The Role of Fish Oil Containing Lipid Emulsions:
A Global Consensus

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Lipid Use in Adult Patients: Expert Consensus Statements and Best Practice Guidance[1]

International Lipid Summit 2022

Involving a panel of international experts to discuss biological and clinical aspects of lipids used in PN.

Objective

Evaluate the current state of knowledge and offer practical guidance on ILE use in PN with a focus on adult patients in various clinical settings.

Outcome

During the meeting, a set of consensus statements, based on evidence* and expert opinion, were developed.

5 Biological aspects

8 Medical & Surgical ICU

11 Surgical & Hospitalised patients

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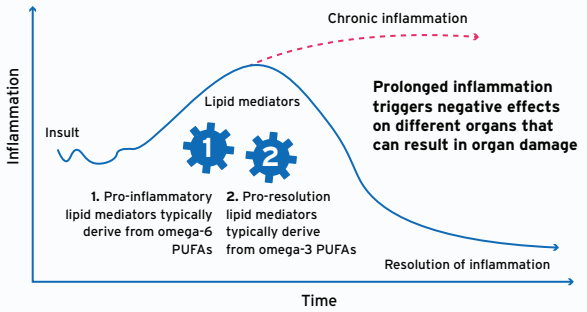
Omega-3 fatty acids are precursors of specialised pro-resolving mediators (SPMs) involved **in inflammatory resolution pathways**[1,2]

Excessive acute or chronic inflammation is a concern in patients requiring medical nutrition during critical illness or after major surgery.[1-3]

However, the timely resolution of inflammation is associated with more favorable clinical outcomes.[1-3]

Fig 1: Adapted from Stoppe C et al. Crit Care 2024

Inflammatory response in acute critical illness



Summary of Key Messages

Fish oil, rich in eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) with inflammation-resolving and immunomodulatory properties, has become an important component of composite ILEs for PN.

PN including fish oil containing ILEs as a source of EPA and DHA represents a key strategy to promote resolution physiology in clinical practice.
Systemic inflammation is common during critical illness and post-surgery, and the capacity and timing of resolution can affect patient outcomes.[2] Resolution of inflammation is triggered by specialised pro-resolving mediators (SPMs). EPA and DHA from fish oil are substrates for the synthesis of SPMs.[1]

Fish oil containing ILEs have clinically meaningful advantages over standard intravenous lipid emulsions for adult ICU and hospitalised patients.
Fish oil containing ILEs showed significant benefits on clinical outcomes over standard ILEs without fish oil in meta- analyses.[4-9]

The use of fish oil containing ILEs represents a cost-effective strategy.
Cost considerations may impact lipid emulsion choice. A meta-analysis with cost-effectiveness analysis showed that PN with fish oil containing ILEs represents cost-saving benefits across different health care systems.[10]

Recommended daily fish oil dose in PN for adult medical and surgical ICU and surgical and hospitalised patients is 0.1 - 0.2g/kg/day.
Based on currently available clinical data, recommended fish oil doses provided by lipid emulsions containing fish oil should be between 0.1-0.2g/kg/day for adult critically ill, surgical and hospitalised patients requiring parenteral nutrition.[11,12]

* animal and human studies reviewed by experts during the summit
ICU = intensive care unit **ILE** = intravenous lipid emulsion **PN** = parenteral nutrition **PUFA** = polyunsaturated fatty acid **SPMs** = specialized pro-resolving mediators.

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References

1. Martindale RG, Calder PC, Cogle SV et al. Lipids in parenteral nutrition: Translating guidelines into clinical practice. Clinical Nutrition Open Science, 60; April 2025, 50-65

2. Cioccari L, Luethi N, Masoodi M. Lipid mediators in critically ill patients: a step towards precision medicine. Front Immunol. 2020;11:599853.

3. Stoppe, C., Martindale, R.G., Klek, S. et al. The role of lipid emulsions containing omega-3 fatty acids for medical and surgical critical care patients. Crit Care 28, 2024, 271

4. Zhao Y, Wang C. Effect of ω-3 polyunsaturated fatty acid supplemented parenteral nutrition on inflammatory and immune function in postoperative patients with gastrointestinal malignancy: a meta-analysis of randomized control trials in China. Medicine (Baltimore) 2018;97(16):0472.

5. Pradelli L, Mayer K, Klek S, et al. ω-3 fatty-acid enriched parenteral nutrition in hospitalized patients: systematic review with meta-analysis and trial sequential analysis. JPEN J Parenter Enteral Nutr 2020;44(1):44-57.

6. Pradelli L, Klek S, Mayer K, et al. Omega-3 fatty acid containing parenteral nutrition in ICU patients: systematic review with meta-analysis and cost- effectiveness analysis. Crit Care 2020;24(1):634.

7. Xu XT, Huang H, Tian MX, et al. A four-oil intravenous lipid emulsion improves markers of liver function, triglyceride levels and shortens length of hospital stay in adults: a systematic review and meta-analysis. Nutr Res 2021;92: 1-11.

8. Notz Q, Lee ZY, Menger J, et al. Omega 6 sparing effects of parenteral lipid emulsions—an updated systematic review and meta-analysis on clinical outcomes in critically ill patients and meta-analysis on clinical outcomes in critically ill patients. Crit Care 2022;26(1):23.

9. Pradelli L, Mayer K, Klek S, et al. Omega-3 fatty acids in parenteral nutrition – A systematic review with network meta-analysis on clinical outcomes Clin Nutr 2023;42(4):590-9.

10. Pradelli L, Klek S, Mayer K, et al. Cost-effectiveness of parenteral nutrition containing ω-3 fatty acids in hospitalized adult patients from 5 european countries and the US. JPEN J Parenter Enteral Nutr 2021;45(5):999e1008.

11. P. Singer, A.R. Blaser, M.M. Berger et al. ESPEN practical and partially revised guideline: Clinical nutrition in the intensive care unit. Clinical Nutrition 2023; 42 1671-1689

12. Martindale RG, Berlana D, Boullata JI, et al. Summary of proceedings and expert consensus statements from the international summit "Lipids in Parenteral Nutrition. JPEN J Parenter Enteral Nutr 2020; 44(Suppl 1):S7-20

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