Initiating Enteral Nutrition and Refeeding

What is Refeeding Syndrome?

Refeeding syndrome is a potentially life-threatening nutritional issue characterized by severe electrolyte disturbances and metabolic abnormalities. Refeeding syndrome occurs when undernourished patients are fed (either orally, enterally, or parenterally) and the body switches from a catabolic to anabolic state of metabolism. The main features of refeeding syndrome include:

- Low electrolytes
  - Hypophosphatemia, hypokalemia, hypomagnesemia, hypocalcemia
- Thiamine deficiency
- Abnormalities of glucose metabolism
- Derangements in fluid balance

Why is this important?

Significantly altered levels of electrolytes and thiamine can lead to a host of serious consequences if not identified and treated properly including but not limited to: pulmonary edema, lactic acidosis, Wernicke's syndrome, seizures, cardiac arrhythmias, paralysis, coma, respiratory failure, leukocyte dysfunction and death.

Assessment

ASPEN Consensus Criteria for Identifying Adult Patients at Risk for Refeeding Syndrome		
	Moderate Risk: 2 Risk Criteria Needed	Significant Risk: 1 Risk Criteria Needed
Body Mass Index	16-18.5 kg/m²	<16 kg/m²
Weight loss	5% in 1 month	7.5% in 3 months or >10% in 6 months
Calorie Intake	None or negligible or intake for 5-6 days or <75% of estimated energy requirements for >7 days or <75% of estimated energy requirements for >1 month	None or negligible oral intake for >7 days or <50% of estimated energy requirements for >5 days or <50% of estimated energy requirements for >1 month
Abnormal prefeeding potassium, phosphorus, or magnesium serum concentrations	Minimally low levels or normal current levels and recent low levels necessitating minimal or single-dose supplementation	Moderately/significantly low levels or minimally low or normal levels and recent low levels necessitating significant or multiple-dose supplementation
Loss of subcutaneous fat	Evidence of moderate loss	Evidence of severe loss
Loss of muscle mass	Evidence of mild or moderate loss	Evidence of severe loss
Higher risk comorbidities	Moderate disease	Severe disease

Table from Da Silva et al. ASPEN Consensus Recommendations for Refeeding Syndrome, NCP 35 (2), 2020.

Assessment (Continued)

Dysphagia, self-feeding difficulty, and other factors make people with ALS at risk for refeeding syndrome after feeding tube placement and enteral nutrition initiation. Criteria for moderate versus severe refeeding syndrome risk are listed in the ASPEN Consensus Criteria above. Please note that it may be difficult to discern whether observed muscle loss is disease-related or nutrition-related in people with ALS.

When determining refeeding syndrome risk, professionals should consider the following questions and compare them to the ASPEN criteria above:

1. What is the patient's BMI?
2. How much weight has the patient lost and how quickly has the weight loss occurred?
3. How much has the patient been eating and are they currently still eating? How much oral intake are they able to sustain until feeding tube placement?
4. Does the patient have any abnormal pre-feeding potassium, phosphorus, or magnesium serum concentrations?
5. What is the degree of subcutaneous fat mass (orbital region, ribs, triceps) and/or muscle mass (temples, clavicles, scapulae, deltoids, dorsal hand, calves, quadriceps) loss, if any?
6. Does the patient have other high-risk comorbidities (e.g., chronic alcohol abuse, dysphagia, post-bariatric surgery, malabsorption, food insecurity, etc)?
7. Is the patient at moderate or high refeeding risk? How will the risk level alter the nutrition plan?

References

1. da Silva JSV, Seres DS, Sabino K, Adams SC, Berdahl GJ, Citty SW, Cober MP, Evans DC, Greaves JR, Gura KM, Michalski A, Plogsted S, Sacks GS, Tucker AM, Worthington P, Walker RN, Ayers P; Parenteral Nutrition Safety and Clinical Practice Committees, American Society for Parenteral and Enteral Nutrition. ASPEN Consensus Recommendations for Refeeding Syndrome. Nutr Clin Pract. 2020 Apr;35(2):178-195. doi: 10.1002/ncp.10474. Epub 2020 Mar 2. Erratum in: Nutr Clin Pract. 2020 Jun;35(3):584-585. PMID: 32115791.

Considerations for Refeeding Syndrome Management in ALS Patients receiving Feeding Tube Placement
1) When arranging feeding tube placement, assess risk of refeeding syndrome based on the factors in the table above. ● If risk of refeeding syndrome appears low, an outpatient procedure or one night observation in the hospital may be sufficient. ● If at high risk, an inpatient hospital admission following tube placement for multiple days should be considered to prevent/monitor refeeding syndrome. ● If refeeding syndrome risk is unclear, obtaining pre-operative lab work (including serum potassium, phosphorus, and magnesium) 2-3 days prior to procedure may help further clarify risk and guide decision-making.
2) For all patients staying at least one night in the hospital, lab work should be obtained prior to initiation of EN.
3) In patients with moderate to high risk with low electrolyte levels, delaying the initiation of EN administration should be considered until electrolyte supplementation is given and lab values are corrected.
4) Supplement 100 mg thiamine before administration of EN or dextrose containing IV fluids. Continue to supplement with 100 mg thiamine for at least 5-7 days in patients with severe starvation or present with signs/symptoms of thiamine deficiency.
5) Initiate EN at 10-20 kcal/kg for the first 24 hours. Advance by 33% of the goal regimen every 1-2 days until goal is reached.
6) Labs should be monitored every 12 hours for the first three days. Monitor vital signs every 4 hours for the first 24 hours after initiation of EN or dextrose containing IV fluids.
7) Consider decreasing EN provision if electrolytes become difficult to correct or drop significantly during initiation/advancement of EN. Could consider decreasing by 50% of calories and advancing by 33% of goal every 1-2 days as clinical presentation allows.
Initiation/Advancement Example Patient description: 60 kg patient with calorie goal of 2100 calories (~6 cartons/day of 1.5 kcal/mL enteral formula) at moderate to high risk of refeeding syndrome. Initiation recommendations (10-20 kcal/kg): 2 cartons = 711 kcal = ~12 kcal/kg Advancement recommendations (33% of goal every 1-2 days): 33% of 2100 = 700 kcal or ~2 cartons of 1.5 kcal/mL formula. Initiation day: Provide 2 cartons of formula. Following days (pending stability of labs, vitals): Advance by 2 cartons/day every 1-2 days until goal of 6 cartons per day is reached.