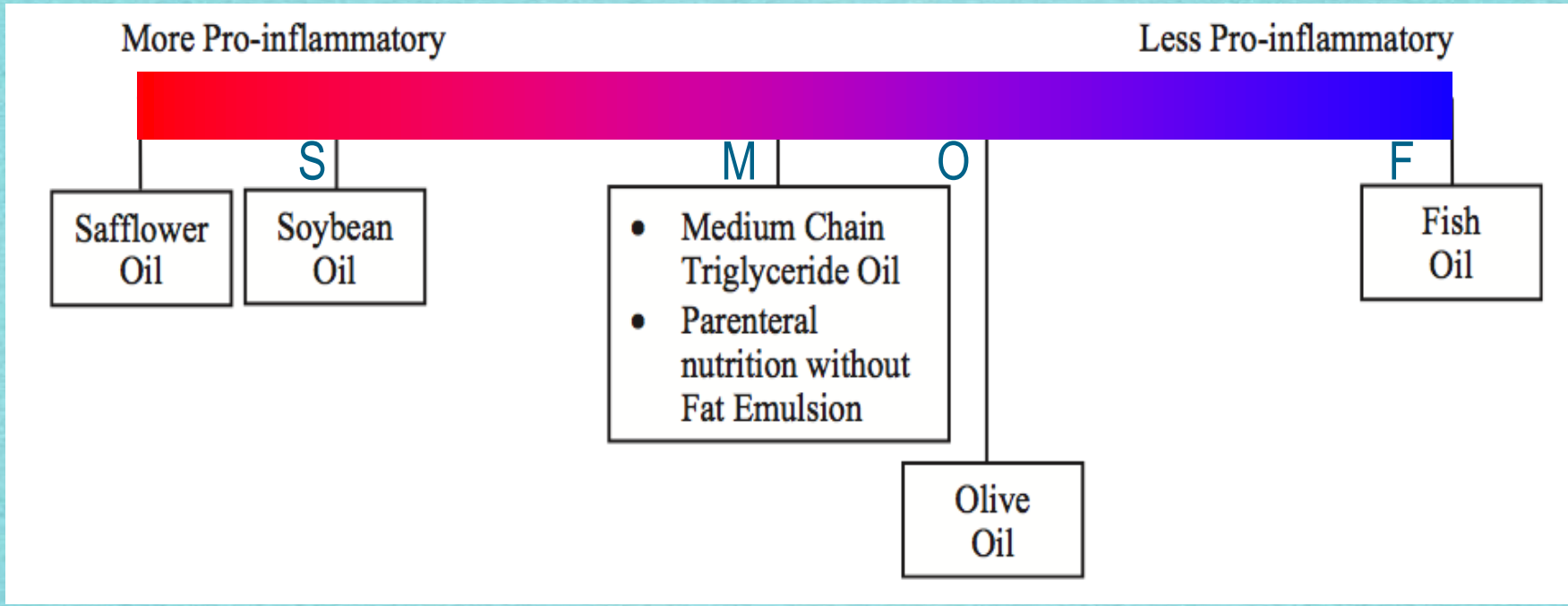
Importance of balanced lipid emulsions with fish oil



Euglycemic, energy-efficient, less pro-inflammatory + Immune modulation

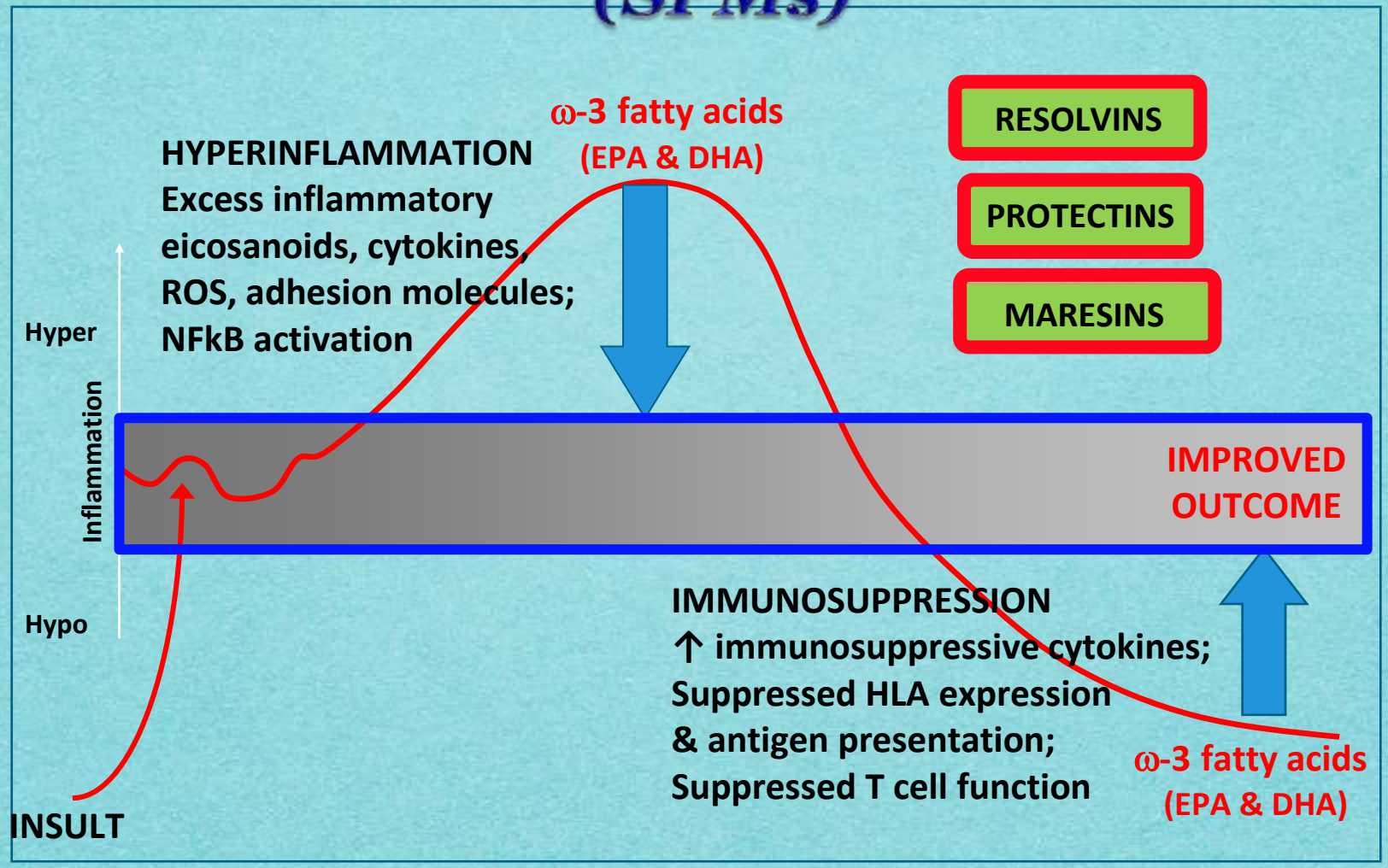
A.S.P.E.N. Position Paper: Clinical Role for Alternative Intravenous Fat Emulsions

Nutrition in Clinical Practice
Volume 27 Number 2
April 2012 150-192

DOI: 10.1177/0884533612439896

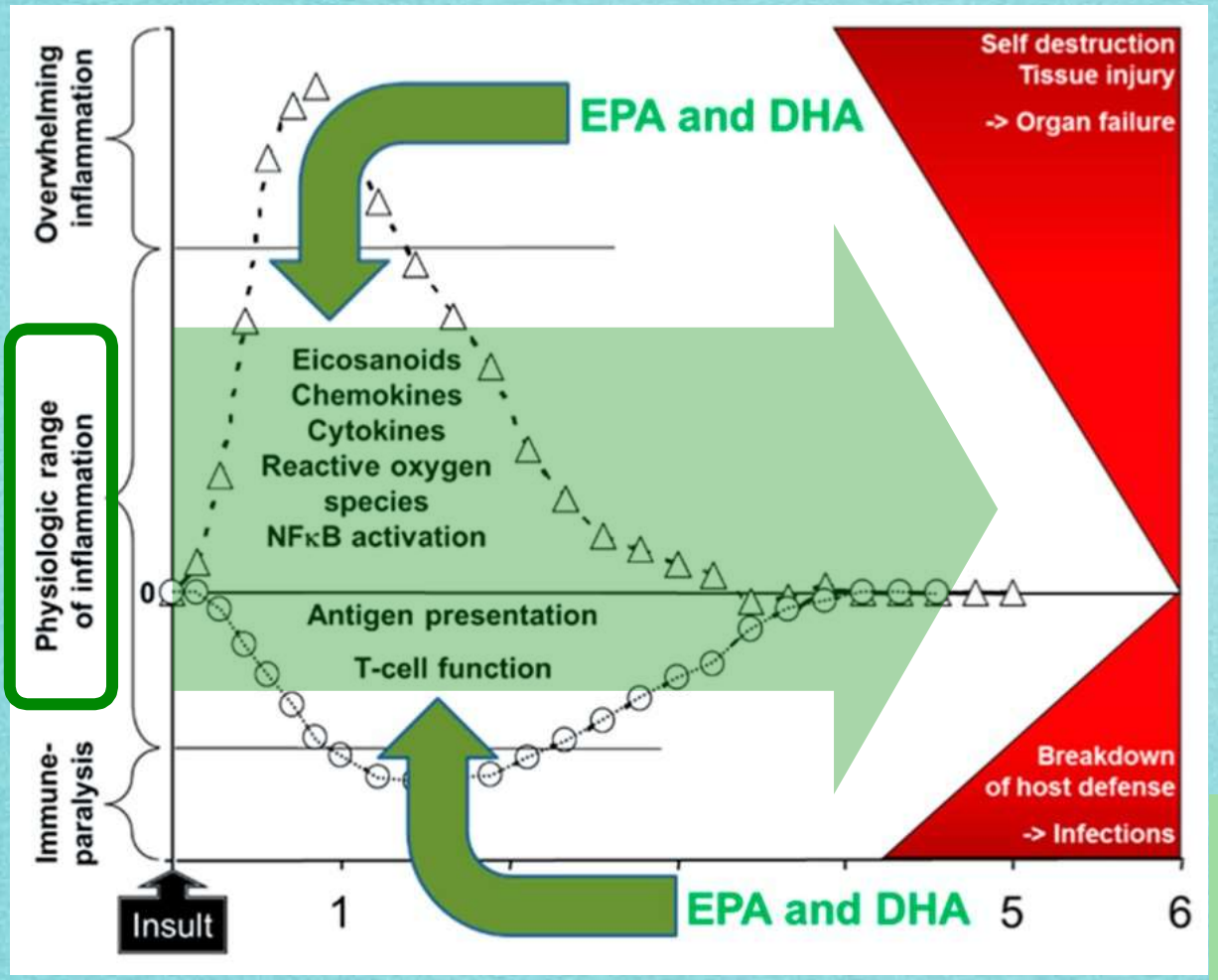
Immuno-inflammatory modulation by ω-3 FA

Specialized pro-resolving mediators (SPMs)



Calder, Clin Nutr 2010; 29: 5-12

Modulation of inflammation by ω-3 FA



- ***Several SPMs lower mortality in viral illness.***
- ***Protectin D1 inhibits viral replication.***

Intravenous Lipid Emulsions to Deliver Bioactive Omega-3 Fatty Acids for Improved Patient Outcomes

Mar. Drugs **2019**, *17*, 274; doi:10.3390/md17050274

Dalli J, et al. Crit Care Med. 2017;45(1):58-68.

Baillie JK, et al. N Eng J Med. 2013;269(2):191-193.

Clinical benefits of fish oils

- Reduced infectious complications
- Improved ventilation parameters
- Enhanced liver tolerance
- Modulation of inflammation in pancreatitis
- Better preservation of organ function
- Reduced number of new organ failures
- Shorter ICU stay
- Shorter hospital stay
- Trend to reduced mortality

1. Weiss G et al. Br J Nutr 2002; 87 (Suppl 1):S89–S94.
2. Grecu I et al. Clin Nutr 2003; 22 (Suppl 1):S23.
3. Tsekos E et al. Clin Nutr 2004; 23:325–330.
4. Jiang Z et al. Clin Nutr 2005; 24:609–610.
5. Wang X et al. JPEN 2008; 32:236-241.
6. Heller AR et al. Crit Care Med 2006; 34:972–979.

IV glutamine dipeptide (Dipeptiven) is not registered and only available in Australia through SAS

Clinical benefits of fish oils LEs in surg pts

Given the findings of this literature review, clinicians in the United States may consider using alternative ILE-containing FO for their surgical critical care patients, as appropriate, to help avoid complications of elevated serum triglycerides.[16-18] This literature review demonstrates that surgical patients who receive FO ILE may experience significantly lower levels of proinflammatory markers and liver function tests.[7,17,18,25-28,31,33] These patients may also benefit from a demonstrated trend toward lower morbidity, mortality, and hospital LOS.[7,18,25-28,33,36]

Given that FO ILEs have been shown to be safe and improve outcomes in numerous studies compared with the historically standard treatment in the United States (100% LCTs from SO) and compared with 50:50 blends of MCT:LCT ILE, surgical ICU clinicians in the United States can consider using FO ILE as an alternative standard of care.

Impact of Intravenous Lipid Emulsions Containing Fish Oil on Clinical Outcomes in Critically Ill Surgical Patients: A Literature Review

Samantha Honeywell, RD, CNSC[1]; Rena Zelig, DCN, RDN, CDE, CSG[1,2,3]; and Diane Rigassio Radler, PhD, RD[1,2,3]

Nutrition in Clinical Practice
Volume 34 Number 1
February 2019 112–122

Benefits of perioperative fish oil-enriched nutrition Tx

safer and better tolerated than pure SO. FO-enriched enteral and parenteral nutrition appears to be well tolerated and confers additional clinical benefits, particularly in surgical ICU patients, due to its anti-inflammatory and immune-modulating effects. Whilst the evidence base is not conclusive, there appears to be a potential for FO-enriched nutrition, particularly administered peri-operatively, to reduce the rate of complications and ICU and hospital stay in surgical ICU patients, as well as to improve complications such as IFALD associated with SO-based LEs. The evidence for

Reduced complication rates

Reduced ICU & hospital stay

Reduced liver complications associated with soybean oil lipid emulsions

Lipids in the intensive care unit: Recommendations from the ESPEN Expert Group☆

Philip C. Calder [a, *], Michael Adolph [b], Nicolaas E. Deutz [c], Teodoro Grau [d], Jacqueline K. Innes [e], Stanislaw Klek [f], Shaul Lev [g], Konstantin Mayer [h], Adina T. Michael-Titus [i], Lorenzo Pradelli [j], Mark Puder [k], Hester Vlaardingerbroek [l], Pierre Singer [g]

Omega-3 FAs: No risk of coagulation disorders

- *Analysis of 8 CTs of >600 pt on nutrition therapy with n-3 FA to study bleeding-related adverse events and effects on coagulation parameters (PT, aPTT]).*
- *No evidence of increased risk of bleeding, nor significant changes in coagulation parameters, with n-3 PUFAs*
- *Findings support safe consumption of n-3 PUFAs, even at short-term doses up to 10 g/day EPA/DHA) or for up to 52 wks >1.5 g/day*
- *No evidence to support any concern re: n-3 PUFAs as part of clinical nutrition therapy and potential increased risk for adverse bleeding manifestations*

Fish oil LC-PUFAs do not affect blood coagulation parameters and bleeding manifestations: Analysis of 8 clinical studies with selected patient groups on omega-3-enriched medical nutrition

http://dx.doi.org/10.1016/j.clnu.2017.03.027

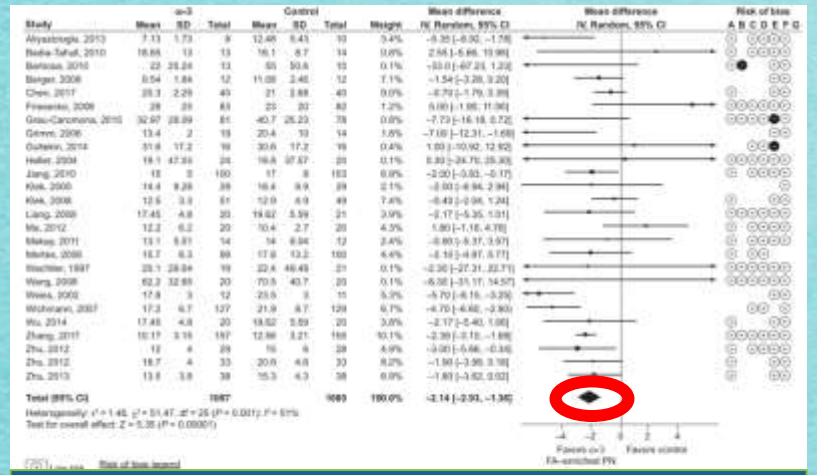
S. Jeansen et al. / Clinical Nutrition xxx (2017) 1–10

ω-3 Fatty-Acid Enriched Parenteral Nutrition in Hospitalized Patients: Systematic Review With Meta-Analysis and Trial Sequential Analysis

Lorenzo Pradelli, MD[1]; Konstantin Mayer, MD[2]; Stanislaw Klek, MD, PhD[3]; Abdul Jabbar Omar Alsaleh, PharmD, MA[1]; Richard A. C. Clark, BSc, DPhil[4]; Martin D. Rosenthal, MD[5]; Axel R. Heller, MD, PhD[6]; and Maurizio Muscaritoli, MD, PhD[7]

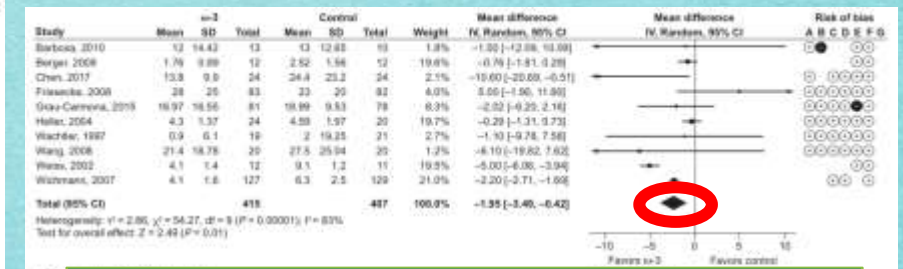
Most comprehensive review and meta-analysis conducted to date 49 randomized, controlled trials; Total number of patients = 3641

Length of hospital stay



Significant reduction of hospital length of stay by 1.95 days (24 studies with 2182 patients)

ICU length of stay



Significant reduction of ICU length of stay by 2.14 days (10 studies with 882 patients)

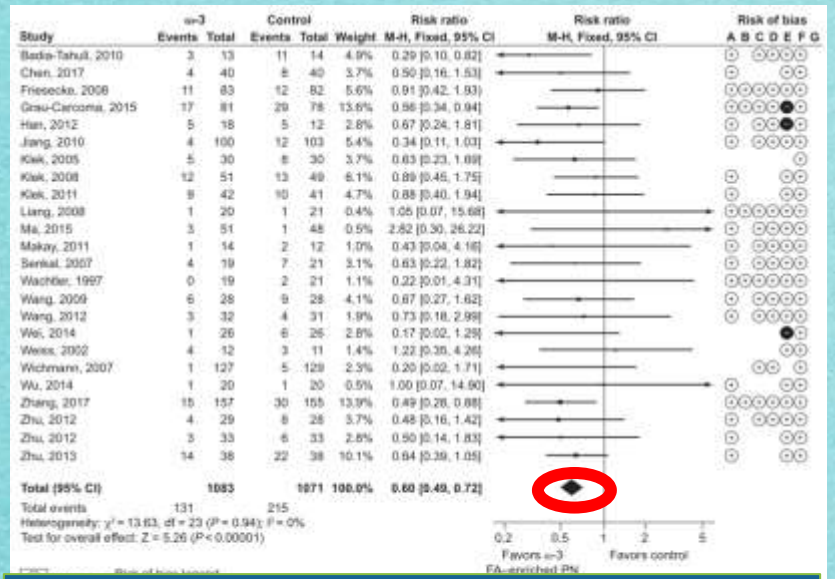
Update references

(*JPEN J Parenter Enteral Nutr.* 2019;0:1–14) DOI: 10.1002/jpen.1672

ω-3 Fatty-Acid Enriched Parenteral Nutrition in Hospitalized Patients: Systematic Review With Meta-Analysis and Trial Sequential Analysis

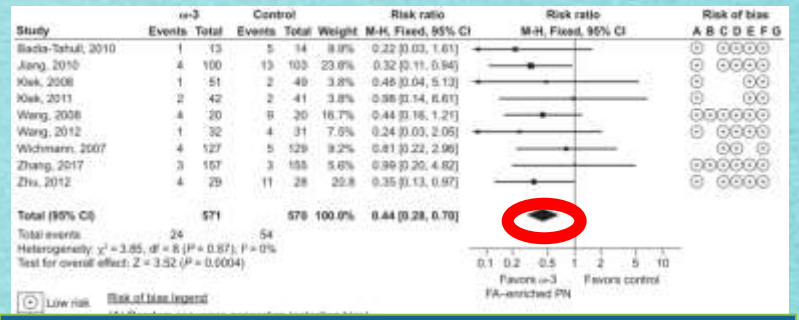
Lorenzo Pradelli, MD[1]; Konstantin Mayer, MD[2]; Stanislaw Klek, MD, PhD[3]; Abdul Jabbar Omar Alsaleh, PharmD, MA[1]; Richard A. C. Clark, BSc, DPhil[4]; Martin D. Rosenthal, MD[5]; Axel R. Heller, MD, PhD[6]; and Maurizio Muscaritoli, MD, PhD[7]

Infection rate



40% significant reduction in relative risk of infection
(24 studies with 2154 patients)

Sepsis



Significant 56% reduction in risk of sepsis
(9 studies with 1141 patients)

(*JPEN J Parenter Enteral Nutr.* 2019;0:1–14) DOI: 10.1002/jpen.1672

Cost effectiveness of n-3 fatty acids in PN

In summary, we demonstrate that ω-3 FA–containing PN is likely a dominant alternative to standard PN from a hospital point of view, with a decrease in mean costs for all 6 countries evaluated (France, Germany, Italy, Spain, UK, US). With regard to the positive clinical and economic outcomes demonstrated in the present analysis and in the recent meta-analysis[4] on which this pharmacoeconomic evaluation is built, we suggest that ω-3 FA–containing PN be considered as standard of care and suggest using the present publication and that by Pradelli et al[4] as a reference for guideline recommendations.

Cost-Effectiveness of Parenteral Nutrition Containing ω-3 Fatty Acids in Hospitalized Adult Patients From 5 European Countries and the US

Journal of Parenteral and Enteral Nutrition
Volume 0 Number 0
August 2020 1–10
DOI: 10.1002/jpen.1972

Omega-3 fatty acid-containing parenteral nutrition in ICU patients: systematic review with meta-analysis and cost-effectiveness analysis

Lorenzo Pradelli[1*], Stanislaw Klek[2], Konstantin Mayer[3], Abdul Jabbar Omar Alsaleh[7], Martin D. Rosenthal[4], Axel R. Heller[5] and Maurizio Muscaritoli[6]

Results: In adult ICU patients, ω-3 FA-containing PN versus standard PN was associated with significant reductions in the relative risk (RR) of infection (RR 0.62; 95% CI 0.45, 0.86; $p = 0.004$), hospital length of stay (HLOS) (− 3.05 days; 95% CI − 5.03, − 1.07; $p = 0.003$) and ICU length of stay (LOS) (− 1.89 days; 95% CI − 3.33, − 0.45; $p = 0.01$). In critically ill ICU patients, ω-3 FA-containing PN was associated with similar reductions in infection rates (RR 0.65; 95% CI 0.46, 0.94; $p = 0.02$), HLOS (− 3.98 days; 95% CI − 6.90, − 1.06; $p = 0.008$) and ICU LOS (− 2.14 days; 95% CI − 3.89, − 0.40; $p = 0.02$). Overall hospital episode costs were reduced in all six countries using ω-3 FA-containing PN compared to standard PN, ranging from €-3156 ± 1404 in Spain to €-9586 ± 4157 in the US.

Conclusion: These analyses demonstrate that ω-3 FA-containing PN is associated with statistically and clinically significant improvement in patient outcomes. Its use is also predicted to yield cost savings compared to standard PN, rendering ω-3 FA-containing PN an attractive cost-saving alternative across different health care systems.

Study registration: PROSPERO CRD42019129311.

Keywords: Parenteral nutrition, Intensive care, Critically ill, Meta-analysis, Cost-effectiveness, Omega-3 fatty acid

Pradelli *et al. Crit Care* (2020) 24:634
https://doi.org/10.1186/s13054-020-03356-w

Parenteral nutrisi

- Balanced amino acid mixture harus diberikan dg dosis infus 1.3–1.5 g/kg ideal body weight per hari (dengan energy supply yang adequat)
- Amino acid solution sebaiknya mengandung 0.2–0.4 g/kg/day of Lglutamine (e.g. 0.3–0.6 g/kg/day alanyl-glutamine dipeptide)
- PN harus mengandung multivitamin dan trace element

Monitoring

- Tujuan monitoring :

1. Memastikan optimal nutisi terencana dengan baik (jumlah kalori, protein, dan mikronutrient)
2. Untuk mencegah dan mengetahui lebih awal komplikasi
3. Untuk monitoring respon dari terapi nutrisi dan mengetahui lebih awal terjadi refeeding
4. Untuk mengetahui adanya defisiensi mikronutrient pada pasien yang beresiko

Monitoring

- Tanda2 vital
- Akses: iv lines perifer, CVP, pipa Nasogastrik (posisi, sumbatan, dll)
- Efek Metabolisme : **GDS** diperiksa saat awal masuk ICU, dan setelah pemberian terapi nutrisi (minimal setiap 4 jam dalam 2 hari pertama)
- **Elektrolit (Potassium, Magnesium, Phosphate)** setiap hari selama minggu pertama.
- Pada pasien refeeding hypophosphatemia (< 0,65 mmol/l atau turun > 0,16 mmol/l) elektrolit harus diperikas 2-3 kali per hari dan nutrisi di batasi dalam 48 jam baru kemudian ditingkatkan
- **Ureum kreatinin** 1-2 hari sekali atau sesuai kebutuhan lain2 bisa 1 minggu sekali
- **Trigliserida** 💻 monitor intake lemak
- **Albumin** 💻 dapat memprediksi keberhasilan nutrisi

Matur Suksma