Clinical Management of Hypoglycaemia

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To be read in conjunction with the following documents:
The Medicines Policy

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This document is no longer authorised for use after this date

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1.0 Introduction

Hypoglycaemia is common in patients with type 1 or insulin treated type 2 diabetes. Hypoglycaemia can also be caused by sulphonylureas e.g. gliclazide and possibly glitazones e.g. rosiglitazone. Biguanides, e.g. Metformin, does not cause hypoglycaemia.

For diabetes inpatients the risk of hypoglycaemia is compounded by:
- Disruption to daily routine
- Pathophysiological effects of the presenting illness or condition (e.g. renal or liver failure)
- Altered appetite and/or mobility
- Alterations / additions to medication.

In addition enforced suspension of self-management also puts some patients at greater risk.

The incidence of hospital hypoglycaemia is reported as ranging from 1.5 % to 20% depending on which population is studied. (1,2,3,) Some studies suggest that inpatients hypoglycaemia is associated with increased mortality (1,4) and others, have identified that it is a marker for poor health outcomes. (2)

The elderly are particularly at risk because of poor general health, renal failure and cognitive impairment. (3,5) Clinical conditions that should be recognised as predisposing patients to hypoglycaemia include renal failure, liver disorders, malignancy, parental nutrition, surgery and pregnancy. However a miscalculated insulin dose with food intake or failure to review and adjust insulin doses are also major contributory factors. (6, 7). Severe hypoglycaemia can cause convulsions, permanent neurological damage or death (8) and in any event it is a frightening and demoralising experience.

2.0 Purpose and Scope of the Document

This document is intended to provide a guide for both medical and nursing staff in all clinical areas to ensure safe and effective management of hypoglycaemia. This policy will be part of the standard diabetes education for Nursing/Medical staff within the Trust.

3.0 Policy Statement

This protocol has been written to promote consistent, high standards of care across the Trust for patients experiencing hypoglycaemia. It is intended that this protocol be used in conjunction with the hypoglycaemia management pathway. (refer to appendix 1.0 and 2.0). If further advice is needed, please make a referral to the inpatient diabetes service.

4.0 Monitoring and Review

This protocol will be reviewed on a yearly basis or sooner if new research is published that mandates an earlier update.

5.0 Inpatient blood glucose targets

The target pre-meal blood glucose for diabetes inpatients in general is 3.5-9mmols. The target pre meal blood glucose for patients with myocardial infarction, cerebrovascular events and ICU patients is lower at 3.5-7mmols. For pregnancy the pre meal target is 3.5-6mmol. The clinical targets should usually be for the majority of blood glucose readings (i.e. 4 out of 5), within the stated range.

Patients with a capillary blood glucose of ≤ 3.5mmol whether or not they have hypoglycaemic symptoms should be treated according to the recommendations outlined in this protocol.
6.0 Common symptoms and signs of hypoglycaemia

**Autonomic**
- Tremor
- Palpitation
- Sweating
- Atypical behaviour
- Hunger
- Visual disturbance
- Paraesthesiae
- Convulsions/Coma

**Neuroglycopenic**
- Drowsiness
- Confusion
- In coordination
- Loss of consciousness

**Non Specific**
- General Malaise
- Headache

7.0 Important notes

1. Some patients with long-term hyperglycaemia may very occasionally experience the **autonomic** or **non-specific** symptoms of hypoglycaemia at blood glucose levels slightly higher than 3.5 mmols. This should be managed as an episode of hypoglycaemia.

2. Some patients lose the ability to recognise impending hypoglycaemia (**hypoglycaemia unawareness**). They should still be treated according to the hypoglycaemia policy as normal.

Patients prone to hypoglycaemia unawareness are:

- People with duration of type 1 diabetes >10yr
- People who are having frequent episodes of symptomatic or asymptomatic hypoglycaemia
- Early pregnancy

N.B All patients admitted to hospital who commence insulin or are already on insulin at admission must be prescribed Glucagon 1mg intramuscularly on their prescription chart.

Treatment management considerations

- In hepatic failure and/or glycogen depletion e.g. alcohol related hypoglycaemia or malnutrition, glucagon may not work.
- Patients who have sulphonylurea-induced hypoglycaemia and those on long acting insulin may require 10% dextrose 6-24hrs after the hypoglycaemia event
- For patients with fluid restriction who require maintenance IV glucose, monitor the fluid intake closely

8.0 Therapeutic management of the conscious hypoglycaemic patient

(Quick reference algorithm can be found in appendix 1.0)

If the patient is conscious and able to swallow, give

- 3 Dextrose tablets

**OR**

If the patient is unable to co-operate, administer

- 1 tube of hypostop gel (Massage externally around jaw and gum line if patient will not swallow dextrose tablets).
AT 10 minutes

If the patient does not start to recover or feel better and the blood glucose is still less than 3.5mmol, please repeat the above procedure. Call the medic if the above procedure has been repeated 3 times and there is no improvement to the patient’s condition.

If the patient is starting to recover and is not nil by mouth, follow up with

- 2 plain biscuits or a piece of fruit or a slice of bread/toast.

  OR

- Normal meal if due

Repeat blood glucose hourly until 7mmol or above

PLEASE NOTE
If the patient’s condition deteriorates i.e. they become semiconscious or unconscious, carry out the emergency treatment as outlined below

9.0 Emergency Treatment of the Unconscious Hypoglycaemic Patient
(Quick reference algorithm can be found in appendix 1.0)

1. CALL OR FAST BLEEP MEDICAL HELP
2. If the patient is unconscious or semiconscious (defined as unable to swallow) the nurse or Doctor may administer Glucagon 1mg Intramuscularly

OR

The Doctor may administer up to 25mls of intravenous 50% glucose slowly into a large vein at a maximum rate of 3mls/min followed by a normal saline flush. This can be stopped once the patient regains consciousness.

The Doctor must stay with the patient until they are fully conscious

3. At 10 minutes

If the patient is starting to recover and is not nil by mouth, follow up with

- 2 plain biscuits, or a piece of fruit or a slice of bread/toast.

  OR

- Normal meal if due

- Repeat blood glucose hourly until 7mmol or above

If at 10 minutes the patient’s state of conscious level or blood glucose level has not improved

- Administer a further 25mls of intravenous 50% glucose slowly into a large vein at a maximum rate of 3mls/min followed by a normal saline flush OR commence administration of 100mls of IV glucose 10% over 30mins and monitor the patient closely until they have regained consciousness.
• Once conscious, stop IV glucose administration and give a long acting carbohydrate (as described above).

Please note

• If patient is nil by mouth, then after initial resuscitation give a continuous infusion of IV glucose 10% until oral/enteral route available and/or capillary blood glucose >7mmol

• Repeat capillary blood glucose hourly until above 7mmol

10.0 Therapeutic management of hypoglycaemia for the enteral fed patient

Capillary blood glucose 2.5-3.5mmol

• Stop feed if running, flush tube until clear with sterile water
• Crush & dissolve 3 dextrose tablets with 20mls sterile water
• Administer the dextrose solution through the feed tube using an enteral tip syringe and flush again with sterile water

If the patient starts to feel better and/or capillary blood glucose is above 3.5mmol

• Restart the feed if there is a least 1-hour left to run
• If NG/PEG is sited and feed is not up but is due to start within 1 hour then start straight away and run as normal OR
• If NG/PEG is sited and NOT due to start for at least an hour, please give a 200ml bolus of Ensure plus and restart normal feed when due OR
• If the NG/PEG tube is not insitu or able to be resited commence 10% IV glucose infusion
• Repeat capillary blood glucose hourly until above 7mmol

If there is no improvement in the patients’ condition or the capillary blood glucose remains between 2.5 –3.5mmol after the first administration of dextrose tablets

• repeat the above procedure (maximum 3 times)
• If the capillary blood glucose still does not rise above 3.5mmols inform the ward medic
• If the capillary blood glucose falls to 2.5mmol see below.

Capillary blood glucose less than 2.5mmol

• The Nurse or Doctor may administer 1mg glucagon IM. For patients who are not suitable for glucagon (see section 7, Important notes) give 100mls of IV glucose 10% over 30mins as first line treatment if the blood glucose is below 2.5mmol.
• Repeat blood glucose after 10minutes
• If the capillary blood glucose is still less than 2.5mmol repeat 1mg glucagon IM
• If the capillary blood glucose does not rise above 2.5mmol after 2x 1mg glucagon IM, commence administration of up to 100mls of IV glucose 10% over 30mins, if patient loses consciousness administer 25mls IV 50% glucose (see section 8, Emergency Treatment of Hypoglycaemia)
• If the patient starts to recover and/or capillary blood glucose rises to 3.5mmols or above follow recommendations as outlined in section ‘If the patient starts to feel better and/or capillary blood glucose is above 3.5mmol’ (see above).

Remember

Ensure that the reason for the hypoglycaemia is identified. Refer to diabetes registrar/diabetes specialist nurse if this trend persists.
11.0 Evaluation and plan

- Identify the cause of the hypoglycaemia. Adjust insulin/ tablets if required

  **N.B Complete a clinical incident form if hypoglycaemia was caused by incorrect administration of insulin or oral medication (incorrect dose or type of treatment, patient or staff error).**

- **Once blood glucose has returned to >5mmol,** give next dose of insulin at prescribed time

- Repeat Blood glucose hourly until 7mmol or above

It is sometimes difficult to identify a cause for hypoglycaemia. Regular episodes of hypoglycaemia must be addressed. Insulin and/or oral medication doses should be reviewed and adjusted to match the patient’s clinical state and diet. If doses are reduced and hypoglycaemia continues then the diabetes Registrar or Inpatient Diabetes Specialist Nurse should be contacted for advice.

12.0 References


Appendix 1.0

Treatment of Hypoglycaemia

**CAPILLARY BLOOD GLUCOSE 3.5mmol or less**

- **CONSCIOUS**
  - not nil by mouth
  - 3 Dextrose tablets
  - OR
  - 1 tube of Hypostop
  - AT 10 MINUTES
    - IF PATIENT STILL FEELS UNWELL OR BLOOD GLUCOSE STILL LESS THAN 3.5MMOL
    - CALL MEDIC IF ABOVE PROCEDURE REPEATED 3 TIMES AND BLOOD GLUCOSE STILL LESS THAN 3.5mmol
  - Patient feels better and not nil by mouth
  - Conscious and not nil by mouth.
  - GIVE SMALL CARBOHYDRATE SNACK OR NORMAL MEAL
  - REPEAT BLOOD GLUCOSE HOURLY UNTIL 7mmol OR ABOVE

- **UNCONSCIOUS**
  - (Or NILBY MOUTH)
  - IM GLUCAGON 1mg *(Nurse/Doctor)*
  - OR
  - 25mls IV 50% glucose (max rate of 3mls/min) + normal saline flush *(Doctor only)*
  - AT 10 MINUTES
    - IF NO RECOVERY
  - GIVE 25 MLS 50% glucose (guidance as above)
  - OR
  - START 10% IV glucose

Refer to appendix 2.0 for the treatment management of hypoglycaemia for the enteral fed patient

At 10 minutes

At 10 minutes

At 10 minutes

At 10 minutes

At 10 minutes

At 10 minutes

At 10 minutes

At 10 minutes

At 10 minutes

At 10 minutes

At 10 minutes
Appendix 2.0

Treatment management of hypoglycaemia for the enteral fed patient

**Capillary Blood Glucose 2.5-3.5mmol**

1. Stop feed, flush tube until clear with sterile water.
2. Crush & dissolve 3 dextrose tabs with 20mls sterile water
3. Syringe through feed tube, flush with sterile water again

**NO EFFECT**

After 10 minutes if patient still feels unwell or blood glucose is still between 2.5-3.5mmol, repeat above procedure

**NO EFFECT**

**Call medic** if the blood glucose does not rise above 3.5mmols after 3 administrations of dextrose tablets. If blood glucose falls below 2.5mmol administer glucagon IM (see right side of chart)

**Capillary Blood Glucose less than 2.5mmol**

Give 1mg glucagon

**NO EFFECT**

After 10 minutes if patient feels better, recommence NG/PEG feed if previously stopped. See below if feed not in situ

**Capillary Blood Glucose still less than 2.5mmol after 10 minutes**

repeat glucagon and call medic

**If NG/PEG sited & feed due to start within 1 hour**

start feed straight away and run as normal. **OR**

If NG/PEG sited & not due to start for **at least** an hour give 200mls bolus of Ensure plus over 20 minutes. Restart feed at normal time **OR**

If NG/PEG not in situ/or able to be resited commence 10% IV glucose until feed restarts

**Capillary Blood Glucose still below 2.5mmol and/or patient loses consciousness**

follow guidelines for unconscious patient (see appendix 1.0)

Repeat blood glucose hourly until above 7mmol for two consecutive tests
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