CASE REPORT: CLINICAL NUTRITION MANAGEMENT OF POTENTIAL REFEEDING SYNDROME
DISEASE DESCRIPTION

- History: First discovered after World War II prisoners were refed and subsequently died.
- Studies attempted to determine why this occurs and ultimately found the following as monitoring of bodily function during refeeding occurred.
  - During starvation the body begins using protein and fats instead of carbohydrates for energy.
  - Decreased intake severely depletes serum levels of minerals including phosphate, magnesium, calcium, thiamine and potassium.
  - When energy is reintroduced, increasing blood glucose leads to an increase in insulin, subsequently using minerals within the body and severely depleting serum levels of these nutrients as the cells are refed.
### Risk Factors:
- Any person who does not consume adequate nutrition
- Many complex life altering conditions can lead to risk for refeeding syndrome

### Comorbidities
- Anorexia nervosa
- Oncology patients
- Malnutrition
- Stroke
- Inflammatory Bowel Disease (IBD)
- Chronic Pancreatitis
- Diabetes Mellitus (DM)
- Hunger strikes
- Malabsorption diseases
- Poor oral intake for greater than 7 days
- Acquired Immunodeficiency Syndrome (AIDS)
- Institutionalized.
Two research articles were used to support and determine evidenced-based research for the treatment of potential refeeding syndrome.

- One original peer-reviewed article
- One systematic review article
Occurrence of refeeding syndrome in adults started on artificial nutrition support: prospective cohort study by Rio et al.

133 participants qualified

Must have been started on nutrition support for the first time during admission

Must also have one of the following risk factors

- BMI less than or equal to 18.5 kg/m²
- Unintentional weight loss of greater than 15% in past 3-6 months
- Little to no intake x 10 days prior to admission
- Alcohol or drug abuse, presently or history of abuse
- Low baseline levels of serum potassium, phosphate, or magnesium

Split into two groups

- Group 1 received less than 800 kcal/day
- Group 2 received greater than 800 kcal/day

Of the 133 participants; three resulted in refeeding syndrome, no related deaths

- Two participants in group one
- One participant in group two

Indicators for refeeding syndrome seen in these patients included

- Severe electrolyte shifts
- Fluid overload
- Disturbance to organ functions

Indicators with the most sensitivity to predict potential refeeding syndrome - 66.7%

- Low serum magnesium
- Weight loss of greater than 15%
- Poor intake for greater than 10 days prior to admission

**SYSTEMATIC REVIEW**

- **Refeeding Syndrome: Treatment considerations based on collective analysis of literature case reports** by Boateng et al.
- **Search terms on MEDLINE** included:
  - “refeeding syndrome”
  - “RFS”
  - “refeeding hypophosphatemia”
- **Articles must address**:
  - The biochemical and physiological changes during a malnourished cachectic state
  - Metabolic process of reverting back to a well nourished fed state

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Review of articles indicated the most effective ways to prevent refeeding syndrome included:

- Identify all patients at risk
- Provide adequate electrolyte
- Vitamin and micronutrient supplementation
- Careful fluid replenishment
- Cautious energy restoration
- Monitor laboratory indices at risk including electrolytes and glucose

The five case studies evaluated included:

- Anorexia nervosa
- Hyperemesis gravidarum
- Death resulted from RFS status post ureteral obstruction removal
- Wernicke’s encephalopathy
- RFS despite hypocaloric feeding
SYSTEMATIC REVIEW: “TAKE HOME MESSAGE”

- Monitoring of laboratory values
- Slow infusion of nutrients
- Monitoring the patient’s mental status
- Less risk with control from nutrition support

- These factors decreased risk of RFS and the related signs and symptoms associated with the disease

- Identify, monitor electrolytes, replete and monitor all micronutrients slowly, fluid holding and slow administration, non-aggressive caloric feedings.

American Society for Parenteral and Enteral Nutrition (ASPEN)

- Monitoring and correcting electrolyte imbalances prior to initiation of feeding
- Nutrition support should be initiated at 25% of goal rate
- Advance nutrition support over 3-5 days
- Serum electrolytes and vitals signs closely monitored during initiation
93 year old female with decreased mental status, non-communicative on admission

The patient’s daughter was the primary caregiver

Brought by family to Emergency Room for worsening mental status and decreased interest in food, water

Admitted to intensive care unit (ICU) and Diagnosed with:
- pre-renal kidney injury,
- severe hypernatremia,
- SIRS/Sepsis,
- respiratory failure,
- infectious pneumonia,
- anemia,
- multiple unstageable pressure ulcers,
- malnutrition

Consults from wound care, care management and palliative team were requested

Nasogastric Tube placed on admission

Plan to feed after patient stabilized
NUTRITION CARE PROCESS: ASSESSMENT- HISTORY

- **Client History**
  - **Past Medical History**
    - Breast Cancer status post mastectomy
    - Hypothyroidism
    - Recent hospitalizations for respiratory failure and sepsis
    - Peripheral vascular disease
    - Unstageable pressure ulcers
    - Anemia
    - Hypoalbuminemia
    - History of intestinal ileus
  - **Medications Discharged from previous hospitalization**
    - ASA, lovenox, prevacid
    - Initiated on vancomycin, zosyn, pantoprazole
NUTRITION CARE PROCESS: ASSESSMENT - HISTORY

- Food/Nutrition History
  - Poor intake x 2-3 weeks prior to admission
  - Multiple failed swallow evaluations at an outside hospital
  - One ensure per day plus 1 bowl pureed food per day
  - Bedbound for one month, unable to prepare meals
NUTRITION CARE PROCESS: ASSESSMENT- PHYSICAL

- Physical Findings
  - No weight loss
  - Appearance of muscle wasting
  - Prominent collar bones and cheek bones
  - Severely diminished mental capacity
  - Positive bowel sounds
  - Open sacral wound- unstageable
  - Multiple other wounds in variety of locations
Usual body weight 145#-150#
Bedscale weight on admission 145#

<table>
<thead>
<tr>
<th>Anthropometrics</th>
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<tbody>
<tr>
<td>Height</td>
</tr>
<tr>
<td>60” (152.4 cm)</td>
</tr>
</tbody>
</table>
Biochemical data, tests and procedures

- Placement of NG tube
- Multiple chest x-rays- determination of pneumonia, placement of NG tube, and questionable pulmonary embolism
- Patient family refused MRI, CT scans
- Scheduled for debridement of wounds – cancelled
Nutrient needs:

<table>
<thead>
<tr>
<th>Macronutrient Needs</th>
<th>Fluid</th>
<th>REE-Mifflin St. Jeor-Kilocalories</th>
<th>Protein Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equation utilized</strong></td>
<td>For greater than age 65 years of age = 25 mL/kg</td>
<td>(10x weight) + (6.25 x cm) – (5x age) – 161= (65.9 kg x 10) + (6.25 x 152.4 cm) – (5 x 93 YO) -161= 986 kcal/day</td>
<td>1.3-1.5 g protein/kg/day</td>
</tr>
<tr>
<td><strong>Formula/ Additonal Information</strong></td>
<td>25 mL/kg x 65.9 kg</td>
<td>Injury Factor of 1.2-1.4 986 kcal x 1.2-1.4= Total Estimated Needs</td>
<td>1.3 x 65.9 kg= 85 g/day</td>
</tr>
<tr>
<td><strong>Determined Need</strong></td>
<td>1647 mL fluid/day</td>
<td>1176-1375 kcal/day</td>
<td>85-98 g/protein/day</td>
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Aramark Nutrition Status

- Severely Compromised
  - Total of 16 priority points awarded
  - Follow-up occurred every 1-4 days

Malnutrition Classification

- Severe malnutrition in the context of social or environmental circumstances
  - Consuming less than 50% of estimated energy needs
  - Clavicle, shoulders, cheek bones prominence
  - Limited to no grip strength
  - Signs of inflammation and acute illness
- Decreased intake due to age, dementia, and dysphagia resulted in severe malnutrition
# Nutrition Diagnosis Terminology

<table>
<thead>
<tr>
<th>Domain</th>
<th>Problem or nutrition Diagnosis Label</th>
<th>Etiology</th>
<th>Signs and/or Symptoms</th>
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</thead>
<tbody>
<tr>
<td>Intake (NI 2.1)</td>
<td>#1 Inadequate oral intake</td>
<td>Related to Lethargy, declining mental status</td>
<td>Patient with history of failed swallow evaluations, need to remain NPO and risk for refeeding syndrome</td>
</tr>
<tr>
<td>Clinical (NC 1.1)</td>
<td>#2 Swallowing difficulty</td>
<td>Related to Altered mental status, lethargy</td>
<td>Pt with history of failed swallowing evaluations, evidence of silent aspiration and maintaining NPO status.</td>
</tr>
</tbody>
</table>
1. Vitamin and Mineral Supplements (ND 3.2.6) Recommend initiation of daily thiamine supplementation, usually depleted first in patients with malnutrition.

2. Enteral and Parenteral Nutrition (ND 2.1)
   - Monitor Phosphorous, Magnesium and Potassium daily due to patient’s risk of refeeding syndrome
   - Initiate Promote at 15mL/hr via NGT
   - Advance q8 hours due to risk for refeeding syndrome
   - Add 1 prosource packet daily for additional 15 g protein and 60 kilocalories.
   - Goal of Promote 55 mL/hour x 24 hours with 1 prosource packet to provide 1380 kcal, 98 g protein, 1108 mL free water and 132% of the RDI.
1. **Collaboration and Referral of Nutrition Care (RC 1.4)**
Recommend obtaining SLP evaluation prior to initiation of oral diet, secondary to patient’s history of dysphagia/ silent aspiration and failing swallowing evaluations at other outside hospitals.

2. **Meals and Snacks (ND 1.2)**
   - Advance diet as tolerated and medically appropriate to least restrictive diet per SLP recommendations
   - Monitor need for oral nutrition supplements when diet initiated.
NUTRITION CARE PROCESS: MONITORING AND EVALUATION

- Patient never reached goal rate for enteral nutrition

- Patient exhibited no signs and symptoms of refeeding syndrome with close monitoring of electrolytes and vital signs as nutrition was initiated

- Nutrition initiated after medical stabilization

- Rate advanced every 4 hours, instead of recommended 8 hours

- No noted additional weight loss, stable weight prior to admission

- *Patient eventually placed on comfort care measures and expired after condition found likely not to improve.*
REFERENCES

- Mehanna HM. Moledina J, Travis J. Refeeding Syndrome: what is is, and how to prevent and treat it. BMJ. June 28, 2008; 336:1495-1498. DOI: 10.1136/bmj.a301