Managing a young woman with severe hypoglycaemia

VIVIENNE MILLER MB BS, FRACGP, DRACOG, DCH, MACPM, MWAME

A young woman in her 20s unknown to your practice is brought in by her friend. The friend tells you that they were shopping when the woman started feeling sweaty, shaky and then confused. You find out that the woman has been generally unwell since the morning and that she is now having trouble speaking clearly. The woman was recently diagnosed with diabetes and requires insulin therapy.

What should happen next?

Answer: The receptionist immediately tells you about the patient and then helps her to lie down in a consultation or treatment room.

What are the most common differential diagnoses of such a presentation?

Answer: Hypoglycaemia, ketoacidosis, alcoholic poisoning, drug intoxication, epilepsy, migraine, cerebrovascular accident (especially a rupturing aneurysm or delayed haemorrhage from head trauma), hyperthermia, psychiatric presentation and meningitis are the most common differential diagnoses.

You see the patient immediately and introduce yourself. The patient is semi-conscious and slurring a few words. What should you do next?

Answer: You ensure the patient cannot fall, check her airway is patent and place her lying in the lateral position. You ask the receptionist to ring 000. You then administer oxygen to the patient via a facial mask. The patient should not be left alone.

Given the history of diabetes, a detailed history and examination is not as important at this stage as rapidly acquiring a capillary (fingerprick) blood glucose level. Hyper- and hypoglycaemia must be treated rapidly and effectively because severe hypoglycaemia may, for example, trigger cardiac events or seizures, or lead to self-harm from trauma while unconscious (such as vomiting with aspiration).

What capillary blood glucose range defines 'hypoglycaemia'?

Answer: For practical purposes, 'hypoglycaemia' is defined as a capillary blood glucose level below 4.0 mmol/L accompanied by symptoms or signs of hypoglycaemia. Major symptoms of hypoglycaemia usually do not occur unless blood glucose levels are below 3.0 mmol/L. Severe hypoglycaemia is better judged by the patient's level of consciousness when the blood glucose reading is in the hypoglycaemic range. Part of the definition of hypoglycaemia includes reversibility with administration of appropriate amounts of glucose.

ENDOCRINOLOGY TODAY 2012; 1(1): 41-42

Dr Miller is a GP in Sydney, NSW.

You take a capillary blood glucose level and the result is 0.8 mmol/L. How reliable is this result?

Answer: It is accepted that there is a variation from machine to machine of usually less than 1.0 mmol/L (0.5 mmol/L either side from the true confirmed baseline). Blood glucometers in general practice should be examined at least three-monthly to check the test strips are in date and the solutions that are used. The meter readings become less reliable with low levels of blood glucose (below 4 mmol/L) because they are designed to read best in the normal range.

In this case the result is compatible with the brief history and examination but is an extremely low capillary blood glucose level not compatible with consciousness. If the reading is in the hypoglycaemia range, the actual level is of lesser importance and any low level should clearly be acted on.

What do you do next?

Answer: You take glucagon 1.0 mg from the emergency doctor's bag (in a child under 6 years, 0.5 mg would be used). Glucagon causes glycogenolysis and release of glucose from the liver, resulting in transiently increased blood glucose levels commencing in several minutes. You administer the glucagon intramuscularly into the patient's upper, outer thigh. This is preferable to a subcutaneous method because in cases of severe hypoglycaemia activation of the adrenergic nervous system causes vasoconstriction, resulting in a relatively lower rate of absorption subcutaneously. It can also be given intravenously, but intramuscularly administration is very effective and more usual in this situation.

What is your greatest worry at this stage?

Answer: Although it is very likely that the patient will respond to glucagon, sometimes the response is not adequate or may be transient. Such situations would include if the patient has already used up her hepatic glycogen stores through recent significant exercise, there has been restrictive dieting or fasting, or she has major insulin excess (for example, insulin overdose). Also, glucagon quite commonly causes nausea and vomiting, which may limit the ability to maintain the blood glucose level by subsequent oral intake. Once the glucagon wears off, the hypoglycaemia may rapidly return and repeated doses often will not work. You have about 20 to 30 minutes to wait for the ambulance to arrive with the dextrose (if you do not have any cannulation equipment and dextrose at the practice).

What happens next?

Answer: Your greatest worry is thankfully not confirmed. The glucagon, over the next five to 10 minutes after its administration, results in a significant improvement in level of consciousness. You give the patient a sweet drink and sit her upright until the ambulance comes. Once she can tolerate some sweet fluids, some longer-acting carbohydrate should be given (e.g. biscuits, sandwich, milk) to sustain the glucose level. You take a history and examine the patient to be sure there is nothing else contributing to the hypoglycaemia, such as inadequate carbohydrate intake, inadvertent insulin dosing or mixing up of insulin types (e.g. short and long acting). Her capillary blood glucose level is now 5.2 mmol/L (on the same glucometer) 15 minutes after the administration of glucagon.

The patient tells you she was diagnosed with type 1 diabetes a few months ago, is not used to the dosing adjustments for insulin injections yet and thinks, in hindsight, she did not eat enough for her breakfast. She now feels much better and wants to know when she can go home. What do you say to the patient?

Answer: You explain to the patient that, ideally, she needs to go to hospital for observation and she definitely needs to be in contact with her diabetes team to review her management and education. In this case, since she is inexperienced in diabetes self-care and there is a risk of the hypoglycaemia recurring or rebound hyperglycaemia, hospital review and a short period of observation are advised. You draft a letter for the hospital.

The friend would like to take her to hospital because she does not think her friend is insured for ambulance transfer. The patient prefers this option. What do you say to the patient?

Answer: You explain to the patient that this is not wise as she could become hypoglycaemic on the way and collapse again. You advise them to wait for the ambulance. You also advise the patient that if she can drive, she herself should not drive for at least six weeks according to Austroads guidelines, but this may vary according to the reason for the hypoglycaemia and the opinion of her specialist, by who she should be reviewed.

Outcome: The patient goes to hospital by ambulance for observation for several hours and her endocrinologist and diabetes educator are made aware of the day's events. Arrangements are made for ongoing management adjustment, support and education. The patient is advised to find a GP near to her home to help provide continuity of her health care. ET

Who wants your opinion?

We do. Did you find a particular article in this issue helpful in your practice? Do you have something to say about an article we have published or some of the opinions expressed? Write and tell us, and we will consider your letter for publication. We are more likely to print short letters (no longer than 250 words), so please be succinct.

Write to: **Endocrinology Today, PO Box 1473, Neutral Bay, NSW 2089**
or email **editorial@endocrinologytoday.com.au**