral glucose tolerance test (OGTT)?

	You	Your Peers	GP Panel
Yes		1 %	
No		99 %	+

Although the NZGG recommends commencing cardiovascular risk assessment for women at the age of 55 years without known risk factors, the panel did not find the question so clear cut. They would perform a risk assessment, including fasting lipids and glucose, for this 50 year-old woman if she raised the issue also they would offer it if there was any hint of diabetes or cardiovascular risk in the personal or family history.

Specialist comments: A grey area, but she has a relatively low risk of diabetes as a presumably slim, European with no family history or other risks and no cardiovascular risks or diabetes symptoms and so she could wait a “few” years.

The panel would not request an OGTT for this man. They would check his renal function and urine for ketones (to exclude ketoacidosis), and move straight into the management of his diabetes. He may need immediate insulin but they commented that even this level of venous plasma glucose can often be managed by lifestyle modification; especially if he has been quenching his thirst with sugary soft drinks!

Specialist comments: He has diabetes without need for additional tests. If he is slim, I would consider Anti-GAD testing to confirm an autoimmune basis and an early requirement for insulin. If overweight it is surprising what 5 - 10% weight loss will do and just stopping sugary drinks and good rehydration can lead to significant glucose reduction.

3. A 38 year-old woman has had two fasting glucose results, on two different days, of 7.2 mmol/L and 7.6 mmol/L. What further diagnostic tests would you request?

	You	Your Peers	GP Panel
No further tests		82 %	+
OGTT		17 %	
Fasting glucose		<1 %	
Random glucose		<1 %	

4. A 57 year-old man of Indian descent presents to you. You decide to perform a cardiovascular risk assessment including a fasting glucose test. The patient requests to have all the tests collected today because he lives an hour from the surgery and doesn't own a car. Do you recommend an alternative to the fasting glucose level?

	You	Your Peers	GP Panel
Random glucose		61 %	
Capillary glucose		3 %	
HbA _{1c}		18 %	
No alternative		29 %	+

This woman meets the criteria for the diagnosis of diabetes and does not need an OGTT. However because she is close to the cut-off point the panel felt GPs may be tempted to seek confirmation from an OGTT. Receiving a diagnosis of diabetes has huge implications for our patients and different people react in different ways. The panel acknowledged the significant impact that diabetes has on day-to-day activities such as the need to change food-shopping and eating-out choices.

Specialist comments: As long as she is not stressed with an intercurrent illness, the diagnosis of diabetes is confirmed. An OGTT is not needed and doesn't change management. A baseline HbA_{1c} would be helpful. Labels are unfortunate but sometimes help people focus.

This is a difficult scenario needing a pragmatic solution tailored to individual circumstances. The panel would not do a random glucose as a normal result may discourage him from having a fasting glucose and lipids. They would give him a form for fasting glucose and lipids for when he is next in town, with an explanation of the importance of a fasting sample.

Specialist comments: Always difficult but guidelines do allow a diagnosis of diabetes to be made on two random glucose levels over 11.0 mmol/L. Moreover, a glucose under 5.5 mmol/L would be very reassuring. But a level inbetween would warrant a greater effort to get a fasting test, combined with fasting lipids. A capillary test is not accurate enough but might give a rough guide, while a HbA_{1c} is not yet diagnostic, though levels <5.5% are reassuring and >6.9% quite suspicious. In the end, if the diagnosis is important to you and your patient, get the test done in the right way if at all possible.

5. A 57 year-old woman has a fasting glucose of 5.4 mmol/L. She has no risk factors for diabetes. When would you recommend rechecking of the fasting glucose?

	You	Your Peers	GP Panel
6 months		1 %	
1 year		19 %	
3 years		21 %	+/-
5 years		56 %	+/-
Probably would not check		3 %	

6. A 43 year-old women presents, she is a Pacific Islander and her mother died of diabetes related problems. She is physically inactive and has a BMI of 26.5. The result of a fasting glucose test is 5.7 mmol/L, how would you follow this up?

	You	Your Peers	GP Panel
Fasting glucose		8 %	
OGTT		87 %	+
HbA_{1c}		5 %	
No follow-up		3 %	

The panel would check the woman's blood glucose again in five years as she has no risk factors for diabetes. They probably would not put her on a formal recall but advise her to get it checked again in three to five years time.

Specialist comments: I would agree with the panel.

This woman is at risk of developing diabetes and has an equivocal plasma glucose result. She would benefit from an OGTT to look for a diagnosis of diabetes, impaired glucose tolerance or impaired fasting glucose. She is likely to benefit from lifestyle modification.

The panel felt an alternative might be to re-check fasting glucose in 3 months after lifestyle changes have been instituted. Long-term followup with an annual fasting glucose is important even if OGTT is normal.

Specialist comments: Actually a fasting glucose of 5.7 mmol/L might soon be reclassified as impaired fasting glucose in the future. But in this case, an OGTT is indication to properly classify her, although irrespective of the result I suspect lifestyle advice would be your next step to treat or avert diabetes.

7. A person with diabetes on metformin has been well controlled for the last year, as judged by six monthly HbA_{1c}. How often would you request fasting glucose tests?

	You	Your Peers	GP Panel
Monthly		2 %	
6 monthly		28 %	
Annually		16 %	+
Would not retest		54 %	

8. A person with diabetes previously on lifestyle control has just started metformin. When would you next check his HbA_{1c}?

	You	Your Peers	GP Panel
1 month		3 %	
3 months		94 %	+
6 months		3 %	
12 months		0 %	

The panel mentioned that patients tend to focus more on glucose levels as measures of adequacy of control because the concept of HbA_{1c} is generally more difficult for patients to understand. Explaining and reinforcing the use of the HbA_{1c} test, enables patients to then incorporate target levels of HbA_{1c} into their goals.

Specialist comments: While the fasting glucose generally correlates well with the HbA_{1c}, it doesn't always. The HbA_{1c} is the better monitoring test, performed 6 monthly, if the patient is stable. Type 2 diabetes does progress however over time. I try and teach patients about what the levels mean and give them an HbA_{1c} target and ensure patients get sent their results. If the fasting glucose is lower than 6 mmol/L but the HbA_{1c} is over 7%, consider postprandial hyperglycaemia. An annual fasting test should include lipids.

The HbA_{1c} is measured three monthly after changes in treatment, where possible the panel felt they would try to have the medication on a three monthly cycle to allow coordination between the two.

The panel pointed out that in some cases there is a misconception that HbA_{1c} correlates directly with serum glucose levels. For example if HbA_{1c} is 10 % it does not mean the average serum glucose for the previous three months has been 10 mmol/L.

Specialist comments: I agree. The HbA_{1c} of 10% does not mean the average glucose is 10 mmol/L. It is probably more likely to be 13 - 14 mmol/L. Performing HbA_{1c} 3 monthly is sensible for unstable patients or after changes in treatment. The HbA_{1c} level is probably most sensitive to the previous 30 - 40 days glucose levels.

Specialist Summary

With an increasing overweight and elderly population, the numbers of patients with impaired carbohydrate tolerance are growing. Correct classification is sometimes difficult. Worldwide, the threshold for diabetes and impaired fasting glucose is slowly changing. It is being realised that glucose, (perhaps like cholesterol and blood pressure) is associated with increased vascular risk at lower levels than we thought 10 or so years ago. Management however is often similar with weight reduction, healthy eating and exercise holding the key to reduced vascular morbidity.

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