

ANZCOR Guideline 9.2.9 – First aid Management of a Diabetic Emergency

Summary

Who does this guideline apply to?

This guideline applies to adult and child victims.

Who is the audience for this guideline?

This guideline is for bystanders, first aiders and first aid providers.

Recommendations

The Australian and New Zealand Resuscitation Committee on Resuscitation (ANZCOR) make the following recommendations:

- When available, and trained to do so, use a blood glucometer to check the victim's blood glucose level.
- When available, glucose tablets are preferred over other sugars for the first aid management of suspected hypoglycaemia in conscious victims.
- When available, and trained to do so, use a GlucaGen® HypoKit® glucagon injection to manage suspected hypoglycaemia in an unconscious or seizing victim.
- If unsure of the blood glucose, manage the victim as having suspected hypoglycaemia.

1 Introduction

Diabetes is a chronic, lifelong medical condition which occurs when the pancreas fails to produce sufficient insulin or the body develops a resistance to the action of its own insulin. Untreated, the absolute or relative lack of insulin will lead to a high blood glucose level. There are two main types of diabetes. 'Type 1 diabetes' is an auto-immune disease that often develops in childhood, and requires lifelong treatment with insulin. 'Type 2 diabetes' is more commonly recognised in adulthood, and requires a treatment combination of diet, exercise, medication, and sometimes insulin. Less commonly, 'gestational diabetes' may develop in pregnancy, and diabetes can also occur as a consequence of another disease or as a side effect of medication.

Normally our body tightly controls its blood glucose level within a 'normal' range. Having diabetes negatively interferes with this control system, and people living with diabetes need to manage their own blood glucose levels by monitoring what they eat, adjusting their insulin or medication doses, and frequently testing their own blood glucose levels.

When blood glucose levels become too high or too low, people with diabetes (and some other people without diabetes) may become unwell and need first aid, or even treatment at a medical facility.

2 Low blood glucose (*hypoglycaemia* or 'a hypo')

2.1 Introduction

People with diabetes may develop low blood glucose as a result of:¹

- too much insulin or other blood glucose lowering medication;
- inadequate or delayed carbohydrate intake after their usual insulin or oral medication dose;
- exercise without adequate carbohydrate intake; possibly delayed for up to 12 hours or more after exercise.
- in the setting of illness; or
- excessive alcohol intake.

Competitors in ultra-marathon endurance events, who do not have diabetes, can also become energy deplete and develop low blood glucose levels requiring first aid management.

Hypoglycaemic events range from those that can be self-managed, to severe episodes, where medical help may be needed.

2.2 Recognition

The brain requires a continuous supply of glucose to function normally. When blood glucose levels fall below normal levels symptoms and signs may include:

- sweating,
- pallor (pale skin), especially in young children¹
- a rapid pulse;

- shaking, trembling or weakness;
- hunger;
- light headedness or dizziness;
- headache;
- mood or behavioural changes, confusion, inability to concentrate;
- slurred speech;
- being unable to follow instructions;
- unresponsive; or
- seizure

2.3 Management

If a person with diabetes has a diabetes management plan then that plan should be followed. If a person with diabetes reports low blood glucose or exhibits symptoms or signs of *hypoglycaemia*:

- Stop any exercise, rest and reassure;
- If the victim is able to follow simple commands and swallow safely, we recommend that first aid providers administer 15-20 grams glucose tablets (4 - 5 x 4 gram glucose tablets) for treatment of symptomatic hypoglycemia [ILCOR CoSTR 2015 strong recommendation, low-quality evidence] ^{2,3,4}.
- If glucose tablets are not available, we suggest administering:
 - Confectionary including:
 - jelly beans (5-20 beans depending on the brand)
 - Skittles® (20-25 candies)
 - Mentos® (5-10 mints) [ILCOR CoSTR 2015, weak recommendation, very-low-quality evidence]²
 - Sugary drinks or sugar-sweetened beverages (approx. 200 mL), but DO NOT administer 'diet' or 'low-cal' or 'zero' or 'sugar free' beverages;
 - Fruit juices (approx. 200 mL);
 - Honey or sugar (3 teaspoons);
 - Glucose gels (15 g of glucose gel); and
- Monitor for improvement – resolution of symptoms would be expected within 15 minutes.

If symptoms or signs of hypoglycemia persist after 10-15 minutes, and the victim is still able to follow simple commands and swallow safely, administer a further 4 x 4g glucose tablets or alternatives as listed above. Once recovered, give a snack with longer acting carbohydrate, for example: 1 slice of bread OR 1 glass of milk OR 1 piece of fruit OR 2-3 pieces of dried fruit OR 1 snack size tub of yoghurt (not diet or 'sugar free' yogurt). If it is a usual meal time, then eat that meal.

If the victim deteriorates, does not improve with treatment, is seizing or is unconscious, call for an ambulance.

- If the victim is unresponsive and not breathing normally, commence resuscitation following the Basic Life Support Flowchart [ANZCOR Guideline 8].
- If the victim is unconscious but breathing, lie the victim on their side and ensure the airway is clear [ANZCOR Guideline 3]

Insulin Pumps

If the victim is wearing an insulin pump, then they themselves may 'suspend' their own pump if part of a personal diabetes management plan.

First aiders should *not* touch any insulin pump being worn by the victim. They should manage and provide treatment for hypoglycaemia as listed above.

2.4 Use of glucagon to treat severe hypoglycaemia

Family members of, and carers for, people with diabetes may be trained in the use of the GlucaGen® HypoKit®. These kits contain an injection of glucagon, which works by triggering the liver to release stored glucose, resulting in raised blood glucose levels. The glucagon is administered by injection.

If trained to do so, give Glucagon in the case of a severe hypoglycaemic event, when the victim is unconscious or seizing, and/or is unable to swallow safely⁴.



3 High blood glucose (*hyperglycaemia*)

3.1 Introduction

Hyperglycaemia means having a high blood glucose level. Common causes of hyperglycaemia include inadequate levels of insulin or incorrect doses of diabetes tablet medications, infections, excess carbohydrate intake, and stressful situations. Hyperglycaemia can develop over hours or days, and many people do not experience symptoms from hyperglycaemia until their blood glucose levels are extremely high. Hyperglycaemia can also occur at the time of initial diagnosis of diabetes, and may go unrecognised until the victim is clearly unwell. If untreated, the victim gradually deteriorates, and can go into a diabetic coma.

3.2 Recognition

When blood glucose levels remain above normal levels symptoms and signs may include:

- excessive thirst;
- frequent urination;
- dry skin and mouth, with sunken eyes (signs of dehydration);
- recent weight loss;
- rapid pulse;
- nausea and vomiting;
- abdominal pain;

- rapid breathing;
- fruity sweet smell of acetone on the breath (similar to paint thinner or nail polish remover); and
- confusion, a deteriorating level of consciousness, or unresponsiveness.

3.3 Management

If a person with diabetes has a diabetes management plan then that plan should be followed. If the victim has no management plan and has symptoms or signs of *hyperglycaemia* they should be assessed by a health care professional.

- If the victim is unresponsive and not breathing normally, commence resuscitation following the Basic Life Support Flowchart [ANZCOR Guideline 8]
- If the victim is unconscious but breathing, lie the victim on their side and ensure the airway is clear [ANZCOR Guideline 3].

4 Management when unsure if the blood glucose level is high or low

When unsure if the victim has a high or low blood glucose level, the safest option is to treat as for *hypoglycaemia* (low blood glucose level). Treatment may lead to a marked improvement if the blood glucose level is low, and is unlikely to do harm if the blood glucose level is high.

4.1 Use of blood glucose measuring devices (Glucometers)

If trained to do so and a glucometer is available, checking the victim's blood glucose level will guide management, and can confirm *hypoglycaemia* or *hyperglycaemia*. Normal blood glucose concentrations are between 4.0 and 7.8 mmol/L.

A blood glucose level between 3.0 mmol/L and 4.0 mmol/L is an "alert value", meaning that to prevent progression to a more serious, clinically important hypoglycaemia, it is time for a normal food intake, either a snack or meal, depending on the time of day and usual food intake habits⁵.

Clinically important *hypoglycaemia* is defined as a blood glucose level less than 3.0 mmol/L, where there is decreased neuro-cognitive function and evidence of increased morbidity and mortality⁵.

Symptoms of hypoglycaemia may be mimicked by other conditions such as stroke, epilepsy, or migraine. If trained, checking a blood glucose will improve the accuracy of diagnosing hypoglycaemia. If blood glucose concentration is normal, and symptoms and signs of hypoglycaemia persist, consider other diagnoses [CoSTR 2015: weak recommendation/low quality evidence]².

Hyperglycaemia is defined as a blood glucose level above the normal reference range. Severe hyperglycaemia is defined as a blood glucose concentration greater than 15 mmol/L.

References

1. International Hypoglycaemia Study Group. Minimizing Hypoglycemia in Diabetes. *Diabetes Care*. August 2015. Volume 38: 1583-159
2. Zideman, D. A., Singletary, E. M., De Buck, E., et al. (2015). Part 9: First aid: 2015 International Consensus on First Aid Science with Treatment Recommendations. *Resuscitation*, 95, e225.
https://cprguidelines.eu/sites/573c777f5e61585a053d7ba5/content_entry573c77e35e61585a053d7bac/573c77e65e61585a053d7bb6/files/S0300-9572_15_00368-8_main.pdf?
Accessed 19/05/2017
3. Carlson JN, Schunder-Tatzber S, Neilson CJ, Hood N. Dietary sugars versus glucose tablets for first-aid treatment of symptomatic hypoglycemia in awake patients with diabetes: a systematic review and meta-analysis. *Emerg Med J* 2016; 34:100–106.
4. Villani M, de Courten B, Zoungas S. Emergency treatment of hypoglycaemia: a guideline and evidence review. *Diabet Med*. 2017 May 6. doi: 10.1111/dme.13379
Diabet Med. 2017 May 6. doi: 10.1111/dme.13379
<https://www.ncbi.nlm.nih.gov/pubmed/28477413> Accessed 19/05/2017
5. International Hypoglycaemia Study Group. Glucose Concentrations of Less Than 3.0mmol/L (54mg/dL) Should Be Reported in Clinical Trials: A Joint Position Statement of the American Diabetes Association and the European Association for the Study of Diabetes. *Diabetes Care*. DOI: 10.2337/dc16-2215

Further Reading

ANZCOR Guideline 2 - Managing an Emergency

ANZCOR Guideline 3 - Recognition and First Aid Management of the Unconscious Victim

ANZCOR Guideline 8 - Cardiopulmonary Resuscitation

ANZCOR Guideline 9.2.2 – Stroke