Diabetes Scenario

Jason is 19 years old and lives in student accommodation in the city. He comes into the surgery without having booked an appointment and asks to see the doctor or practice nurse because he is feeling unwell. The doctor is on visits and will be back soon, and the practice nurse is doing the baby vaccine clinic so is really busy. The receptionist asks if you can see him while he is waiting.

You can see that Jason looks unwell. He is a little flushed, looks very skinny and says he is a little breathless. He tells you that over the past couple of weeks he has been really thirsty and has lost over a stone in weight. He was underweight before he became unwell and is now worried because his clothes don’t fit anymore. Jason gets up at night to pass urine almost every hour but attributes this to the fact he is drinking copious amounts of water as he is so thirsty and his vision is blurred.

You wonder what could be the matter and in order to reassure Jason about his weight you decide to weigh him. You check his records and find that when he registered at the surgery when he started college his weight was 11 stone 10 llbs he now weighs 10st 9 Ilbs. What do you suspect could be the cause?

* Option 1: Urine Infection
* Option 2: He is not eating healthily
* Option 3: He is probably drinking too much

The correct answer is Option 1.

**Feedback:** His symptoms and his frequency of micturition could be due to a urine infection

What tests can you do to confirm this?

* Option 1: Urine test
* Option 2: Blood pressure test
* Option 3: Blood test

The correct answer is Option 1.

**Feedback:**A dip stick urine test will show if there is blood present and quantify it and it will show if there are leukocytes present, these are white blood cells and are high when infection present, as we make white blood cells specifically to fight infections.

You decide to do a urine test in case his frequency of micturition is due to a urine infection. You ask him to provide a urine sample which you dip test using a multistix. This shows that he has a very high level of glucose and ketones in the urine and he is not known to have diabetes.

What do you do next?

* Option 1: You have been trained to use this and regularly help out in the diabetic clinic so you think he probably has undiagnosed diabetes.
* Option 2: You explain to Jason that as the nurse is still busy it might be useful to check his blood glucose reading as the urine has shown positive to glucose. He agrees so you do a quality control test on the meter first as you know it should be checked on a daily basis. He washes his hands to ensure there is no glucose on the fingers and then you do the test. The reading shows a blood glucose of 28.3 mmol/l.

The correct answer is Option 2.

**Feedback:** Yes, if you have been trained to do a blood glucose test, then you can test Jason to confirm your suspicions. A trained nurse may confirm their suspicions - an unregistered nurse should not discuss the implications of the test with Jason

What is the diagnostic level for the confirmation of diabetes?

* Option 1: fasting plasma glucose of more than 7.0 mmol/l or a random plasma glucose of more than 11.1 non fasting
* Option 2: fasting plasma glucose of less than 7.0 mmol/l or a random plasma glucose of less than 11.1 non fasting
* Option 3: fasting plasma glucose of more than 5.0 mmol/l or a random plasma glucose of more than 9.0 non fasting

The correct answer is Option 1.

**Feedback:** The diagnostic level for confirmation of diabetes is a fasting plasma glucose of more than 7.0 mmol/l or a random plasma glucose of more than 11.1 non fasting. Usually 2 laboratory tests need to be done but as Jasons blood glucose is very high and he has some of the common symptoms of type 1 diabetes there cannot be any doubt about the diagnosis ( see [Diabetes UK](https://www.diabetes.org.uk/) for information on the diagnosis of diabetes).

What is the relevance of ketonuria in diabetes?

* Option 1: Ketones are toxic and if insulin is not received in the next couple of hours his condition will deteriorate
* Option 2: Ketones show that the patient is not following the correct diet and he should be given advice about how to correct this
* Option 3: Ketones can show which form of diabetes the patient has

The correct answer is Option 1.

**Feedback:** Ketonuria is a sign of either an absolute or relative lack of insulin and confirms the diagnosis of type 1 diabetes when seen with heavy glycosuria. His breath may smell of ketones (pear drop aroma) but not all people can detect this. Ketones are toxic and if the young man does not receive insulin in the next couple of hours his condition will deteriorate quickly and he could become very nauseated or vomit. High levels of ketones can cause the individual to become acidotic so his breathing could become laboured and he could go into coma.

What is the relevance of his thirst and polyuria?

* Option 1: His body is trying to quickly remove the excess glucose by filtering it through the kidneys, so he passes copious amounts of urine. He also becomes really thirsty but will be unable to maintain his fluid balance so he has become extremely dehydrated
* Option 2: It is the concentration of certain osmolites, such as salt. If the water volume of the body falls below a certain threshold or the osmolite concentration becomes too high, then the brain registers a need 'thirst'. His body has excess salt which has triggered his thirst and he needs to increase his intake of fluids to balance the levels

The correct answer is Option 1.

**Feedback:** His body is trying to quickly remove the excess glucose by filtering it through the kidneys, so he passes copious amounts of urine. He will be unable to maintain his fluid balance so will become extremely dehydrated

What should do you do next?

* Option 1: He needs to be given glucose immediately and told to rest.
* Option 2: He needs to be given insulin immediately

The correct answer is Option 2.

**Feedback:**The young man will need to be given insulin as soon as possible and may need to be admitted to hospital as an emergency for intravenous insulin and intravenous fluids to correct the acidosis and dehydration. Report your findings to the registered nurse immediately – she should call the GP straight away and explain the situation.

Mrs Patel is an 89 year old widow. She has been living in a nursing home for the past 2 years because her family have been unable to cope with her nursing needs following a stroke in 2002, which has affected her right side and her speech. Mrs Patel is unable to manage the normal activities of daily living. She was diagnosed with type 2 diabetes 20 years ago. Mrs Patel had taken a great interest in her diabetes when she was able to but since having the stroke and the death of her spouse in 2003, she has not been able to participate in her own personal and diabetes care. Over time Mrs Patel has become increasingly frustrated because she is unable to communicate how she is feeling, or what her needs are. Mrs Patel is on Gliclazide 80 mgs twice daily and metformin 1gm twice daily. You notice that Mrs Patel is off her food and has had very little to eat that day. The nurse in charge has given Mrs Patel her medication as prescribed at 10 am. At 2 pm you notice Mrs Patel is sweating profusely, she is pale and appears to be drowsy but responds to her name.

You consider the signs and symptoms you are faced with and wonder whether Mrs Patel’s blood glucose level is ok. You inform the nurse in charge of Mrs Patel’s condition and confirm with her that you will do a blood glucose test (based on your level of competence) and take the 'hypo' kit to the bedside in case the blood glucose is less than 4. Following the capillary blood glucose test you discover that Mrs Patel’s blood glucose is 2.4mmols. What steps do you take next?

* Option 1: Record the blood glucose level on the Mrs Patel’s chart and report the result to a registered member of the staff immediately
* Option 2: Record the blood glucose level on the Mrs Patel’s chart and report the result to a registered member of the staff when you have finished with your other patients
* Option 3: Immediately inform a registered member of staff

The correct answer is Option 1.

**Feedback:** You need to write down the glucose level so that there is a record, but this is an emergency situation so you must act very quickly to prevent Mrs Patel’s lapsing into a hypoglycaemic coma. Inform a registered member of staff immediately.

What is the clinical term for a low blood glucose?

* Option 1: Hypoglycaemia
* Option 2: Hyperglycaemia

The correct answer is Option 1.

**Feedback:** Hypoglycaemia (hypo) is described as a blood glucose < than 4 mmols. Glucose is a sugar carried in the blood stream that your body uses for energy. Blood glucose can be erratic at times, sometimes becoming very low when medication is taken and food is restricted or the patient is off their food.

As Mrs Patel is still conscious and responding to her name, and her swallowing reflex is intact you would aim to treat her hypo following the guidelines for the management of hypoglycaemia in the nursing home. Can you remember what the recommended treatments for hypoglycaemia are?

**Feedback:** Recommended treatments for hypoglycaemia: 240 mls of Lucozade or 200 mls of smooth orange juice, 4-5 Glucotabs or 5-6 dextrose tablets.

If Mrs Patel does not feel better and the blood glucose is still less than than 4 mmols after 5-10 minutes repeat one of the above treatments again. When Mrs Patel starts to feel better it is advisable to give some starchy food like a sandwich or a banana.

What was the cause of Mrs Patel’s hypoglycaemia?

* Option 1: She was given her Gliclazide tablets at 10 am but she had not eaten because she was off her food, Gliclazide stimulates the pancreas to produce insulin thus causing Mrs Patel to have hypoglycaemia
* Option 2: She has not eaten because she was off her food.
* Option 3: She had a sickness virus that meant she was not eating.

The correct answer is Option 1.

**Feedback:** Mrs Patel was given her Gliclazide tablets at 10 am but she had not eaten because she was off her food, Gliclazide stimulates the pancreas to produce insulin thus causing Mrs Patel to have hypoglycaemia. You also need to be aware that Mrs Patel needs to be assessed to identify the reason why she is off her food. May require a medication review because Gliclazide may not be the best medication for an elderly woman, kidneys may not be functioning properly therefore she may be keeping the medication in her body much longer than the manufacturer’s recommendations.

The signs and symptoms of hypoglycaemia that Mrs Patel had were sweating heavily and going pale.

The other signs and symptoms of hypoglycaemia are feeling anxious, trembling and shaking, tingling of the lips, hunger and palpitations

How would you prevent Mrs Patel from getting hypoglycaemia in the future?

* Monitor and record Mrs Patel's fluid and food intake
* Report and record any changes in eating habits to nurse in charge
* Mrs Patel may need feeding as she has difficulty with the activities of daily living
* Test and record Mrs Patel’s blood glucose as prescribed by the team
* Report any abnormal readings to nurse in charge
* Be aware that Mrs Patel will need further assessment as to the reasons why she is off her food. For example, Mrs Patel may be feeling depressed and lonely because she lost her husband
* She may feeling generally unwell for other reasons
* Mrs Patel may require a medication review

**Feedback:** All of these ways are correct.

What other factors may you consider when caring for Mrs Patel that are relevant to management of her diabetes?

* Fear and anxiety of hypoglycaemia
* Hypoglycaemia unawareness
* Lack of mobility and exercise
* Always have glucose at Mrs Patel’s bedside
* Reasons for poor eating habits
* Constipation or obstruction
* Illness
* Ill fitting dentures or poor oral hygiene

**Feedback:** All of these ways are correct.