A conservative refeeding approach in female inpatients with restrictive eating disorders is not protective of refeeding syndrome

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Introduction
Restrictive eating disorders are serious illnesses with devastating health consequences. The common feature of these disorders is severe weight control measures that lead to extreme weight loss, low weight and medical instability. Refeeding and weight restoration are essential for recovery. 1,2 However, underweight inpatients are at the increased risk of refeeding syndrome – a complex condition of metabolic abnormalities, including electrolyte imbalances, that may occur during re-introduction of food. 3 Due to this, refeeding of underweight inpatients is commonly initiated at a low energy rates. 4 However, the outcome of this practice in adult inpatients is not clear.

Aim
To describe the effect of a conservative refeeding protocol (4.0 MJ per day) on rates of hypophosphatemia, hypokalaemia, hypomagnesemia and hypoglycaemia in female inpatients with restrictive eating disorders and explore differences in measured variables in patients reaching medical stability at different stages of hospitalisation.

Methods
Historical medical records of female adult patients admitted for treatment in January 2010 - December 2013 were reviewed. Data collected included:
- Demographic characteristics;
- Anthropometric measures;
- Medical history and comorbidities;
- Energy prescription;
- Micronutrient supplementation.
Biocchemical data (glucose, potassium, phosphate and magnesium concentrations) were collected from the Auslab medical database.
Abnormal values (hypokalaemia ≤3.5mmol/L), hypomagnesemia (≤0.7mmol/L), hypophosphatemia (≤0.81mmol/L), and hypoglycaemia (≤4.0mmol/L) at day 1, day 3, day 7 and day 14 were noted.
Ethical approval was obtained from the University of the Sunshine Coast Research Ethics Committee (S/14/685) and the Metro North Hospital and Health Service Research Ethics Committee (HREC/14/QPCH/32).

Results
- 27 female inpatients (median age 22 years) were included in this study;
- Majority had Anorexia Nervosa (93%, n=25), as primary diagnosis;
- Secondary diagnosis included: Depression/Anxiety (21%, n=6), Malnutrition (21%, n=6), Diabetes (11%, n=3), Renal failure (7%, n=2).

Almost all patients (96%, n=26) had at least one: 44% (n=12) had two; 15% (n=4) had three and 4% (n=1) had four abnormal blood values symptomatic of refeeding syndrome during the first 2 weeks of admission.

On average, patients reached medical stability on 18.6±10.3 day in hospital. Length of stay was: Group 1 (37%, n=10) <14 days, Group 2 (63%, n=17) ≥14 days. Proportion of patients with electrolyte and glucose abnormalities differed between groups (Figure 1, 2). Additionally, admission weight, BMI and mean energy prescription after day 7 of hospitalisation were significantly lower in the group with longer hospital stay (Table 1).

Discussion
- High proportion of inpatients developed some abnormalities primarily during the first 3 days of treatment.
- Hypoglycaemia was present on day 14 in more than half of inpatients who where hospitalised for longer than 2 weeks.
- Hypoglycaemia, hypokalaemia and hypophosphatemia were the most common imbalances regardless of the hospitalisation period.
- Patients who took longer to reach medical stability had a significantly lower body weight and BMI at admission.
- Significant weight increase occurred only after day 8, with some weight loss noted in the first 3 days of hospitalisation.

Conclusion
Conservative refeeding regime appeared to be:
- Not protective of symptoms of refeeding syndrome.
- Insufficient to induce weight restoration that is crucial for recovery.

Limitations
Small sample size and retrospective nature - lower level of evidence.

Future focus
To investigate the effect of an assertive, high energy refeeding regime on the metabolic response and weight gain.


Figure 1. Percentage of hypophosphatemia (≤0.81mmol/L), hypokalaemia (≤3.5mmol/L), hypomagnesemia (≤0.7mmol/L) and hypoglycaemia (≤4.0mmol/L) upon admission and after 3 and 7 days in patients who reached medical stability before 14 days (n=10).

Figure 2. Percentage of hypophosphatemia (≤0.81mmol/L), hypokalaemia (≤3.5mmol/L), hypomagnesemia (≤0.7mmol/L), and hypoglycaemia (≤4.8mmol/L) upon admission and after 3 and 7 days in patients who reached medical stability on or after 14 days.

Table 1. Changes in weight, BMI and energy intake during hospitalisation in patients reaching medical stability and on or after 14 days.

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<thead>
<tr>
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<th>Day 1</th>
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<td>Group 2</td>
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Data presented as mean (SD) or median (25%;75% percentile).

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