

NARROWING THE PROTEIN DEFICIT GAP IN CRITICALLY ILL PATIENTS USING A VERY HIGH PROTEIN ENTERAL FORMULA

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BACKGROUND & OBJECTIVES

Protein deficits in critically ill patients have been associated with longer ICU stays¹ and increased mortality² in patients at nutrition risk. Current clinical view suggests that if protein goals are met, meeting full energy targets may be less important^{3,4}. Use of an isocaloric, higher protein enteral nutrition (EN) formula may provide patients with adequate protein, without overfeeding energy in the first week of critical illness.

Objective

Assess the protein and energy intake of critically ill patients before and after availability of a very high protein (VHP) EN formula in a mixed medical-surgical-trauma ICU located in Hamilton General Hospital, Hamilton Health Sciences in Hamilton, ON, Canada.

METHODS

- Retrospective study of mechanically ventilated medical-surgical ICU patients receiving exclusive EN for a minimum of 5 days during the first week of ICU admission.
- 20 subjects received standard EN (prior to availability of the VHP formula)
- 20 subjects received the VHP EN formula (Peptamen® Intense 1.0 HP)
- Exclusion criteria included acute renal failure not dialyzed, hepatic encephalopathy grade 3 or 4, use of parenteral nutrition, or intentional underfeeding in the first week of ICU admission.

DATA COLLECTED

- Demographics – age, gender, APACHE II score, admission diagnoses
- Protein and energy prescriptions
- Daily protein and energy intake
- Gastrointestinal tolerance
- Feeding interruptions

RESULTS

Table 1: Characteristics of Study Population

Variable	Standard EN (n=20)	VHP EN (n=20)	P Value
Gender, Male	15 (75%)	16 (80%)	>0.99
Age (y)	53.3 ± 16.6	56.8 ± 12.4	0.46
APACHE II Score	21.4 ± 4.3	18.8 ± 7.1	0.17
BMI (kg/m ²)	31.4 ± 6.5	43.0 ± 13.9	0.004

Table 2: Nutrition Prescribed and Delivered over First 5 Study Days

Variable	Standard EN (n=20)	VHP EN (n=20)	P Value
Nutrition Prescribed			
Protein (g/d)	111.4 ± 25	135.5 ± 22.2	0.0030
Energy (kcal/d)	1893.7 ± 340.9	1695.7 ± 401.8	0.46
Nutrition Delivered			
Total protein intake from EN, including modular protein (g/d)	81.7 ± 16.7	112.2 ± 27.8	0.0002
Modular protein contribution (g/d)	21.6 ± 3.4	0.0	0.0352
Total energy intake from EN, including lipid-based medication (kcal/d)	1506.0 ± 380	1520.3 ± 345	0.9014
Energy Intake from EN (kcal/d)	1379.2 ± 300	1294.8 ± 266	0.3529
Energy Intake from lipid-based medication (kcal/d)	126.9 ± 173.3	225.5 ± 234	0.1382
Protein intake from EN by weight (g/kg) ^b	1.1 ± 0.24	1.46 ± 0.35	0.0006
Energy intake from EN by weight (kcal/kg)	19.0 ± 4.3	17.1 ± 4.3	0.1757

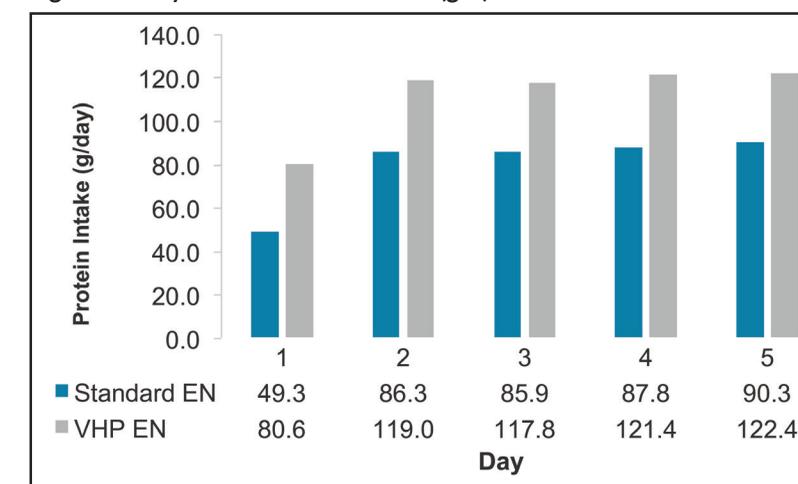
^a Values are mean ± standard deviation

^b An ideal body weight (BMI, Body mass index 25 kg/m²) was used to determine protein needs and delivery for patients with BMI ≥ 30. Actual body weight used for patients with BMI < 30.

RESULTS

- There were no significant differences between groups in baseline characteristics of gender, age, and APACHE II scores
- Total protein prescribed was significantly higher in the VHP group versus the standard EN group.
- Total protein received for the first five days of exclusive EN was significantly higher in the VHP group versus the standard EN group.
- Total energy prescribed and received was not significantly different between groups.
- There were no significant differences between groups in lipid based medication use, EN tolerance or feeding interruptions.

Figure 1: Daily Protein Intake from EN (g/d)



CONCLUSION

EN feeding with a VHP formula in ICU patients resulted in higher protein intakes without increasing energy intake or use of modular protein in the first week of critical illness.

REFERENCES

1. Yeh D et al. *JPEN* 2018; 42(2): 212-218.
2. Nicolo M et al. *JPEN* 2016; 40(1):45-51.
3. Hurt R et al. *NCP* 2017; 32(1S):142S- 151S.
4. Singer P et al. *Clin Nutr* 2018, [https:// doi.org/10.1016/j.clnu.2018.08.037](https://doi.org/10.1016/j.clnu.2018.08.037)