Not All Fats are Equal: Evaluating Lipid Emulsions and Unplanned Hospitalizations in Home Parenteral Nutrition Patients

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Background

- Data from a previous study suggests critically ill hospitalized patients on mixed-oil injectable lipid emulsions (MO-ILE) were associated with a shorter intensive care unit (ICU) length of stay (LOS) compared to those receiving traditional soybean-oil injectable lipids emulsions (SO-ILE)[1]
- As the use of home parenteral nutrition (HPN) continues to expand, research evaluating unplanned hospitalizations among HPN patients in the home infusion setting remains limited[2]

Study Objective

- The purpose of this study is to compare the average number of unplanned hospitalizations per patient receiving MO-ILE versus SO-ILE

Methods

- Multicenter, retrospective chart review conducted within a single national home infusion company
- December 2024 to December 2025
- Inclusion: Adult patients ≥18 years old requiring HPN containing MO-ILE or SO-ILE
- Exclusion: Other lipids or both types of lipid emulsions received within the time frame
- Data was extracted from electronic medical records and outcomes-reporting software
- Collected variables included demographics, HPN duration, HPN regimen characteristics, unplanned hospital readmission dates, primary International Classification of Diseases (ICD)-10 code, liver function markers, and C-reactive protein (CRP)
- Continuous and categorical variables were analyzed using Mann-Whitney U test
- Statistical significance was defined as $p < 0.05$
- **Primary outcome:** Association between lipid emulsion type and the average number of unplanned hospitalizations
- **Secondary outcome:** LOS during hospital readmissions, cause of hospitalization, liver function markers, and CRP

References

1. Haines, K.L., Ohnuma, T., Trujillo, C. et al. Hospital change to mixed lipid emulsion from soybean oil-based lipid emulsion for parenteral nutrition in hospitalized and critically ill adults improves outcomes: a pre–post-comparative study. Crit Care 26, 317 (2022).
2. Guenter P, Robinson L, DiMaria-Ghalili RA, Lyman B, Steiger E, Winkler MF. Development of Sustain™: A.S.P.E.N.'s National Patient Registry for Nutrition Care. JPEN J Parenter Enteral Nutr. 2012 Jul;36(4):399-406. doi: 10.1177/0148607111432760. Epub 2012 Jan 26. PMID: 22282869.

Table 1: Baseline Demographics

Baseline Demographics			
Characteristic	**Total**	**MO-ILE**	**SO-ILE**
Patients, n	143	122	21
Age, mean, y	56.40	53.40	59.40
Gender			
Male, n	37	34	3
Female, n	107	88	19
Weight, mean, kg	70.88	71.01	70.75
Height, mean, cm	167.10	168.60	165.60
BMI, mean, kg/m^2	26.05	26.19	25.91
Diabetic Status			
Type 1 diabetes, n	2	2	-
Type 2 diabetes, n	15	13	2
Days on service, mean, d	309.67	368.69	250.65
Unknown, n	14	11	3
HPN Characteristics			
Infusion Time, mean, h/d	15.24	14.17	16.30
Days on lipid HPN, mean, d/week	5.39	5.58	5.20
Energy from HPN, mean, kcal/infusion	1522.26	1482.01	1562.50
Amino Acids, mean, g/infusion	84.27	81.25	87.28
Glucose, mean, g/infusion	221.74	213.12	230.36
Lipid, mean, g/infusion	47.92	48.04	47.80
Concurrent Medication Use			
Antibiotics, n	57	49	8
Statin, n	18	16	2
Insulin, n	11	10	1

Table 2: HPN Indication

HPN Indication	
Primary Diagnosis	**Total**
Malabsorption	41
Postsurgical	19
Crohn's	9
Short Bowel Syndrome	6
Functional Impairment	4
Noninfective gastroenteritis	3
Structural/Mechanical GI Disorders*	38
Motility Disorder	26
Gastroparesis	16
Others†	10
Malnutrition	17
Severe GI Symptoms	10
Malignancy‡	7
Hepatobiliary	3

* Structural/Mechanical GI disorders include fistula, abdominal hernia, intestinal obstruction, diverticulitis, absence parts of digestive tract, gastrostomy or ileostomy malfunction, complication of bariatric surgery, and other disease of the stomach and duodenum.
† Other motility disorders include dysphagia, esophagus dysfunction, and hypertrophic pyloric stenosis.
‡ Malignant neoplasms included those of the esophagus, colon, rectosigmoid junction, and small intestine.

Table 3: Primary and Secondary Outcomes

Primary Outcome			
	MO-ILE	**SO-ILE**	**p-value**
Unplanned hospitalizations, mean	0.93	1.33	p = 0.065
Secondary Outcomes			
	MO-ILE	**SO-ILE**	**p-value**
LOS, mean, d	8.4	6.65	p = 0.56
Laboratory markers			
AST, mean, units/L	33.44	28.80	p = 0.56
ALT, mean, units/L	36.52	26.12	p = 0.33
ALP, mean, units/L	135.71	151.52	p = 0.13
Triglycerides, mean, mg/dL	110.79	90.56	p = 0.2
CRP, mean, mg/L	10.68	21.31	p = 0.18

Figure 1: Study Flow Diagram

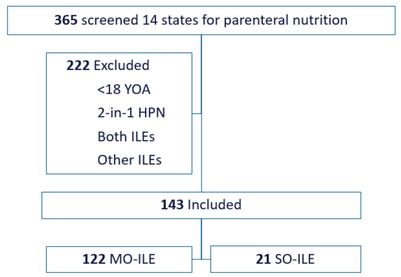
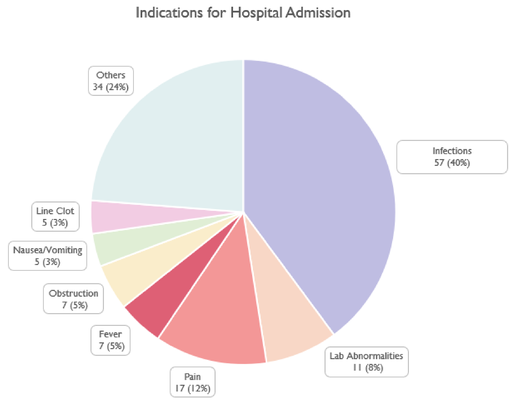


Figure 2: Indications for Hospital Admission



Results

- A total of 143 patients were screened with 122 patients receiving MO-ILE and 21 patients receiving SO-ILE **(Figure 1)**
- The average number of unplanned hospitalizations per patient was lower in the MO-ILE group compared with the SO-ILE group (0.93 vs 1.33 hospitalizations per patient, respectively; p = 0.065) **(Table 3)**
- The indication for hospital admission shows infection as the highest cause of hospitalization **(Figure 2)**
- Patients with MO-ILE had an average of 8.4 days per hospitalization compared to 6.65 days in the SO-ILE group (p = 0.56)
- Comparing averages for the laboratory values of the MO-ILE and SO-ILE, respectively:
  - Aspartate aminotransferase (AST) 33.44 and 28.80 (p = 0.56)
  - Aspartate aminotransferase (ALT) 36.52 and 26.12 (p = 0.33)
  - Alkaline phosphatase (ALP) 135.71 and 151.52 (p = 0.13)
  - Triglycerides 110.79 and 90.56 (p = 0.2)
  - CRP 10.68 and 21.31 (p = 0.18)

Conclusions

- In this analysis of adult patients receiving HPN, the use of MO-ILE was associated with a numerically lower number of unplanned hospitalizations compared to the traditional SO-ILE, although not statistically significant
- Despite fewer unplanned hospitalizations, LOS was not reduced in patients receiving MO-ILE, suggesting that severity and complexity of the patient's underlying conditions may play a more influential role in determining LOS than lipid formulation alone
- MO-ILE has been associated with reduced omega-6 fatty acid leading to an improved inflammatory profile. Although not statistically significant, the lower CRP level observed in the MO-ILE group may support a clinical benefit in the home infusion setting
- The strength of the study captures a homogenous HPN population across 14 states enhancing generalizability of findings
- The retrospective nature of the study, the imbalance in sample sizes between comparison groups, and unmeasured confounders including underlying disease severity prior to HPN initiation, variations in catheter care practices, and the patient adherence to prescribed regimens are limitations of the study

Disclosure

No financial disclosures

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