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

Patient has 1 or more of the following	Patient has 2 or more of the following
BMI less than 16 kg/m2	BMI less than 18.5 kg/m2
Unintentional weight loss greater than 15% within the last 3 to 6 months	Unintentional weight loss greater than 10% within the last 3 to 6 months
Little or no nutritional intake for more than 10 days	Little or no nutritional intake for more than 5 days
Low levels of potassium, phosphate or magnesium before feeding	A history of alcohol abuse or drugs including insulin, chemotherapy, antacids or diuretics

Management

- High risk patient: start at 10kcal/kg. Aiming to meet full nutritional requirements between days 4-7.
- Extremely high risk patient: start at 5kcal/kg. Recommend ECG monitoring, if possible, in this patient group.
- **Oral/ enteral nutrition**: Prescribe oral thiamine 100mg three times daily and Multivitamin/ trace element supplement for 4 days.
- **TPN**: Prescribe Pabrinex IV once daily for one dose prior to starting feed and for a further 3 days. Multivitamin/ trace element supplement will be added to TPN. See Appendix 3 if prescribing intravenous thiamine during Pabrinex shortage.

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.
- **Day 2 and 3**: Repeat **Nutrition- Refeeding** order set bundle – a significant reduction in phosphate should alert to the possibility of refeeding syndrome.
- Check that electrolyte status is being maintained and observe patient. Check temperature, stool, fluid balance and drug charts regularly. Repeat Refeeding order set bundle until stable and thereafter at least twice weekly.
- Guidance on replacing potassium, phosphate, calcium and magnesium via the NHS Lanarkshire Guidelines Website and App: Electrolyte Disturbance | Right Decisions (scot.nhs.uk)

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.

Criteria for determining people at high risk of developing refeeding problems

Patient has 1 or more of the following	Patient has 2 or more of the following
BMI less than 16 kg/m2	BMI less than 18.5 kg/m2
Unintentional weight loss greater than 15% within the last 3 to 6 months	Unintentional weight loss greater than 10% within the last 3 to 6 months
Little or no nutritional intake for more than 10 days	Little or no nutritional intake for more than 5 days
Low levels of potassium, phosphate or magnesium before feeding	A history of alcohol abuse or drugs including insulin, chemotherapy, antacids or diuretics

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.

Assessment and Management

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

For patients at risk of refeeding syndrome:

• Dietetics will introduce feeding at maximum 50% of nutritional requirements for first 2 days before increasing to full requirements if no biochemical abnormalities.

Refeeding Syndrome

• High risk patients start at maximum 10kcal/kg 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 at 5kcal/kg and an increase in energy provision will be dependent on trends in biochemistry. Recommend ECG monitoring, if possible, in this patient group.

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

For patients at risk of refeeding syndrome and commencing Parenteral Nutrition, please speak to the ward dietitian and pharmacist for advice regarding the volume and type of TPN to be administered. If out-of-hours, please refer to your local hospital policy for out-of-hours management of TPN.

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 first 4 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.

For patients receiving TPN:

- Prescribe one pair of Pabrinex® ampoules intravenously once daily before feeding commences and continue prescription for 3 days in total. Multivitamins and trace elements will be added to TPN daily by pharmacy.

Monitor glucose especially in Diabetic patients

Monitor and adjust fluid balance carefully.

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)

• Commence oral/enteral/ parenteral feeding

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

• Check that electrolyte status is being maintained and observe patient

• Check temperature, stool, fluid balance and drug charts regularly

Refeeding Syndrome

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

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

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 thiamine + multivitamin/ trace element supplement/ Pabrinex 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.
• 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:	4
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Responsible Person (if different from lead author)	Pamela Miller

CONSULTATION AND DISTRIBUTION RECORD	
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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, addition of IV thiamine advice in Pabrinex shortage	4

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
Altered Glucose Metabolism	Hyperglycaemia Metabolic acidosis Hypotension	Dehydration Osmotic diuresis Hyperosmolar hyperglycaemic non-ketotic coma
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	

Appendix 3- Intravenous thiamine use during Pabrinex shortage

Intravenous thiamine for prevention of refeeding syndrome should be reserved for those with intestinal failure where the oral or enteral route is unavailable.

In these patients where Pabrinex would have been prescribed but if Pabrinex stock is unavailable due to medicine shortage, Intravenous thiamine can be prescribed. This medication is unlicensed and patients should be informed using the NHS Lanarkshire's consent procedure.

Dose:
Intravenous thiamine 200mg once daily for one dose prior to feeding and for a further 3 doses.

If you are unsure about when to start intravenous thiamine, please speak to your dietitian or ward pharmacist who can advise and ensure an appropriate supply is made.