



## CLINICAL GUIDELINE

# Diabetes, Algorithm for treatment of Hypoglycaemia in Adults with Diabetes

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

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### Important Note:

The Intranet version of this document is the only version that is maintained. Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

# Treatment of Hypoglycaemia in Adults in Hospital

Hypoglycaemia is a serious condition and should be treated as an emergency regardless of level of consciousness. Hypoglycaemia is defined as blood glucose of less than 4mmol/L (if not less than 4mmol/L but symptomatic give a small carbohydrate snack for symptom relief). For further information see "The Hospital Management of Hypoglycaemia in Adults with Diabetes Mellitus" [http://www.diabetologists-abcd.org.uk/JBDS/JBDS\\_HypoGuideline\\_FINAL\\_280218.pdf](http://www.diabetologists-abcd.org.uk/JBDS/JBDS_HypoGuideline_FINAL_280218.pdf)

## MILD

**Patient conscious, orientated and able to swallow (not fasting)**

- Give 15-20g of quick acting sugar, such as:
  - 60ml Glucojuice®
  - 5-7 Dextrosol® tablets or 4-5 Glucotabs®
  - 150-200ml pure fruit juice\*
  - 170ml Original Lucozade®
- Recheck blood glucose after 10-15 minutes: if less than 4.0mmol/L repeat above **up to 3 times**.
- If still less than 4, call doctor and consider IV 10% glucose at 100 ml/hr\*\* or 1mg glucagon IM (**once only** for Glucagon)\*\*\*

## MODERATE

**Patient conscious and able to swallow, but confused, disorientated or aggressive**

- If capable and cooperative, treat as for mild hypoglycaemia
- If not capable and cooperative but can swallow give 1.5-2 tubes of 40% glucose gel (squeezed into mouth between teeth and gums). If ineffective, use 1mg glucagon IM (**once only**)\*
- Recheck blood glucose after 10-15 minutes and if still less than 4.0mmol/L repeat above **up to 3 times**.
- If still hypoglycaemic, call doctor and consider IV 10% glucose at 100 ml/hr\*\* and 1mg IM glucagon (once only)

## SEVERE (or fasting)

**Patient unconscious/fitting, or very aggressive or nil by mouth (NBM)**

- Check ABC, stop IV insulin, contact doctor urgently
- Give IV glucose over 15 minutes as
  - 75ml 20% glucose or
  - 150ml 10% glucose or
  - 30ml 50% glucose (risk of extravasation injury) or
- 1mg Glucagon IM \* (**once only**)
- Recheck glucose after 10 minutes and if still less than 4.0mmol/L, repeat treatment

- Blood glucose should now be above 4mmol/L. Give 20g of long acting carbohydrate e.g. two biscuits / slice of bread / 200-300ml milk/ next meal containing carbohydrate (give 40g if IM Glucagon has been used) . Continue regular glucose monitoring.
- **For patients with enteral feeding tube**, Give 20g quick acting carbohydrate via enteral tube e.g. 50-70ml Ensure Plus ® Juice or Fortijuce®. Check glucose after 10-15 minutes. Repeat up to three times until glucose > 4.0mmol/L. Refer to full guideline for further management.

- If glucose now 4.0mmol/L or above, follow up treatment as described on the left.
- If NBM, once glucose >4.0mmol/L give 10% glucose infusion at 100ml/hr\*\* until no longer NBM or reviewed by doctor

**IN SEVERE, RECURRENT or RESISTANT HYPOGLYCAEMIA OR PATIENT HAEMODYNAMICALLY UNSTABLE, CONSIDER ADRENAL INSUFFICIENCY (see adrenal insufficiency guideline) OR OTHER CONTRIBUTING ILLNESS**

**DO NOT** routinely omit subsequent insulin dose. If not eating, quick acting insulin may be withheld and if on mixed insulin, a variable rate IV infusion may be appropriate until eating again. **CONTINUE** regular capillary blood glucose monitoring for 24- 28 hours (may be longer if sulphonylurea, long acting insulin or renal impairment). Recurrent or severe hypoglycaemia or those needing IV glucose infusion may need up to hourly glucose monitoring. **REVIEW** insulin/oral hypoglycaemic doses. Give hypoglycaemia education and refer to diabetes team.\*Avoid fruit juice in renal failure. \*\*IN PATIENTS WITH RENAL/CARDIAC DISEASE, USE INTRAVENOUS FLUIDS WITH CAUTION (slow rate or higher concentrations of glucose can be considered). \*\*\*GLUCAGON takes 15 minutes to work and may be ineffective if malnourished, liver disease or recurrent hypoglycaemia. Caution if hypoglycaemia induced by oral hypoglycaemic agent.

## SITUATION

### Hypoglycaemia – blood glucose <4mmol/L

- A potentially dangerous side effect of insulin therapy and sulphonylureas
- Prompt treatment is required

## BACKGROUND

### Common causes of hypoglycaemia in diabetes:

- Inadequate food intake, fasting, delayed or missed meals
- Too much insulin or sulphonylurea, or administration of wrong insulin type
- Insulin administration/drug administration at an inappropriate time
- Problems with insulin injection technique/injection site causing variable insulin absorption
- Increased physical activity (e.g. mobilisation after illness)
- Alcohol
- Malabsorption e.g. gastroparesis

### At risk groups for severe/recurrent hypoglycaemia:

- Tight glycaemic control, impaired hypoglycaemic awareness, cognitive impairment, extremes of age, breast feeding mother with diabetes

### Conditions that increase risk of hypoglycaemia (IN DIABETES AND NON-DIABETES):

- Malnutrition/cachexia, liver disease\*
- Abrupt discontinuation of corticosteroids, hypoadrenalism\*\*, renal or hepatic impairment, pancreatectomy

\*these patients may not have adequate glucagon stores and may need continuous IV dextrose

\*\*hypoadrenalism may not already be diagnosed – consider in all patients who have a history of long-term steroid use, history of autoimmune or endocrine disease, hypotensive, electrolyte abnormalities of low Na/high K (NOT always present), or unexplained recurrent hypoglycaemia

## ASSESSMENT

Assess recent pattern of blood glucose levels i.e. last 48 hours.

- Establish when and what the patient last ate
- Check insulin/ diabetes medication is being prescribed and administered at correct dose, time, and in relation to food intake
- Check for signs of lipohypertrophy (lumpy areas at injection sites) which may affect insulin absorption
- Check credibility of blood glucose monitoring e.g. hand washing before testing
- Consider drug error/overdose
- Assess for signs and symptoms of adrenal insufficiency e.g. fluid-resistant hypotension, recent or long term steroids, hyponatraemia and/or hyperkalaemia, past medical history suggest at risk as above
- Assess nutritional status

## RECOMMENDATION

Treat hypoglycaemia as per protocol. Observe patient until recovery complete and provide information on hypoglycaemia management. Consult diabetes/endocrine team for advice if necessary, and refer all patients with severe or recurrent hypoglycaemia.

- Establish the cause of hypoglycaemia and take action to prevent recurrence. Inform patient if medication dose is changed
- If any suspicion re: adrenal insufficiency, administer steroids as per adrenal insufficiency guideline and refer to endocrine. **Do not** delay steroid administration for cortisol bloods.
- **Do not** omit long-acting insulin in type 1 diabetes - treat hypoglycaemia, consider cause and administer insulin as usual after dose review
- Blood glucose may be high following hypoglycaemia; avoid additional correction doses
- If receiving IV insulin treatment, check blood glucose every 15 minutes until above 4 mmol/L, then re-start IV insulin after review of infusion rates and requirement for IV insulin. Consider concurrent IV 10% glucose infusion at 100ml/hr.
- Replenish used ward stocks and complete an audit form from the hypo box