Refeeding Syndrome Guideline

TARGET AUDIENCE	All staff involved in clinical care of patients within NHS Lanarkshire, including acute sector and long-term patients in primary care.
PATIENT GROUP	All adult patients within NHS Lanarkshire.

Clinical Guidelines Summary

Assessment
Recommend electrolytes are checked and corrected, especially potassium (K), magnesium (Mg), phosphate (PO4) and calcium (Ca).

Ensure patient weight and MUST score are recorded prior to assessment.
Dietetics will provide detailed plans on how to increase energy provision at their review of patients.

Risk Category	How to Identify Patient
At Risk Patient	Any patient who has had little or no food intake for >5 days
High Risk Patient (at least 1 of the following)	BMI less than 16 kg/m2
	Unintentional weight loss greater than 15% within the last 3 to 6 months
	Little or no nutritional intake for more than 10 days Low levels of potassium, phosphate or magnesium before feeding
High Risk Patient (at least 2 of the following)	BMI less than 18.5 kg/m2 Unintentional weight loss greater than 10% within the last 3 to 6 months
	Little or no nutritional intake for more than 5 days
	A history of alcohol abuse or drugs including insulin, chemotherapy, antacids or diuretics
Extremely High Risk	Patients in a starved state with BMI <14kg/m2
	Very little or no nutrition for >15 days

Refeeding Syndrome

Management

- High risk patient: start at 10kcal/kg. Aiming to meet full nutritional requirements between days 4-7.
- Extremely high risk patient: Extremely high-risk patients consider starting between 5kcal/kg/day-10kcal/kg/day as per dietetic assessment and trends in biochemistry. Monitor cardiac rhythm continually using telemetry in these patients and any others who already have or develop cardiac arrhythmias.
- **Oral/ enteral route**: Prescribe oral thiamine 100mg 3 times a day alongside a multivitamin/trace element supplement for first 10 days of feeding. Thiamine may be crushed and mixed with water if to go via enteral feeding tube. This is an off-label use but advice available from NEWT guidelines.
- If above route unsuitable, prescribe one pair of Vitamin B+C Intravenous High Potency concentrate for solution for infusion ampoules intravenously once daily before feeding commences and continue prescription for 3 –5 days.

- **Parenteral route**: Prescribe one pair of Vitamin B+C Intravenous High Potency concentrate for solution for infusion ampoules intravenously once daily before feeding commences and continue prescription for 3 –5 days. Multivitamins and trace elements will be supplied by pharmacy with appropriate administration details for all TPN patients. Tailored TPN bags will contain multivitamins and trace elements therefore no need to administer separately.

Monitoring

- **Day 1:** Baseline sample prior to starting any feeding regime- request U&E, LFT, Mg, PO4, Ca, Glucose and FBC using the **Nutrition-**Refeeding order set bundle via TrakCare. Request **CRP** for acute phase response. Ensure patient weight and baseline ECG are recorded.
- **Day 2 and 3:** Repeat **Nutrition- Refeeding** order set bundle- a significant reduction in potassium, magnesium or phosphate should alert to the possibility of refeeding syndrome.
- Ensure that electrolyte status is being maintained and observe patient. Check temperature, stool, fluid balance and drug charts regularly. Repeat Refeeding order set bundle daily until stable and thereafter at least twice weekly. Monitor BMs four times daily until stable then once daily.
- Guidance on replacing potassium, phosphate and magnesium via the NHS Lanarkshire Guidelines Website and App: see link on page 7 of guideline.

Content

Refeeding Syndrome

Introduction

Re-feeding syndrome is a description of the fluid and electrolyte shifts from the extracellular to intracellular compartments that take place in malnourished patients undergoing refeeding.

During starvation, insulin concentrations are low as liver stores of glycogen are mobilized. The glycogen is rapidly converted into glucose and gluconeogenesis activated, resulting in protein and lipid breakdown. Free fatty acids and ketones become the major source of energy.

When feeding is recommenced, there is a switch back to carbohydrate-based energy sources which results in insulin release. This stimulates cellular uptake of glucose, phosphate, potassium and water and anabolic protein synthesis. This process results in severe hypophosphataemia often accompanied by hypokalaemia and hypomagnesaemia. This can happen with oral, enteral and parenteral feeding.

Aim, Purpose and Outcomes

- To promote awareness of Refeeding Syndrome; its risks, prevention and optimum management of at-risk patients.
- To ensure all patients admitted to an acute site in NHS Lanarkshire are assessed for malnutrition on admission and weekly thereafter to aid identification of at -risk patients.

Refeeding Syndrome

Assessment and Management

Recommend electrolytes are checked and corrected, especially potassium (K), magnesium (Mg), phosphate (PO4) and calcium (Ca).

Ensure patient weight and MUST score recorded as part of baseline assessment.

Patients at Risk

Risk Category	How to Identify Patient
At Risk Patient	Any patient who has had little or no food intake for > 5 days
High Risk Patient (at least 1 of the following)	BMI less than 16 kg/m2
	Unintentional weight loss greater than 15% within the last 3 to 6 months
	Little or no nutritional intake for more than 10 days Low levels of potassium, phosphate or magnesium before feeding
High Risk Patient (at least 2 of the following)	BMI less than 18.5 kg/m2
	Unintentional weight loss greater than 10% within the last 3 to 6 months
	Little or no nutritional intake for more than 5 days
	A history of alcohol abuse or drugs including insulin, chemotherapy, antacids or diuretics
Extremely High Risk	Patients in a starved state with BMI <14kg/m2
	Very little or no nutrition for >15 days

For patients at risk of refeeding syndrome:

- Nutrition will be increased slowly as per dietetic assessment. An increase in feed should be dependent on biochemistry.

- High risk patients start at maximum 10kcal/kg/day and an increase in energy provision will be dependent on trends in biochemistry. Aiming to meet full nutritional requirements between days 4-7.

- Extremely high-risk patients consider starting between 5kcal/kg/day-10kcal/kg/day as per dietetic assessment and trends in biochemistry. Monitor cardiac rhythm continually using telemetry in these patients and any others who already have or develop cardiac arrhythmias.

• Dietetics will provide detailed plans on how to increase energy provision at their review of patients.

For patients at risk of refeeding syndrome and are to commence TPN, please submit a "Complex Nutrition Team" referral via Trakcare before 11am for same day review which will trigger a review by a dietitian and pharmacist to make the assessment of volume and type of TPN to be commenced. TPN will not be commenced until this assessment has taken place during working hours Monday to Friday. Please ensure the required TPN bloods (as listed below) are also available at the time of referral.

For high-risk patients starting on oral or enteral nutrition:

- Prescribe oral thiamine 100mg 3 times a day alongside a multivitamin/trace element supplement for the first 10 days of feeding. Thiamine may be crushed and mixed with water if to go via enteral feeding tube. This is an off-label use but advice available from NEWT guidelines.
- If above route unsuitable, prescribe one pair of Vitamin B+C Intravenous High Potency concentrate for solution for infusion ampoules intravenously once daily before feeding commences and continue prescription for 3 –5 days.

For patients receiving TPN:

- Prescribe one pair of Vitamin B+C Intravenous High Potency concentrate for solution for infusion ampoules intravenously once daily before feeding commences and continue prescription for 3 –5 days.

Multivitamins and trace elements will be supplied by pharmacy with appropriate administration details for all TPN patients. Tailored TPN bags will contain multivitamins and trace elements therefore no need to administer separately.

Monitoring

• Take a baseline (Day 1) sample prior to starting any feeding regime – request **U&E, LFT, Mg, PO4, Ca, Glucose and FBC** selecting the **Nutrition- Refeeding** order set bundle via TrakCare and requesting **CRP** (to assess acute phase response). ALL patients must have a baseline ECG and weight recorded, please consider repeat ECG at an appropriate time if any clinical concerns.

Consider ECG if abnormal heart rate, low serum potassium, low serum magnesium or low serum phosphate. If evidence of cardiac abnormalities on ECG, please consider continuous cardiac monitoring and if required escalate for senior review.

• Monitor glucose especially in Diabetic patients

• Monitor and adjust fluid balance carefully.

• Patients at high risk of refeeding syndrome with electrolyte derangement in the days preceding feeding should have **twice daily bloods (Nutrition-Refeeding order set bundle)** taken and reviewed after each set of results is returned as a clinical priority.

• Repeat **Nutrition- Refeeding** order set bundle on Days 2 and 3 – a significant reduction in phosphate and / or reduction in potassium / magnesium levels should alert to the possibility of refeeding syndrome.

• Ensure that electrolyte status is being maintained and monitor patient. Check temperature, stool, fluid balance and drug charts regularly and BMs.

• Repeat **Nutrition- Refeeding** order set bundle at least DAILY until stable and thereafter a minimum of twice weekly.

• More frequent monitoring will be required in those who fail to stabilise biochemically or clinically and those displaying re-feeding.

Blood test in Refeeding Bundle	**Monitoring frequency**
U+E	Daily until stable, then 1-2 times weekly
Liver function tests	Daily until stable, then 1-2 times weekly
Magnesium	Daily until stable, then 1-2 times weekly
Phosphate	Daily until stable, then 1-2 times weekly
Calcium	Daily until stable, then 1-2 times weekly
CRP	Daily until stable, then 1-2 times weekly
Glucose (BMs)	Baseline four times daily then once daily when stable

Electrolyte Replacement and Monitoring

Guidance on replacing potassium, phosphate, calcium and magnesium via the NHS Lanarkshire Guidelines Website and App: Electrolyte Disturbance | Right Decisions (scot.nhs.uk)

Roles and Responsibilities of Staff

Medical staff/ non-medical prescribers:
• Identifying patients at risk of re-feeding syndrome with an aim to prevent and manage refeeding syndrome before nutritional support commenced.
• Prescribing oral thiamine + multivitamin/ trace element supplement/ Vitamins B+C IV High Potency concentrate for solution for infusion depending on oral/intravenous access before starting nutritional support in patients at risk of refeeding syndrome.
• Ensuring biochemical monitoring undertaken daily on commencement of feed and supplementation of electrolytes when appropriate.
• Assessing whether oral/enteral/ parenteral nutrition required and liaising with dietetics/ pharmacy team to ensure the prescribed regimen is based on individual patient requirements.

Nursing staff:
• Ensuring all patients are screened on admission using the Malnutrition Universal Screening Tool (MUST) and reviewed on a weekly basis thereafter.
• Ensuring patients are referred to the Dietetic department if they have a MUST score of 2 or more
• Note also extended role above for nurse prescribers.

Pharmacy staff:
• Ensuring at risk patients are prescribed oral/intravenous B vitamins prior to commencement of nutritional support.
• Providing advice on electrolyte supplementation.
• Note extended role above for pharmacist independent prescribers.

Dietetic staff
• Identifying patients at risk of Refeeding Syndrome with an aim to prevent and manage refeeding syndrome before nutritional support commenced.
• Assessing individual patient risk of Refeeding Syndrome and calculating requirements based on individual patient needs.
- Responsible for the titration on nutritional support to reduce and manage risk.

• Note also extended role above for dietetic prescribers.

References/Evidence

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Appendix 1

1. Governance information for Guidance document

Lead Author(s):	Pamela Miller
Endorsing Body:	ADTC
Version Number:	5
Approval date	**May 2025**
Review Date:	May 2028
Responsible Person (if different from lead author)	Pamela Miller

CONSULTATION AND DISTRIBUTION RECORD	
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Distribution	

CHANGE RECORD			
Date	**Lead Author**	**Change**	**Version No.**
June 2020	Pamela Miller	Review- nil added	3
October 2024	Pamela Miller	Review- changes to format, content, IV thiamine in Pabrinex shortage	4
March 2025	Pamela Miller	Review- change of name from Pabrinex to Vitamins B+C, removal of IV thiamine advice. Review of content.	5

Appendix 2: Clinical Consequences Table

Clinical Consequences	Body Systems	
Hypophosphataemia	**Cardiac** Altered Myocardial Function Cardiac Arrhythmia Congestive Heart Failure **Hepatic** Liver Dysfunction	**Haematological** Haemolytic anaemia WBC Dysfunction Thrombocytopenia Haemorrhage **Respiratory** Acute ventilatory failure
Hypokalaemia	**Cardiac** Cardiac Arrhythmia Cardiac arrest **Renal** Decreased Urinary Concentrating Ability Polyuria and Polydipsia Decreased GFR **Hepatic** Exacerbation of hepatic Encephalopathy	**Neuromuscular** Weakness, Paralysis, Rhabdomyolysis **Gastrointestinal** Constipation Ileus **Respiratory** Respiratory Depression
Hypomagnesaemia	**Cardiac** Tachycardia Cardiac Arrhythmia **Gastrointestinal** Abdominal pain, Anorexia, Diarrhoea, Constipation	**Neuromuscular** Ataxia, Confusion, Muscle Tremors, Weakness, Tetany **Respiratory** Respiratory Depression
Altered Glucose Metabolism	Hyperglycaemia Metabolic acidosis Hypotension Hyperosmolar hyperglycaemic non-ketotic coma	Dehydration Osmotic diuresis
Fluid Balance	Cardiac failure Hypotension	pre-renal failure Sudden death
Vitamin Deficiency	Wenicke-Korsakoff syndrome Disorientation/ Short term memory loss Nystagmus or other eye movement disorders	