ADULT INPATIENT REFEEDING GUIDELINES

Managing inpatients at risk of refeeding syndrome

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LOCSSIP Reference:		NATSSIP Standard:	List standard (NATSSIPS Standards)		

Version No:	Date of EqIA:	Approved by:	Date Approved:	Date made active:	Review Date:
1	10/2020	Nutrition & Hydration Steering Group	21/10/2021	21/10/2021	21/10/2023
		Chair N&H Group	12.2.2024 27.9.2024 15.1.25	21.2.2024 30.9.2024 22.1.25	31.7.2024 31.12.2024 28.2.2025
		Extended by Chair N&H Group Noted that this guideline mentions Pabrinex which has been discontinued. Staff are ask to refer to the Medicines Safety Notice dated January 2025 - for advice– any queries to contact their site Pharmacy	18.6.2025	19.6.2025	30.09.2025

Brief Summary of Document:	Guidelines to support the safe recognition and management of refeeding syndrome in adult inpatients
Scope	This clinical guideline is for use with all inpatients at risk of refeeding syndrome and can be used out of hours, at weekend and bank holidays and when a dietitian is not immediately available, to avoid a delay in initiating nutrition. These guidelines should be used by dietitians, registered nursing staff,

	biochemists, pharmacists, doctors, allied health professionals (AHPs) and students alike within the scope of the individual's clinical competence
To be read in conjunction with:	https://www.nice.org.uk/Guidance/CG174 331: Enteral Feeding policy for Adults including Operational guidelines HD018: Guidance on the Mental Capacity Act
Patient Information:	

Owning committee/ group	Hywel Dda University Health Board Nutrition and Hydration Group
Executive lead	Mandy Rayani, Director of Nursing, Quality and Patient Experience

Reviews and updates		
Version no:		Date Approved:
1	New guideline Adult Refeeding Guidelines	2012
	Guideline reviewed 20/5/16	Extended to 31/3.20
2	Full Review	

Glossary of terms

Term	Definition
AHPS	Allied Health Professionals
RFS	Refeeding syndrome
AWSSP	All Wales Adult Nutrition screening tool
TPN	Total Parenteral Nutrition

Keywords	Refeeding, RFS.

Contents

1. AIM OF GUIDELINE

To minimise clinical risk and promote the safe introduction of nutrition via oral diet, oral nutritional supplements, enteral tube feeding and parenteral nutrition to all adult inpatients.

2. OBJECTIVES

The aim of the guideline will be achieved by the following objectives:

- To define refeeding syndrome.
- To provide guidance on identifying 'at risk' patients.
- To recommend best practice for the prevention and treatment of refeeding syndrome.

3. SCOPE

This guideline is for use with all adult inpatients at risk of developing refeeding syndrome and can be used out of hours, at weekend and bank holidays and when a dietitian is not immediately available, to avoid a delay in initiating nutrition. This guideline should be used by dietitians, registered nursing staff, biochemists, pharmacists, doctors, allied health professionals (AHPs) and students alike within the scope of the individual's clinical competence.

4. INTRODUCTION

Refeeding syndrome can occur in the malnourished or starved individual upon the reintroduction of oral, enteral or parenteral nutrition. This guideline has been produced to support staff in the identification of patients at risk of refeeding syndrome, classification of risk, and management of refeeding syndrome.

5. DEFINITION OF REFEEDING SYNDROME (RFS)

Refeeding syndrome (RFS) is not a singular condition but a group of biochemical shifts and clinical symptoms that can occur in the malnourished or starved individual upon the reintroduction of oral, enteral or parenteral nutrition (Solomon and Kirby, 1990).

In practice electrolyte disturbances are often observed but with no adverse clinical symptoms. This is often referred to as biochemical refeeding whilst RFS with clinical symptoms is often referred to as symptomatic refeeding. (BDA PENG A Pocket guide to Clinical Nutrition, 5th edition, 2018 Vera E Todorovic and Bruno Mafrici).

The most common electrolyte disturbances are hypophosphatemia, hypokalaemia and hypomagnesaemia with occasional hypocalcaemia.

Patients may experience peripheral oedema, fluid overload and disturbances to organ function including respiratory, failure, cardiac failure and pulmonary oedema.

More information on the pathogenesis of refeeding syndrome can be found in Appendices 1 and Appendix 2.

6. IDENTIFICATION OF PATIENTS WHO MAY BE AT RISK OF REFEEDING SYNDROME

NICE CG 32 is a useful framework to support the identification of patients at high risk of malnutrition. However, it is likely the refeeding risk factors listed in the NICE guidance are only true risks in the presence of starvation so clinical judgement should be used when making decisions about risk. (PENG 2018)

Refeeding syndrome can occur in patients receiving oral, enteral or parenteral nutrition. It is less likely to occur in those fed orally (although it is possible) since starvation is usually accompanied by a reduction in appetite. The presence of ketones in the urine may suggest a period of starvation, which can provide an indication that RFS is more likely to occur. (PENG Committee Consensus opinion, 2018)

Patients with eating disorders are at significant risk of refeeding syndrome and may, be being admitted for ‘safe refeeding’ (although this may not be the only reason for an admission). Anorexia Nervosa and its subtypes are a mental health illness. A patient with an eating disorder may have the intellectual capacity to understand the nature, purpose and result of treatment (including that of refeeding), however may be unable to consent to treatment due to their capacity being compromised by eating disorder cognitions such as fear of weight gain CQC (2008). In this instance, the patient may be considered for treatment under the MHA, 1983.

Refeeding problems can occur in overweight patients who have eaten very little or nothing for prolonged periods. Particular caution is needed in bariatric surgical patients who have developed complications resulting in a significant period of starvation.

It should not be assumed that there is low/no risk of RFS if electrolytes are in the normal range prior to feeding. Homeostatic mechanisms make it common for patients to have normal serum levels prior to feeding so clinical judgement is vital when making decisions about risk. (NICE 2006)

Malnourished and/or dehydrated patients with renal impairment can have normal or high potassium and phosphate levels. The combined effect of rehydration and refeeding can cause significant changes in biochemistry within hours resulting in very low levels.

Even when there appears to be sufficient level of oral intake to reduce the risk of RFS, consideration should be given to the extent of any vomiting or malabsorption that may be present. (PENG Committee Consensus opinion, 2018)

Inpatients who have a history of substance misuse or alcohol excess or are taking certain medications are also at high risk of developing RFS.

Completion of the inpatients All Wales Adult Nutrition screening tool (WAASP) by nursing staff within 24 hours of admission will identify those who are at high risk of malnutrition. Gathering information from inpatients on history of food intake or reviewing food record charts and taking a weight history will also support assessment.

People who have eaten little or nothing for more than 5 days may be classed as “at risk” but not high risk of developing refeeding problems. These patients should have nutrition support introduced cautiously for first 48 hours with clinical and biochemical monitoring. Practically this may mean starting with one course at each mealtime and building up to full diet after 48 hours. No further restriction is needed after this time if biochemical and clinical monitoring reveals no refeeding problems.

Patients are at high risk of developing RFS if:

Patient has one or more of the following:	Patient has 2 or more of the following:
• BMI <16kg/m² • Unintentional weight loss >15% within the previous 3-6 months* • Little or no nutritional intake for >10 days • Low level of potassium, phosphate or magnesium prior to feeding – need to consider alongside other nutritional risk factors and reasons e.g. rehydration, diuretic use, chemotherapy	• BMI <18.5kg/m² • Unintentional weight loss >10% within the previous 3-6 months* • Those with very little or no intake for >5 days • A history of drug or alcohol abuse or some drugs including insulin, chemotherapy, antacids or diuretics

(NICE, 2006)

* Percentage weight loss or unintentional weight loss can be calculated as follows:

Percentage weight loss = (usual weight (kg) – current weight (kg)/usual weight x 100

E.g. if a patient weighed 40kg on admission but usual weight was 50kg:

Percentage weight loss = (50kg – 40kg)/50kg x 100 = 20% which places them at high risk

NICE CG 32 does make reference to an extreme high risk category but management would be the same as patients identified as high risk of developing RFS.

7. STARTING NUTRITION AND HYDRATION FOR PATIENTS AT RISK OF REFEEDING SYNDROME

Evidence on the management of RFS is of weak quality with many limitations. Guidelines that are more recent indicate a shift towards providing more energy on initiation of nutrition support (Friedl et al 2018) than was previously suggested.

Electrolyte Provision

It is important to remember patients may have low levels of electrolytes for other reasons, which may be independent of RFS. Over prescription of enteral/intravenous fluids, causing over hydration and several medications can result in low potassium, magnesium and phosphate independent of refeeding syndrome and these factors must be taken in to account when assessing risk. (PENG 2018)

- Basic requirements for electrolytes should be met from the onset of feeding to prevent refeeding syndrome. Correcting low levels of electrolytes prior to feeding may unnecessarily delay feeding and should occur concurrently.
- Other sources of electrolytes should be taken into account when assessing a patient's requirements. E.g. parenteral nutrition, intravenous medications, oral intake, existing supplementation. This may also affect fluid administration.
- Electrolyte levels are likely to drop when nutrition is reintroduced as they move from extracellular to intracellular compartments.

- If low levels of electrolytes are observed during feeding additional electrolyte replacement should be provided. There should be no reason to stop feeding.
- Consideration should be given to the route of administration of electrolytes. Oral absorption may take longer and be more erratic than intravenous absorption so clinical judgement should be used to decide how urgent supplementation is. The absorption of oral preparations of electrolytes may take longer than an intravenous infusion. Clinical judgements should be used to decide the most appropriate route of electrolyte replacement.
- Clinicians should seek advice from pharmacy and/or refer to local guidelines on the management of low electrolyte levels.
- Extra caution may be needed for those with cardiac or renal impairment and electrolyte replacement should be assessed on an individual patient basis.
- Critical care units are likely to use different criteria for replacement of electrolytes.

Thiamine and micronutrient provision (vitamins, minerals and trace elements)
The recommendations for vitamin, mineral and trace element supplementation vary considerably due to lack of evidence.

There is an increased requirement for thiamine during refeeding due to its role in carbohydrate metabolism. Inpatients at high risk of refeeding will often have poor dietary intake so their baseline levels of thiamine and micronutrients are already depleted.

Clinical judgement should be used when deciding on route of administration of vitamins and minerals (micronutrients). For example, patients receiving oral or enteral nutrition, may still be at risk of deficiency and require intravenous replacement if they experience malabsorption due to a clinical condition.

For those identified as at high risk of refeeding consider:

Table 1

Route	
Oral	Thiamine 200 – 300mg daily for up to 10 days Vitamin B Co strong 1 or 2 tablets, 3 times a day for up to 10 days Forceval 1 capsule daily for 10 days
Enteral	Thiamine 200 – 300mg daily for up to 10 days Forceval soluble once daily for up to 10 days
Intravenous	Pabrinex I + II once daily for 3 to 5 days Solivito, Addaven and Vitlipid (or equivalent as discussed with Pharmacy) (Addaven is replacing Additrace but for a period of time both may be used)

Patients who are withdrawing from alcohol and those in critical care may be on higher doses of Pabrinex already.

Once patients are established on enteral or parenteral nutrition and receiving full requirements, they are unlikely to need ongoing supplementation as enteral and parenteral feeds are usually capable of providing 100% of vitamin and mineral requirements.

Energy provision

- Starting nutrition at 10 – 20kcals/kg/day is likely to be safe for all risk categories if adequate electrolytes and micronutrients are provided and appropriate monitoring provided. (PENG Committee Consensus opinion, 2018)
- It may be safest to feed closer to 10kcals/kg for those identified at the extremes of risk. E.g. someone with a very low BMI
- Care should be taken not to overfeed obese patients and expert dietetic advice will be required to support this.
- Carbohydrate provided may be more crucial to the development of refeeding syndrome (Khan et al, 2011; Fan et al, 2004) Avoid providing excessive calories from carbohydrate as the change of metabolic substrates is responsible for fluid and electrolyte shifts

Patients requiring additional fluids
Circulatory volumes should be replaced but care should be taken not to fluid overload patients. Consideration should be given to sodium and carbohydrate content of the fluid used – 1 litre of 5% dextrose contains 50g carbohydrate/200Kcal. Consideration should be given to provision of thiamine if using fluids containing glucose.

Aim for a fluid intake between 20 – 30mls/kg/day and a sodium provision of <1mmol/kg/day. This will minimise the risk of fluid and sodium overload and refeeding oedema. (PENG Committee Consensus opinion, 2018)

More guidance on Intravenous fluid therapy in adults in hospital can be found in NICE guidance CG174 https://www.nice.org.uk/Guidance/CG174

NUTRITIONAL SUPPORT

Oral Nutrition

- For those identified at high risk, or exhibiting RFS intake should be increased cautiously and dietetic review sought within working hours.
- All food and fluid intake should be accurately recorded on an All Wales Food Record Chart and fluid balance chart if clinically indicated.
- The patient's current level of nutritional intake should be considered. If a patient is not showing any signs of biochemical or clinical RFS it is unlikely an energy provision below their present intake is necessary.
- If patients are eating, avoid prescription of supplement drinks unless prescribed by a dietitian. Avoid fat free, juice style supplements, which have a significantly higher carbohydrate content. (PENG 2018)

Enteral Nutrition

- All patients should be referred to a dietitian for assessment in working hours.
- The out of hours refeeding regimes should be used if dietetic review is unavailable. Do not use the "out of hours" regimens from the Adult Enteral Feeding Guidelines. A suitable enteral feeding regimen is included in this guideline for those identified as high risk of refeeding (see appendix 3).
- If day 3 of regimen is completed, continue with this prescription until dietetic review.
- The calorie, protein, electrolyte and fluid provision are included on the regime.

Total Parenteral Nutrition (TPN)

- There should never be a need to start TPN out of hours with the exception of patients in critical care. Dietetic assessment is required in any other setting.
- Until a dietetic review is available, focus on correction of any electrolyte imbalances, provision of thiamine and micronutrients and fluid provision as appropriate to clinical condition.

8. MONITORING OF PATIENTS AT RISK OF REFEEDING SYNDROME

- Due to homeostatic mechanisms, it is not uncommon for serum levels of potassium, magnesium and phosphate to be within normal parameters prior to feeding.
- Pre feeding correction of low plasma levels is unnecessary.
- Monitor appropriate biochemistry including potassium, phosphate and magnesium. Refer to table below for detail.
- Restore circulatory volume and monitor fluid balance and overall clinical status closely
- Monitor cardiac electrical rhythm (ECG) in patients identified as at extremes of high risk of refeeding and any others who already have or develop any cardiac arrhythmias.

Table No. 2

Parameter	Frequency	Rationale
Sodium, Potassium, Urea, Creatinine	Daily until risk resolved	Assessment of renal function, fluid status, and sodium and potassium status.
Glucose	At least daily until risk resolved, may be more frequent in diabetics or those commenced on parenteral feeding	Hyper and hypoglycaemia are known complications
Magnesium, Phosphate	Daily until risk resolved	Concentrations known to reduce during refeeding. Low phosphate is very common in refeeding and low magnesium may be the cause of refractory hypokalaemia
Corrected Calcium	Daily until risk resolved	Concentrations can be affected during refeeding. Phosphate supplementation can cause hypocalcaemia
Fluid balance	Daily	To prevent over or under hydration. To compare prescribed with actual volumes delivered. To take account of IV/enteral fluid provision.
Weight	Daily until risk with fluid balance resolved	To identify fluid overload or refeeding oedema as a consequence of refeeding. Useful to interpret changes alongside fluid balance charts.

(PENG 2018)

9. RESPONSIBILITY

Director of Nursing

The Executive Director of Nursing, Quality and Patient Experience, who is a member of the Board has overall responsibility for nutrition in the organisation.

Nutrition and Hydration Group

The Nutrition and Hydration Task Group is responsible for the oversight of all aspects of nutrition within the Organisation. This responsibility includes the development and implementation of guidance, the identification and management of related education and training needs, and for ensuring systems are in place for monitoring of compliance with guidance and identifying risks to nutritional care via the quality and safety structure.

All clinical service team managers are responsible for ensuring compliance with this guidance within their team and ensuring staff are competent and access relevant training.

Medical Staff are responsible for:

- Promoting the awareness of the risks, the prevention and management of refeeding syndrome when initiating any form of nutritional support.
- For prescription of nutritional support.
- For ensuring timely and appropriate biochemical monitoring.
- For supplementation of electrolytes.
- For prescribing appropriate vitamin and mineral replacement therapy
- For timely referral to dietetics to ensure appropriate nutritional support

Dietitians are responsible for:

- Raising awareness, education and training of medical and nursing staff on the recognition, prevention and appropriate management of refeeding syndrome.
- Providing expert advice regarding refeeding risk and management
- Assessing the referred patients risk of refeeding and advising on management accordingly
- Provision of appropriate refeeding plans and feeding regimens
- Monitoring of nutritional status

Qualified Nursing staff are responsible for:

- Through nutritional risk screening identifying patients who are at high risk of malnutrition and may therefore be at risk of refeeding syndrome.
- Referring patients at high nutritional risk to the dietetic service.
- Following the prescribed feeding and electrolyte replacement regimens, highlighting any problems to the medical team.

Pharmacists are responsible for:

- Ensuring the electrolyte and vitamin, mineral and trace element supplements used to manage refeeding, and other nutritional products are correctly prescribed.
- To identify prescribing errors or prescribing that does not adhere to refeeding guidance to the medical team.

Biochemists are responsible for:

- Highlighting abnormal biochemistry results to the ward/medical team.

Other Allied Health Professionals are responsible for:

- Communicating to the wider health care team if a patient's intake is poor which may predispose them to a refeeding risk.

10. TRAINING

Training and awareness sessions for medical staff and secondary care pharmacy teams can be provided by Dietetics as requested. Education on refeeding risk and management is incorporated into other nutrition focused training and a log of staff trained is kept on the dietetic training database e.g. F1 doctor training, screening tool training, RRAMCI course training.

11. IMPLEMENTATION AND MONITORING

The guideline will be cascaded to relevant medical staff through the Nutrition steering group and any locality nutrition groups. Monitoring of this guideline will be through clinical audit.

12. REFERENCES

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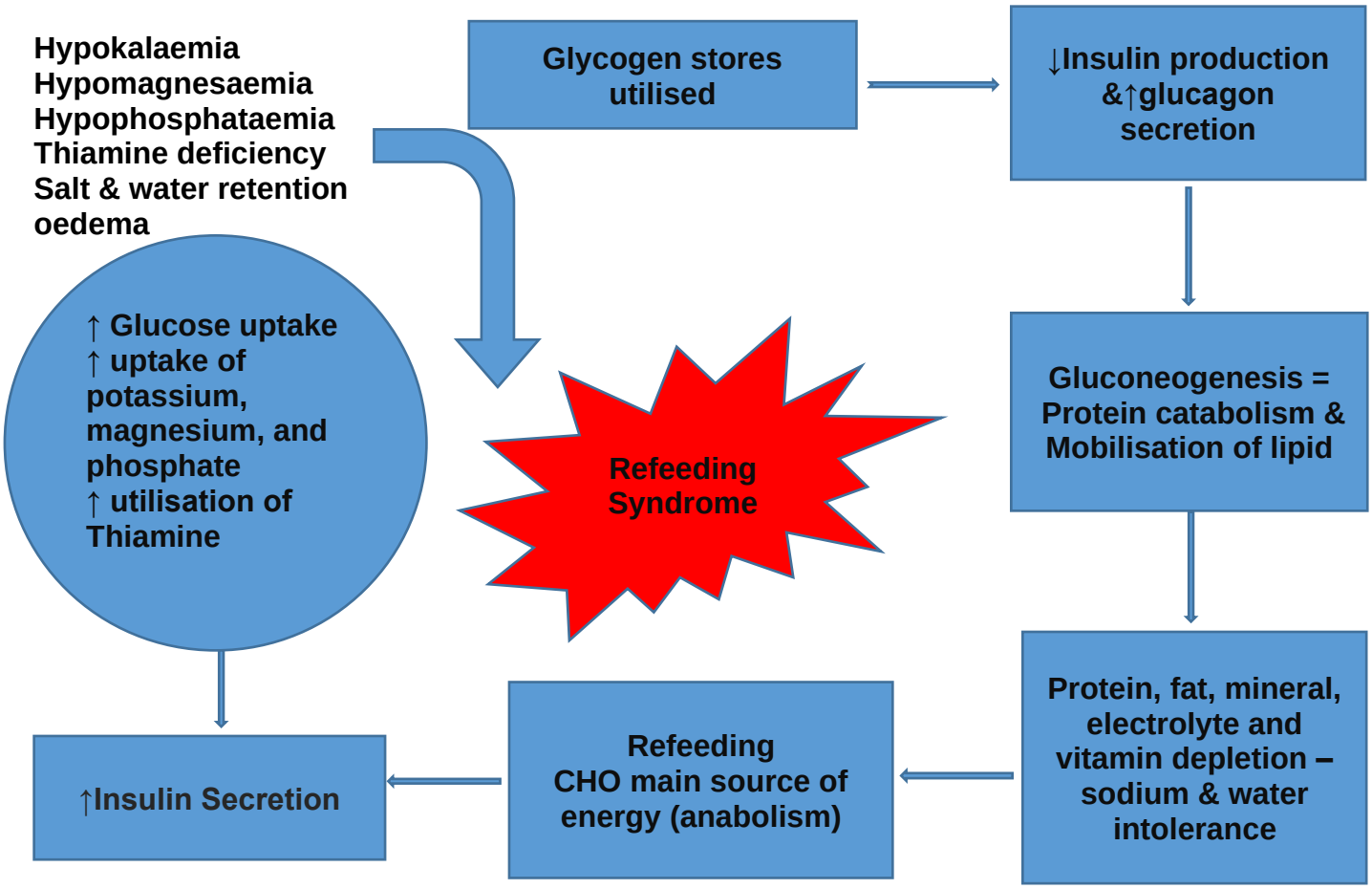
13. APPENDIX 1: Pathogenesis of Refeeding Syndrome

Pathogenesis of refeeding syndrome

During starvation, adaptations take place to reduce cellular activity and organ function in order to save energy. The changes include down regulation of metabolic pumping and synthetic activities with consequences that include:

- Decreased insulin and increased glucagon secretion, with a switch from glucose towards ketone bodies as a source of energy
- Deficiency of vitamins and trace elements
- Whole body depletion of potassium, magnesium and phosphate
- Increased intracellular and whole body sodium and water
- Impaired cardiac, intestinal and renal reserve, leading to reduced ability to excrete excess sodium and water
- Abnormal liver function

Starvation and Refeeding

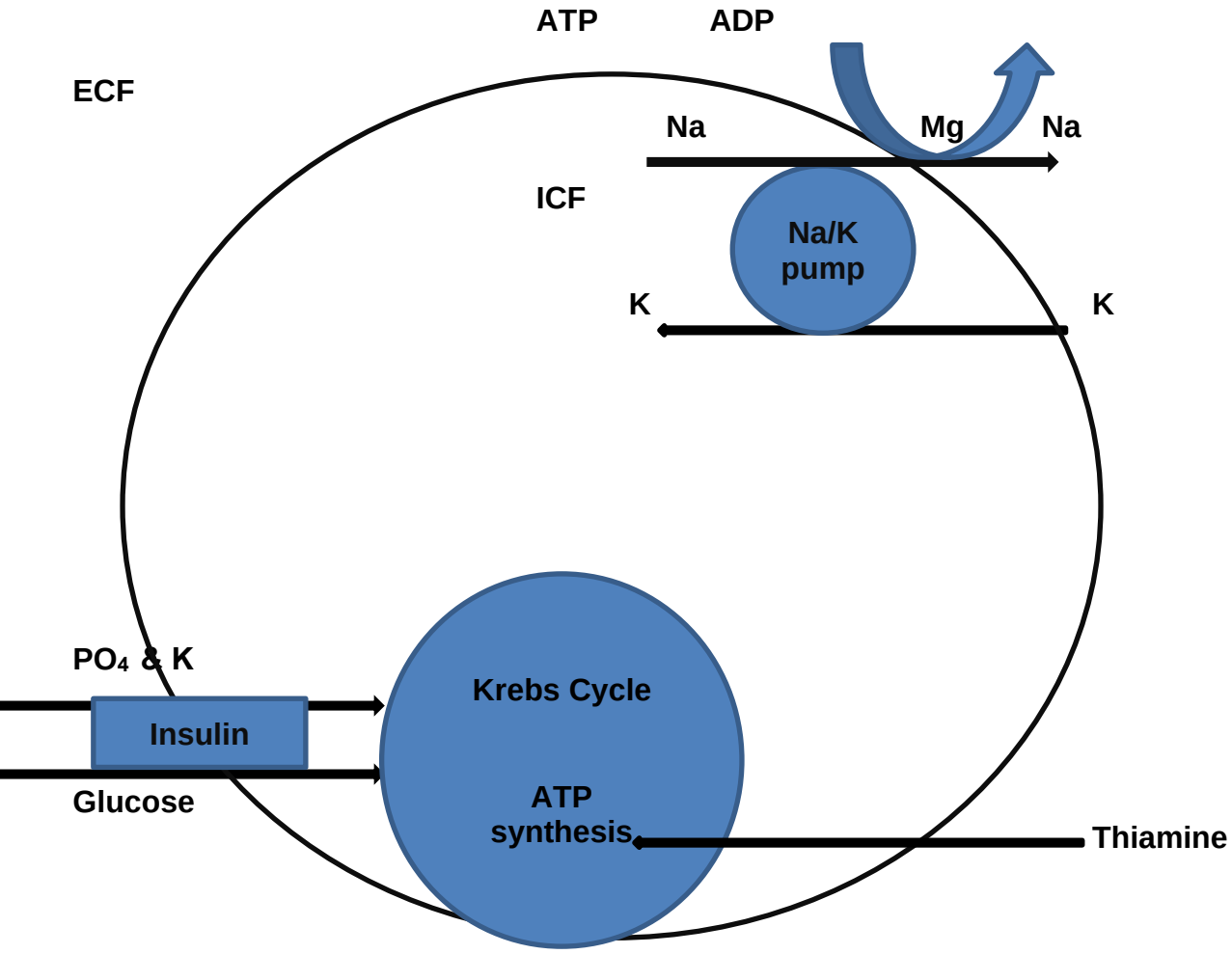


Adapted from Stanga et al (2008) EJCN, 62:667

During refeeding:

- Increased insulin release leads to increased uptake of glucose, phosphate and potassium into the cells.
- Reactivation of the sodium / potassium membrane pump leads to further movement of potassium into cells with a simultaneous movement of sodium and fluid out of the cells.
- Reduced phosphate is associated with increased urinary magnesium excretion.
- Stimulation of protein synthesis leads to increased anabolic tissue growth which in turn leads to increased cellular demand for phosphate, potassium, glucose and water.
- Reduced sodium and water excretion.
- Increased cellular thiamine utilisation due to its role as a co-factor for carbohydrate.

Effect of Refeeding Syndrome on cell metabolism



(PENG 2018)

14. APPENDIX 2: Clinical Sequellae of Altered Electrolytes in Refeeding Syndrome

(Solomon and Kirby 1990, Brooks and Melnik 1995)

Electrolytes	Cardiac	Respiratory	Hepatic	Renal	GI	Neuromuscular	Haematological
Low phosphate	Altered myocardial function Arrhythmia Congestive heart failure	Acute ventilatory failure	Liver dysfunction	Acute renal failure Bicarbonate and glucose wasting	Anorexia Nausea	Lethargy, weakness, seizures, confusion, coma, paralysis, Diaphragm wasting	Haemolytic anaemia, WBC dysfunction thrombocytopenia, Haemorrhage, Red cell 2,3 diphosphoglycerate deficiency
Low potassium	Arrhythmia Cardiac arrest ECG changes	Respiratory depression	Exacerbation of hepatic encephalopathy	Decreased urinary concentrating Ability, Polyuria and polydipsia Decreased GFR	Constipation Ileus	Paralysis Rhabdomyolysis Weakness	
Low magnesium	Arrhythmia Tachycardia	Respiratory depression		Increased potassium loss	Abdominal pain, Anorexia, Diarrhoea, Constipation	Ataxia Confusion Muscle tremors Weakness Tetany	

15. APPENDIX 3 - Refeeding Out of Hours Enteral Feeding Regimen

ADDRESSOGRAPH

Patient Name:
DOB:
NHS Number:
Hospital Number:

This regimen can be used for patients identified at high risk of refeeding when a Dietitian is not available. Refer to the dietitian as usual so can be seen on next working day.

Ensure patient is positioned as upright as possible throughout feeding at a minimum of 45° for at least 30 minutes after feed has stopped to minimize risk of aspiration

Stage/Day	Feed Type / Name (CHECK FEED LABEL)	Feed Volume (ml)	Rate / Bolus (ml/hr)	Feeding Period (hrs)	Rest Period (hrs)	Water Flushes Pre and Post Feed (ml)	Date and Time Feed Started
1	Nutrison 1kcal/ml	400ml	20ml/hr	20hrs	4hrs	50ml	
2	Nutrison 1kcal/ml	600ml	30ml/hr	20hrs	4hrs	50ml	
3	Nutrison 1kcal/ml	800ml	40ml/hr	20hrs	4hrs	50ml	
Please continue with stage 4 of regimen unless advised by the Dietitian							

ENSURE REGISTERED NURSE SIGNS THE DRUG CHART EVERY TIME FEED IS SET UP
TURN OVER FOR NUTRITIONAL CONTENT OF FEED OVER 24 HOURS

Date / Stage	Energy (kcals)	Protein (g)	Carbohydrate (g)	Sodium (mmol)	Potassium (mmol)	Feed Volume (mls)	Water Volume (ml)	Total Fluid Volume (ml)
1	400	16	49.2	17.2	15.2	400	100	500
2	600	24	73.8	25.8	22.8	600	100	700
3	800	32	98.4	34.4	30.4	800	100	900

ADDITIONAL INFORMATION

- Use the appropriate nursing care plan and follow any tube care advice given by your Nutrition Nurse.
- Ensure tube position is checked each time tube is used to administer feed, fluids and medications.
- Check that feed is correct and check the expiry date of the feed.
- Do not hang feed packs for longer than 24hours or decanted feed for longer than 4hours - discard any unused feed.
- Change and dispose of giving sets every 24hours. Label each giving set with time and date of set up.
- Always use a 60ml purple enteral feeding syringe.
- As a minimum flush feeding tubes with 30mls of sterile water before and after giving medication and give a 10ml flush between medications

- **Do not start oral nutritional supplements at the same time as the starter regimen**
- **Restore circulatory volume and monitor fluid balance and overall clinical status closely. Monitor fluid balance closely**
- **For patients who require additional IV fluids to meet fluid requirements saline or Hartmann's solution may be more appropriate compared with dextrose saline due to the calorie content (1L 5% dextrose saline contains 200kcal)**