STUDY SUMMARY

Exploring the impact of arginine-supplemented immunonutrition on length of stay in the intensive care unit: A retrospective cross-sectional analysis.

Martin ND, Schott LL, Miranowski MK* et al.
PLoS ONE. 2024; 19(4): 1-14.

Objective:

The objective of this study was to evaluate whether differences in arginine content among isocaloric and isoproteic enteral immunonutrition formulas are associated with differences in clinical outcomes, specifically intensive care unit (ICU) length of stay (LOS), among critically ill patients.

Methods:

This retrospective, cross-sectional study used data from the PINC AI™ Healthcare Database (October 2015–February 2019). Inpatients aged 18 years and older with at least 3 days of use within 5 consecutive days and a minimum of 1 billed day of ICU utilization were included. Patients were grouped by exposure to higher (18.7 g/L; HAF – IMPACT® Peptide 1.5) or lower (11 g/L; LAF – Pivot® 1.5) L-arginine containing formulas that were otherwise equivalent in both calories and protein (**Table 1**). Primary outcome was ICU LOS while secondary outcomes included hospital LOS and surgical site infections. Data were from an all-payer, geographically diverse, hospital-based database representative of US hospitals, capturing service and billing information from all therapeutic areas for approximately 25% of all inpatient discharges in the country. Multivariable generalized linear regression models adjusted for demographic, clinical, and hospital variables were used.

Table 1. Nutrition comparison of the immunonutrition formulas (per Liter)

EN Formula Contents	HAF (IMPACT® Peptide 1.5)	LAF (Pivot® 1.5)
Kcal/mL	1.5	1.5
Protein, g (%)	94 (25)	93.8 (25)
Source	Hydrolyzed casein and arginine	Hydrolyzed casein, whey, and arginine
Supplemental L-arginine, g	18.7	11
Total arginine, g	20.8	13
Carbohydrate, g (%)	140 (38)	172.4 (45)
Fiber, g	--	7.5
Fat, g (%)	63.6 (37)	51 (31)
Ω6:Ω3	1.5:1	1.7:1
EPA + DHA, g	4.9	3.7
MCT:LCT	50:50	20:80
MCT, g	31.8	10.2
Supplemental nucleotides, g	1.8	--
Select micronutrients		
Vitamin C, mg	1000	304
Selenium, mcg	100	78
Zinc, mg	36	30.8

DHA, docosahexaenoic acid; EN, enteral nutrition; EPA, eicosapentaenoic acid, HAF, higher L-arginine (Impact® Peptide 1.5, Société des Produits Nestlé S.A) formula; LAF, lower arginine formula (Pivot® 1.5, Abbott Laboratories) formula; LCT, long-chain triglycerides; MCT, medium-chain triglycerides; Ω6:Ω3, ratio of omega 6 and omega 3 fatty acids

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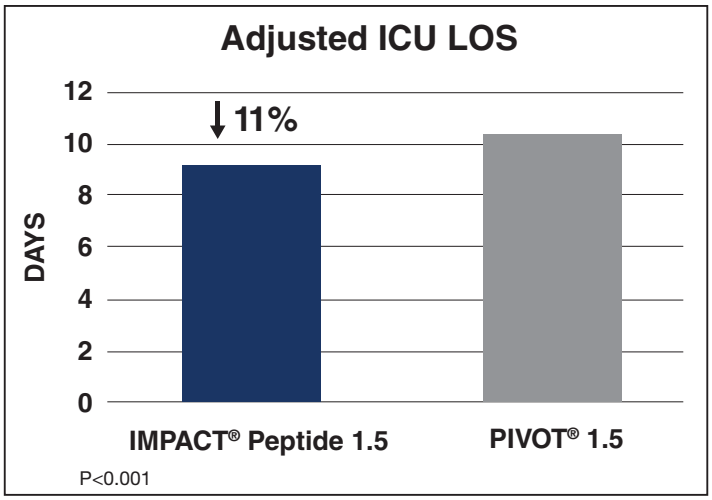
Results:

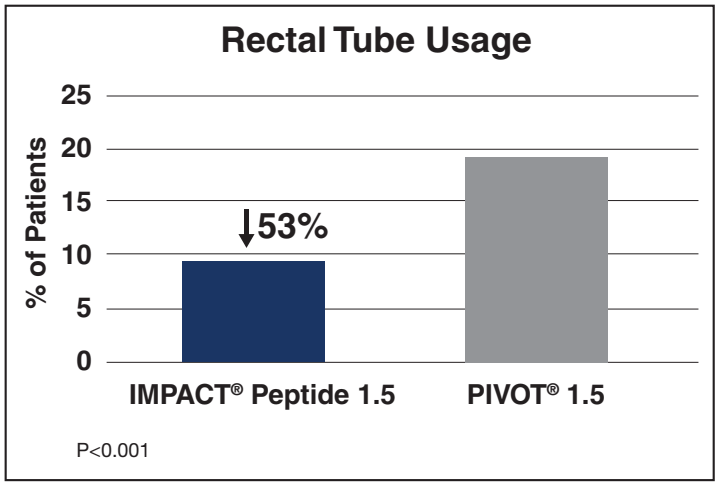
A total of 3,284 patients (74.5% surgical) across 21 hospitals were identified, with 2,525 receiving HAF and 759 receiving LAF. The HAF group had an 11% relative risk reduction in ICU LOS compared to LAF, with adjusted mean ICU LOS of 9.4 vs 10.6 days (p<0.001; **Figure 1**). Hospital LOS, mortality, and surgical site infection rates did not differ significantly between groups. Rectal tube usage was lower in the HAF group (9.1% vs 19.4%, p<0.001; **Figure 2**).

Figure 1: Adjusted Mean ICU LOS (days) by immunonutrition formula group



Adjusted model included age category, sex, race, primary insurance payer, admission type, discharge status, hospital bed size and geographic region, EN pattern, nutrition units billed per day, severity of illness, risk of mortality, surgery status, trauma status, septicemia, pneumonia, obesity, congestive heart failure, cancer, complicated diabetes, renal failure, malnutrition, ECMO or tracheostomy, mechanical ventilation, rectal tube, days of antidiarrheal medication use, and wound dehiscence/disruption.

Figure 2. Rectal Tube Usage by Immunonutrition Formula



Conclusion:

Higher L-arginine-supplemented immunonutrition also containing fish oil and nucleotides (IMPACT® Peptide 1.5) may play a role in improving health outcomes in the critically ill as evidenced by shorter ICU LOS, primarily in surgical patients. Using a select immunonutrition formula for patients in the ICU may provide healthcare resource utilization savings. However, causal relationships cannot be established due to the observational design, and further prospective research is warranted.

Summary prepared by Nestlé Health Science.

The study may be downloaded at:

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0302074