

## 10.2 Strategies to Optimize Parenteral Nutrition and Minimize Risks: Use of lipids

*There are no new randomized controlled trials since the 2015 updates and hence there are no changes to the following summary of evidence.*

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

**Summary of evidence:** There were 2 level 2 studies reviewed that compared the use of lipids high in soybean oil to no lipids in parenteral nutrition (Battistella 1997, McCowen 2000).

**Mortality:** Both studies reported no difference in mortality between the groups and this was confirmed when the data from these 2 studies was aggregated (RR 1.29, CI 0.16-10.7,  $p = 0.8$ ) (figure 1).

**Infections:** A significant reduction in pneumonia ( $p = 0.05$ ), line sepsis ( $p = 0.04$ ) and total number of infectious complications was seen in trauma patients not receiving lipids compared to those receiving lipids (Battistella 1997). In the McCowen 2000 study, the group that received no lipids (hypocaloric group) showed a trend towards a reduction in infections ( $p = 0.2$ ). Combining these studies, the meta-analysis done showed a significant reduction in infections in the group that received no lipids (RR 0.63, CI 0.42-0.93,  $p = 0.02$ ) (figure 2).

**LOS and Ventilator days:** A significantly shorter ICU stay ( $p = 0.02$ ), hospital stay ( $p = 0.03$ ) and significantly fewer ventilated days ( $p = 0.01$ ) were observed in trauma patients not receiving lipids compared to those receiving lipids (Battistella 1997). No difference in LOS was seen in the McCowen 2000 study (did not report on ventilator days)

**Other complications:** Incidence of hyperglycemia was similar in the hypocaloric and standard groups (McCowen 2000).

### Conclusions:

- 1) Withholding lipids high in soybean oil has no effect on mortality.
- 2) Withholding lipids high in soybean oil is associated with a reduction in infections in critically ill patients
- 3) Withholding lipids high in soybean oil may reduce LOS and duration of ventilation in trauma patients.

*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 lipids (PN) in critically ill patients**

Study	Population	Methods (score)	Intervention	Mortality # (%)†		RR (CI)**	Infections # (%)‡		RR (CI)**
				No lipids	Lipids		No lipids	Lipids	
1) Battistella 1997	Polytrauma patients N=60	C.Random: not sure ITT: no Blinding: no (8)	PN without lipids (1.5 g/kg protein, no lipids) vs. PN with lipids (30 kcal/kg/day + 1.6 gm/kg/d protein, 25 % calories from fat)	2/27 (7)	0/30 (0)	0.18 (0.01-3.60)	No lipids Pneumonia 13/27 (48) line sepsis 5/27 (19) total # infections per group 39/27	Lipids 22/30 (73) 13/30 (43) 72/30	1.52 (0.97-2.38) 2.34 (0.96-5.70) NA
2) McCowen 2000	Probable ICU patients (mostly ventilated) N=48	C.Random: not sure ITT: no Blinding: no (6)	Hypocaloric PN (no lipids), Pro 70g/d CHO 1000kcal/d vs standard PN (with lipids) ,Pro1.5g/kg/d, 25kcal/kg/d + lipids	Hypocaloric PN 2/21 (10)	Standard PN 3/19 (16)	0.60 (0.11-3.23)	Hypocaloric PN 6/21 (29)	Standard PN 10/19 (53)	0.54 (0.24-1.21)

**Table 1. Randomized studies evaluating lipids (PN) in critically ill patients (continued)**

Study	LOS days		Ventilator days		Cost		Other	
	No Lipids	Lipids	No lipids	Lipids	No lipids	Lipids	No lipids	Lipids
1) Battistella 1997	18± 12 (27) ICU 27 ± 16 (27) hospital	29 ± 22 (30) ICU 39 ± 24 (30) hospital	15 ± 12 (27)	27 ± 21 (30)	NA	NA	No lipids NA Calories received kcal/kg/day 21 ± 2 Protein received gm/kg/day 1.6 ± 0.1	Lipids NA 28 ± 2 1.6 ± 0.2
2) McCowen 2000	Hypocaloric PN 19 ± 14 (21)	Standard PN 17 ± 15 (19)	Hypocaloric PN NA	Standard PN NA	Hypocaloric PN NA	Standard PN NA	Hypocaloric PN Calories received kcal/kg/day 14 ± 3 Protein received gm/kg/day 1.1 ± 0.2 Hyperglycemia 20	Standard PN 18 ± 4 1.3 ± 0.2 26%

Figure 1. Mortality

Comparison: 01 lipids vs no lipids (parenteral)

Outcome: 01 mortality

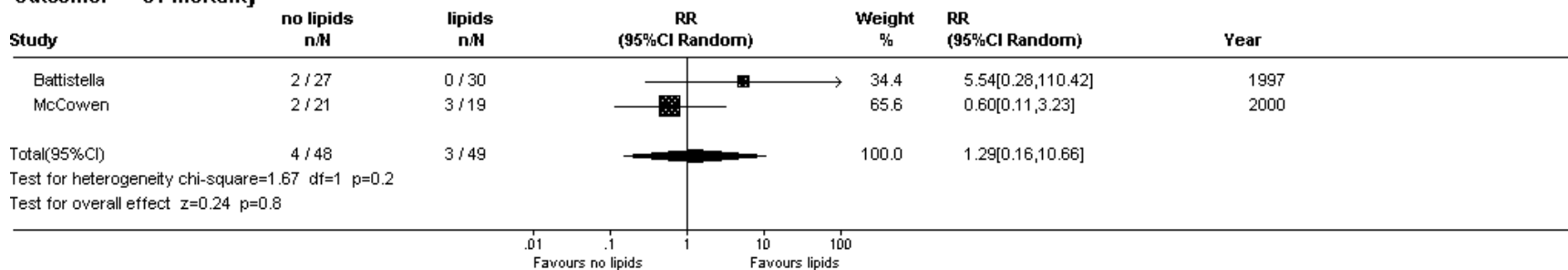


Figure 2. Infections

Comparison: 01 lipids vs no lipids (parenteral)

Outcome: 02 Infectious complications

