

Hypoglycaemia

Low blood glucose levels

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Low blood glucose levels (Hypoglycaemia)

Introduction

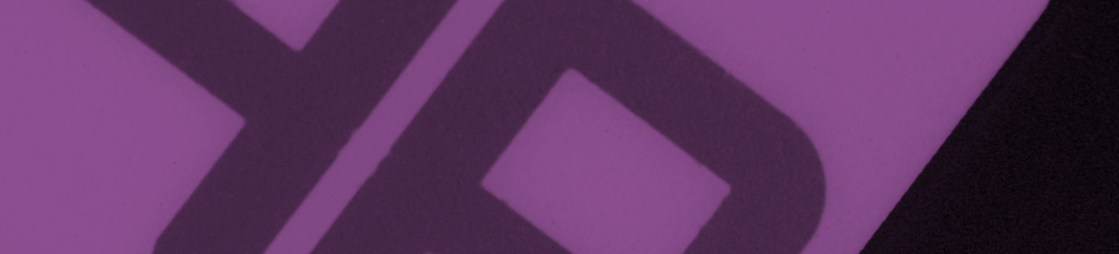
Low blood glucose (sugar) levels are common in people treated with insulin and some tablets used in diabetes. A low blood glucose level is uncomfortable and can be dangerous for the person with diabetes and others. There can be confusion between a low blood glucose level and the term 'Hypoglycaemia' (also known as 'a hypo'). They are the same thing. Hypoglycaemia occurs when the glucose (sugar) level in the bloodstream falls below the normal range which is 4.0 mmol/l. Once the blood glucose level falls below 3.5 mmol/l the body activates systems to correct the low glucose level. When the blood glucose gets below 3.0 mmol/l there is a reduction in brain function. You do not need to have symptoms, or need help or be unconscious to have had a hypo.

A hypo is a blood glucose level below 4 mmol/l (with or without symptoms). This booklet is designed to explain why low glucose levels occur; how the body reacts to low glucose levels; the different terms we use for low glucose levels - or hypos; what you can do to avoid them and the UK driving regulations and hypos.

What are the different types of hypo?

Most people will get SYMPTOMS when their glucose levels drop. These are due to the activation of an 'automatic' nervous system within the body (called the 'autonomic nervous system') and also an increase in a hormone in the bloodstream called adrenaline. This causes sweating, a pounding heart, shaking, anxiety and hunger.

If the blood glucose drops further then a change in brain function can occur, such as not concentrating, feeling less coordinated, tingling around the lips and repeating things when speaking. Some people appear non-communicative and may become argumentative or aggressive when asked if they are having problems.



Most people who have hypos can quickly recognise the SYMPTOMS and treat themselves with rapid-acting carbohydrate such as 100 - 150 mls of Lucozade™ or another type of non-diet fizzy drink or 4 or 5 Dextrosol™ or Dextro Energy™ tablets.

Some people with very tightly controlled glucose levels, those with frequent hypos, or those who have had diabetes for a long time may have less sharp warning symptoms of a low glucose level. This is dangerous and is called IMPAIRED AWARENESS OF HYPOGLYCAEMIA.

A small percentage of people lose their warnings altogether and have NO AWARENESS OF HYPOGLYCAEMIA.

Some people will have a SEVERE HYPO. This means they need someone else (a family member, a colleague, a paramedic, a GP or a doctor in A&E) to help them get their glucose levels back to normal by either feeding them glucose, or using an injection of glucagon or glucose into a vein. Each year about 50% of people who have had Type 1 diabetes for more than 15 years and 25% of those with Type 2 diabetes treated with insulin for more than 5 years will have a SEVERE HYPO. Approximately 1 in 14 people treated with insulin will have a SEVERE HYPO every year that needs to be treated by a healthcare professional.

What causes hypos?

Too much insulin. This can be caused by either tablets that make the pancreas gland secrete more insulin (these are called sulphonylurea tablets such as Gliclazide, Glipizide, Glimepiride or Glibenclamide), or any insulin injection.

What causes impaired awareness of hypoglycaemia?

There are areas within the brain that detect low glucose levels. These areas send a message to the autonomic nervous system and the adrenal glands, which sit above the kidneys and secrete a hormone called adrenaline. The adrenaline releases glucose from body stores, speeds up the heart, makes you sweat and makes you shake. This gives you a warning that your glucose levels are low. If the low glucose level is not corrected and the glucose drops further then the brain itself works less well and thinking and coordination are impaired.

In some people these warning systems do not function until the glucose level in the blood stream is dangerously low (below 2.0 mmol/l). At this low blood glucose level there is not enough glucose for the brain to function properly, which means that sometimes the person is unable to realise they are having a hypo, so they cannot help themselves out of the hypoglycaemia. They then require somebody else to help them and this is called a SEVERE HYPO. This is particularly a problem if it occurs when sleeping.

Please let the diabetes team at St John's Hospital know if you have had a SEVERE HYPO.

IMPAIRED AWARENESS OF HYPOGLYCAEMIA can occur in those people who keep their average glucose levels below 8.0 mmol/l, those who have lots of hypos, those who have previously had severe hypos and those who have had diabetes for over 15 years.

How can I keep myself safe and not lose my hypo awareness?

If you are treated with insulin it is very likely that at some stage you will have a hypo and get the SYMPTOMS of a low glucose level. The closer you keep your glucose levels to normal (4-8 mmol/l) the more often you will go low. Many people who keep their glucose levels well-controlled will feel low about twice a week and will be able to take the correct amount of rapid-acting carbohydrate (sugar) to bring the glucose levels up without overshooting.

If you are having very frequent hypos, or can only feel a low glucose when it is about 2.0 mmol/l, you are at risk of having a SEVERE HYPO.

If you **have had** a SEVERE HYPO recently you are at very high risk of having another within the next month.

Please let the diabetes team at St John's Hospital know if you have had a SEVERE HYPO.

Hypoglycaemia begets hypoglycaemia. So, if you have lots of hypos you must reduce your insulin to stop having them. If you are taking sulphonylurea tablets such as Gliclazide, Glipizide, Glimepiride or Glibenclamide you should reduce the dose or stop taking them altogether. It is known that if you have **no levels below 4.0 mmol/l for at least a month** your warning signs of low blood glucose should improve.

If you have had a SEVERE HYPO do not correct any subsequent high blood glucose levels for at least 24 hours. Allow yourself to run high.

What can I do if I have reduced awareness of hypoglycaemia or no awareness at all?

The first thing is to realise that you have this important complication of diabetes. Being aware that you cannot pick up your warning signs as clearly as before is important. It is also important for your family, close friends and work colleagues to be made aware that you have this problem and they must be given clear instructions about how to treat a SEVERE HYPO should you have one in their presence. Reduced awareness may improve if you have no glucose levels under 4.0 mmol/l for at least a month. This will usually mean your glucose levels are higher than you might like, but this is necessary to keep you and others safe. You must test your blood glucose levels frequently as you cannot rely on your feelings to know if your blood glucose level is low.

What if I have no awareness?

Unfortunately, this is a very serious complication of diabetes. It will affect some people who have had diabetes for many decades.

In this situation everyone who is close to you must be made aware that you cannot feel your hypos coming on. They will know when you are low as your behaviour may change slightly even though you are not aware of this. You have to rely entirely on frequent blood glucose testing to keep yourself safe, and you have to keep your glucose levels always above 4.0 mmol/l.

You should always carry some ID to let people know that you have diabetes in case they find you in a SEVERE HYPO. Please ask a member of the diabetes team about forms of ID that are available.

Why are hypos so important?

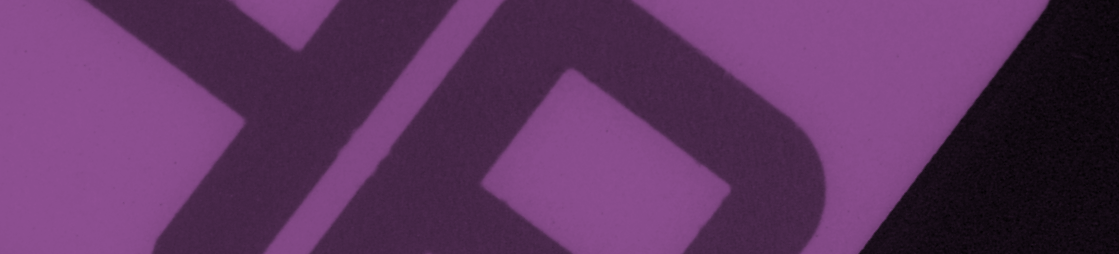
Having a very low glucose level is horrible. You feel dreadful, your behaviour changes and it upsets you, your family and friends. Strangers who are not aware of this change in behaviour may think you are drunk and may be unsympathetic. Some people with a SEVERE HYPO will lose consciousness and some will have a seizure (a fit). Some people who have had a SEVERE HYPO will have a short-lived weakness of an arm or a leg for a few hours and may feel generally 'hung-over'. Some people with a SEVERE HYPO injure themselves or other people. Brain function is not normal as your glucose level drops below 3.0 mmol/l. As the glucose drops further your brain function gets more and more impaired. If you are operating machinery, doing intellectual work or driving a vehicle your performance will be severely impaired once your glucose level drops below 3.0 mmol/l.

If you have a road traffic accident when you have a blood glucose level below 3.0 mmol/l you may be prosecuted for dangerous driving and this can carry a custodial sentence.

What if I have a SEVERE HYPO which cannot be helped by family or friends?

Somebody should dial 999. The operator will ask you which service you require, you should ask for the 'ambulance service'. You will then be passed on to the ambulance service call taker. They will confirm your details including your address/location and telephone number (please be ready with these) and ensure an ambulance is on its way.

While you are waiting for the ambulance to arrive you may be offered advice by the call-taker or possibly handed over to a paramedic advisor who will be able to offer you some specific advice over the telephone while the ambulance is on its way.



When the ambulance arrives it may be a car, with one ambulance clinician, a double crewed ambulance with two ambulance clinicians or even a car and an ambulance.

The paramedic will assess your condition, check your blood glucose level and then treat you. A number of treatment options are available and include oral glucose gel, glucagon (injected into the muscle) or intravenous glucose (injected into a vein).

Most people respond quickly to these treatments and afterwards there are a number of options available to you for follow-up care including transportation to the emergency department. This will occur if you do not respond well, there are risk factors or complications or where there are concerns that you may suffer a further hypoglycaemic event. If you respond well to treatment and blood glucose levels can be stabilised above 5 mmol/l, it may not be necessary to take you to hospital. The ambulance clinician will discuss options with you and determine what the best and safest option would be regarding referral.

You are of course entitled to refuse transportation to the Emergency Department, but if you have suffered a SEVERE HYPO it is always important to listen to the advice of the ambulance clinician and realise the importance of speaking to your diabetes care provider as soon as possible afterwards.

Please let the diabetes team at St John's Hospital know if you have had a SEVERE HYPO.

Reducing the risk of hypos

Certain insulins are associated with fewer hypos. Not having fatty lumps at injection sites (by using different places for insulin injection), and by not taking too high an insulin dose (especially the long acting insulins) will all reduce the risk of hypos.

Frequent testing of your blood glucose will help you take the correct amount of insulin and let you know what your threshold is for picking up the symptoms of a low blood glucose. It should certainly be above 3.5 mmol/l. For those with Type 1 diabetes insulin pumps reduce the risk of hypos and for a very small number of people islet cell transplantation may be considered.

The people who see you for your diabetes care are there to assist you by not letting hypos get out of control. Sometimes it is your family that feel hypos are taking over rather than you appreciating this. Please ask them if they think your hypos are a problem. At every consultation with a healthcare professional hypos must be discussed and at least once a year your injection sites must be examined by a healthcare professional.

If your warnings are not as sharp as you would like please talk about this to one of the diabetes team.

Driving regulations and hypoglycaemia

The DVLA in Swansea issues driving licences in the United Kingdom. If you are treated with insulin you must inform the DVLA. If you have two SEVERE HYPOS within a year your licence will be removed. It will be up to the individual who has had the SEVERE HYPOS to inform the DVLA. It is recommended that you always test your blood glucose before you drive and ensure the level is at least 5.0 mmol/l. If you are driving a long distance you should check your blood glucose regularly. Always keep rapid acting carbohydrate in the car and blood glucose testing kit. If you feel hypo when driving pull off the road, take rapid-acting carbohydrate, take the keys out of the ignition and get out of the drivers' seat. Please wait for 40 minutes after your blood glucose is above 4.0 mmol/l before driving again.

If you have complete unawareness of hypos it will be difficult for the DVLA to grant you a licence.

If you are treated with medication that may cause hypoglycaemia

If you hold a Group 2 licence and you treat your diabetes with any tablet from the sulphonylurea groups (Gliclazide, Glipizide, Glimepiride or Glibenclamide) you must notify the DVLA as these increase the risk of hypoglycaemia.



If you are treated with insulin

In November 2011, the DVLA removed the ban for people on insulin driving Group 2 vehicles (larger vehicles, and some passenger-carrying vehicles). People with diabetes treated with insulin can now undergo an individual independent medical assessment annually to assess their fitness to drive these vehicles. To apply for a licence for these larger vehicles you will need to meet the following criteria:

- You have had no severe hypoglycaemic event in the previous 12 months (this is defined as 'requiring assistance of another person').
- You have full hypoglycaemic awareness.
- You can show adequate control of your diabetes by regular blood glucose monitoring, at least twice daily and at times relevant to driving*.
- You can demonstrate an understanding of the risks of hypoglycaemia.
- There are no other debarring complications of diabetes.

*If you have insulin-treated diabetes, you will need to have used a blood glucose meter with a memory function to measure and record blood glucose levels for at least three months prior to submitting your application.

Information can be found on the DVLA website **www.direct.gov.uk**. If you do not have access to the internet you can get a questionnaire by calling DVLA's Customer Enquiry Group. Phone: **0300 790 6806**. Open 8.00am-5.30pm (Mon–Fri) / 8.00am-1.00pm (Saturday).

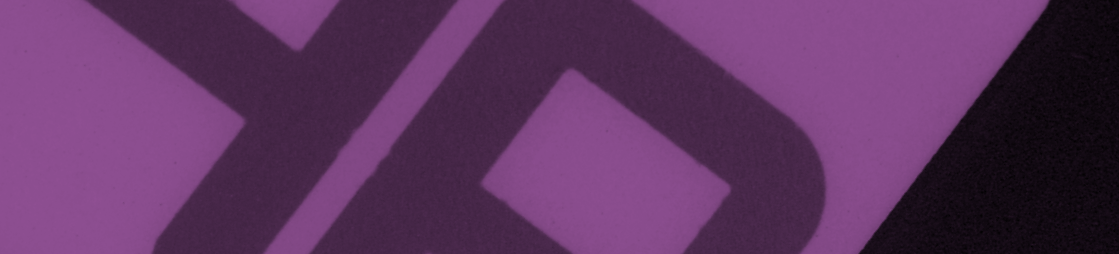
The bottom line

Low glucose levels (hypoglycaemia) are an almost inevitable consequence of insulin treatment. For the majority of people they are inconvenient, for some they can be serious and for a small minority they can be life-threatening. Early on in diabetes the warnings of hypoglycaemia will be sharp. As the years roll on they may change and the glucose levels may be lower before the warning symptoms kick-in. For an unfortunate few all warning symptoms will be lost.

If you have had a **SEVERE HYPO please contact the diabetes team as soon as possible** as you are at great risk of having another SEVERE HYPO unless changes are made to your insulin.

If we do not know about your hypos then we cannot help you with them. We are here to help you with your diabetes in all its aspects.





If you have any questions regarding anything within this booklet please discuss them with the diabetes team at St John's Hospital, Livingston.

Thank you for reading this booklet.

The Diabetes Team, St John's Hospital (November 2012)

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