ENTERAL NUTRITION SUPPORT FOR PATIENTS ON MECHANICAL VENTILATION
PRACTICAL TIPS AND GUIDANCE FROM THE LITERATURE

For some patients with COVID-19, severe acute respiratory illness, including pneumonia and acute respiratory distress syndrome (ARDS), will lead to the need for mechanical ventilation in an intensive care unit (ICU) which places them at high nutrition risk.¹

Enteral nutrition (EN) is often the nutrition therapy of choice in critically ill, mechanically ventilated patients.² Current nutrition practice guidelines indicate delivery of early enteral nutrition may reduce disease severity, diminish complications, decrease length of stay in the ICU, and favorably impact patient outcomes.³

This review provides a summary of what we know from the literature related to nutrition guidelines when managing ventilated patients with acute respiratory illness in the ICU.

NUTRITIONAL CONSIDERATIONS FOR CRITICALLY ILL, MECHANICALLY VENTILATED PATIENTS

**INITIATION OF ENTERAL NUTRITION**
- Provide early enteral nutrition, within 24–48 hours of admission to ICU⁴
- EN formulas should be initiated at approximately 25mL/hour and advanced as tolerated to the goal feeding rate over 72 hours⁵
- Patients at high risk for aspiration may benefit from post-pyloric feeding tube placement³

**PROTEIN AND CALORIE REQUIREMENTS**
- Critical illness is associated with protein breakdown and altered gut absorption²,⁶
- Adequate provision of protein is associated with lower mortality and increased likelihood of being discharged from the ICU⁷,⁸
- In critically ill patients, achieving protein goals should take precedence over meeting energy needs⁹

The following are American Society for Parenteral and Enteral Nutrition (ASPEN) guidelines for the assessment of protein and energy needs in the adult critically ill patient³:

<table>
<thead>
<tr>
<th>PATIENT SUBGROUP</th>
<th>PROTEIN REQUIREMENTS</th>
<th>ENERGY REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ACTUAL BODY WEIGHT</td>
<td>IDEAL BODY WEIGHT</td>
</tr>
<tr>
<td></td>
<td>1.2-2.0 g/kg/d</td>
<td>11-14 kcal/kg</td>
</tr>
<tr>
<td>Non-Obese (BMI &lt;30)</td>
<td>2.0 g/kg/d</td>
<td>11-14 kcal/kg</td>
</tr>
<tr>
<td>Obese (BMI 30-40)</td>
<td>2.0 - 2.5 g/kg/d</td>
<td>22-25 kcal/kg</td>
</tr>
<tr>
<td>Obese (BMI 40-50)</td>
<td>2.0 - 2.5 g/kg/d</td>
<td>22-25 kcal/kg</td>
</tr>
<tr>
<td>Obese (BMI &gt;50)</td>
<td>2.0 - 2.5 g/kg/d</td>
<td>22-25 kcal/kg</td>
</tr>
<tr>
<td>Acute Kidney Injury</td>
<td>1.2-2.0 g/kg/d</td>
<td>25-30 kcal/kg</td>
</tr>
<tr>
<td>RRT</td>
<td>up to 2.5 g/kg/d</td>
<td>25-30 kcal/kg</td>
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</table>

RRT = Renal replacement therapy
Formula should be selected based on nutritional priorities for each individual patient, with attention to tolerance, nutrition adequacy and nutritional therapeutic indications.

**SOME KEY FEATURES TO CONSIDER WHEN CHOOSING AN ENTERAL NUTRITION FORMULA**

- **Meeting protein without overfeeding calories:** Very high protein, low CHO content.6,10,11
- **Tolerance and increased protein absorption:** Peptide-based, high in MCT.12,13
- **Immune modulating properties and high in antioxidants:** omega-3 (fish oil), 100% whey protein14-16
- **Insulinotropic properties to help blood glucose control:** 100% whey, MCT, lower carbohydrate (CHO) content.17
- **Maintenance of commensal microbiota and promotion of bowel health:** Soluble fibre content3

Key features in enteral nutrition formula products often considered for mechanically ventilated patients:

<table>
<thead>
<tr>
<th>FORMULA</th>
<th>Kcal/L</th>
<th>PROTEIN g/L (% TE*)</th>
<th>CHO g/L (% TE*)</th>
<th>Soluble Fibre g/L</th>
<th>Fish Oil</th>
<th>Designed for tolerance &amp; absorption**</th>
<th>Very High PRO (≥25% TE*)</th>
<th>Low CHO (&lt;40% TE*)</th>
<th>CALORICALLY DENSE (≥1.2kcal/ml)</th>
</tr>
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<tbody>
<tr>
<td>PEPTAMEN® INTENSE 1.0 HP</td>
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<td>92 (37%)</td>
<td>76 (31%)</td>
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<td>✓</td>
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<td>76 (25%)</td>
<td>112 (36%)</td>
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<td>188 (49%)</td>
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<td>176 (47%)</td>
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</table>

*%TE = % of total energy. **Hydrolyzed 100% whey protein, a minimum of 50% of fat as MCT oil.

**SUGGESTIONS FOR MONITORING ENTERAL NUTRITION**

**REFEEDING SYNDROME** Some patients on mechanical ventilation are at risk for refeeding syndrome. EN should be started at trophic (10-25mL/hour) or half rate and increased slowly over 72 hours. Monitor serum phosphate, potassium and magnesium daily for approximately 4 days.18

**PROKINETIC AGENTS** Prokinetic agents should only be used as needed; use prophylactically in patients at high risk for aspiration.3

**VASOPRESSOR AGENTS** Caution should be exercised when providing EN to patients who are hemodynamically unstable and on vasopressors. Patients should be fully resuscitated prior to initiation of enteral feeding.3

**OBSERVE FOR INTOLERANCE** Symptoms include abdominal distention, diarrhea, constipation, abdominal pain, nausea and vomiting.2

**ON DISCHARGE FROM THE ICU** Individuals discharged from the ICU remain at high risk of malnutrition, as nutritional needs continue to be elevated and inadequate oral nutrition is prevalent. Continuing with EN in the post-ICU period improves the adequacy of nutrition intake until needs can be met orally.19

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10. Aghaloo, M et al. NCP 2020; E-pub ahead of print.