

# Hypoglycaemia

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## Background – About Hypoglycaemia

- Consider hypoglycaemia in Type 2 diabetes, especially in at-risk patients e.g:
  - the elderly
  - patients with cardiovascular disease and renal impairment
  - patients on combination therapies, including sulphonylureas and insulin
  - patients with heavy alcohol intake.
- In Type 1 diabetes, hypoglycaemia is the result of a mismatch between insulin dose, food intake, and exercise.
- Hypoglycaemia is a significant cause of falls and fractures in the elderly, and is dangerous in patients using heavy machinery.

## Assessment

1. Ask about **symptoms** of hypoglycaemia.

### **Symptoms of hypoglycaemia**

- *Hunger, sweating, or shakiness*
- *Nervousness, irritability, agitation, aggression*
- *Dizziness, or light-headedness*
- *Drowsiness, confusion*
- *Difficulty speaking, weakness*
- *Palpitations*
- *Numbness around the lips and fingers*
- Some patients may have difficulty recognising hypoglycaemia symptoms.
- If patient feels unwell, advise early checking of blood glucose.

2. Ask about the frequency, severity, and awareness of hypoglycaemic episodes.

- **Consider asking these questions**

- *At what glucose level do you first notice a hypo?*
- *Have you ever had a low blood sugar detected by a family member before you were aware?*
- *How often does your partner or another family member prompt you to check if your glucose is low?*
- *Are you argumentative if this occurs?*
- *Have you required help from another family member to manage hypoglycaemia (e.g., fetch food, drink, or administer this)?*
- *Have you had an ambulance call-out or required glucagon in the last 12 months?*
- *Do you ever pick up readings on blood glucose meter < 3 mmol/L without symptoms? Readings < 2 on blood glucose meter are a major warning sign that the patient is having asymptomatic episodes.*

*If possible, ask family members whether they notice hypoglycaemia before the patient does and how often it occurs.*

- **Note:** HbA1c levels are not helpful in evaluating hypoglycaemia as it occurs at all levels of HbA1c.

### 3. Consider **causes of hypoglycaemia**

- Missed or delayed meals
- Too little carbohydrate with meals
- Extra physical activity not covered by extra carbohydrate or a reduction in insulin dose
- Dose of insulin or antidiabetic medication is too high
- Alcohol on an empty stomach or too much alcohol
- Too much time between injection and meal
- Changing the time that insulin is given
- Illness especially if vomiting
- Very rare causes such as Addison disease, hypopituitarism

### 4. Consider whether the patient has **hypoglycaemic unawareness**.

- Unawareness occurs when there is failure in the autonomic drive that alerts the patient to falling blood glucose levels.
- The patient does not have the typical symptoms of hypoglycaemia when the blood glucose is  $< 3.5$  mmol/L.
- It is not common in type 2 diabetes.
- In type 1 diabetes, hypoglycaemia unawareness increases with diabetes duration and presence of autonomic neuropathy.
- Hypoglycaemic unawareness in type 1 diabetes can be caused by frequent 'hypos' or 'running low'. Set slightly higher BSL targets to reverse.

## Management

It is recommended that patients have a **hypo kit** and that one be kept on all clinical sites.

A **hypo kit** should contain:

- blood glucose monitoring kit
- disposable gloves
- liquid carbohydrate e.g., fruit juice, or soft drink
- 15 g oral glucose gel or glucose tablets
- treatment algorithm
- low GI carbohydrate food e.g., milk, biscuits, fruit.

## Emergency treatment for severe hypoglycaemia and inability to swallow

1. Commence **emergency resuscitation** if necessary.
  1. Call **000** (triple zero) and arrange urgent ambulance transfer to hospital stating "diabetic emergency/cardiac arrest".
  2. Commence resuscitation using the principles of **DRS ABCD**.
2. Position patient in the recovery position.
3. Check blood glucose level (BGL) of any unconscious patient.
4. Depending on safety assessment, consider sublingual glucose gel, honey, or sugar in children.
5. Administer 1 mg of glucagon intramuscularly or subcutaneously into the thigh, buttock or upper arm. If not available, further emergency medical assistance will be required.
6. Observe. After glucagon injection, patient should recover within 10 minutes but this may take up to 20 minutes.
7. Once patient regains consciousness, administer carbohydrate using **rule of 15**.

### **Rule of 15**

1. Provide 15 grams of quick-acting carbohydrate that is easy to consume e.g:
  - half a can of non-diet soft drink
  - half a glass of fruit juice
  - 3 teaspoons of sugar or honey
  - 6 to 7 jelly beans
  - 1 tube glucose gel
  - glucose tablets – 15g equivalent.
2. Wait 15 minutes and repeat blood glucose check. If the level is not rising, repeat the above treatment.
3. If the patient's next meal is > 15 minutes away, provide some longer acting carbohydrate e.g:
  - a sandwich
  - 1 glass of milk or soy milk
  - 1 piece of fruit
  - 2 to 3 pieces of dried fruit e.g., apricots or figs
  - 1 tub of natural low-fat yoghurt
  - 6 small dry biscuits and cheese.
4. Test glucose again during the next 2 to 4 hours.

### **Oral treatment if patient can swallow**

1. Don't delay as untreated hypos can lead to loss of consciousness.
2. Ensure the patient is seated or lying, and not at risk of falling.
3. If clinical suspicion is high, forego testing.
4. Otherwise, test blood glucose. If < 4, treat immediately with simple carbohydrate, using the **rule of 15**.

### **Review and educate about treatable causes**

1. Consider **treatable causes**.
  - Missed or delayed meals
  - Too little starchy food (carbohydrate) with meals
  - Extra exercise or physical work not covered by extra food
  - Too much insulin, or too many diabetes tablets
  - Consider non-accidental overdose of excessive insulin in a patient with mental health issues.
  - Alcohol on an empty stomach, or too much alcohol
  - Too much time between injection and meal
  - Changing the time that the patient has insulin or tablets
2. If there is no clear precipitant, such as a missed meal, consider the following actions:
  - Ensure adequate carbohydrate intake and regular meals.
  - Reduce alcohol intake.
  - Reduce insulin by 10%.
  - Reduce sulphonylurea, or stop sulphonylurea and start agent with low risk of hypoglycaemia e.g., metformin, DPP4 inhibitor, SGLT2 inhibitor or GLP-1 agonist. See [Diabetes Management](#).

- Increase self-monitoring blood glucose.
  - Monitor BGL and take carbohydrate snack before driving.
3. Consider re-education. See [Diabetes Education](#) referral.
4. Illness can sometimes cause blood glucose levels (BGL) to drop, especially when vomiting is part of the illness. See:
- Baker Heart and Diabetes Institute – [Hyperglycaemia and Sick Day Management for Adults With Type 1 Diabetes](#)
  - National Diabetes Service Scheme (NDSS) – [Living With Type 2 Diabetes: What to Do When You are Sick](#)
5. Consider driving implications:
- Advise of requirement to notify [VicRoads](#) if diabetes mellitus.
  - Educate about **Above 5 to Drive** for those who take insulin or other glucose lowering medication.
 

**Above 5 to drive**

    - *Test your blood glucose and ensure it is above 5 mmol/L before driving and every 2 hours during driving.*
    - *If you suspect a hypo while driving, pull over safely and treat the hypo with at least 15 g of fast acting carbohydrates:*
      - *For example, 6 to 10 jelly beans, 200mL fruit juice or non-diet soft drink.*
      - *Carry this with you at all times.*
      - *Follow up with a long acting carbohydrate.*
    - *Check your blood sugar rises above 5 mmol/L and reconfirm it 30 minutes later before resuming driving.*
    - See NDSS – [Diabetes and Driving](#)
  - If hypoglycaemic unawareness, carefully consider whether fit to drive.
6. In patients with hypoglycaemia unawareness, set higher glucose or HbA1c targets in consultation with an endocrinologist.

## Referral

- If recurrent severe hypoglycaemia, or hypoglycaemia associated with loss of consciousness, arrange [immediate diabetes referral or admission](#).
- Arrange [urgent or routine diabetes referral](#) if:
  - recurrent hypoglycaemia.
  - hypoglycaemic unawareness.
  - fitness to drive assessment for commercial driver's licence is required. See [fitness to drive](#).
- Consider referral to a [diabetes educator](#).

## Information

### For health professionals

#### Further information

Australian Diabetes Society – [National Evidence-based Guidelines for Management of Type 1 Diabetes in Children, Adolescents and Adults](#)

### For patients

- Baker Heart and Diabetes Institute – [Hypoglycaemia](#)
- Diabetes Victoria – [Hypoglycaemia and Diabetes](#)
- National Diabetes Services Scheme – [Multicultural Diabetes Portal](#)

## References

1. The Royal Australian College of General Practitioners (RACGP). [Management of type 2 diabetes: A handbook for general practice](#). Melbourne: RACGP; 2020.

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