

Beaumont Health

## Beaumont Health Scholarly Works and Archives

---

Posters

Pharmacy

---

3-2022

### **Impact of Soy-Based Versus Composite Lipid Emulsion (Soybean, Medium Chain Triglycerides, Olive and Fish Oil) in Critically Ill Patients**

Sandra Kless

Lisa Hall Zimmerman

Olaf Kroneman

Follow this and additional works at: [https://scholarlyworks.beaumont.org/pharmacy\\_posters](https://scholarlyworks.beaumont.org/pharmacy_posters)



Part of the [Pharmacy and Pharmaceutical Sciences Commons](#)

---



# Impact of Soy-Based Versus Composite Lipid Emulsion (Soybean, Medium Chain Triglycerides, Olive and Fish Oil) in Critically Ill Patients

Sandra Kless PharmD, BCNSP; Lisa Hall Zimmerman PharmD, BCPS, BCNSP, BCCCP, FCCM, FCCP; Olaf Kroneman MD, CNSC

Nutrition Support Services, Departments of Pharmaceutical Services • Beaumont Hospital, Royal Oak, MI



## Background

- Parenteral composite lipid emulsion (COMP) has been shown to provide an anti-inflammatory effect.
- Recent meta-analysis demonstrated a reduced hospital and intensive care unit lengths of stay (LOS) and reduced rates of infections with composite lipid emulsion.
- The study sites used parenteral soy-based (SOY lipids in critically ill patients prior to 2017 and composite lipids were used based on criteria-based.
- In 2020, composite lipids were approved for use in all critically ill patients at the study sites.

## Purpose

- To evaluate the impact of soy-based versus composite lipid emulsion in critically ill patients receiving parenteral nutrition on clinical outcomes of combined infections and liver dysfunction.

## Methods

### Description

- IRB approved, retrospective, cohort study of critically ill adult patients who received parenteral nutrition
- Composite lipids (COMP): 1/2020-12/2020 • Eight-hospital system
- Soy-based lipids (SOY): 1/2016-12/2016 • Time period: 1/2016 to 12/2020

### Inclusion Criteria

- ≥18 years of age • Admitted to the Intensive Care Unit (ICU) > 24 hours

### Exclusion Criteria

- Patients not admitted to the ICU • Patients <18 years of age

### Primary Outcome

- Occurrences of combined infections and liver dysfunction

### Definitions

- Composite lipids – soybean, medium chain triglycerides, olive and fish oil

## Methods cont.

- Infections
  - Bacteremia • Urinary tract infections
  - Intra-abdominal infection • Skin soft tissue infection (SSTI)/wound
  - Meningitis • Pneumonia
- Liver dysfunction
  - >5 times from baseline, indicative of Parenteral nutrition associated liver disease

### Statistics

- SPSS v21.0 was used for analysis with a p-value of < 0.05 being considered significant

## Results

Figure 1.

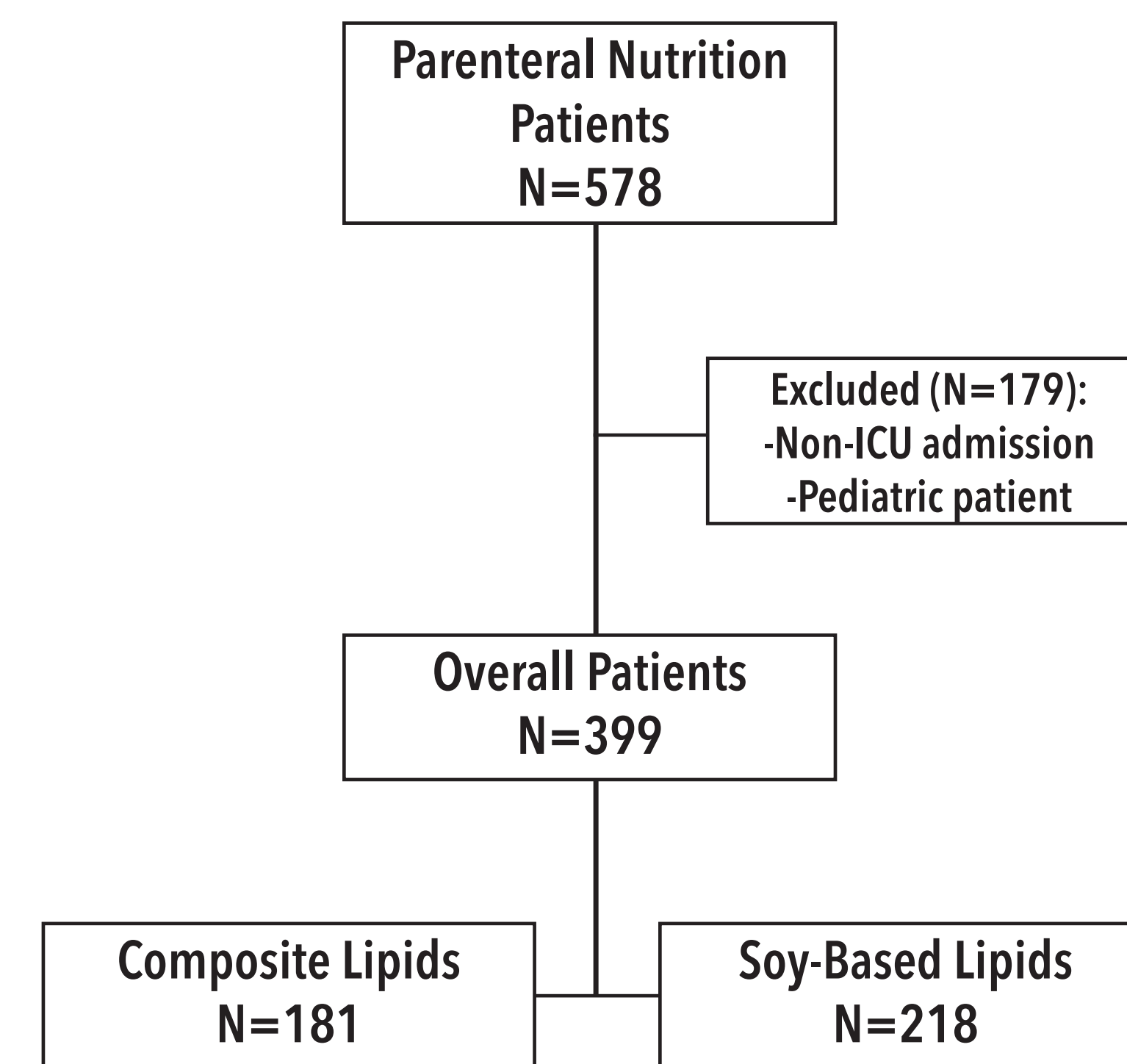


Table 1. Baseline Characteristics

	COMP N=181	SOY N=218	P-value
Age (years)*	64.1 ± 15.6	68.0 ± 15.3	0.01
Alkaline phosphatase, (units/L)*	121 ± 100	126 ± 163	0.75
Aspartate aminotransferase (AST), (units/L)*	79 ± 238	58 ± 97	0.29
Alanine transaminase (ALT), (units/L)*	64 ± 281	42 ± 72	0.32
Total bilirubin, (mg/dL)*	1.5 ± 2.7	1.5 ± 3.2	0.98

\*mean ± standard deviation, COMP=composite lipids, SOY=soy-based lipids

Table 2. Baseline Laboratory Information Infections

	COMP N=181	SOY N=218	P-value
Bacteremia, n(%)	6 (3)	18 (8)	0.03
Pneumonia, n(%)	17 (9)	27 (12)	0.34
Urinary Tract Infection, n(%)	5 (2)	22 (10)	0.004
Intra-abdominal Infection, n(%)	5 (2)	27 (12)	<0.001
SSTI/Wound, n(%)	13 (7)	11 (5)	0.37
Meningitis, n(%)	1 (0.5)	0	0.45

COMP=composite lipids, SOY=soy-based lipids, SSTI=skin soft tissue infection

Table 3. Outcomes

	COMP N=181	SOY N=218	P-value
Composite Liver Dysfunction, n(%)	21 (11)	14 (6)	0.06
Alkaline phosphatase > 5 times baseline, n(%)	4 (2)	2 (9)	0.42
Aspartate aminotransferase > 5 times baseline, n(%)	3 (2)	1 (0.4)	0.35
Alanine transaminase > 5 times baseline, n(%)	7 (4)	3 (1)	0.19
Total bilirubin > 5 times baseline, n(%)	11 (6)	9 (4)	0.51
Composite Infection, n(%)	42 (23)	84 (38)	0.001
Composite Liver Dysfunction and Infections, n(%)	126 (70)	149 (68)	0.78
Length of Stay (days)*	28.5 ± 18.5	22.8 ± 15.1	0.001
ICU Length of Stay (days)*	15.8 ± 12.9	12.7 ± 11.4	0.01
Mechanical Ventilation, n(%)	111 (61)	126 (57)	0.47
Mechanical Ventilation Duration (days)*	12.1 ± 14.4	9.7 ± 11.7	0.17

\*mean ± SD, ICU= Intensive care unit, COMP=composite lipids, SOY=soy-based lipids

Figure 2.

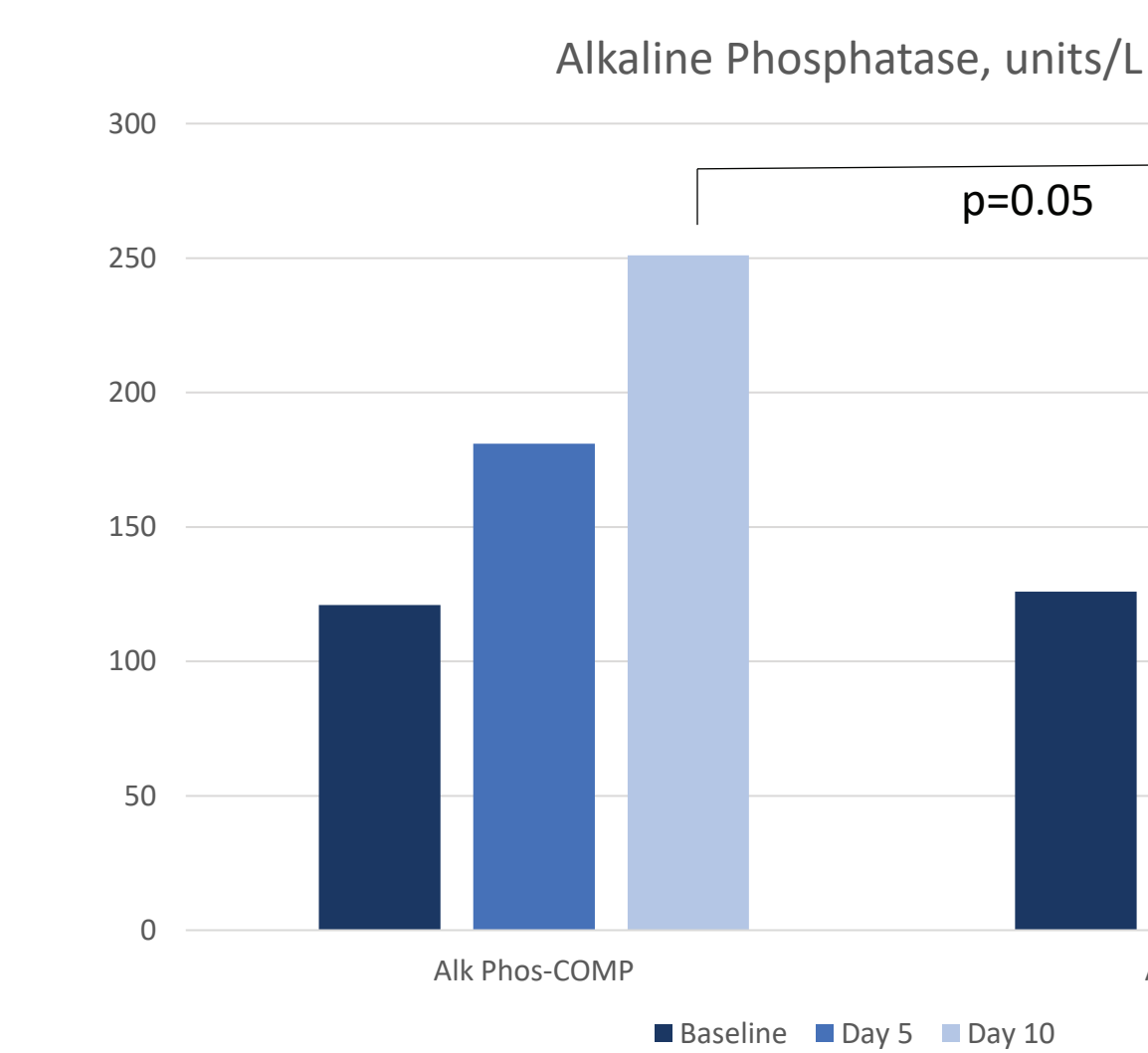


Figure 3.

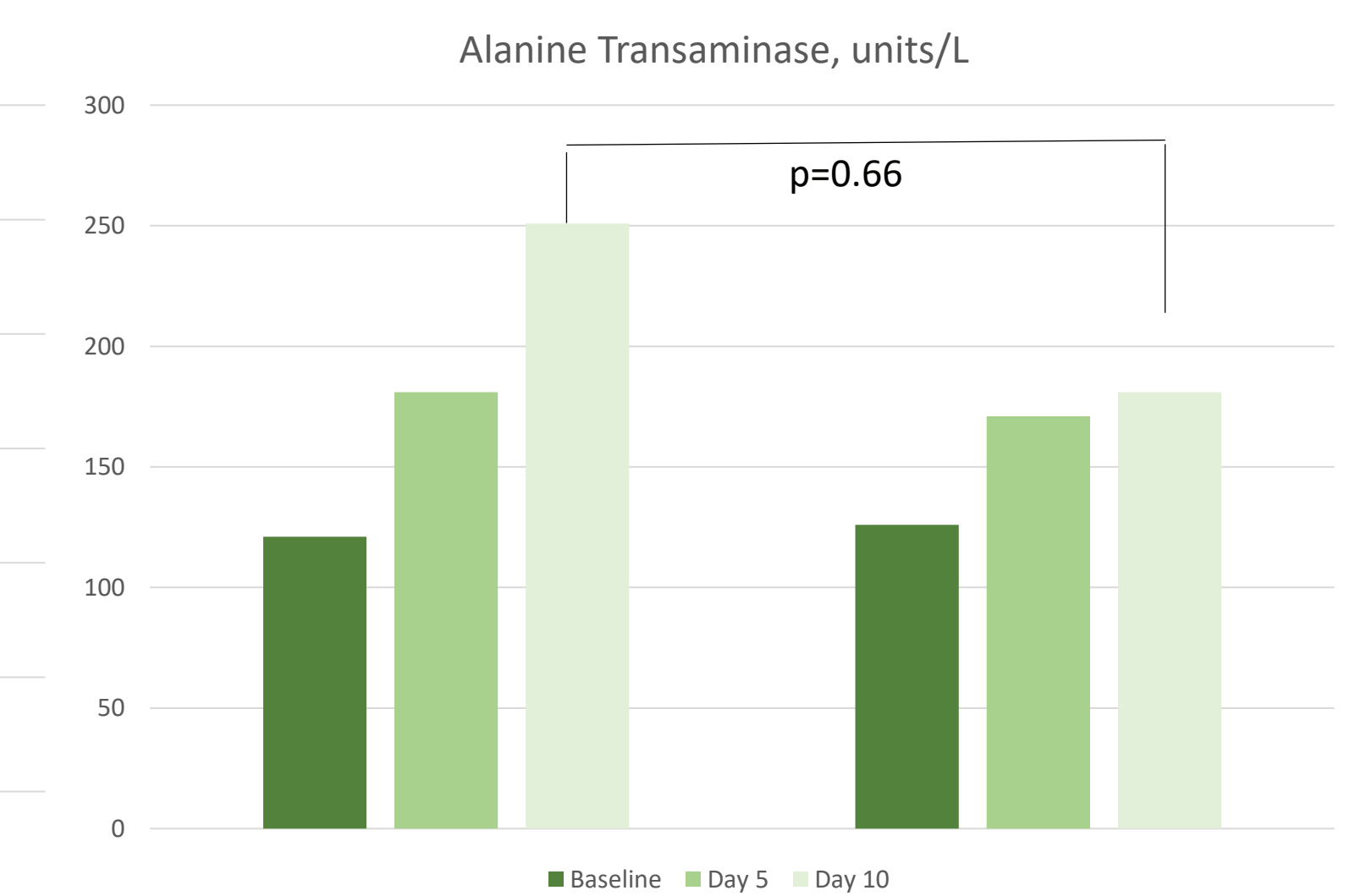


Figure 4.

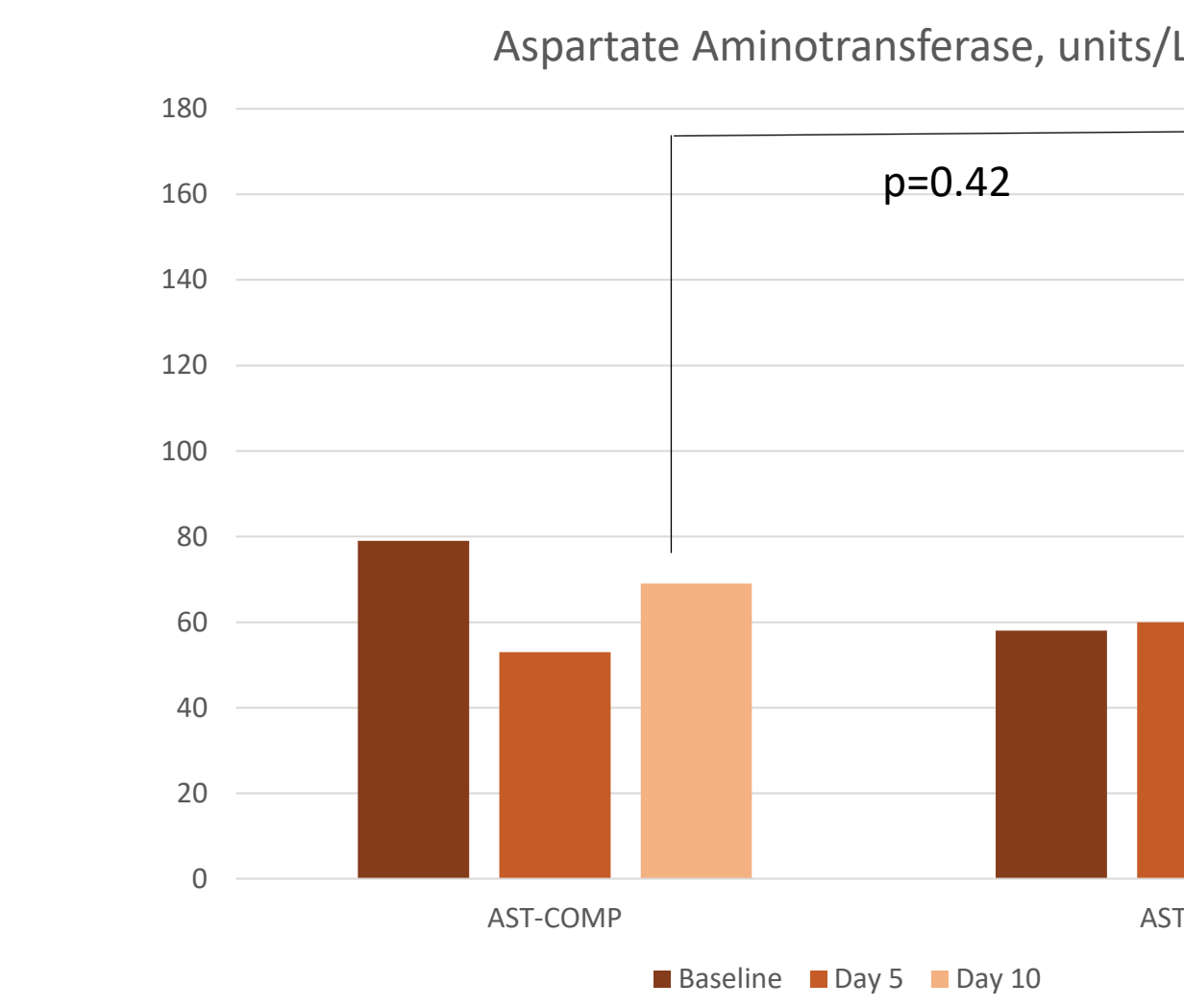
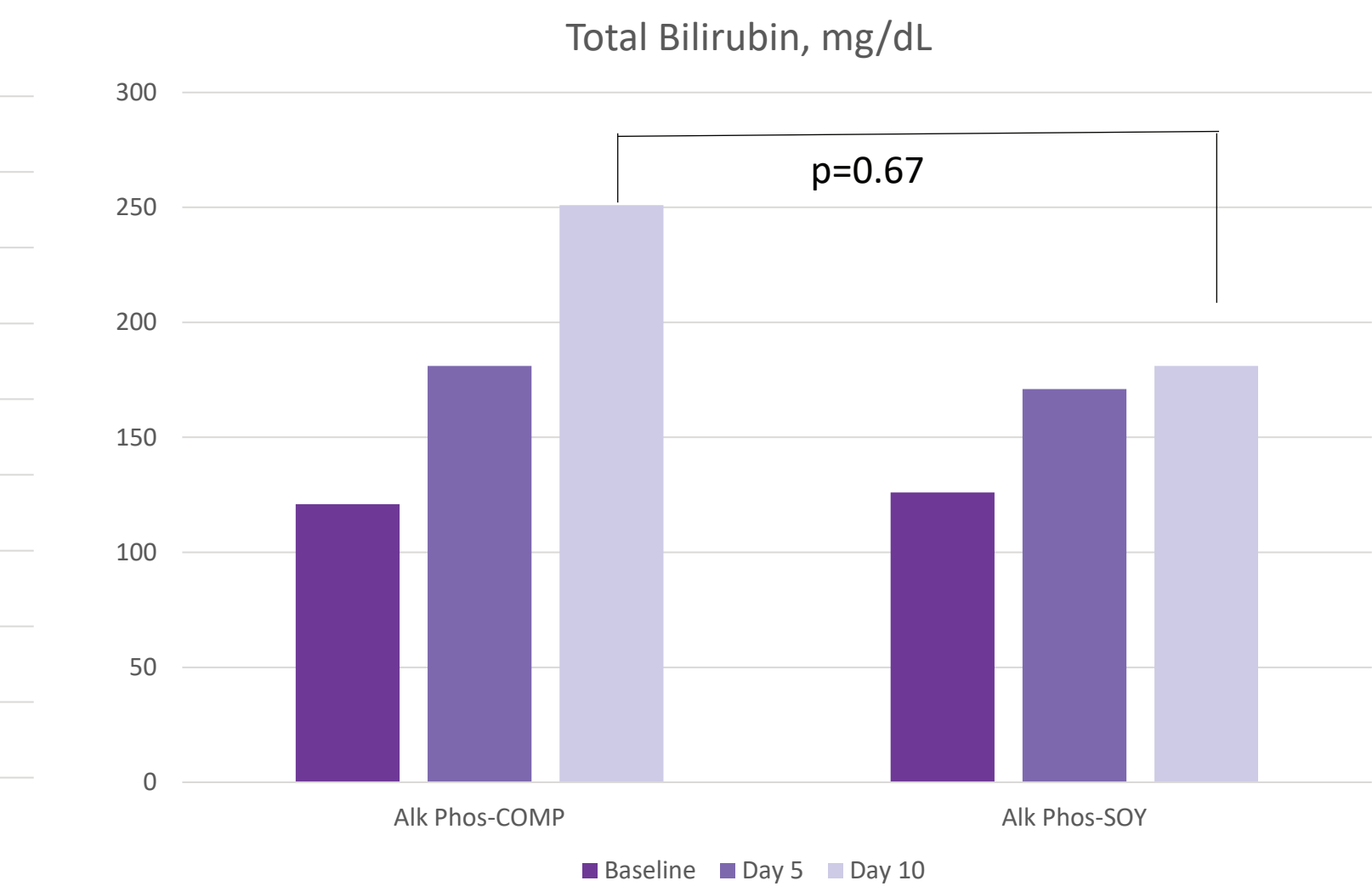


Figure 5.



## Conclusions

- Composite lipid emulsion as a component of parenteral nutrition has demonstrated anti-inflammatory effects and significant impact in the critically ill patient population compared to soybean-based lipid products.
- This study showed a reduced composite endpoint of infectious episodes and liver dysfunction with composite lipids versus soybean lipid products.
- An increase length of stay was noted in the COMP group which may have been tributed to the severity of illness during the time period compared.
- With the known significant impact of composite lipid emulsions in critically ill patients, it should be considered in this patient population.

## References

- Bae HJ, Lee GY, et al. *Am J Health-Syst Pharm.* 2017;74:904-18.
- Manzanares W, Langlois PL, et al. *Critical Care.* 2015;19:167.
- Manzanares W, Dhaliwal R, et al. *J Parenter Enteral Nutr.* 2014;38:20-28.
- Biesboer A, Stoehr N. *Nutr Clin Pract.* 2016;31(5):610-618.
- McClave S, Taylor B, Martindale R, et al. *J Parenter Enteral Nutr.* 2016;40(2):159-211.