

Birmingham, Solihull, Sandwell and Environs Area Prescribing Committee (APC)

Treatment and Management of Hypoglycaemia in Adults with Diabetes Mellitus

Diabetes Medicines Management Advisory Group (DMMAG)

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Treatment and Management of Hypoglycaemia in Adults with Diabetes Mellitus

Hypoglycaemia is defined as a capillary blood glucose (CBG) level of below 4mmol/L and requires immediate treatment. (Diabetes.co.uk, 2019)

Healthcare professionals should provide information about the awareness and management of hypoglycaemia, to patients treated with medications which can cause hypoglycaemia. For example, those taking sulphonylureas and prandial glucose regulators e.g. Repaglinide, or patients on insulin therapy. This information can be provided and reinforced through structured education. See [Hypoglycaemia In Adults In The Community](#) and [What is a hypo?](#) for more information.

In addition, the NICE 'Diabetes in adults' quality standard (QS6), updated in 2016, states that people with diabetes who have experienced hypoglycaemia requiring medical attention, should be referred to a specialist diabetes team.

Symptoms of Hypoglycaemia

Symptoms of hypoglycaemia can be categorised into adrenergic and neuroglycopenic symptoms. Adrenergic symptoms appear first due to activation of the sympathetic nervous system (including the adrenal medulla). Neuroglycopenic symptoms occur later as a result of brain glucose deprivation.

Some common symptoms of hypoglycaemia are listed below. For more information on symptoms see [Hypoglycaemia In Adults In The Community](#).

Adrenergic symptoms	Neuroglycopenic symptoms
<ul style="list-style-type: none"> • Tremor • Paraesthesia • Hunger • Palpitations • Nausea • Headache • Sweating 	<ul style="list-style-type: none"> • Convulsions • Loss of consciousness • Drowsiness • Blurred vision • Speech difficulties • Confusion • Coma

Impaired Awareness of Hypoglycaemia

Impaired awareness of hypoglycaemia increases the risk of progressing to severe hypoglycaemia in affected patients. This can be due to a decline in intensity of hypoglycaemia symptoms or patients experiencing no symptoms at all. It can also present as the onset of neuroglycopenic symptoms before the appearance of adrenergic warning symptoms (John R.White Jr., 2007).

Impaired awareness of hypoglycaemia is more commonly noted in patients with long standing diabetes and those who experience hypoglycaemia frequently (Graveling and Frier, 2010).

Some medications such as beta blockers can also lead to an impaired awareness of hypoglycaemia as well as factors such as stress, depression and consuming alcohol.

See [The Contribution of Medications to Hypoglycemia Unawareness](#) for more information.

Risk factors for Hypoglycaemia

There are many risk factors for hypoglycaemia. Some are listed below:

Risk factors for Hypoglycaemia

- Impaired awareness of hypoglycaemia
- Cognitive impairment
- Strict glycaemic control
- Long duration of Diabetes Mellitus
- History of frequent or severe hypoglycaemia
- Terminal illness
- Increased exercise
- Irregular lifestyle
- Lack of blood glucose monitoring
- Food malabsorption disorders
- Bariatric Surgery

One of the main risk factors for hypoglycaemia is strict glycaemic control as highlighted in the 2008 ACCORD study. Recognised and unrecognised hypoglycaemia was more common in the intensive group than in the standard group as well as a statistically significant relationship between the number of hypoglycaemic episodes and the risk of death among participants.

Potential causes of Hypoglycaemia

There are many possible causes of hypoglycaemia. Some are listed below:

Possible causes of Hypoglycaemia

- Acute illness
- Stress
- Accidental intramuscular injection of insulin
- Incorrect insulin injection technique
- Confusion with treatment
- Missed/delayed meals
- Reduced appetite
- Reduced intake of carbohydrates
- Unplanned exercise
- Drinking alcohol without eating

Treating Hypoglycaemia

Hypoglycaemia is treated in different ways depending on whether it is mild (patient conscious and able to self-treat), moderate (patient conscious but requires third party assistance) or severe (patient unconscious and requires third-party assistance).

15-20g of fast-acting carbohydrate is used to treat a hypoglycaemic episode if the patient remains conscious and can self-treat. Patients should be counselled on carrying hypoglycaemia treatments with them at all times.

Suitable treatments (15-20g fast-acting carbohydrate) include:

- 4- 5 jelly babies
- 200ml of smooth orange juice
- 150ml of full sugar Coca Cola
- 5 or 6 dextrose tablets

The suitability of hypoglycaemia treatments should be reviewed for individual patients. For example, orange juice may not be suitable for patients on dialysis. (DaVita Kidney Care, 2020)

Patients should be discouraged from using foods with a high fat content such as chocolate, to treat hypoglycaemia. The higher fat content will slow the release of glucose into the bloodstream and may not raise blood glucose fast enough.

NB: Since the introduction of The Soft Drinks Industry Levy in April 2018 many soft drinks companies changed the formulation of their products to reduce sugar content. As a result of this, 150ml of Lucozade® is no longer sufficient to treat hypoglycaemia. If patients choose to treat hypoglycaemia with Lucozade®, they will need to drink 170ml-230ml. (This figure is correct at the time of writing for Lucozade® Energy-Original. Patients should check the nutritional information on labels of hypoglycaemia treatment products to decipher what quantities would equate to 15-20g of carbohydrate.)

If after 10 - 15 minutes of treating the hypoglycaemic episode, capillary blood glucose levels are not above 4mmol/L the patient should re-treat using 15-20g of fast acting carbohydrate. CBG levels should then be tested again 15 minutes later, and the hypo should continue to be re-treated until CBG levels are above 4mmol/L. If a patient has treated a hypoglycaemic episode three times and CBG levels are still below 4mmol/L patients should seek immediate medical advice.

When the patient has reached a CBG level of more than 4mmol/L they should take a snack providing sustained availability of 15-20 grams of carbohydrate (e.g. a sandwich, a cereal bar or 2 digestive biscuits) or the next meal (if it is due). This will prevent blood-glucose concentration from falling again.

Moderate Hypoglycaemia

Locally, patients are encouraged to self- treat where possible, however, if the treatments above cannot be safely administered due to a patient being confused, disorientated or aggressive, products such as GlucoGel® (2 x 25g tubes) or RapiLOSE® gel can be prescribed. The patient must be conscious and able to swallow and these products should not be prescribed routinely for the treatment of hypoglycaemia.

Glucose 40% gel is administered to conscious patients, who can swallow, having a hypoglycaemic episode. The contents of the tube are squeezed into the side of the mouth (between teeth and gums) and cheeks are then massaged gently from the outside. See Birmingham, Sandwell, Solihull and environs (BSSE) Area Prescribing Committee (APC) formulary for [Treatment of hypoglycaemia products](#).

Severe Hypoglycaemia

Call 999 immediately for patients who are fitting or unconscious. Do not administer any treatments by mouth. The patient must be put into the recovery position and 1mg Glucagon injection may be administered if a suitably trained person is present.

Glucagon is used to treat serious hypoglycaemia symptoms, including collapse and fitting and can be administered via subcutaneous or intramuscular injection. When prescribing Glucagon, it is important to reinforce that it will be people living with the patient who will need to know how to use the injection correctly and not necessarily the patient themselves.

For more information on how to treat hypoglycaemia in special situations such as when a patient is using an insulin pump or is enterally fed please see [Hypoglycaemia In Adults In The Community](#) for more information.

Flash Glucose Monitoring and Hypoglycaemia

Flash glucose monitors measure interstitial blood glucose and not capillary blood glucose levels. It is therefore imperative that patients who use a flash glucose monitor are counselled on the time lag associated with interstitial blood glucose levels. If hypoglycaemia is suspected, patients should test capillary blood glucose and treat as above.

Locally, primary care is asked to prescribe a box of 50 test strips per month for use with a capillary blood glucose meter for those patients who use a flash glucose monitor.

For more information on Flash Glucose Monitoring please see the NHS Birmingham and Solihull (BSol) CCG policy on [Commissioning of Flash Glucose Monitoring for Patients with Diabetes](#).

Continuous Glucose Monitoring and Hypoglycaemia

Continuous glucose monitoring (CGM) is useful in hypoglycaemia management, as patients are able to observe the trend of their blood glucose levels. Continuous glucose monitors can also be set to sound an alarm and alert patients when blood glucose levels are high or low. This enables patients to respond more quickly to changes in their blood glucose levels.

Continuous glucose monitors measure interstitial blood glucose and patients will therefore need to be counselled on the time lag between the monitor and real-time capillary blood glucose levels. If hypoglycaemia is suspected, patients should test capillary blood glucose and treat as above.

Managing Hypoglycaemia

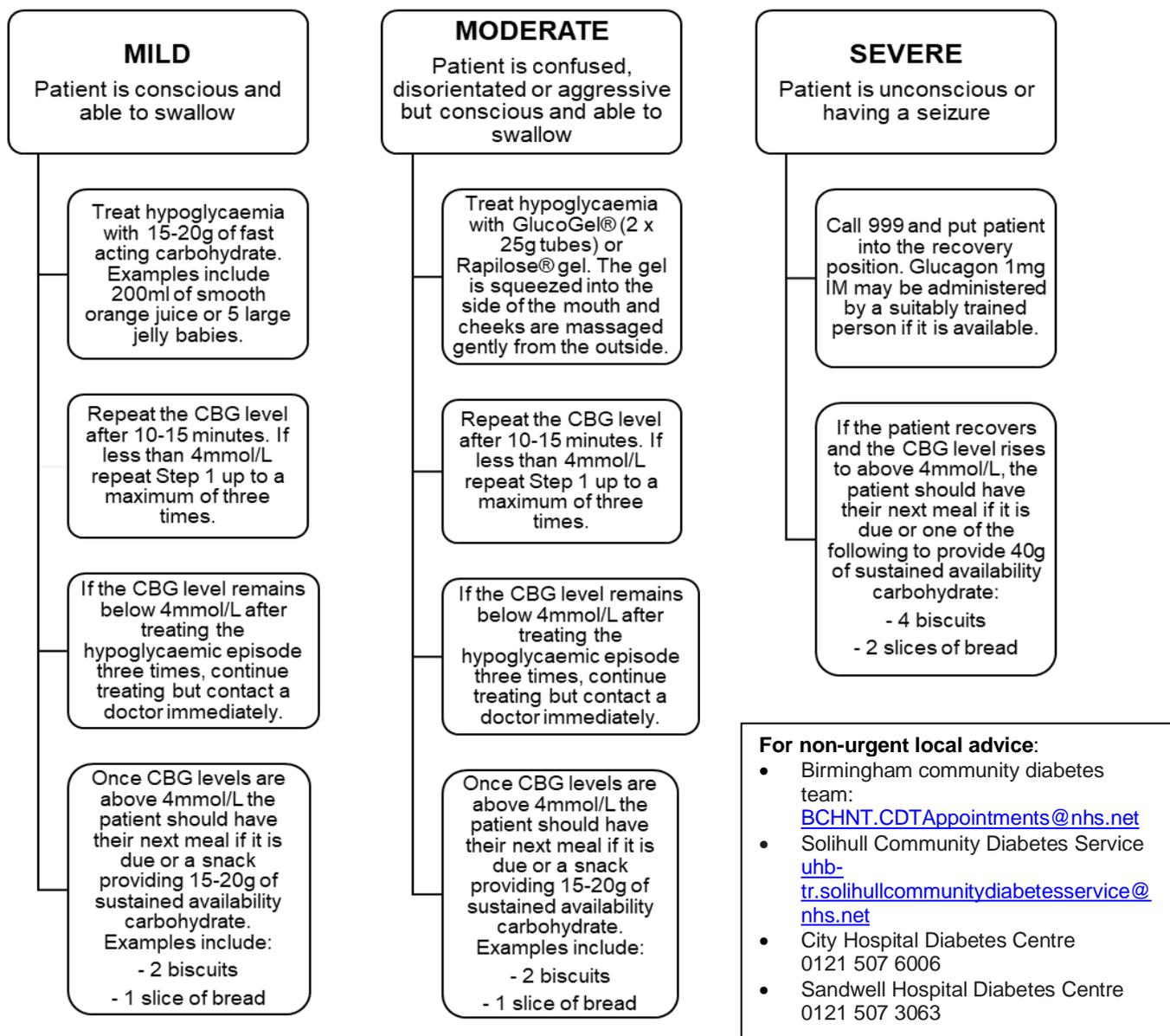
Suspected Hypoglycaemia

Check capillary blood glucose (CBG).

If patient unable to check CBG they should manage their symptoms as if the CBG is below 4mmol/L.

If CBG is above 4mmol/L, other causes for the symptoms should be considered.

If CBG is below 4mmol/L the patient should be assisted in following one of the pathways below.



Following an episode of hypoglycaemia, the cause should be investigated and medication, insulin and treatment regimes should be reviewed.

Patients who have experienced hypoglycaemia requiring medical attention should be referred to a specialist diabetes team as per the NICE 'Diabetes in Adults' QS6 quality standard (2016).

Driving and Hypoglycaemia

To avoid having hypoglycaemic episodes whilst driving patients should:

- Always test their CBG levels before driving. If levels are below 5mmol/L they should not drive. If the CBG level is between 4mmol/L and 5mmol/L the patient should eat a small snack which provides sustained availability of carbohydrate, such as two plain biscuits or a piece of fruit. If the CBG level is below 4mmol/L the patient should treat the hypoglycaemic episode and then wait at least 45 minutes after CBG levels have risen above 5mmol/L, to drive.
- Avoid driving when tired or on medications that may cause drowsiness. These will impact the patient's ability to recognise low blood glucose levels.
- Always travel with treatments in the event of a hypoglycaemic episode. See page 3 for a list of appropriate treatments.
- Travel with equipment which enables them to test their CBG levels on a journey.
- Take regular breaks to test their CBG levels. On long journeys this should be at least every two hours.

For DVLA guidance please see [Assessing fitness to drive - a guide for medical professionals](#).

For more information on driving and hypoglycaemia please see [Diabetes: Safe Driving and the DVLA](#).

Treating Hypoglycaemia whilst driving

If a patient starts to feel signs or symptoms of a low blood glucose level, they should find a safe place to stop and park. The key must be removed from the ignition and the patient should move into the passenger's seat.



The patient should test their CBG. If the level is below 4mmol/L they should treat the hypoglycaemic episode in the usual way with 15-20g of fast acting carbohydrate. The patient should wait at least 45 minutes after their blood glucose level has risen above 5mmol/L and they feel fully alert before driving again.



If the level is between 4mmol/L and 5mmol/L the patient should eat a small snack which provides sustained availability of carbohydrate, such as two plain biscuits or a piece of fruit. The patient should re-check their CBG levels and only drive again when their CBG level has risen above 5mmol/L and they feel fully alert before driving again.

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