NHS Greater Glasgow and Clyde

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 online 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.

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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. Adapted from full guideline "The Hospital Management of Hypoglycaemia in Adults with Diabetes Mellitus". For peri-operative patients please refer to "Diabetes, Perioperative guideline for the management of diabetes"

It is considered appropriate for people aged 16-18 to be managed using this guideline as their clinical team will be familiar with this guideline. If being managed in a paediatric facility, separate guidelines can be followed.

Treatment of Hypoglycaemia in Adults in Hospital

Mild/Moderate

Patient conscious and able to swallow (eating, drinking or "sip-to-send")

- Stop IV insulin
- Give 15-20g of quick acting sugar, such as:
  - 60ml Lift juice shot® or Glucojuice®
  - 5-7 Dextrosol® tablets or 4-5 Glucotabs ®
  - 150-200ml pure fruit juice
  - 170-200ml 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 after 40-45 minutes/3 treatment cycles, call doctor and consider 150-200ml 10% glucose IV Glucose over 15 mins or 1mg glucagon IM*** (**Glucagon once only and not as only 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 Fortijuice®. Check glucose after 10-15 minutes. Repeat up to three times until glucose > 4.0mmol/L. Refer to full guideline from diabetes.org.uk linked above for further management

Severe or fasting

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

- Check ABC, stop IV insulin, contact doctor immediately
- **Peri-arrest call (2222) should be placed if unconscious/fitting**
- Give IV glucose over 15 minutes as
  - 75ml 20% dextrose or
  - 150ml 10% dextrose IV over 15 minutes or
  - 30ml 50% glucose (risk of extravasation injury) or
  - 1mg Glucagon IM * (**once only and not as only treatment – should be adjunctive**)***
- Recheck glucose after 10 minutes and if still less than 4.0mmol/L, repeat above treatment

- If glucose now 4.0mmol/L or above and able to eat, follow up treatment with 20g long acting carbohydrate 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.
- If patient on VRIII, restart VRIII but consider lowering rate of insulin to prevent further hypoglycaemia
- Once treated, monitor blood glucose closely (at least hourly) until blood glucose >6mmol/L and stays above 6.

IN SEVERE, RECURRENT or RESISTANT HYPOGLYCAEMIA OR PATIENT HAEMODYNAMICALLY UNSTABLE, CONSIDER ADRENAL INSUFFICIENCY (see "Background" on next page) OR OTHER CONTRIBUTING ILLNESS

DO NOT routinely omit subsequent insulin dose or long acting basal insulin. 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. Recurrent or severe hypoglycaemia or those needing IV glucose infusion may need up to hourly glucose monitoring. **REVIEW** insulin/oral hypoglycaemic doses and refer to inpatient diabetes team for recurrent, severe or unexplained hypoglycaemia.*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 e.g. gliclazide
- Prompt treatment is required

"Looming" hypoglycaemia – blood glucose 4-6mmol/L in an unwell patient on glucose lowering treatment such as insulin or sulphonylureas e.g. gliclazide.

BACKGROUND

Common causes of hypoglycaemia in diabetes:

- Inadequate food intake, fasting, delayed or missed meals
- Too much insulin or sulfonylurea, 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 on treatment for diabetes, acute kidney injury
- In patients at high risk of recurrent hypoglycaemia e.g. patient with acute kidney injury on insulin/Gliclazide consider dose reduction if blood sugar 4.0-6.0mmol/L ("looming hypoglycaemia")

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

- Malnutrition/cachexia, liver disease
    - these patients may not have adequate glucagon stores and may need continuous IV dextrose
- Abrupt discontinuation of corticosteroids, hypoadrenalism, renal or hepatic impairment, pancreatectomy
    - 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, hypotension, electrolyte abnormalities (hyponatraemia/hyperkalaemia 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
- If hypoglycaemia picked up on continuous blood glucose monitor e.g. Freestyle Libre a capillary blood glucose should be checked to confirm
- 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 <u>any</u> 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 insulin requiring diabetes - treat hypoglycaemia, consider cause and administer insulin as usual after dose review. Risk of DKA in insulin-requiring patients and can affect all types of diabetes.

- Blood glucose may be high following hypoglycaemia; avoid additional correction doses
- Document treatment given in nursing and/or medical notes as appropriate
- 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 – some wards may have a “hypo box” with a checklist of suggested contents as follows
    - 2x10 Glucose 4g tablets
    - 3x60ml Glucose 15g drinks
    - 2x3 Glucose 25g oral gel