

## 9.2 Composition of Parenteral Nutrition: Type of lipids

June 28<sup>th</sup>, 2005

### Recommendation:

*There are insufficient data to make a recommendation on the type of lipids to be used in critically ill patients receiving parenteral nutrition.*

**Discussion:** Given the insufficient data evaluating the effects of structured lipids (LCT [long chain triglycerides] + MCT [medium chain triglycerides]) on clinical outcomes, the concerns around feasibility and potential concerns of safety and cost of structured lipids, the committee decided that a recommendation can not be put forward. Based on one study, given the lack of a treatment effect of Emulsan with no benefit over Intralipid, the committee decided that a recommendation could not be made.

Values	definition	Score: 0, +, ++, +++
Effect size	magnitude of the absolute risk reduction attributable to the intervention listed--a higher score indicates a larger effect size	0
Confidence interval	95% confidence interval around the point estimate of the absolute risk reduction, or the pooled estimate (if more than one trial)--a higher score indicates a smaller confidence interval	1+
Validity	refers to internal validity of the study (or studies) as measured by the presence of concealed randomization, blinded outcome adjudication, an intention to treat analysis, and an explicit definition of outcomes--a higher score indicates presence of more of these features in the trials appraised	2+
Homogeneity	similar direction of findings among trials--a higher score indicates greater similarity of direction of findings among trials	2+
Safe	estimated probability of avoiding any significant harm that may be associated with the intervention listed--a higher score indicates a lower probability of harm	2+
Feasible	ease of implementing the intervention listed--a higher score indicates greater ease of implementing the intervention in an average ICU	1+
Cost	estimated cost of implementing the intervention listed--a higher score indicates a lower cost to implement the intervention in an average ICU	2+

## 9.2 Topic: Composition of Parenteral Nutrition: Type of lipids

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**Question:** Does the type of lipids in parenteral nutrition affect outcomes in the critically ill adult patient?

**Summary of evidence:** There were 3 level 2 studies and 1 level 1 study (Lindgren et al) reviewed. For most of the studies, focus of the investigation was on surrogate endpoints but these studies were still included because they did report on mortality or infection. Three studies compared a mixture of long chain triglycerides (LCT) + medium chain triglycerides (MCT) to long chain triglycerides (Nijveldt, Lindgren and Garnacho-Montero), one study compared two different types of LCT emulsions (Kari).

**Mortality:** A meta-analysis of the studies on LCT+MCT vs LCT showed no difference in mortality between the groups (RR = 0.95, 95 % confidence intervals 0.46-1.95, p = 0.9) (see page 9.2-5). No difference in mortality was seen between the groups receiving Emulsan or Intralipid.

**Infections:** Nijveldt et al reported no differences in the incidences of new infections or positive blood cultures between the groups receiving LCT+MCT or MCT, however no numbers were reported (level 1 study).

**LOS and Ventilator days:** No difference in LOS was seen between groups receiving MCT+LCT vs LCT (Nijveldt, Garnacho-Montero).

**Other complications:** A significant improvement in nutritional parameters (i.e. nitrogen balance, retinol binding protein, prealbumin) was observed in the groups receiving LCT + MCT in some of the studies (Garnacho-Montero, Lindgren) while others found no difference (Nijveldt, Kari).

### **Conclusion:**

No difference in outcomes in critically ill patients receiving different types of lipids (i.e. LCT + MCT vs. LCT; Emulsan vs. Intralipid).

*Level 1 study: if all of the following are fulfilled: concealed randomization, blinded outcome adjudication and an intention to treat analysis.*

*Level 2 study: If any one of the above characteristics are unfulfilled.*

Table 1. Randomized studies evaluating type of lipids (PN) in critically ill patients

Study	Population	Methods (score)	Intervention	Mortality # (%)†		RR (CI)**	Infections # (%)‡		RR (CI)**
				Emulsan	Intralipid		Emulsan	Intralipid	
1) ID # 5 Kari 1998	ICU , severe injury patients N = 20	C.Random: not sure ITT: yes Blinding: no (6)	Two different types of lipids i.e. Emulsan (LCT, soybean oil- egg phosphatide) vs Intralipid (LCT)	2/10 (20)	2/10 (20)	NA	Emulsan NA	Intralipid NA	NA
2) ID # 7 Nijveldt 1998	ICU, septic surgical patients, trauma N = 20	C.Random: not sure ITT: yes Blinding: double (10)	PN with LCT+ MCT (Lipofundin) vs PN with LCT (Intralipid)	LCT + MCT 2/12 (17) ICU	LCT 1/8 (13) ICU	1.33 (0.14-12.4)	LCT + MCT NA	LCT NA	NA
3) ID # 6 Lindgren 2001	ICU patients, sepsis, multi-trauma N = 30	C.Random: yes ITT: yes Blinding: yes (12)	PN + structured lipids (LCT + MCT) vs PN with LCT	LCT + MCT 1/15 (7)	LCT 0/15 (0)	3.0 (0.13-68.3)	LCT + MCT 6/15 (40)	LCT 4/15 (27)	1.5 (0.53-4.3)
4) ID # 98 Garnacho-Montero 2002	Surgical ICU Patients with peritonitis and abdominal sepsis  N = 72	C.Random: not sure ITT: no Blinding: no (6)	PN with 10 % MCT/LCT (Lipofundin) vs PN with 10 % LCT (Intralipid). Both groups received PN with 45 % Branched chain amino acids	LCT + MCT ICU 8/35 (23)  Hospital 11/35 (31)	LCT ICU 11/37 (30)  Hospital 13/37 (35)	0.77 (0.35-1.69)  0.85 (0.44-1.62)	LCT + MCT NA	LCT NA	NA

Table 2. Randomized studies evaluating type of lipids (PN) in critically ill patients

Study	LOS days		Ventilator days		Cost		Other	
1) ID # 5 Kari 1998	NA	NA	NA	NA	NA	NA	NA	NA
2) ID # 7 Nijveldt 1998	LCT + MCT 13.8 ± 2.9 (12)	LCT 17.4 ± 3.0 (8)	NA	NA	NA	NA	NA	NA
3) ID # 6 Lindgren 2001	NA	NA	NA	NA	NA	NA	LCT + MCT 5/15 (33)  Nitrogen balance at day 3 2.6 ± 5.6 gms	LCT 4/15 (27)  -11.7 ± 4.8 gms
4) ID # 98 Garnacho- Montero 2002	ICU 16.6 ± 6.1 (35)	ICU 15.8 ± 7 (37)	NA	NA	NA	NA	LCT + MCT Retinol binding protein 1.7 ± 1 Nitrogen balance 14.2 ± 2.9	LCT 0.8 ± 0.6 11.6 ± 4

C.Random: concealed randomization

ITT: intent to treat

NA: not available

MCT: medium chain triglycerides

LCT: long chain triglycerides

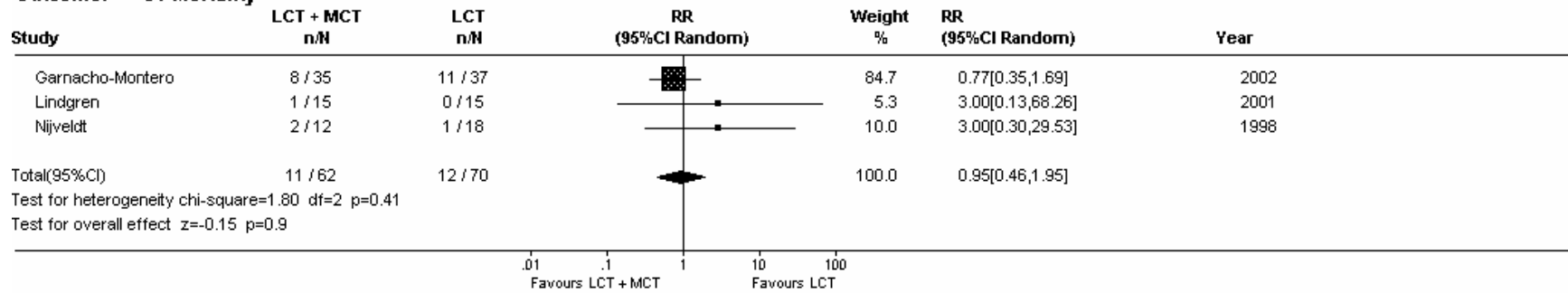
\*\* RR= relative risk, CI= Confidence intervals

† hospital mortality unless specified

‡ number of patients with infections unless specified

**Comparison: 01 LCT+MCT vs. LCT**

**Outcome: 01 Mortality**



**TOPIC: 9.2 Composition of PN: Type of lipids**

*(Reviewers: Ulrich Suchner, Minto Jain.)*

**Article inclusion log**

**Criteria for study selection**

Type of study: RCT or Meta-analysis
Population: critically ill ventilated patients (no elective surgery patients)
Intervention: TPN and /or EN
Outcomes: mortality, LOS, QOL, functional recovery, complications, cost. Exclude studies with only biochemical, metabolic or nutritional outcomes.

ID #	Author	Journal	I	E	why rejected
5.	1. Kari	Current Therap. Research 1998	√		
6.	2. Lindgren	Clinical Nutrition 2001	√		
7.	3. Nijveldt	Clinical Nutrition '98	√		
98.	4. Garnacho-Montero	Nutrition 2002	√		
	5. Manuel-y-Keenoy	European J Clin Nutr 2002		√	No significant outcomes, not ICU patients
	6. Jarnberg	Current Therap Research 1991		√	Excluded as no significant outcomes
	7. Planas	Int. Care Med 1999		√	No significant outcomes
	8. Chassard	CCMedicine 1994		√	No significant outcomes
	9. D'Angio	Annals Pharm 1992		√	Not ICU patients
	10. Jeevandam	Nutrition 1995		√	No significant outcomes
	11. Calon	Infusiontherap. 1990		√	No significant outcomes
	12. Ball	Int. Care Med 1989		√	Not RCT (cross over)
	13. Ball	Int Care Med. 1993		√	Not RCT

I = included, E = excluded