SYDNEY SOUTH WEST
AREA HEALTH SERVICE
NSW HEALTH

Policy Directive

Royal Prince Alfred Hospital
Refeeding Syndrome Policy

Document No:	RPAH_PD2010_036
Functional Sub-Group:	Clinical Governance
Summary:	This policy aims to ensure that patients at risk of refeeding syndrome are managed appropriately to minimise metabolic abnormalities and safely reintroduce nutrition (oral, enteral or parenteral).
Approved by:	Ken Cahill, Executive Director RPAH
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Replaces Existing Policy:	Refeeding Syndrome Policy 2007
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Note: Sydney South West Area Health Service (SSWAHS) was established on 1 January 2005 with the amalgamation of the former Central Sydney Area Health Service (CSAHS) and the former South Western Sydney Area Health Service (SWSAHS).

In the interim period between 1 January 2005 and the release of single Area-wide SSWAHS policies (dated after 1 January 2005), the former CSAHS and SWSAHS policies were applicable as follows:-

- SSWAHS Eastern Zone : CSAHS
- SSWAHS Western Zone: SWSAHS

Royal Prince Alfred Hospital
Refeeding Syndrome Policy

CONTENTS

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1. Introduction

The risks addressed by this policy:

Clinical Risks:

Refeeding Syndrome is the term used to describe the adverse metabolic effects and clinical complications when a starved or seriously malnourished individual commences refeeding. If nutrition in such a patient is not managed carefully, a variety of detrimental effects can occur including:

- sensory disturbances, confusion, depression, irritability
- glucose intolerance, hyperglycaemia, polyuria
- impaired muscle contraction (including heart, respiratory and gastrointestinal muscles)
- neuromuscular weakness
- reduced oxygenation of tissues, ventilation difficulties
- cardiac arrhythmias
- cardiac arrest

The aims / expected outcome of this policy

To facilitate the safe, appropriate administration of nutrition support to prevent complications from Refeeding Syndrome in patients who are at risk.

2. Policy Statement

This policy has been developed to provide a guide to managing the risk of Refeeding Syndrome in the hospital wards.

Refeeding Syndrome is a potentially lethal condition that occurs when aggressive nutrition is recommenced in someone who has metabolically adapted to starvation.

During starvation, the body conserves energy and protein by decreasing heart rate, blood pressure, metabolic rate, protein/enzyme production, and gut activity. Lean body tissue is broken down, releasing intracellular K^+, PO_4^{2-}, Mg^{2+}, Zn^{2+} which are cleared by increased urinary excretion resulting in a net body deficit. This process occurs over the first 3-10 days of starvation.

After this adaptation period, if nutrition (either parenteral, enteral, or aggressive oral nutrition support) is provided, abrupt metabolic changes occur. These include increase in heart rate, blood pressure and metabolic rate; change in hormone levels (eg increase in insulin, thyroid hormones); stimulation of protein synthesis and replenishment of body

energy stores (ATP, glycogen) with sudden increase in thiamine consumption. Sodium moves out of cells into serum (resulting in retention of fluid) and intracellular electrolytes (K^+, PO_4^{2-}, Mg^{2+}, Zn^{2+}) shift from serum back into cells resulting in reduced serum levels. These changes can cause thiamine deficiency and severe, even fatal, alterations in the function of muscles, nerves and brain.

3. Principles / Guidelines

3.1 Recognising Risk of Refeeding Syndrome

- The following patients can be classified at <u>extreme risk</u>:
  - patients with BMI<14 or who appear extremely emaciated
  - patients known or suspected to have anorexia nervosa
  - patients known or suspected to have chronic alcoholism
  - patients with severe recent weight loss (>5% of usual weight in one month, or >10% in six months)
  - patients presenting with low levels of K^+, PO_4^{2-}, Mg^{2+} (check for signs of dehydration, e.g. raised urea, which might mask low levels)
- The following patients can be classified at <u>high risk</u>:
  - frail elderly patients assessed by dietitian as being at nutritional risk
  - patients not coping with difficult economic circumstances, e.g. homeless
  - morbidly obese patients with rapid weight loss (e.g. after gastric ballooning or banding)
  - patients who have not been fed for 7 – 10 days with evidence of stress and depletion
  - patients who have been fasted and/or given only IV fluids for a prolonged period
- Risk is increased in patients who are given TPN or IV dextrose, as these are rapidly-administered parenteral carbohydrate which speeds the metabolic effects. However, patients receiving enteral feeding or oral diet can also be at risk.
- Refeeding syndrome may show up as late as 3-6 days after feeding starts, particularly in renal failure.

3.2 Team Responsibilities

- Once risk is identified, monitor patient closely and replace electrolytes as needed. Extreme risk patients should have electrolyte levels tested, and prophylactic supplementation provided, prior to commencing any nutrition support.

3.3 Prophylactic Supplementation for Extreme Risk Patients

- This supplementation should occur prior to any nutrition support.

	IV (preferable)	**Oral**
Thiamine	thiamine 100mg	thiamine 100mg
Multivitamin	Cernevit 1 x 5mL vial	Vitaminorum 2 tablets
Zinc	zinc chloride 2mL ampoule, given over 12h in 1000mL normal saline (= 5.1mg Zn^{2+} = 78μmol Zn^{2+})	zinc sulphate 1 capsule (= 50mg Zn^{2+}= 765μmol Zn^{2+})
Phosphate	potassium dihydrogen phosphate 1x10mL ampoule, given over 12h in 500mL normal saline (= 10mmol PO_4^{2-} + 10mmol K^+)	Phosphate-Sandoz 1 tablet (elemental phosphorus 500mg = 16.1mmol PO_4^{2-} + 20.4mmol Na^+ + 3.1mmol K^+)

3.4 Starting the Refeeding Process

Referral

- All patients requiring nutrition support should be referred to a dietitian promptly. Where the patient is at risk of Refeeding Syndrome, the dietitian will document this clearly and provide a specialised feeding regimen.

Monitoring

- Check serum levels of K^+, PO_4^{2-}, Mg^{2+}, 6 – 8 hours after commencing nutrition support and then daily for first week, and then at least second-daily until stabilised.
- Nutrition support will need to be stopped if PO_4^{2-} levels fall to critically low range, until replacement has occurred and levels are approaching normal.
- Once patient has stable biochemistry and is tolerating nutrition support at the goal rate, risk of refeeding syndrome no longer exists and close monitoring can be ceased. Serum levels should be checked three days after supplementation is discontinued.

Feeding

- If patient is on an oral diet, small meals should be ordered and patient should be monitored closely.
- For enteral or parenteral nutrition support, the administration rate is initially lower than the normal starting rate.

Extreme risk patients	High risk patients
Start with 0.5 x estimated BEE i.e. start as low as 20mL/h	Start with 0.8 – 1.0 x estimated BEE ie start with about 1000Cal/day = 40mL/h
Increase by 200-300Cal every two to three days only if tolerated and biochem is stabilised	Increase rate daily or second-daily, 20 – 40mL/h at a time, only if tolerated and biochem is stabilised
May take two weeks to reach goal rate	May reach goal rate in a week

- During this period of reduced nutrition, fluid requirements will need to be met via IV or extra water flushes into the feeding tube. Continue monitoring and supplementing as needed.

3.5 Supplementation During Nutrition Support

- In general, extreme risk patients should receive IV supplementation, or the higher dose in the oral dose range (see below). As electrolytes reach the top end of normal range, supplementation can change to oral form and/or move to a lower dose. Supplementation is continued until:
    - the patient is receiving feed at the goal rate, AND
    - electrolytes are stable in normal range

Thiamine Supplementation

- 100mg/day for first five days

IV	Oral
thiamine 100mg	thiamine 100mg

Multivitamin

- Daily for first three weeks or until stable

IV	Oral
Cernevit 1 x 5mL vial	Vitaminorum 2 tablets daily

Phosphate

- Normal range 0.6 – 1.3mmol/L
- RDI 32mmol

IV	Oral
Mild hypophosphataemia (0.71-0.97mmol/L): potassium dihydrogen phosphate 1x10mL ampoule (or 0.16mmol/kgBW) given over 8h in 1000mL normal saline (=10mmol PO_4^{2-} + 10mmol K^+) Repeat over next 12h if serum level not sufficiently changed.	Phosphate-Sandoz 1-6 tablets daily (elemental phosphorus 500mg = 16.1mmol PO_4^{2-} + 20.4mmol Na^+ + 3.1mmol K^+) Start with 1 tablet and increase if needed. Wait 2h before giving any calcium supplements. This may cause diarrhoea and the IV route is preferred if patient is requiring a higher dose.
Moderate hypophosphataemia (0.48-0.71mmol/L) give 2x10mL ampoules (or 0.32mmol/kgBW) over 8 hours in 1000mL normal saline	
Severe hypophosphataemia (<0.48mmol/L) give 4x10mL ampoules (or 0.64mmol/kgBW) over 12 hours in 1000mL normal saline	

Magnesium

- Normal range: 0.72 – 0.92mmol/L
- RDI 11mmol
- IV supplementation recommended if pt presents with low Mg^{2+} levels, as this indicates total body depletion and oral magnesium is poorly tolerated at high doses.
- Serum levels should be monitored for 2 weeks even if normal, as blood levels do not necessarily reflect total body store, and fluctuations can occur.

IV	Oral
magnesium sulphate 1x5mL ampoule, given over 12h in 500mL normal saline (= 10mmol Mg^{2+}) Repeat over next 12h if serum level not sufficiently changed.	Magmin 1-6 tablets daily (magnesium aspartate 500mg = 1.7mmol Mg^{2+} Start with 1 tablet and increase if needed. Wait 2h before giving any calcium supplements. This may cause diarrhoea and the IV route is preferred if patient is requiring a higher dose.

Zinc

- Normal range: 10 - 18μmol/L
- RDI 12mg, i.e. 183μmol

IV	Oral
zinc chloride 2mL ampoule, given over 12h in 1000mL normal saline (= 5.1mg Zn^{2+} = 78μmol Zn^{2+}) Usually given 3 times per week (M,W,F)	zinc sulphate 1 capsule daily (= 50mg Zn^{2+}= 765μmol Zn^{2+})

Potassium

- Normal range: 3.5 – 5.0mmol/L
- Normal diet intake: 50 – 140mmol

IV	Oral
Use the existing ward protocol for K^+ replacement Pre-loaded IVI bags	* Slow K 1-6 tablets (600mg tab = 8mmol K^+) * Chlorvescent 1-6 tablets (14mmol K^+) * KCl elixir 1-6 doses (15mL dose = 20mmol K^+) Start with one tablet/dose and increase if needed.

4. Performance Measures

- Number of incidents related to management of refeeding syndrome as monitored via IIMS

5. Definitions

- **BEE: Basal Energy Expenditure**
- **BMI:** Body Mass Index
- **IV:** Intravenous
- **RDI:** Recommended Daily Intake
- **TPN:** Total Parenteral Nutrition

6. References and links

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