

Reaching macronutrient protein goals in the ICU with supplementation

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Background

- Nutrition support plays a vital role in the critically ill patient's hospital stay
 - Reduction in 28-day mortality, intensive care unit (ICU) length of stay, days of mechanical ventilation
- Nutrition goals in the ICU, specifically energy and protein goals are weight-based
 - Daily energy requirements: 25-30 kcal/kg/day
 - Daily protein requirements: 1.2-2 kcal/kg/day
- Recent studies suggest gradual titrations to achieve nutrition goals by day four and five
- Enteral nutrition at Novant Health New Hanover Regional Medical Center is initiated, in the ICU, by registered dietitians following independent patient assessment
 - Registered dietitian (RD) writes orders in notes, including amount of protein to be supplemented
- In-house study showed mechanically ventilated patients, on enteral nutrition, not meeting protein goals by day five of enteral nutrition
- LiquaCel®, hydrolyzed protein providing 16 g protein, to be dispensed by central pharmacy, ordered via MAR by RD, and documented as administered by nursing staff

Objectives

- Evaluate the percent of grams of goal protein requirements reached after protein supplementation on day five of enteral nutrition
- Evaluate the percent of grams of goal protein requirements reached after protein supplementation on days one through four of enteral nutrition
- Assess weight based protein intake on days one through five of enteral nutrition
- Assess hospital and ICU length of stay, time from mechanical ventilation to enteral nutrition

Methods

- Study design:** IRB-approved, retrospective, single-center, pre-post process analysis
- Inclusion:** Patients 18 years of age and older, located in ICU, mechanically ventilated on propofol ≥ 48 hours, and received enteral nutrition for ≥ 48 hours
 - Admitted October 1, 2018 through December 31, 2020
- Exclusion:** Patients unable to be fed via enteral nutrition or pregnant

Table 1. Baseline Characteristics

	Total (n = 150)	Pre-LiquaCel® (n = 100)	Post-LiquaCel® (n = 50)	p-value
Patient Characteristics				
Age (years), mean ± SD	61.2 ± 16.2	59.8 ± 16.7	63.9 ± 15	
Gender (male), n (%)	76 (51%)	49 (49%)	27 (54%)	0.56
BMI (kg/m ²), mean ± SD	30.9 ± 8.9	29.2 ± 8.3	34.4 ± 9.1	0.0005
COVID-19 positive, n (%)		0 (0%)	13 (26%)	
mNUTRIC score, mean ± SD	5 ± 2	5 ± 3	5 ± 1	

Results

Figure 1. Percent grams of goal protein requirements reached on days one through five

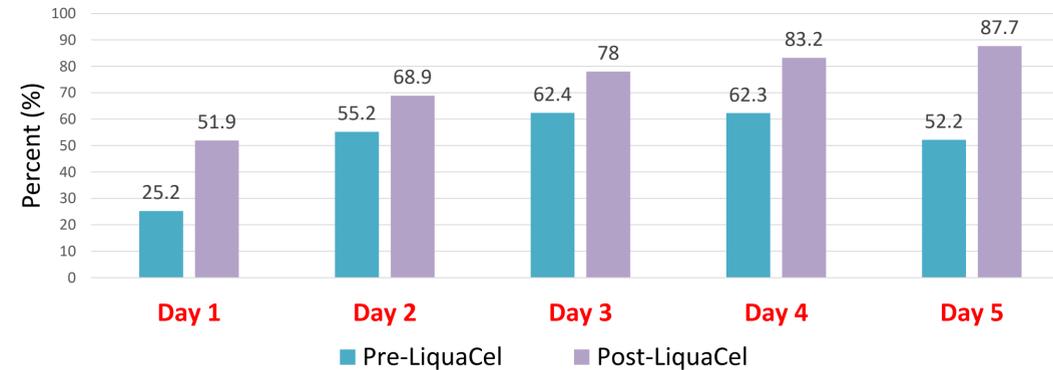


Figure 2. Protein received per body weight on days 1 through 5

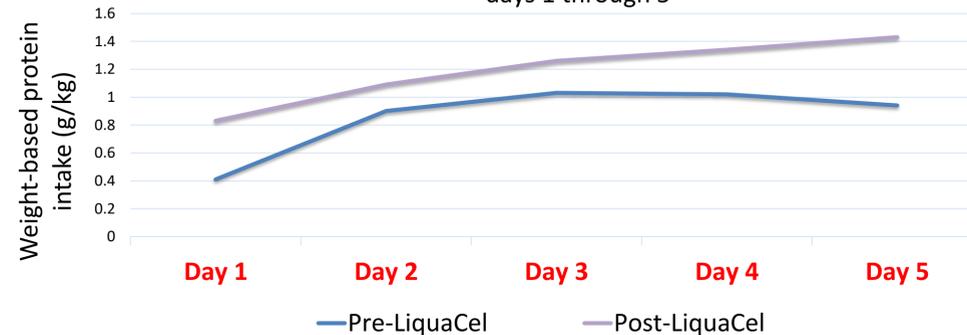


Table 2. Secondary Outcomes

	Pre-LiquaCel® (n = 100)	Post-LiquaCel® (n = 50)	p-value
Nutrition Outcomes			
Duration of propofol (days), mean ± SD	6.9 ± 4.1	8.9 ± 5.6	0.0150
Time from intubation to nutrition (days), mean ± SD	1.5 ± 1.2	1.5 ± 1.6	
Days of nutrition mechanically ventilated, mean ± SD	7.6 ± 5.3	8 ± 4.9	
Clinical Outcomes			
Hospital LOS (days), mean ± SD	24.5 ± 20.5	25.3 ± 17.3	0.8218
ICU LOS (days), mean ± SD	11.4 ± 6.9	14.9 ± 8.4	0.0073
Duration of ventilation (days), mean ± SD	8.6 ± 4.7	9.8 ± 5	0.1418
In-hospital mortality, n (%)	36 (36%)	28 (56%)	0.0196

Discussion

- Significantly higher protein goals achieved on all study days following process implementation
 - By day four and five ≥ 80% of goal protein (grams) reached
- Significant difference in amount of protein intake (g/kg) with average daily requirement within goal by day 3
 - Days 3-5: 1.26 ± 0.37 g/kg/day to 1.43 ± 0.48 g/kg/day
- LiquaCel® packets administered between 80-100% with appropriate documentation
- No difference in time from intubation to enteral nutrition initiation between groups
- ICU length of stay and in-hospital mortality was longer in the post-LiquaCel® group
 - COVID-19 patients were included with ICU stays longer than average
 - COVID-19 patients' nutrition requirements appropriately assessed by RD

Conclusion

- The process of placing protein supplementation on the MAR and documenting administration allowed for a more significant amount of protein administered
- Patients in the post-LiquaCel® group were able to meet guideline-recommended weight-based protein requirements
- Continue to document protein supplementation on the MAR
- Future studies needed to assess clinical outcomes of additional protein administration in the ICU

References

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Disclosure

All authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.