

Document Control

Title Managing Hyperglycaemia in Acute (Adult) Inpatients Requiring Enteral Feeding Guidelines			
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1. Introduction

- 1.1. This document sets out Northern Devon Healthcare NHS Trust's best practice guidelines for the management of hyperglycaemia in acute adult inpatients requiring Enteral feeding.

2. Background

- 2.1. It is widely recognised that improving nutritional status with artificial feeding has the associated short term complication of hyperglycaemia even in adults without diabetes (Pasquel et al, 2011). Research suggests that hyperglycaemia can increase the risk of developing systemic inflammation, poor immune function and endothelial and mitochondrial dysfunction; delaying the healing process (Grout et al, 2012). Therefore achieving optimum glycaemic control can reduce morbidity and mortality (Kumar, 2011).

3. Purpose

- 3.1. The purpose of this document is to provide guidance on managing a patient with hyperglycaemia requiring enteral feeding.

- 3.2. Implementation of this guideline will ensure:
- 3.3. Safe management of a patient with enteral feeding induced hyperglycaemia
- 3.4. This guideline applies to all staff involved in the care of the acute adult inpatient requiring Enteral feeding

Target patient group:

- All patients requiring enteral feeding

Aims

- To improve glycaemic control in patients requiring enteral feeding (excluding patients on ICU who should follow the ICU feeding protocol)
- To provide guidance on blood glucose monitoring, medication, insulin regimens, management of hyperglycaemia and treatment of hypoglycaemia in patients requiring enteral feeding

4. Definitions / Abbreviations

DSN - Diabetes Specialist Nurse

CBG - Capillary blood glucose

NGT - Nasogastric tube

VRII - Variable rate insulin infusion

IV - Intravenous

IM - Intramuscular

5. Contact Numbers

- 5.1. The Diabetes Specialist Nursing Team can be contacted on 01271 322726 and internal extension 2726 or alternatively on bleep number 044.

6. Roles and Responsibilities

Role of Diabetes Specialist Team

- 6.1. To provide expert advice and guidance with the aim to optimise glycaemic control.

Role of Dietician

- 6.2. Regularly review enteral requirements and liaise with Diabetes team if any changes are made.
- 6.3. To ensure Diabetes Team are aware of patient on enteral feed.

Role of Doctors

- 6.4. To monitor venous blood glucose and urea and electrolytes on a daily basis.

Role of All Staff

- 6.5. To ensure Diabetes Team are aware of patients on enteral feed.
- 6.6. Aim to monitor and maintain glycaemic control and fluid and electrolyte balance during admission.

7. General principles for the management of hyperglycaemia in acute (adult) inpatients requiring enteral feed.

Capillary blood glucose monitoring

Patients not known to have diabetes:

- 7.1. At least twice in every 24 hours

Patients with diabetes:

- 7.2. Prior to feed to establish baseline
- 7.3. 4 hourly initially
- 7.4. 6 hourly when stable

Target capillary blood glucose range:

- 7.5. Aim for blood glucose levels 6.0-12.0mmol/L.
- 7.6. Blood glucose targets should be tailored to the individual patient

Points to remember:

- 7.7. Patients receiving enteral feed should have their capillary blood glucose checked based on clinical need and not just at mealtimes.
- 7.8. Patients with blood glucose levels above 12.0mmol/L on more than 2 consecutive occasions should be referred to the diabetes team at earliest opportunity, for out of office hours or weekends then follow guidance below

- 7.9. If blood glucose consistently above 14.0 mmol/L and patient unwell assess for DKA or HHS and refer to available pathways (MAU, ICU and A&E)

Patients already on medication for their diabetes

- 7.10. Metformin can be continued (if not contraindicated) as a re-suspended powder which can be administered via the nasogastric tube
- 7.11. Crushing oral hypoglycaemic medication such as Sulphonylureas (e.g Gliclazide, Glipizide, Glimeperide, Tolbutamide) is not advised due to the unpredictable absorption of the medication therefore should be withheld until the patient is able to swallow safely and enteral feed discontinued

Insulin regimens

- 7.12. Insulin regimens should be tailored to the individual patient

Patients who are insulin naïve

- 7.13. Refer to the diabetes team at the earliest opportunity

Feeding over 20-24 hours:

- 7.14. Subcutaneous isophane insulin (e.g. Insulatard, Humulin I, Insuman Basal)
- 7.15. Starting doses of 10 units to be prescribed and administered at start of feed and 10-12 hours later
- 7.16. Titrate doses by at least 10-20% if hyperglycaemia persists

Feeding over 10-18 hours:

- 7.17. Subcutaneous isophane insulin (e.g. Insulatard, Humulin I, Insuman Basal)
- 7.18. Starting dose of 12 units to be prescribed and administered at start of feed and 8 units 8-10 hours later
- 7.19. Titrate by at least 10-20% if hyperglycaemia persists

Bolus Feeds: (at mealtimes administered via an enteral syringe)

- 7.20. Refer to the diabetes team at the earliest opportunity

Patients with type 2 Diabetes already on insulin

- 7.21. Refer to the diabetes team at the earliest opportunity
- 7.22. If patient has not been receiving usual insulin prior to feed commencing, then commence insulin naïve pathway as above

- 7.23. If patient has continued their usual insulin prior to feed commencing then consider a switch to Isophane insulin (e.g. Insulatard, Humulin I, Insuman Basal) as guided by timings of feeding regimen (see above).
- 7.24. Doses may need to reflect patient's usual doses and may need reduction of up to 20% when changing the type of insulin

Patients with type 1 diabetes

- 7.25. Refer to the diabetes team at the earliest opportunity
- 7.26. If possible, speak to the patient regarding their usual insulin regimen and how they would like to manage their insulin during the enteral feeding period
- 7.27. Long acting basal insulin (e.g. Lantus, Levemir, Abasaglar) should continue at the usual dose initially
- 7.28. Patients usual bolus doses of rapid/short acting insulin will need to be adjusted to fit in with the feeding regimen
- 7.29. For example: for a feed running over 20-24 hours, bolus doses could be administered at start of feed then, 6 and 12 hours into feed

Patient on a continuous subcutaneous insulin infusion (CSII) pump

- 7.30. Refer to the diabetes team at the earliest opportunity
- 7.31. Is patient fully competent and able to manage the insulin pump?

Rationale for deeming patient competent should be documented in the notes and competency assessed on a daily basis

- 7.32. If not deemed competent, then discontinue the insulin pump and commence subcutaneous regimen for type 1 diabetes as above

Timing of insulin

- 7.33. The timing of insulin injections must coincide with feed timings and not at usual meal times regardless of whether this is during the day or at night

Variable rate insulin infusion (VRII)

- 7.34. Avoid use of intravenous insulin wherever possible
- 7.35. If the patient is confused and repeatedly pulling out enteral tube, identify causes of confusion and treat accordingly. Intravenous insulin could be considered to manage hyperglycaemia. Refer to the diabetes team at the earliest opportunity.
- 7.36. If the patient requires management for diabetic ketoacidosis (DKA) or hyperosmolar hyperglycaemic state (HHS) pathways are available on MAU and patients should be managed in this specialist area.

If feeding tube is removed after subcutaneous insulin injection is given

- 7.37. Replace tube as per protocol if possible and continue feed
- 7.38. If unable to replace tube, ensure patient has IV access, monitor blood glucose hourly and treat hypoglycaemia as below

Hypoglycaemia

Pathway to follow if enteral tube is patent:

- 7.39. Mix 4 level teaspoons sugar in 50mls water and administer via the enteral tube using an enteral syringe
- 7.40. Do not use fizzy drinks with enteral tubes as they can damage the tube
- 7.41. Flush with water
- 7.42. Re- check blood glucose in 10 minutes and repeat sugared water if blood glucose remains under 4.0 mmol/L
- 7.43. If blood sugar is above 4.0 mmol/L after 10 minutes, give 100mls of a milk based supplement e.g. Fresubin Energy drink using a 50mls enteral syringe and flush with 50mls water
- 7.44. Restart normal feeding regimen
- 7.45. Do not withhold next insulin dose, dose adjustment will be required

Pathway to follow if enteral tube is not patent or there is no enteral tube

- 7.46. Urgent medical review
- 7.47. Ensure IV access
- 7.48. Do not use glucogel due to risk of aspiration
- 7.49. Administer 150ml 10% IV Glucose over 10-15minutes
- 7.50. Or
- 7.51. Administer IM glucagon 1mg (**only if the patient has been receiving feed**)
- 7.52. If feed not recommenced proceed to 100mls/hr 10% IV Glucose

8. Education and Training

- 8.1. Responsibility for education and training lies with the Diabetes Specialist Nursing Team. It will be provided through informal training on the ward.

9. Consultation, Approval, Review and Archiving Processes

- 9.1. The author consulted with all relevant stakeholders. Please refer to the Document Control Report.
- 9.2. Final approval was given by drugs and therapeutics committee on
- 9.3. The guidelines will be reviewed every 3 years. The author will be responsible for ensuring the guidelines are reviewed and revisions approved by the drugs and therapeutics committee in accordance with the Document Control Report.
- 9.4. All versions of these guidelines will be archived in electronic format by the author within the Diabetes Team policy archive.
- 9.5. Any revisions to the final document will be recorded on the Document Control Report.
- 9.6. To obtain a copy of the archived guidelines, contact should be made with the author.

10. Monitoring Compliance and Effectiveness

- 10.1. Monitoring of implementation, effectiveness and compliance with these guidelines will be the responsibility of the author. Where non-compliance is found, it must have been documented in the patient's medical notes.

11. References

National Institute for Health and Clinical Excellence (2006) "Nutrition Support in Adults: Clinical Guideline 32." NICE. London. www.nice.org.uk/CG032NICEguideline

[Joint British Diabetes Societies \(JBDS\) for inpatient care \(2012\) Glycaemic management during the inpatient enteral feeding of stroke patients with diabetes. NHS Diabetes](#)

12. Associated Documentation

[Hypoglycaemia in Adults with Diabetes Mellitus – Hospital Management Guidelines \(Available on BOB\)](#)

Appendix 1: Algorithm for the management of hyperglycaemia during enteral feeding

