

6.1 Enteral Nutrition (Other): Closed vs. open system

June 28th, 2005

Recommendation:

There are insufficient data to make a recommendation on the administration of EN via closed vs. open system in the critically ill.

Discussion: The committee noted that despite favourable safety and feasibility considerations, there was a small effect size of aseptic techniques of enteral nutrition on diarrhea, based on the results of one small study (n = 36 patients). The merits of a closed system (aseptic) i.e. less bacterial contamination/enteritis/diarrhea when compared to an open (non-septic) were discussed.

| 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 | 1+ (diarrhea) |
| 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 | 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 | 3+ |
| Feasible | ease of implementing the intervention listed--a higher score indicates greater ease of implementing the intervention in an average ICU | 3+ |
| Cost | estimated cost of implementing the intervention listed--a higher score indicates a lower cost to implement the intervention in an average ICU | 2+ |

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Question: Does the use of a closed system for enteral feeding result in better outcomes when compared to an open system in the critically ill adult patient?

Summary of evidence: There was one level 2 study that compared the incidence of bacterial contamination and diarrhea using a closed system i.e. aseptic techniques (ready to use bags, aseptic insertion of feeding tubes, tube changes every 24 hours) vs. an open system i.e. routine technique of enteral nutrition administration (open system).

Mortality: Not reported.

Infections, LOS, ventilator days: Not reported.

Diarrhea: The use of a closed system/aseptic technique of enteral nutrition administration vs. open system/routine resulted in less bacterial contamination and the incidence of diarrhea was lower in the group receiving aseptic vs routine enteral feeds ($p = 0.06$).

Conclusion:

Closed system/aseptic techniques of enteral nutrition compared to open/routine are associated with a trend towards a reduction in diarrhea in critically ill 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 a closed vs. open system in critically ill patients

| Study | Population | Methods (score) | Intervention | Other | RR (CI)** | | | | | | | | | | |
|--------------------------|---------------|---|--------------------------|--|-----------|---------|----------------------|--|----------|-----------|----------|--|-----------|------------|-----------------------------------|
| ID # 70 Mickschl 1990 | ICU N = 36 | C.Random: not sure ITT: yes Blinding: no (7) | Aseptic EN vs routine EN | <table border="0"> <tr> <td>Aseptic</td> <td>routine</td> </tr> <tr> <td colspan="2"># contaminated feeds</td> </tr> <tr> <td>1/18 (6)</td> <td>7/18 (39)</td> </tr> <tr> <td colspan="2">diarrhea</td> </tr> <tr> <td>5/18 (28)</td> <td>10/18 (57)</td> </tr> </table> | Aseptic | routine | # contaminated feeds | | 1/18 (6) | 7/18 (39) | diarrhea | | 5/18 (28) | 10/18 (57) | <p>NA</p> <p>0.50 (0.21-1.17)</p> |
| Aseptic | routine | | | | | | | | | | | | | | |
| # contaminated feeds | | | | | | | | | | | | | | | |
| 1/18 (6) | 7/18 (39) | | | | | | | | | | | | | | |
| diarrhea | | | | | | | | | | | | | | | |
| 5/18 (28) | 10/18 (57) | | | | | | | | | | | | | | |

C.Random: concealed randomization

ITT: intent to treat

NA: not available

Mortality, Infections, LOS days, Ventilator days and Cost: not reported

** RR= relative risk, CI= Confidence intervals

TOPIC: 6.1 Closed vs. Open system

(Reviewers: Shannon MacKenzie & Deborah Schroter-Noppe)

Article inclusion log

Criteria for study selection

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| 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 | |
|------|--------|----------|-------------------------------------|---|--------------|-------------------------|
| 70. | 1. | Mickschl | Heart & Lung 1990 | √ | | |
| | 2. | Levinson | Anaesth Int Care 1993 | | √ | No significant outcomes |
| | 3. | Herlick | Nutrition in Clinical Practice 2000 | | √ | Not ICU patients |
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I = included, E = excluded