

3.2 Nutritional Prescription of Enteral Nutrition: Achieving target dose of enteral nutrition

June 28th, 2005

Recommendation:

Based on 1 level 2 study, when initiating enteral nutrition in head injured patients, strategies to optimize delivery of nutrients (starting at target rate, higher threshold of gastric residual volumes and use of small bowel feedings) should be considered. In other critically ill patients, there are insufficient data to make a recommendation.

Discussion: The committee noted the modest treatment effect associated with aggressive enteral nutrition in the one study of head injured patients that had high internal validity. Cost and feasibility concerns were also favourable and the improved calorie and protein intake with aggressive enteral nutrition was also noted. However, the committee was concerned about the probability of harm associated with aggressive enteral nutrition as illustrated by recent non-randomized studies (1,2). Two other studies, although in parenteral nutrition, showed that higher energy intake resulted in better outcomes in head injured patients (3,4).

- 1) Mentec H, Dupont H, Bocchetti M, Cani P, Ponche F, Bleichner G. Upper digestive intolerance during enteral nutrition in critically ill patients: frequency, risk factors, and complications. Crit Care Med 2001; 29(10):1955-61.
- 2) Ibrahim EH, Mehninger L, Prentice D, Sherman G, Schaiff R, Fraser V, Kollef M. Early versus late enteral feeding of mechanically ventilated patients: Results of a clinical trial. JPEN 2002;26:174-181.
- 3) Rapp RP, Young DB, Twyman D. The favorable effect of early parenteral feeding on survival in head-injured patients. Journal of Neurosurgery 1983;58:906-12
- 4) Young B, Ott L, Twyman D et al. The effect of nutritional support on outcome from severe head injury. Journal of Neurosurgery 1987;67:668-76.

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	2 +
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	2+
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	3+
Homogeneity	similar direction of findings among trials--a higher score indicates greater similarity of direction of findings among trials	0
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	1+
Feasible	ease of implementing the intervention listed--a higher score indicates greater ease of implementing the intervention in an average ICU	2+
Low cost	estimated cost of implementing the intervention listed--a higher score indicates a lower cost to implement the intervention in an average ICU	3+

3.2 Nutritional Prescription of Enteral Nutrition (dose): Achieving target dose of enteral nutrition

June 28th, 2005

Question: Does achieving target dose of enteral nutrition result in better outcomes in the critically ill adult patient?

Summary of evidence: There was only one level 2 study that compared the use of early aggressive enteral nutrition (i.e. starting at goal rate on day 1, 34% patients went on to small bowel feeding) to standard early enteral nutrition (starting at 15ml/hour on day 1 and increasing gradually). This study included patients > 10 years of age but was not excluded from this review as the median age was 28 (95% C.I. 22-37) for the control and 34 (95% C.I. 24-43) for the experimental group.

Mortality: There was no difference in mortality.

Infections: The early-enhanced fed group had less infections (p 0.02).

LOS: This was only reported on a subgroup of patients hence not included.

Other complications: Early enhanced enteral nutrition was associated with a trend towards fewer major complications and better neurological outcome at 3 months (p =0.08). The early-enhanced fed group also received significantly more calories (p =0.0008) and protein (p < 0.001) than the slowly fed group.

Conclusion:

There is no effect of early enteral nutrition on mortality, LOS or ventilator days in the critically ill patient. Early aggressive EN compared to a slower rate of advancement of EN is associated with a trend towards a reduction in the # infections and complications in head injured patients and results in more adequate calorie and protein intake.

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 target dose of enteral nutrition in critically ill patients

Study	Population	Methods (score)	Intervention	Mortality # (%)		RR (CI)**	Infections # (%)‡		RR (CI)**
				Enhanced EN	standard rate		Enhanced EN	standard rate	
ID # 45 Taylor 1999	Head injured ventilated > 10 yrs n = 82	C.Random: not sure ITT: yes Blinding: no (10)	Enhanced EN (goal rate at Day 1) vs EN at slow rate	5/41(12.2) 6 months	6/41 (14.6) 6 months	0.83 (0.28-2.52)	25/41 (61)	35/41 (85)	0.71 (0.54-0.94) 0.69 (0.46-1.05)
							18/41 (44) pneumonia	26/41 (63) pneumonia	

LOS days		Nutritional Outcomes		Other		RR (CI)**
Enhanced EN	standard rate	Enhanced EN	standard rate	Enhanced EN	standard rate	
NA	NA	% energy needs met (mean) 59.2	36.8	37 % major complications	61 % major complications	0.55 (0.3-0.95)
		% nitrogen needs met (mean) 68.7	37.9	61 % had better neurological outcome at 3 months	39 % had better neurological outcome at 3 months	1.6 (0.99-2.5)
				68 % had better neurological outcome at 6 months	61 % had better neurological outcome at 6 months	1.12 (0.8-1.5)

C.Random: concealed randomization

ITT: intent to treat

NA: not available

‡ refers to the # of patients with infections unless specified

** RR= relative risk, CI= Confidence intervals

Ventilator days and cost not reported

TOPIC: 3.2 Achieving target dose of enteral nutrition

(Reviewers: Sabrina Martin & Jan Greenwood)

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
45.	1.	Taylor	CCMedicine 1999	√		

I = included, E = excluded