Worcestershire Acute Hospitals NHS Trust

Identification and Management of Re-Feeding Syndrome

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and / or carer. Health care professionals must be prepared to justify any deviation from this guidance.

INTRODUCTION

This guideline has been developed to advise all healthcare professionals involved in providing nutritional support to malnourished patients.

This guideline explains re-feeding syndrome and outlines identification of individuals at risk. It discussed the main considerations when providing nutritional support in patients thought to be at risk of re-feeding syndrome.

For advice on patients starting the out of hours emergency enteral feed regimen please see the 'Out of Hours Emergency Enteral Feeding Guideline' WAHT-NUT-008

For advice on patients at risk of re-feeding syndrome who require parenteral nutrition regimens please also contact Pharmacy and refer to 'Parenteral Nutrition Guideline' WAHT-NUT-007.

Please be aware that re-feeding syndrome can also occur in patients receiving oral nutrition support, i.e. oral nutritional supplement drinks.

THIS GUIDELINE IS FOR USE BY THE FOLLOWING STAFF GROUPS:

Qualified Doctors, qualified Nurses, Pharmacists and Dietitians.

Lead Clinician(s)	
Dr Thea Haldane	Consultant Gastroenterologist
Approved by Nutrition and Hydration Committee:	16th October 2015
Approved by Medicines Safety Committee on:	14th October 2015
Review Date: This is the most current document and is to be used until a revised version is available	6TH November 2020

Key amendments to this guideline

Date	Amendment	By:
January 2009	Approved by Nutrition Steering Committee (nutrition and hydration committee) and Medicines Safety Committee	
March 2011	Who is at risk? Section amended and minor amendment to Re-feeding Syndrome flowchart	Jo Brown
June 2011	Reformatting of protocol for prevention of re-feeding syndrome chart	Jo Brown
March 2013	Guideline expiry extended whilst under review	Jo Brown
May 2013	Guideline expiry extended whilst under review	Jo Brown
June 2013	Guideline expiry extended whilst under review	Jo Brown
August 2013	Guideline expiry extended whilst under review	Jo Brown
29/10/2013	Guideline has been extended for 6 months whilst under major review	Nalinee Owen
25/3/2014	Guideline extended for 3 months	Nalinee Owen
24/11/2014	Guideline extended for 3 months	Nalinee Owen
28/01/2015	Guideline extended until 30th April 2015	Jo Brown
24/04/2015	Guideline extended until 30th June 2015	Jo Brown
24/06/2015	Guideline extended until 30th September 2015	David Aldulaimi
Sept. 2015	Amendments to re-feeding syndrome protocol in line with NICE & BAPEN.	Dr Haldane and the nutrition team
October 2017	Document extended for further two years, no changes	Dr Haldane
December 2017	Sentence added in at the request of the Coroner	
17/09/2019	Document extended for 6 months to ensure current guidelines are adapted to new national guidelines	Dr Haldane
6th May 2020	Document extended for 6 months during COVID period	

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INTRODUCTION

This guideline has been developed to advise all healthcare professionals involved in providing nutritional support to malnourished patients.

This guideline explains re-feeding syndrome and outlines identification of individuals at risk. It discussed the main considerations when providing nutritional support in patients thought to be at risk of re-feeding syndrome.

Re-feeding syndrome is largely under diagnosed due to ethical issues of research and because clinicians are often unaware of its existence.

The majority of papers and literature that discuss re-feeding syndrome refer to the review paper by Solomon and Kirby in 1990, 2000 and more recently NICE (Feb, 2006) and BAPEN (Nov, 2012).

Prospective, non-interventional studies have been attempted to determine the incidence, risk factors and the clinical effects of re-feeding syndrome. The incidence of re-feeding syndrome is largely unknown as no universally accepted definition exists.

COMPETENCIES REQUIRED:

All qualified staff involved in providing and delivering nutritional support to malnourished patients.
All qualified Doctors, qualified Nurses, Pharmacists and Dietitians.

DETAILS OF GUIDELINE

Re-feeding syndrome can occur when initiating all forms of nutrition support in malnourished or starved patients. For example patients who have had no or little nutrition for 5 or more days may become intracellularly depleted of potassium, magnesium and phosphate and deficient in B vitamins (especially thiamine).

PATHOGENESIS OF RE-FEEDING SYNDROME

STARVATION

Gluconeogenesis → protein catabolism → negative Nitrogen balance

↓

↓Lean body mass

↓

Water & mineral depletion

↓

Adjustment to new metabolic state

RE-FEEDING

Conversion to glucose metabolism

↓

Insulin release

↓

Cellular glucose uptake, protein synthesis

↓

Intracellular shifts PO_4^-, K^+, Mg^{++}

↓

Clinical symptoms of Re-feeding Syndrome.

NB: Vitamin B is essential for carbohydrate metabolism

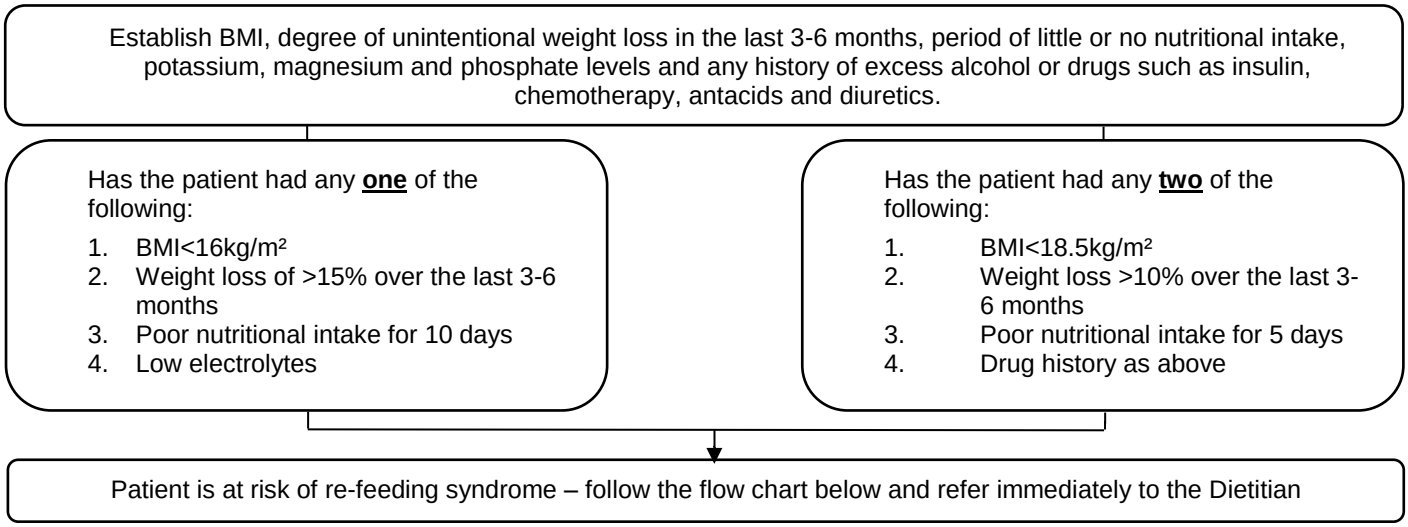
CONSEQUENCES OF INTRACELLULAR SHIFTS IN RE-FEEDING SYNDROME

- Hypophosphataemia
- Hypokalaemia
- Hypomagnesaemia
- Altered glucose metabolism
- Fluid balance abnormalities
- Vitamin deficiencies

CLINICAL SYMPTOMS OF RE-FEEDING SYNDROME (please refer to trust reference ranges for normal values)

	Low Phosphate	Low Potassium	Low Magnesium	Fluid/ Glucose
Cardiac	• Altered myocardial function • Arrhythmia • Congestive heart failure	• Arrhythmia • Cardiac arrest • ECG changes	• Arrhythmia • Tachycardia	• Heart failure
Respiratory	• Acute ventilatory failure	• Respiratory depression	• Respiratory depression	• Pulmonary oedema • Respiratory depression
Hepatic	• Liver dysfunction	• Exacerbation of hepatic encephalopathy		• Fatty liver
Renal	• Acute renal failure • Bicarbonate and glucose wasting	• Decreased urinary concentrating ability • Polyuria & Polydipsia • Decreased GFR	• Increased potassium loss	
Gastro-intestinal tract	• Anorexia • Nausea	• Constipation • Ileus	• Abdominal pain • Anorexia • Diarrhoea • Constipation	
Neuromuscular	• Lethargy • Weakness / paralysis • Confusion • Coma • Diaphragm weakness	• Paralysis • Rhabdomyolsis • Weakness	• Ataxia • Confusion • Muscle tremors • Tetany	• Hyperosmotic non-ketotic coma
Haematological	• Haemolytic anaemia • WBC dysfunction • Thrombocytopenia • Haemorrhage • Red cell 2,3 diphosphoglycerate deficiency			
Metabolic	• Reduced oxygen release to tissues from haemoglobin	• Glucose intolerance	• Hypocalcaemia • Hypokalaemia	• Hyperglycaemia • Hypernatraemia or hyponatraemia

WHO IS AT RISK?



RECOMMENDATIONS TO MANAGE AND PREVENT RE-FEEDING SYNDROME

To increase awareness of what re-feeding syndrome is and who the 'at risk' patients are.

To check electrolytes before commencing nutrition support.

To replace electrolytes (unless otherwise indicated) whilst commencing and progressing nutritional support (whether this is via the oral, enteral or parenteral route).

To continue to monitor electrolytes and replace electrolytes (unless otherwise indicated) until the patient is receiving their target nutritional support.

Please note that 'Forceval' soluble tablet is not required for patients receiving parenteral nutrition as their vitamin and mineral requirements will be met within their parenteral nutrition prescription.

Please initiate and increase calorie delivery slowly in the "at risk" patient. The more rapidly calories are delivered, the greater demand on circulating electrolytes thus there will be an increased risk of re-feeding syndrome.

The re-feeding syndrome protocol can be seen overleaf which also appears on the reverse of the 'out of hours' feeding regimen (please refer to the 'Out of Hours Enteral Feeding Guideline') and on all enteral feed regimes provided by the Dietitians across the trust.

PROTOCOL FOR PREVENTION OF REFEEDING SYNDROME

Re-feeding Syndrome: Identification of those at risk

Establish BMI, degree of unintentional weight loss in the last 3-6 months, period of little or no nutritional intake, potassium, magnesium and phosphate levels and any history of excess alcohol or drugs such as insulin, chemotherapy, antacids and diuretics.

Has the patient had any one of the following:

- BMI<16kg/m²
- Weight loss of >15% over the last 3-6 months
- Poor nutritional intake for 10 days
- Low electrolytes.

Has the patient had any two of the following:

- BMI<18.5kg/m²
- Weight loss >10% over the last 3-6 months
- Poor nutritional intake for 5 days
- Drug history as above

Patient is at risk of re-feeding syndrome – follow the flow chart below and refer immediately to the Dietitian

- Prior to commencing nutrition prescribe thiamine and B vitamins to be given at least 30 minutes before and during the first 10 days of feeding: high dose thiamine (200-300mg/day) and Vit B Co strong 1-2 tablets which can also be given via NGT/PEG or consider IV Pabrinex - one pair of intravenous high potency ampoules in 100ml sodium chloride 0.9% over 15-30 minutes (this contains 250mg of Thiamine).
- Give 1 Forceval soluble tablet, dissolved in 125 - 200ml sterile water (Oral/NG/PEG) once daily until the Dietitian reviews (avoid giving during the feed break).

*NB: if patient is not deemed at risk of re-feeding syndrome please follow the appropriate feeding regimen over page

Starting to Feed Safely - In Patients at risk of Re-feeding Syndrome

Step 1:
Commence enteral nutrition as per appropriate feeding regimen over page (if there are any concerns with swallow please refer to speech and language therapy).

Step 2:
Measure electrolytes: even if normal, replace potassium, phosphate and magnesium (see appendix 1 / discuss with pharmacy for guidance on electrolyte replacement). Only withhold supplementation if levels are high.

Step 3:

- Monitor potassium, magnesium, phosphate, calcium and sodium daily until bloods are normal and stable and the patient is receiving their target nutritional support, then continue to check bloods on a weekly basis.
- Continue to replace potassium, phosphate and magnesium (unless high) until the patient is receiving their target nutritional support.

Step 4:

- Monitor blood glucose levels (BMs) four times daily, as per BM chart.
- Monitor daily fluid balance.
- Doctors to assess the need for additional / replacement fluids on an individual basis. Unless contraindicated aim for 20-30ml/kg/day taking into account current fluid intake.

NB. The more rapidly calories are delivered and the rate increased, the greater the demand on circulating electrolytes; thus there will be an increased risk of re-feeding.

MONITORING TOOL

This should include realistic goals, timeframes and measurable outcomes.

How will monitoring be carried out?

Who will monitor compliance with the guideline?

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	Were patients commenced on the appropriate out of hours feed regimen according to their re-feeding risk? Was the feed regimen followed signed by a Doctor? Was thiamine / vitamin B / Pabrinex / Forceval prescribed appropriately? Were re-feeding bloods measured and supplemented if levels were normal? Were re-feeding bloods monitored at appropriate intervals?	Foundation year 1 and 2 training session discussing nutrition, re-feeding and parenteral guidelines. Retrospective audits	Annually Twice per year	Senior dietitian and senior pharmacist Dr Haldane and the nutrition team	Results of the audit will be reported back to members of the nutrition and hydration committee. Audit results will also be reported back to appropriate directorates as necessary via Dr Haldane.	Twice a year

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Circulated to the chair of the following committee's / groups for comments:

Name	Committee / group
Sonya Murray	Chair of Nutrition and Hydration Committee
Alison Smith	Chair of Medicines Safety Committee
Steve Graystone	Director of Critical Care, Patient Safety

Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

		Yes/No	Comments
1.	**Does the policy/guidance affect one group less or more favourably than another on the basis of:**		
	Race	No	
	Ethnic origins (including gypsies and travellers)	No	
	Nationality	No	
	Gender	No	
	Culture	No	
	Religion or belief	No	
	Sexual orientation including lesbian, gay and bisexual people	No	
	Age	No	
2.	**Is there any evidence that some groups are affected differently?**	No	
3.	**If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?**	N/A	
4.	**Is the impact of the policy/guidance likely to be negative?**	No	
5.	**If so can the impact be avoided?**	N/A	
6.	**What alternatives are there to achieving the policy/guidance without the impact?**	N/A	
7.	**Can we reduce the impact by taking different action?**	N/A	

If you have identified a potential discriminatory impact of this key document, please refer it to Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact Human Resources.

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	No
2.	Does the implementation of this document require additional revenue	No
3.	Does the implementation of this document require additional manpower	No
4.	Does the implementation of this document release any manpower costs through a change in practice	No
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	No
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval

Appendix 1

Electrolyte Supplementation in Re-feeding Syndrome

ELECTROLYTE	SUPPLEMENTATION METHOD	ADDITIONAL COMMENTS
PHOSPHATE	Refer to Trust guideline WAHT-PHA-011 http://nww.worcsacute.nhs.uk/EasysiteWeb/getresource.axd?AssetID=11948&type=full&servicetype=Attachment	Check calcium, potassium and phosphate levels after phosphate infusion. Use lower doses in renal impairment (consult pharmacy)
POTASSIUM	Level below 2.5mmol/l, if symptomatic or unable to take orally 20mmol in 500mls or 40mmol in 1000mls of 0.9% sodium chloride at a maximum recommended rate of 10mmol per hour. Repeat as necessary after measuring potassium levels. NB Higher concentrations are used in the ITU/HDU setting for patients with central venous access. Level above 2.5 mmol/l and able to take orally Sando-K tablets 4 to 8 tablets per day in divided doses.	
MAGNESIUM	Refer to Trust guideline WAHT-PHA-012 http://nww.worcsacute.nhs.uk/EasysiteWeb/getresource.axd?AssetID=11950&type=full&servicetype=Attachment .	