CRITICAL CARE PATIENT

IMPROVING OUTCOMES WITH NUTRITION IN CRITICAL CARE PATIENTS
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IMPROVING OUTCOMES

Nestlé Health Science
RICHARD

**Admitted to the ICU**

**60 years old**
**Height: 1.75 m**
**Weight: 63 kg**
**Ventilated in ICU**

**Examples of patient conditions in the ICU**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Examples</th>
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</thead>
</table>
| Acute pancreatitis | • Trauma  
• Traumatic brain injury  
• Open abdomen  
• Burns  
• Postoperative major surgery |
| Organ failure (pulmonary, renal, and liver) | Critically ill obese |
| Sepsis | Chronic critically ill |

... but all share the same challenges
MANY CRITICAL CARE PATIENTS FACE METABOLISM CHALLENGES

**PROTEIN**
- Hyper-metabolism and marked protein catabolism
- In response to stress:
  - Protein catabolism
- Lean body mass

**CARBOHYDRATE**
- Carbohydrate (CHO) metabolism issues and stress hyperglycemia
- During stress induced by trauma, surgery, or infection or sepsis:
  - Endogenous glucose production
  - Plasma glucose concentrations
  - Stress hyperglycemia involves
  - Hepatic gluconeogenesis
  - Insulin resistance
  - Insulin deficiency

MANY CRITICAL CARE PATIENTS ALSO FACE GI CHALLENGES

**GI DYSFUNCTION**
- GI dysfunction: contribution to malnutrition
- 62% of patients in the ICU have GI dysfunction
- GI dysfunction affects the ability to ingest, digest, absorb, transport, use and secrete nutrients in the body

**METABOLIC AND GI CHALLENGES IN CRITICAL CARE PATIENTS CAN ADVERSELY AFFECT OUTCOMES**
- Delayed recovery, with subsequent increased morbidity and financial costs
- Decreased quality of life

**PROTEIN**
- Protein requirements are expected to be in the range of 1.2–2.0 g/kg/day, with potentially greater amounts needed for burns or multitrauma
- Protein requirements are proportionately higher than energy requirements

**CHO**
- Hyperglycemia is a common response to acute illness
- Tight glycemic control is recommended
- High protein hypocaloric feeding may help glucose control
HIGHER PROTEIN INTAKE IS ASSOCIATED WITH REDUCED MORTALITY IN THE ICU\textsuperscript{14}

Inadequate protein delivery is associated with an increase in mortality\textsuperscript{16,17}

STANDARD POLYMERIC FEEDS FAIL TO OPTIMALLY DELIVER THE PRESCRIBED AMOUNT OF PROTEIN\textsuperscript{1}

On average ICU patients receive only approximately 58% of the prescribed protein\textsuperscript{18}

Failure to deliver prescribed amount of protein may be linked to delayed gastric emptying or gut dysmotility\textsuperscript{18}

Reasons for enteral nutrition interruption have been shown to include frequent use of invasive procedures\textsuperscript{19}

Average protein actually delivered: 0.6 g/kg/day\textsuperscript{16}

Protein intake and mortality in the ICU\textsuperscript{16}

Protein target: 1.2-2.0 g/kg/day\textsuperscript{14}

Average % protein delivered by EN

Prospective, multi-institutional study in 201 units from 26 countries including 3,390 mechanically ventilated patients who remained in the unit and received artificial nutrition for at least 96 h.\textsuperscript{18}
THE CHALLENGE TO MEET PROTEIN TARGETS WITH STANDARD POLYMERIC FEEDS

Typical composition of standard polymeric enteral feeds\textsuperscript{1,20}

<table>
<thead>
<tr>
<th>PROTEIN</th>
<th>CALORIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>44-62 g/l</td>
<td>15-20% from protein</td>
</tr>
<tr>
<td></td>
<td>40-55% from carbohydrates</td>
</tr>
<tr>
<td></td>
<td>30-40% from fat</td>
</tr>
</tbody>
</table>

MEETING PROTEIN TARGET\textsuperscript{1,20}

- Volume of enteral feeds
- Delivery of carbohydrates and fat

RISK OF OVERFEEDING

THE CHALLENGE OF DELIVERING HIGH AMOUNTS OF CARBOHYDRATES AND CALORIES WITH STANDARD POLYMERIC FEEDS

- High amounts of carbohydrates (40-55%) in critical care patients
- Increase in the risk of overfeeding\textsuperscript{21-23}
- Acute stress\textsuperscript{5}

HYPERGLYCEMIA\textsuperscript{5,22,24}

- 2-fold increase risk of infections\textsuperscript{25}
- 60% increase in ICU length of stay\textsuperscript{26}
- Longer length of stay: 8 days vs. 5 days, \( p=0.001 \), independent of diabetes status\textsuperscript{26}
- Higher hospital readmission rates\textsuperscript{26}
- Increased mortality\textsuperscript{27,28}

*Compared with patients without hyperglycemia
### OPTIMIZING NUTRITION MANAGEMENT TO IMPROVE OUTCOMES IN ICU PATIENTS

**GOAL**
1,14,29
- **Preserve** lean body mass
- **Help attenuate** the metabolic response to stress
- **Prevent** oxidative cellular injury

**STRATEGY**
1,4,14,21-23,29
- **Early enteral nutrition:**
  - Proactive strategy to favorably impact patients’ health outcomes
- **Increased protein intake**
  - Protein needs are higher than energy needs1,29
  - Higher protein intake is associated with reduced mortality14
- **Reduced carbohydrate intake**
  - CHO feeding fails to suppress glucose production in critically ill patients, indicating hepatic resistance to glucose, insulin, or both4
  - Increasing the volume of standard polymeric feeds to meet protein targets leads to excessive amount of CHO, inducing hyperglycemia21-23

### PEPTAMEN®: HIGH PERFORMANCE DELIVERY OF NUTRIENTS FOR YOUR ICU PATIENTS

- Enzymatically hydrolyzed 100% whey protein, high MCT content
- **High performance delivery of nutrients with a balanced protein and energy composition**

- **Facilitates enteral success from the start**
- **Facilitates gastric emptying vs. standard feeds**21
- **Supports better tolerance vs. standard feeds**26
- **Optimized absorption**3,22,23
- **Gut function preservation**23
- **Enhanced energy and protein delivery**26
- **Improves absorption and utilization**
THE HIGH PROTEIN/LOW CHO FORMULA SPECIFICALLY DEVELOPED FOR YOUR ICU PATIENTS

PEPTAMEN® INTENSE

- Highest amount of protein in the market (37% of calories from protein)¹
- Contains 50:50 MCT:LCT ratio for easy absorption
  - 1.0 kcal

Composition of total calories

- High protein
  - Enzymatically hydrolyzed 100% whey protein

- Low carbohydrate
  - vs. 33-35% with competitors*

- High MCT fat
  - vs. 20-26% with competitors*
  - vs. 42-45% with competitors*

PEPTAMEN® INTENSE meets the recommendations of ASPEN and ESPEN for adult critical care patients

*Other tube feeding products
PEPTAMEN® INTENSE HELPS ACHIEVE HIGH PROTEIN TARGETS AS RECOMMENDED BY GUIDELINES

In critical care patients receiving propofol

The protein intake was significantly higher with PEPTAMEN® INTENSE than with a standard high-protein feed:

97.9 + 28.6 g/day vs. 81.7 + 19.5 g/day (p=0.044)

More than 75% of patients on PEPTAMEN® INTENSE received ≥80% of prescribed protein on days 2 through 5

Significant lower caloric intake with PEPTAMEN® INTENSE than with a standard high-protein feed:

1,077 + 314.7 kcal/day vs. 1,333 + 329.2 kcal/day (p=0.016)
PEPTAMEN® INTENSE FACILITATES BLOOD GLUCOSE MANAGEMENT IN ADULT ICU PATIENTS

More patients significantly achieved the recommended target blood glucose range on PEPTAMEN® INTENSE than on high-protein standard formula.

PEPTAMEN® INTENSE: twice less CHO than in high-standard protein formulas

PEPTAMEN® INTENSE: Lower incidence of insulin administration than with high-standard protein formulas (p=0.044)

12% reduction in the incidence of insulin administration (p=0.044)

Achieves high protein targets as recommended by guidelines: 1.2-2.0 g/kg/day

Facilitates blood glucose management: low carbohydrate content (29%)

Decreases the risk of overfeeding

PRESERVES LEAN BODY MASS
ATTENUATES THE METABOLIC RESPONSE TO STRESS

*Mean CHO intake
REFERENCES

37. Wieser J, et al. Use of a very high protein enteral nutrition formula assists in meeting the protein needs of patients receiving intravenous sedation with propofol. Clinical Nutrition Week, ASPEN 2017
39. Hopkins B, Jackson N. Yes, You can achieve very□high protein targets in your tube fed ICU patients! CNW 2017
42. CINSE Study
START WITH PEPTAMEN® INTENSE TO DELIVER THE RIGHT BALANCE OF ENERGY AND PROTEIN

Put your critical care patients on track to a fast recovery\(^{43}\) and improved clinical outcomes.

- Reduces recovery time and LOS\(^{35,44}\)
- Slows down weight loss\(^{43}\)
- Improves nitrogen balance and utilization \(^{45,46}\)
- Improves nutritional status \(^{42,43,46-49}\)

INTRODUCING
HIGH PERFORMANCE. IMPROVED OUTCOMES.

PEPTAMEN® INTENSE
Nestlé Health Science