

Blood Glucose monitoring during extra-corporeal renal therapy and plasmapheresis.

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1.0 INTRODUCTION

Blood glucose (BG) Monitoring is a way of testing the concentration of glucose in the blood and is one of the main tools involved in controlling diabetes.

2.0 AIM / PURPOSE

The aim of this policy/ guideline is to give all staff that work at SaTH affiliated renal units clear instruction into the monitoring of blood glucose levels and interpretation of levels obtained during dialysis.

3.0 OBJECTIVES

The objectives of this policy are:

- To ensure blood glucose levels remain stable during extra-corporeal therapies and plasmapheresis.
- To obtain accurate blood glucose results and initiate appropriate action for abnormal blood glucose levels.

4.0 DEFINITIONS USED

BG- Blood glucose

PPE- personal protective equipment- Gloves, facemask and apron

OHA'S - Oral hypoglycaemic agents.

5.0 SPECIFIC DETAIL

5.1 Preferred timing of Blood glucose levels.

All patients with diabetes who take insulin and OHA's should have their BG levels tested

- Start of dialysis session to ensure an episode of hypoglycaemia does not occur soon after connecting patient to the machine.
- Prior to discontinuation of dialysis session to ensure patient is safe to leave the unit and not at risk of hypoglycaemia. If patient is driving home and taking insulin BG level should be 5 mmol/l or above as in accordance with DVLA guidelines.

Diet controlled diabetes only need BG levels testing once weekly pre and post dialysis.

Patients on insulin and OHA's need to ensure they eat 2 ½ - 3 hourly- please ensure carbohydrate snack is offered to avoid hypoglycaemic episode.

5.2 Testing.

- BG monitor should be in working order and calibrated within the last 24 hours.
- Test strips should be in date and all equipment should be stored in an orange glucometer box.
- Obtain consent from the patient prior to procedure and inform them of results obtained.
- Prepare equipment for testing, this will include:
 - Blood glucose monitor (calibrated Optium exceed blood glucose meter)
 - Testing strips
 - 2ml syringe
 - Green needle
 - Sani-cloth CHG 2%
 - Lancet and gauze if patient is not receiving dialysis
 - Gloves

Whilst receiving dialysis treatment

- To obtain BG reading remove test strip from packaging and insert into BG monitor
- Clean arterial port with sani-cloth 2%, allow to dry for 30 seconds and take 0.1 - 0.2ml of blood from the port using 2ml syringe and green needle, discard needle once sample has been obtained
- Transfer blood sample onto test strip and wait for result
- Record result on daily dialysis chart, if inpatient, record in medical notes or nursing chart

If not receiving dialysis

- Obtain blood sample by cleaning patient's finger with plain water. This to ensure there are no contaminants present, which may alter the BG reading and allow to dry
- Check the meter is ready for use by inserting test strip
- Using lancet prick side of patient's finger, taking care not to use index finger, thumb or pads of fingers.
- Squeeze small amount of blood from the finger, when blood appears check the meter is ready and transfer blood on to test strip
- Wait for result, give patient gauze to stem bleeding and record result on daily dialysis chart

5.3 Recording and interpretation of results

All results should be recorded on daily dialysis sheet and on Renal Database

If BG level is <4 mmol/l when patient **is** on dialysis then staff are to follow Renal think Glucose algorithm and complete audit form (see Appendix 1)

If BG level <4 mmol/l and patient **not** having dialysis then staff are to follow Think Glucose algorithm and SaTH trust guidelines for treatment of hypoglycaemia and complete audit form (see Appendix 2)

50% Glucose is only to be used when patient is having dialysis treatment and ONLY into extracorporeal circuit as per algorithm guidelines.

If BG level is >15 mmol/l test for blood ketones using ketone test strips. Inform Sister in charge of result.

If blood Ketones : <0.6 mmol/l - no action required
 $0.6-1.5$ mmol/l - inform medical team and re-check in two hours

>1.5 mmol/l - patient may be at risk of developing Diabetic Ketoacidosis, please contact medical team immediately and refer to Diabetes Specialist Nursing Team.

When Blood glucose levels < 4 mmol/l or >15 mmol/l for three consecutive dialysis sessions please contact Diabetic specialist Nursing team for advice and advise patients to contact their GP or Community Diabetic Nurse Specialist on 01743 277693.

Three monthly HbA1c to be carried out on all diabetic patients with their monthly bloods.

6.0 TRAINING

All education and training covered in staff competency pack

7.0 AUDIT

Audit form for use with Hypo box.

8.0 REFERENCES

1. [DVLA - drivinglicence.uk.com](http://www.dvla.gov.uk/drivinglicence)
2. NICE, 2012. Diabetes in adults. Quality standard. London:NICE
3. Diabetes UK, 2013. Diabetes in adults. NHS Diabetes.

9.0 CONTRIBUTION LIST

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Appendix 1 (*Attached*)

Algorithm for the Treatment of Hypoglycaemia during Extra-corporeal Renal Therapy

Appendix 2 (*Attached*)

Algorithm for the Treatment of Hypoglycaemia in Adults with diabetes in hospital



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Algorithm for the Treatment of Hypoglycaemia during Extra-corporeal Renal Therapy

Hypoglycaemia is defined as blood glucose of less than 4mmol/l (if not less than 4mmol but symptomatic give a small carbohydrate snack for symptom relief)

MILD

Patient conscious, orientated and able to swallow

Give 25g of glucose (or 3-4 heaped tea spoons of sugar) in 50ml of water orally.
Alternatively 1-2 tubes of glucogel.

Repeat blood glucose after 10-15 minutes.

Treatment can be repeated up to 3 times

If hypoglycaemia persists contact Renal Doctor for further advice.
If out of hours Medical team on-call.

MODERATE

Patient conscious but confused / disorientated or aggressive and able to swallow

If patient able to swallow give 1-2 tubes of glucogel

Repeat blood glucose after 10-15 minutes.

Treatment can be repeated up to 3 times

If hypoglycaemia persists contact Renal Doctor for further advice.
If out of hours Medical team on-call.

SEVERE

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

Check ABC, stop IV insulin, if fitting fast bleed a doctor.

Blood glucose <4.0mmol but >3.0mmol administer 10mls of 50% glucose.

Blood Glucose <3.0mmol administer 20mls 50% Glucose.

Blood Glucose <4.0mmol and patient experiencing Hypovolaemia administer 20mls of 50% Glucose

Repeat blood glucose after 10-15 minutes.

If patient requires >40mls of 50% Glucose they must be reviewed by a doctor.

Blood glucose should now be above 4mmol/l. Give 20g of long acting carbohydrate eg 2 biscuits or a slice of bread or next meal if it is due.

For enterally fed patients ONLY

Restart feed or give bolus feed as per feeding plan or supplement intake with 10% glucose at 100ml/hr

DO NOT OMIT SUBSEQUENT DOSES OF INSULIN, CONTINUE REGULAR CAPILLARY BG MONITORING FOR 24 TO 48 HOURS AND GIVE HYPO EDUCATION OR REFER TO DSN FOR ADVICE. MEDICATION REVIEWS SHOULD BE DONE BY MEDICAL TEAM.

ONLY TO BE USED ON SaTH NHS Trust RENAL DIALYSIS UNITS

For the treatment of Hypoglycaemia when not receiving Extra-corporeal renal therapy refer to the trusts
Algorithm for the treatment of Hypoglycaemia in Adults with Diabetes in hospital



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Algorithm for the Treatment of Hypoglycaemia in Adults with Diabetes in Hospital

Hypoglycaemia is defined as blood glucose of less than 4mmol/l (if not less than 4mmol but symptomatic give a small carbohydrate snack for symptom relief)

MILD

Patient conscious, orientated and able to swallow.

Give 15-20g of glucose (or 2-3 heaped tea spoons of sugar) in 150ml of water orally.

Or

200ml of fruit Juice

Repeat blood glucose after 10-15 minutes.

Treatment can be repeated up to 3 times

If hypoglycaemia persists consider IV glucose 10% at 100 ml/hr

MODERATE

Patient conscious but confused / disorientated or aggressive and able to swallow

If patient able to swallow give 1-2 tubes of glucogel

Repeat blood glucose after 10-15 minutes.

Treatment can be repeated up to 3 times

If hypoglycaemia persists consider IV glucose 10% at 100 ml/hr

SEVERE

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

Check ABC, stop any IV insulin, and fast bleed a doctor

If patient has IV access give 75-80 ml of glucose 20%. If no IV access available 1mg of Glucagon can be given IM. (Note if patient has severe hepatic disease this should be avoided)

Repeat blood glucose after 10-15 minutes.

Treatment can be repeated up to 3 times
If hypoglycaemia persists consider IV glucose 10% at 100 ml/hr

Patient must be reviewed by a doctor

Blood glucose should now be above 4mmol/l. Give 20g of long acting carbohydrate eg 2 biscuits or a slice of bread or next meal if it is due.

For enterally fed patients ONLY

Restart feed or give bolus feed as per feeding plan or supplement intake with IV glucose 10% at 100ml/hr

DO NOT OMIT SUBSEQUENT DOSES OF INSULIN, CONTINUE REGULAR CAPILLARY BG MONITORING FOR 24 TO 48 HOURS AND GIVE HYPO EDUCATION OR REFER TO DSN FOR ADVICE. MEDICATION REVIEWS SHOULD BE DONE BY MEDICAL TEAM.

For Patients with Renal Impairment

- Glucogel may be used for mild to moderate hypoglycaemic episodes
- In severe cases of hypoglycaemia 25ml of 50% glucose may be given directly into dialysis circuit