Critical Care Nutrition

www.criticalcarenutrition.com

ENTERAL NUTRITION (EN) IN THE CRITICALLY ILL ADULT- PRACTICE GUIDELINES

General Considerations:

In critically ill patient's, malnutrition is associated with impaired immune function, impaired ventilatory drive and weakened respiratory muscles leading to ventilatory dependence and increased infectious morbidity and mortality (1). Malnutrition is prevalent in ICU patients, has been reported as being as high as 40%, and is associated with poor patient's outcomes (2). The benefits of nutrition support include:

1) Improved wound healing
2) Decreased catabolic response to injury
3) Improved gastrointestinal structure and function
4) Improved clinical outcomes including a reduction in complication rates and length of stay with accompanying cost savings (3).
5) Stress ulcer prophylaxis

Early EN can be associated high gastric residuals, bacterial colonization of the stomach, and an increased risk of aspiration pneumonia (4,5). Parenteral nutrition has been associated with gut mucosal atrophy, overfeeding, hyperglycemia, an increased risk of infectious complication and increased mortality (6).

Despite the potential risks of EN, it is the preferred route to deliver nutrition support to the critically ill adult. The following guidelines were developed to help ensure timely, safe, cost-effective EN.

General Guidelines:

1) *Feeding access*: Unless an alternative feeding access is insitu (i.e. jejunostomy) or gastric feeding contraindicated (i.e. bowel obstruction), EN should be provided through a large bore nsogastric (NG) tube (i.e. Argyle Salem sump tube - Sherwood Medical, St Louis, MO, USA). Large bore NG tubes allow for a more accurate assessment of gastric residual volumes (GRV), an important step in preventing pulmonary aspiration secondary to undetected delayed gastric emptying. Once gastric feeding has been established, a smaller more flexible NG feeding tube can be placed (i.e. Entriflex feeding tube - Sherwood Medical, St Louis, MO, USA).

2) Feeding formula◆ (7): For most patients a standard polymeric formula is usually appropriate.

3) Position◆ (7)*:* Unless contraindicated, the head of bed should be elevated at 45° at all times. If this is not feasible, the head of the bed should be elevated as much as possible.

4) Feed initiation◆ (7): Unless contraindicated (i.e. bowel obstruction), EN is to be initiated within 24 – 48 hours of admission. Unless contraindicated all EN formula should be initiated at full strength and at an hourly rate of 25 ml . (Refer to 'Enteral Nutrition Feeding Guideline').

5) Feed titration: Unless contraindicated, the hourly EN feed rate should be increased by 25 ml every 4 hours with the goal (target) feed rate being achieved within 48 - 72 hrs. MD orders identifying the goal rate and stating • titrate feeds to goal rate as per protocol • should be included with the original feed order. (Refer to 'Enteral Nutrition Feeding Guideline').

6) Bowel sounds (BS): An absence of BS's is common in critically ill patients and does not reflect an inability of the small bowel to assimilate nutrients. EN is not to be held or the feed rate reduced because of absent BS's.

7) GRV◆ (7): EN is not to be held or the rate reduced for a single GRV • s exceeding 250ml. After the first GRV >250 ml, IV

metoclopramide should be initiated (unless contraindicated). If after a total of 4 doses of metoclopramide GRV • s continue to exceed maximum threshold (250 ml), a small bowel feeding tube (i.e. nasoduodenal feeding tube) should be placed. (Refer to 'Enteral Nutrition Feeding Guideline').

8) Emesis: Single episodes of emesis associated with oral stimulation (i.e. suctioning) or aggressive coughing, are not indications to withhold EN. Repeated emesis or emesis not in association with stimulation should be assessed by an ICU MD in a timely manner.

9) Diarrhea: Diarrhea (i.e. the presence of 3 - 5 liquid stools or > 300 – 500mL over a 24 hour period) is often multifactorial and not related to the feeding formulae. If diarrhea occurs, the EN formula is not to be diluted, the rate reduced, or EN held. Feed manipulation deprives the patient of nutrition and does not aid in determining the true cause of the diarrhea (i.e. stool impaction, sorbitol in liquid meds, etc). A fiber-containing formula may be considered once all potential causes of diarhea have been ruled out. (Refer to 'Enteral Nutrition: Management of Diarrhea Guideline').

10) Constipation: Narcotic agents, immobility, and dehydration all contribute to constipation. Constipation may result in faecal impaction, overflow diarrhea, intestinal obstruction, megacolon, and perforation. Prevention is key. Narcotic agents are to be minimised, adequate water provided via the gastrointestinal tract, and regular bowel care (routine of rectal checks, cathartic agents, and enemas) are to be encouraged.

11) NPO periods: The repeated holding of EN before and after surgical and non-surgical procedures can quickly lead to nutritional compromise. Prevention is key. Excessive fasting periods are to be avoided in intubated patients, especially patients with a well-positioned postpyloric feeding tube in combination with an NG tube (for concurrent gastric decompression) or in patients who have a large bore NG tube that allows for gastric decompression. Unless specifically contraindicated (i.e. tracheostomy; prone position) feeds should be continued up to the operative procedure and resumed at final rate immediately following the procedure. As a general rule, NPO periods >4 hours are to be discouraged. (Note: Approved institutional guidelines should be adhered to).

12) Feed termination: Following extubation EN should be resumed in a timely manner (i.e. within 2-4 hours of extubation unless contraindicated). The ability of the patient to resume oral intake should be assessed in a timely manner (i.e. 4 hours following extubation). Contraindications to oral intake include a reduced level of consciousness, the presence of dysphagia, etc. EN should be terminated when oral intake is able to provide >75% of the patient's daily energy requirement.

♦ Evidence-based recommendation. All other recommendations opinion-based only.

REFERENCES

1. Dark DS, Pingleton SK. Nutrition and nutritional support in critically ill patients. J Intensive Care Med 8:16-33, 1993

2. Giner M, Laviano A, Meguid MM, et al. In 1995 a Correlation between malnutrition and poor outcomes in critically ill patients still exists. Nutrition 12: 23-29, 1996

3. Heyland DK. Nutritional support in the critically ill patient, a critical review of the evidence. Crit Care Clin 14:423-40, 1998

4. Heyland DK, Cook DJ, Schoenfeld PS, et al. The effect of acidified enteral feedings on gastric colonization in the critically ill patient: results of a multicenter randomized trial. Crit Care Med 29:1955-61, 2001

5. Mentec H, Dupont H, Bocchetti M, et al. Upper digestive intolerance during enteral nutrition in critically ill patients: frequency, risk factors, and complications. Crit Care Med 29:1955-61, 2001

6. Heyland DK, MacDonald S, Keefe L, et al. Total parenteral nutrition in the critically ill patient; A meta-analysis. JAMA 280:2013-9, 1998

7. Heyland DK, Dhaliwal R, Drover J, Gramlich L, Dodek P. Clinical practice guidelines for nutrition support in mechanically ventilated critically ill adult patients. JPEN Sept, 2003 (in press).

***Developed by*:** J. Greenwood, RD (Vancouver General Hospital) in collaboration with the CCCCPGC (21/7/03).