Commencing Nasogastric Feeding in Adult Intensive Care Unit - ITAPS CMG Guideline

University Hospitals of Leicester NHS
NHS Trust
Clinical Support and Imaging
Nutrition and Dietetic Service
C24/2020

1. Introduction and Who Guideline applies to

1.1 The use of feeding guidelines on Adult Intensive Care Unit (AICU) has been practised for a number of years and most AICUs within the UK have such guidelines. It is recommended that early enteral nutrition be initiated on Critical Care patients where possible and ideally, within 48 hours of AICU admission (Singer *et al*, 2019; 2023). Delivering early nutritional therapy is seen as a proactive therapeutic strategy that may reduce disease severity, diminish complications, decrease length of stay and have a favourable impact on patient outcomes. (McClave *et al*, 2016: Compher et al, 2022).

1.2 This clinical guideline is for use by medical and nursing teams to provide advice and information in order to start an enteral feed on an adult inpatient (over 16 years old) in University Hospital of Leicester (UHL) AICUs, who are to be fed via a nasogastric tube (NGT) prior to Dietetic assessment. This includes all levels of AICU patients.

1.3 This clinical guideline is **for use on UHL Adult Intensive Care** and applies to feeding by nasogastric tubes (NGTs) only.
Please refer to the Guideline for Commencing Out of Hours Enteral Tube Feeding (Nasogastric) in Adult Inpatients (Trust Reference B55/2006) in all other ward areas including high dependency patients not on the AICU, with the exception of renal, where the Out of Hours Enteral tube feeding (Nasogastric) Starter Regimen for an Adult Inpatient with *Renal Failure* (Trust Reference C2/2015) should be followed.
It is recommended that at the earliest opportunity patients commencing nasogastric feeding are verbally referred to an AICU Dietitian on the unit if at LRI or GH and via ICE if at LGH HDU.

1.4 This clinical guideline differs from the other out of hours nasogastric feeding guidelines in UHL due to:
- Differing energy and protein requirements of critically ill patients;
- The use of gastric residual volumes as one marker of tolerance of enteral nutrition on critical care that is not routinely used in other ward areas;
- Increased clinical monitoring of patient on UHL AICUs.

1.5 Medical and Nursing staff must follow the relevant critical care tube checks in the Insertion and Management of Nasogastric and Orogastric Tubes in Adults UHL Policy (Trust Ref B39/2005) before commencing any feed, and document on the safety checklist for NGT insertion.

2. Guideline Standards and Procedures

2.1 If a decision is made to commence nasogastric feeding for an adult inpatient (over 16 years old) on a UHL AICU prior to Dietitian assessment, this clinical guideline should be followed by medical and nursing staff. Enteral feeding **must not** be started prior to Dietitian assessment for those patients on specialised therapeutic diets such as Ketogenic diets (for intractable epilepsy) or for an inherited metabolic disorder.

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2.2 Adverse reaction to foods and enteral feeds

a) **It is crucial to check if the patient has an adverse reaction to any food or potential food-based ingredients/products.**

b) Appendix 1 **must** be followed and used to assess patient hypersensitivity status and therefore, enteral feed suitability prior to starting enteral feeding. Care must be taken in patients who are known or suspected adverse reaction.

c) IgE-mediated reactions are characterised by early onset symptoms of a trigger food (5-30 minutes and almost always within 2 hours), whereas Non IgE-mediated reactions are less defined as symptom onset is prolonged. Food intolerance is a non-immune reaction with associated symptoms.

d) In line with EU legislation from 2014, the presence of any of the 14 major allergens as an ingredient in a food/food product must be clearly labelled. These are celery, cereals containing gluten (wheat/barley/rye/oats), crustaceans (e.g. prawn, crab, crayfish, lobster), eggs, fish, lupin, cows milk, molluscs (e.g. mussels, clams, oysters, squid), mustard, peanuts, sesame, soy beans, sulphur dioxide/sulphites and tree nuts (e.g. almonds, hazelnuts, walnuts, brazil nuts, cashews, pecans, pistachios and macadamia).
It is important to note that this is not an exhaustive list and other food allergens may be present (e.g. pea protein, legume, seeds, food preservatives/colourings, etc).

e) Specifically in respect of enteral feeds used in UHL (manufactured by Nutricia), some enteral feeds, including Nutrison Protein Plus, contain cows milk protein, fish oils, soya, coconut oil and pea protein.

f) Appendix 2 should then be followed to commence enteral feeding and assess tolerance.

g) As part of Appendix 2, reference should be made to Appendix 3 to guide assessment and management of refeeding syndrome risk with slower rate enteral feeding, serum electrolyte monitoring and supplementation with additional vitamins and minerals.

2.3 Cultural and Religious preferences

a) If a patient, relative or carer requests if an enteral feed is suitable for vegetarian or alternative cultural or religious dietary restriction, the restriction and the ingredients/contents of enteral feeding products as recommended in Appendix 1 should be discussed with the patient/relative and they can decide if the enteral feed is suitable or is acceptable as part of medical treatment for them.

b) If a strict vegan diet is followed, it will not be possible to provide nutritionally complete enteral feeding with the products available in the hospital. Appendix 1 should be used to discuss with the patient/relative and they can decide if the enteral feed may be unsuitable for them.

c) If there is any doubt or concern, refer to the AICU Dietitian at the earliest opportunity for further advice.

Assessing Allergic Status and Feed Suitability
PRINT & PLACE IN PATIENTS NOTES

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Appendix 1

Use this flowchart below **before** starting enteral feed to assess the patient's food allergy/hypersensitivity status and feed suitability.

If a food allergy/hypersensitivity is known or suspected you need to identify and clarify the suspected or known food allergen(s) with the patient, their relatives or carers.

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Allergens are identified in **bold** in the ingredients list – this is **not** a finite list as it only uses the 14 food allergens identified by the European Commission (EC).

For example, patients may have an allergy to pea protein or food preservatives and these may not be listed in bold on the ingredient list. If the patient requires a gluten or lactose free feed, this information should be contained in the leaflet as well.

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Check the ingredients listed on the leaflet attached to the pack of **Nutrison feed**.
CAUTION: Nutrison Protein Plus DOES contain cows milk protein, pea protein, coconut oil and fish oils as well as other potential allergens.

⇩ **NO CONCERNS**

If there are no concerns and **Nutrison Protein Plus feed** is suitable, continue with following Appendix 2

⇩ **CONCERNS**

If there are concerns and Nutrison Protein Plus feed is not suitable, check the ingredients listed on the leaflet attached to the pack of **Nutrison Soya feed**

⇩ **NO CONCERNS**

If there are no concerns and **Nutrison Soya feed** is suitable, continue with following Appendix 2

⇩ **CONCERNS**

If there are still concerns and Nutrison Soya feed is not suitable, do not start enteral feed. Refer to the AICU Dietitian face to face or ICE (LGH)

If in **any** doubt or the patient requires a more detailed assessment of their food allergy and/or hypersensitivity status:

DO NOT START ENTERAL FEED
&
REFER TO YOUR AICU DIETITIAN

Starting a nasogastric feed on an adult critical care patient
PRINT & PLACE IN PATIENTS NOTES

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Appendix 2

Does patient have a functioning, accessible gut?

NO
Consider Parenteral Nutrition (PN) if patient at high nutritional risk or 5 or more days nil nutrition

YES
Insert 12 Fr combined drainage feeding tube unless contraindicated and refer to UHL Policy for Insertion of NG Feeding Tubes B39/2005

Prescribe Forceval Soluble OD on all patients unless CKD ≥ 3 or contraindicated
Is patient at risk of refeeding syndrome? (Appendix 3)
If yes, prescribe Vitamin B co strong 1 tablet TDS, Thiamine 100 mg BD (unless contraindicated).
If intravenous route is essential, prescribe Intravenous Vitamin B and C injection (Pabrinex) OD for 3-10 days

Use Appendix 1 to assess food allergy/hypersensitivity status

Prescribe Nutrison Protein Plus or Nutrison Soya (as per Appendix 1 assessment) and commence feed at 10ml/hour
Maximum rate to be prescribed is 30 ml/hour under 50 kg and 40 ml/hour if over 50 kg

After 4 hours, is patient tolerating feed?
Check: gastric residual volumes, abdominal distension, vomiting or overt regurgitation
(NOTE: gastric residual volumes should be ≤400ml at LRI, LGH and GH **with the exception of** ECMO and cardiac surgery (up to 4 days) at GH **and** proned patients where ≤200ml is used)

NO
Replace appropriate gastric residual volume amount and discard remaining volume
Maintain feed rate and re-check after 4 hours

YES
Replace all gastric volume and increase feed by 10ml/hour every 4 hours to **maximum rate 30 ml/hour under 50 kg and 40 ml/hour if over 50 kg**
Recheck gastric volumes every 4 hours

Is patient tolerating feed?

NO
Replace appropriate gastric residual volume and reduce feed by up to 10-20ml/hour
Consider prokinetics, discuss with Doctors and Dietitian

If patient is on more than 15 ml/hour propofol or 1000ml of 10% dextrose, consider maintaining low dose feed 10-20ml/hour until Dietitian review

For non-surgical patients:
If a patient has been tolerating feed for 72 hours, reduce checking gastric volumes from 4 hourly, to 6 hourly, to 8 hourly to once daily. Reinstate to 4 hourly monitoring if any sign of poor feed toleration.

Checklist to determine risk of refeeding syndrome (see Appendix 4)

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Appendix 3

S Number: **Surname:** **First Name:** **Date of Birth:**	
Patient has <u>one or more</u> of the following: (please circle yes / no)	
• A Malnutrition Universal Screening Tool (MUST) score of 4 or more	**YES NO**
• BMI less than 16 kg/m^2 **See MUST**	**YES NO**
• Unintentional weight loss greater than 15% within the last 3-6 Months **See MUST**	**YES NO**
• Little or no nutritional intake for more than 10 days	**YES NO**
• *Low levels of potassium, phosphate or magnesium prior to feeding* ***see note below**	**YES NO**
Or patient has two or more of the following: (please circle yes / no)	
• BMI less than 18.5 kg/m^2 **See MUST**	**YES NO**
• Unintentional weight loss greater than 10% within the last 3-6 Months **See MUST**	**YES NO**
• Little or no nutritional intake for more than 5 days	**YES NO**
• A history of alcohol abuse or drug abuse *	**YES NO**
Is patient at risk of developing refeeding problems	**YES NO**
If Yes (*with caveat of note below) - needs Thiamine 100 mg BD, Vitamin B co-strong 1 tablet TDS, prescribing and daily bloods including potassium, phosphate and magnesium until stable. **Note: Only if Parenteral route is essential, prescribe Intravenous Vitamin B and C (Pabrinex) for 3-10 days.** **If No- Start feeding as using Appendix 2 ensuring assessment of patient allergic status (Appendix 1). Consider glucose sources already prescribed if at risk of refeeding syndrome.**	
Completed By (Print Name):	**Signature**
Job title	

*The NICE guidance for Nutrition support in adults was not written specifically for patients on critical care units. In the absence of specific guidelines for assessing risk of refeeding in critical care there is consensus for this guideline that the NICE guidance (see table above) can be used with the caveat that the two criteria - low levels of potassium, phosphate and magnesium (commonly seen in patients admitted to the critical care units for reasons other than refeeding) and use of insulin, antacids and/or diuretics (frequently used in patients on critical care) are not as useful in the critical care setting for helping to determine refeeding risk. In fact use of these criteria could lead to an over diagnosis of refeeding risk and lead to an increased use of intravenous B vitamins which poses a risk in itself. It is noted that the regular monitoring and correction of electrolytes as currently takes place within the critical care setting would be key here.

1. Summary

1.1 Refeeding syndrome is defined as severe fluid and electrolyte shifts and metabolic complications resulting in decreased plasma levels of phosphate, potassium and magnesium. Feeding without adequate thiamine can lead to Wernickes Encephalopathy.

1.2 Medical staff should use this information to assess if the patient is at risk of re-feeding problems or not. N.B. any inpatient who has had very little or no food for > 5 days is at some risk of re-feeding problems. (Mehnna et al 2008)

1.3 **Medical staff should assess re-feeding risk, using Table One in Appendix 3.** If patients are not at risk of re-feeding problems ask registered nurse to commence nasogastric tube feed as per the flowchart. Thiamine and Vitamin B co – strong would not be required in this case. Copies of the flow charts for individual patients are available by printing out the table.

2. Re-feeding Problems - Background

2.1 The definition of re-feeding syndrome is severe fluid and electrolyte shifts and related metabolic complications in malnourished patients undergoing refeeding (Solomon et al 1990). It was first identified after the Second World War when prisoners of war were re-fed after prolonged starvation and suffered cardiac insufficiency, neurological complications, peripheral oedema, hypertension and death (Solomon et al 1990, Melchoir 1998).

2.2 In starvation, synthesis of insulin is reduced, and glucagon levels rise. This results in changes in the production of glucose from carbohydrate and an increase in protein and lipid breakdown. Patients who are starved, break down lean body mass, and become depleted in water and minerals (Nightingale 2001).

2.3 During refeeding, metabolism is switched from lipid back to carbohydrate. Insulin is released, and there is an increased uptake of glucose, phosphorous, potassium, and water into the cells and protein is synthesised. Thiamine is an essential co-enzyme in carbohydrate metabolism and feeding without sufficient body stores of this vitamin can lead to Wernicke's encephalopathy definitions.

2.4 Refeeding problems encompass life-threatening acute micronutrient deficiencies, fluid and electrolyte imbalance, and disturbance of organ function and metabolic regulation that may result from over-rapid or unbalanced nutrition support. They can occur in any severely malnourished individuals but are particularly common in those who have had very little or no food intake, even including overweight patients who have eaten nothing for protracted periods.

a) The problems arise because starvation causes adaptive reductions in cellular activity and organ function accompanied by micronutrient, mineral and electrolyte deficiencies. Abnormalities in malnourished individuals may, therefore, include: deficiencies of vitamins and trace elements;
b) whole body depletion of intracellular potassium, magnesium and phosphate;
c) increased intracellular and whole body sodium and water;
d) low insulin levels and a partial switch from carbohydrate metabolism to ketone metabolism to provide energy;
e) impaired cardiac and renal reserve with less ability to excrete an excess salt and water load.
f) abnormalities of liver function.

2.5 Giving nutrients and fluid to malnourished patients will reverse these changes but in doing so leads to an increase in demands for electrolytes and micronutrients, and a simultaneous shift of sodium and water out of cells. Over-rapid or unbalanced nutrition support can, therefore, precipitate acute micronutrients deficiencies and dangerous changes in fluid and electrolyte balance.

2.6 Enteral tube feeding can precipitate refeeding problems since excessive feeding levels can be achieved easily. The problem can also be exaggerated if the products do not include adequate vitamins, phosphate or electrolytes.

2.7 Provision of intravenous fluids containing glucose may also precipitate refeeding problems

3. Education and Training

Awareness training of this updated guideline is needed. Critical Care Dietitians will lead on this with support from the Critical Care Clinical Educators, Critical Care Core Group, Critical Care Link Nurses, displays and training on the unit.

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Max rate of 40 ml hour is not exceeded prior to Dietetic Review	First 5 patients from start of audit period	Critical Care Dietitian on Site	Annual	Via team meetings
Feeding rate is not reduced on first gastric residual volumes	First 5 patients from start of audit period	Critical Care Dietitian on Site	Annual	Via team meetings
Correct feed is being used	First 5 patients from start of audit period	Critical Care Dietitian on Site	Annual	Via team meetings
Use of refeeding checklist	First 5 patients from start of audit period	Critical Care Dietitian on site	Annual	Via team meetings

5. Equality Analysis Assessment

5.1 The Trust recognises the diversity of the staff and local community it serves. Our aim therefore is to provide a safe environment free from discrimination, harassment and victimisation and treat all individuals fairly with dignity and respect and, as far as is reasonably possible, according to their needs.

5.2 As part of its development, an Equality Analysis on this policy have been undertaken and its impact on equality have been reviewed and no detriment was identified.

OR if 5.2 above does not apply seek wording from The Head of Equality on equality@uhl-tr.nhs.uk

EDI Statement

We are fully committed to being an inclusive employer and oppose all forms of unlawful or unfair discrimination, bullying, harassment and victimisation.

It is our legal and moral duty to provide equity in employment and service delivery to all and to prevent and act upon any forms of discrimination to all people of protected characteristic: Age, Disability (physical, mental and long-term health conditions), Sex, Gender reassignment, Marriage and Civil Partnership, Sexual orientation, Pregnancy and Maternity, Race (including nationality, ethnicity and colour), Religion or Belief, and beyond.

We are also committed to the principles in respect of social deprivation and health inequalities.

Our aim is to create an environment where all staff are able to contribute, develop and progress based on their ability, competence and performance. We recognise that some staff may require specific initiatives and/or assistance to progress and develop within the organisation.

We are also committed to delivering services that ensure our patients are cared for, comfortable and as far as possible meet their individual needs.

6. Supporting References

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6. Key Words

Critical Care feeding, Intensive care feeding, ICU, NG guideline, critical care, feeding protocol

CONTACT AND REVIEW DETAILS	
Guideline Lead (Moira Dawson AICU ACP Dietitian)	**Executive Lead**
Details of Changes made during review: Added recommendation to add Forceval Soluble for all patients excluding CKD ≥3 patients/contraindicated following enteral feeding audit 2024 which showed 50% of patients were not meeting micronutrient requirements at day 7 Updated the starting rate of enteral feed to be 10 ml per hour Nutrison Protein Plus instead of 10-25 to prevent overfeeding Changed words to make it more obvious that feed needs to be prescribed Updated the maximum rate of enteral feed to be prescribed to be reduced to 30 ml -40 ml hour Nutrison Protein Plus based on enteral feeding audit which showed overfeeding patients in first 48 hours. Added caveat if high doses of non-nutritional sources of energy to consider maintaining lower rate of feed Updated allergy section and references Change from IV Pabrinex to IV Vitamin B and C injection (Pabrinex) due to a change to generic brand	