Utility of Peptide-Based Diets in Critically Ill Patients

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BACKGROUND

- Enteral tube feeding (ETF) is an important life-sustaining therapy in patients with compromised volitional intake.[1]
- **Up to 75% of critically-ill patients on ETF experience gastrointestinal (GI) intolerance, including enteral feeding intolerance (EFI), which may compromise nutrient delivery and adequacy of feeding. [2,3] GI dysfunction in critically-ill patients is associated with worsened clinical outcomes. [2]**
- Specialty ETFs are formulated to aid in the medical management of various disease conditions. **100% whey peptide-based (WPBD) ETF are complete feedings with hydrolyzed protein for improved absorption and added medium chain triglycerides for enhanced digestibility and tolerance.**

OBJECTIVES

- The primary objective of this study is to explore if patient characteristics and EFI differ by ETF formula.
- The secondary objective is to assess the clinical characteristics between ETF groups, including days of nutrition formula use, presence of predefined diagnoses and comorbidities.

METHODS

- Retrospective observational study utilizing the Premier Healthcare Database.
- Adult patients (≥ 18 years) with an ICU stay receiving ETF for any condition during acute hospitalization in the United States from October 1, 2015 through October 31, 2019.
- WPBD formulas (Peptamen®, Nestlé HealthCare Nutrition) were compared to patients receiving other hydrolyzed protein formulas (OPBD; Vital®, Kate Farms® Peptide 1.5, Liquid Hope®Peptide), and to standard intact protein formulas (SETF, i.e., Jevity®, Osmolite® Promote®, Glucerna®, Oxepa®, Nutren®, Fibersource® HN, Diabetisource® AC, Glytrol®, Isosource®, Compleat®, Replete®). ETF groups were determined from medical charge master data.
- Data was collected on patients who received WBPD, OPBD and SETF for 3 consecutive days or 3 of 5 consecutive days.
- Patients with more than one ETF product billed during same inpatient stay were excluded.
- EFI was defined as having any one ore more of the following symptoms recorded via ICD-10-CM discharge diagnoses: abdominal distention or pain, constipation, diarrhea, nausea and vomiting.
- Pairwise statistical comparisons were made between ETF formulas and WPBD via medians and frequencies, using Wilcoxon Rank Sum tests and Chi-square tests, respectively. Multivariable logistic regression examined factors associated with the increased risk of EFI.

References:
1. Mundi M, et al. NCP 2020;35:487-494.
2. Blaser A, et al. ACTA Anaesthesiologica Scandinavica 2014;58:914-922.
3. Gungabissoon U, et al. JPEN 2015;39:441-448.
4. Heyland D, et al. Crit Care Med 2021;49(1):49-59.

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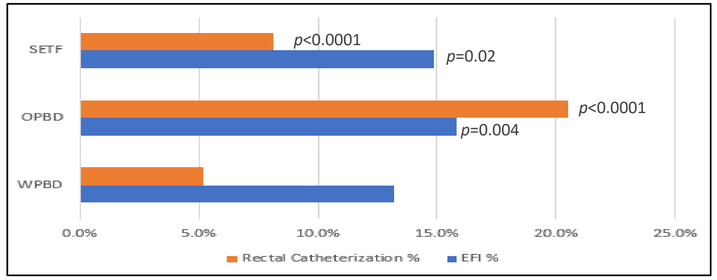
RESULTS

- 19,679 patients across 67 hospitals were included: 3,242 received WPBD, 3,121 received OPBD and 13,316 received SETF.
- Across all ETF groups, mean (SD) age was 63.8 (15.8) years with 44% female. Mean (SD) length of Stay (LOS) was 17.7 (13.3) days, and ETF duration of 8 (7.1) days. **Table 1**
- The median (Q1, Q3) days of ETF formula delivery in the WBPD group was 6 (4, 9) as compared to OPBD 6 (4, 9) (p=0.8) and SETF 6 (4, 10) (p< 0.0001).
- EFI was reported in 13% of WPBD, 16% of OPBD and 15% of SETF patients (WPBD vs OPBD, p=0.004; WPBD vs SETF, p=0.02). Rectal catheterization was significantly lower in the WPBD group. **Figure 1**
- Although patients receiving WPBD had higher severity of illness and risk of mortality (i.e., comorbidities) (**Figure 2 & 3**), odds of EFI were 18% higher for OPBD than WPBD, and 15% higher for SETF than WPBD, after adjusting for covariates. **Figure 3**
- EFI odds were also higher for patients with sepsis (11%), hyperglycemia (36%), critical illness myopathy (58%) and pneumonia (12%), holding other variables constant.

Table 1. Demographics

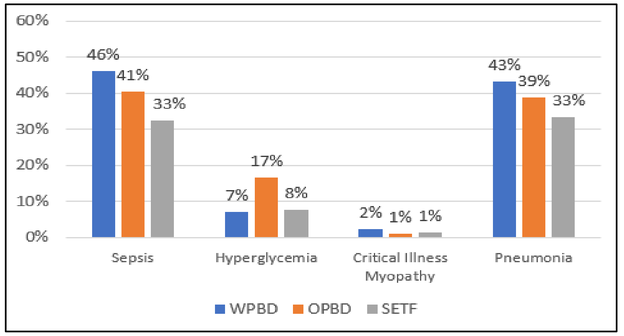
Characteristic	WPBD (N=3,242)	OPBD (N=3,121)	p value	SETF (N=13,316)	p value
Age, years, %					<0.0001
18-34	6.9%	8.9%		5.4%	
35-49	12.0%	14.2%		9.5%	
50-64	31.1%	33.5%		29.3%	
65-79	36.1%	33.5%		38.5%	
80+	13.9%	9.9%		17.3%	
Sex, %					
Female	44.1%	41.0%	0.01	44.6%	0.68
Male	55.9%	59.0%		55.4%	
Race, %					
White	83.1%	80.9%	<0.0001	79.6%	<0.0001
Black	8.0%	14.3%		12.6%	
Other	8.9%	4.8%		7.8%	

Figure 1. EFI and Rectal catheterization by ETF type



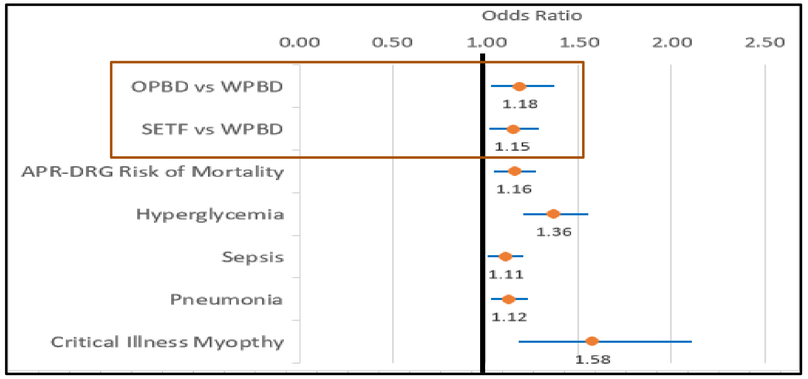
p values represent pairwise comparison to WPBD

Figure 2 . Frequency of comorbidities according to ETF groups



WPBD vs OPBD all p < 0.001, WPBD vs SETF all p < 0.0001 except hyperglycemia

Figure 3 . Multivariable Logistic Regression Model of Risk of EFI*



OPBD vs WPBD (OR=1.18, CI: 1.0, 1.4, p=0.02); SETF vs WPBD (OR=1.15, CI: 1.0, 1.3, p=0.02)
*Model included categorical options for each variable displayed. Blue lines indicate 95% CI. Age, sex, race, Elixhauser index, C. Diff infection, mechanical ventilation, prokinetic days, obesity , liver disease, CHF and weight loss also included in model.

CONCLUSION

- **This retrospective analysis shows that use of WPBD is associated with improved ETF tolerance, as compared to OPBD and SETF.**
- **Odds of EFI were higher for both OPBD and SETF than WPBD, holding all other variables constant. Use of WPBD in critically-ill patients with the highest severity of illness is associated with lower frequency of EFI.**
- **Historically, tolerance of ETF is associated with more adequate nutrient provision.[4] Exclusive use of WPBD in patients with the highest severity of illness may lead to improved nutrient provision and decreased incidence of EFI.**
- **Additional adjusted analysis is needed to demonstrate clinical outcome differences associated with use of WPBD, OPBD and SETF as related to severity of illness and GI intolerance.**