

# Enteral Nutrition Support of Patient with Acute Respiratory Failure

Critical illness is associated with catabolism and altered gut absorption, with up to 75% of patients experiencing feeding intolerance.<sup>1,2</sup> Per the nutrition risk screening tool, NRS 2002, intensive care patients on mechanical ventilation are considered at high nutrition risk with increased protein requirements.<sup>3</sup> Adequate provision of protein in ventilated patients is associated with lower mortality and increased likelihood of being discharged alive from the ICU.<sup>4,5</sup>

## NUTRITIONAL CONSIDERATIONS

- **Protein and Calorie Requirements:** Indirect calorimetry is the gold standard for nutritional assessment of calorie needs. If unavailable, the following predictive equations are recommended:<sup>6</sup>
  - Non-Obese (BMI <30): 25-30 kcal/kg actual body weight/day and 1.2-2.0g protein/kg/day. During the early phase of critical illness, provision of 15-20 kcal/kg actual body weight or 70-80% of measured needs may be warranted.<sup>12</sup>
  - Obese (BMI 30-50): 11-14 kcal/kg actual body weight/day and 2.0g protein/kg ideal body weight/day for BMI 30-40 with up to 2.5 g pro/kg ideal body weight/day ideal body weight/day for BMI >40
  - Obese (BMI >50): 22-25 Kcal/kg ideal body weight/day and up to 2.5 g protein/kg ideal body weight/day for BMI >40
  - Acute Kidney Injury (no renal replacement therapy): 25-30 kcal/kg actual body weight/day and 1.2-2.0 g protein/kg actual body weight/day
  - Acute Kidney Injury (renal replacement therapy): 25-30 kcal/kg actual body weight/day and up to 2.5 g protein/kg actual body weight/day
- **Feeding Tube Placement:** Patients at high risk for aspiration may benefit from post-pyloric feeding tube placement.<sup>6</sup> Patients with Acute Respiratory Distress Syndrome may benefit from prone positioning with head of bed elevated 10 degrees.<sup>7\*</sup>
- **Initiation of Enteral Nutrition:** Initiate early enteral nutrition within 24-48 hours of admission to the ICU in hemodynamically stable patients.<sup>6,12</sup>
- **Refeeding Syndrome:** Patients on mechanical ventilation are at risk for refeeding syndrome. EN should be started at trophic (10-25mL/hour) or half rate and increased slowly over 72 hours. Monitor serum phosphate, potassium and magnesium daily for approximately 4 days.<sup>8</sup>
- **Prokinetic Agents:** Prokinetic agents should only be used as needed; use prophylactically in patients at high risk for aspiration.<sup>6</sup>
- **Vasopressor Agents:** Patients should be fully resuscitated prior to initiation of enteral feeding. Caution should be exercised when providing EN to patients on vasopressors.<sup>6</sup>
- **Gastric Residual Volume (GRV):** If monitored, EN should not be held for GRVs <500mL, unless other signs of intolerance exist.<sup>6</sup>
- **Managing Intolerance:** Monitor for intolerance, including abdominal distention, decreased bowel sounds, absence of flatus, diarrhea, constipation, abdominal pain and vomiting.<sup>1</sup>

INTOLERANCE	RISK FACTOR	MANAGEMENT <sup>10</sup>
High GRV, regurgitation, vomiting	Mechanical ventilation; age >70 years; sedation or low level of consciousness; neurological deficits, patient positioning; elevated blood glucose; gastroesophageal reflux	Alter sedation; position head of bed 10 degrees* or 30-45 degrees; improve blood glucose control; use prokinetic agents; switch to continuous feeding from bolus or intermittent. Utilize 100% whey-based formula to facilitate faster gastric emptying <sup>11</sup>
Diarrhea	Medication with sorbitol; antibiotics, Clostridium Difficile (C. Diff), formula rate, type and mOsm	Test for C. Diff and treat as needed; as possible, discontinue sorbitol containing medications; decrease mOsm of tube feeding formula; use continuous versus intermittent or bolus feeding. Use peptide-based feeding with easily absorbed ingredients <sup>9</sup>
Abdominal distention and/or pain; constipation	Ileus, obstruction, infection, swallowing air while on mechanical ventilation, constipation	Rule out/treat ileus and possible bowel obstruction-hold tube feeding; check for C.Diff and treat as needed; monitor and/or discontinue use of opioids; use preventative protocols for constipation

## CRITICAL CARE NUTRITION EDUCATION PROGRAMS



Access videos at [www.nestlenutrition-institute.org/resources/videos](http://www.nestlenutrition-institute.org/resources/videos)

Controversies in Critical Care

Feeding the Critically Ill Patient: An Update

Glucose Management in the ICU: The Evolving Role of Nutrition

Protein Requirements for the Critically Ill Patient with Renal/Liver Failure: Evidence Update

Metabolic Management of Enteral Nutrition in the ICU

Responses of the Gastrointestinal Tract to Stress

Strategies for Improving Enteral Nutrition Delivery in the ICU

Use of Peptide-Based Formulations for Optimizing Enteral Nutrition Delivery, GI Tolerance, and Metabolic Management

References: 1. Allen K, et al. *NCP* 2019;34:540-557. 2. Blaser AR, et al. *Acta Anaesth Scand* 2014;58:914-922. 3. Kondrup J, et al. *Clin Nutr* 2003;22:415-421. 4. Weijs PJ, et al. *Crit Care* 2014;18:701. 5. Allingstrup MJ, et al. *Clin Nutr* 2012;31:462-468. 6. McClave SA, et al. *JPEN* 2016;40:159-211. 7. Saez de la Fuente, I, et al. *JPEN* 2016;40:250-255. 8. Allen K, et al. *Curr Gastro Rep* 2013;15(6):327. 9. Mundi M, et al. *NCP* 2020; DOI:10.1002/ncp.10477. 10. Tatsumi H. *J of Intensive Care* 2019;7:30. 11. Fried MD, et al. *J of Ped* 1992;120:569-572. 12. Singer P, et al. *Clin Nutr* 2019;38:48-79.

# Suggested Adult Enteral Feeding Protocol for Optimizing Tolerance Sample Order Set

## Enteral Feeding Initiation (Check Appropriate Order(s))

- 1. RD Nutrition Consult for nutrition assessment, feeding recommendations, tolerance assessment and tracking of cumulative calorie deficit
- 2. Insert nasogastric feeding tube and verify tube placement with abdominal film –OR–
- 3. Consult GI or Tube Team for specialized feeding tube placement: (Circle one) nasogastric, nasojejunal, percutaneous gastrostomy
- 4. If patient has had nothing by mouth for >10 days or is <85% IBW, monitor for Refeeding Syndrome

## Formula Selection and Infusion Method (Check Appropriate Order(s))

- 1. Prescribing physician –OR–  RD complete Malabsorption Index™ to determine optimal formula
- 2. Consider early initiation (within 24-48 hrs) of immune modulating peptide-based formula for the appropriate patient population (major elective surgery, trauma, burns, head and neck cancer)
- 3. Select enzymatically hydrolyzed 100% whey formula:
  - Select enzymatically hydrolyzed 100% whey, 37% protein formula for enhanced protein delivery and blood glucose management:
  - Defer to RD for formula selection
- 4. Select infusion method:
  - Continuous feeding: Begin \_\_\_\_\_ mL/hour full strength and advance 25 mL/hour every 8 hours as tolerated to goal rate: (Specify) \_\_\_\_\_ mL/hour
  - Bolus feeding: \_\_\_\_\_ mL every \_\_\_\_\_ hours
  - Volume based feeding: \_\_\_\_\_ mL daily, nurse to infuse over available hours/day, not exceeding 280 mL/hour for gastric feeding and 150 mL/hour post-pyloric feeding
- 5. Select free water flush:  200 mL/shift –OR– \_\_\_\_\_ mL free water every \_\_\_\_\_ hour

## Routine Nursing Orders

- Mouthwash swab application 10 mL chlorhexidine to mucous membrane twice daily
- Record accurate initial height and daily weights
- Keep head of bed elevated 30-45 degrees at all times, unless contraindicated
- For clogged feeding tube, instill pancrelipase tablet and bicarbonate tablet crushed in 10 mL water \_\_\_\_ time(s)
- Record stool frequency
- DO NOT stop feeds for residuals less than 500 mL where there are no other signs of intolerance
- Gastric residual aspirate of <500 mL should be returned to the patient when no accompanying signs of intolerance are present
- Flush with 50 mL water every 4 hours if flush is not ordered
- Flush feeding tube with 10 mL at beginning and ending of feedings, after gastric residual aspiration and before/after medication administration
- Nursing to resume feeding once tube placement has been confirmed by radiologist or physician responsible for care
- Do not stop tube feedings for diagnostic tests, usual nursing care, or routine bedside procedures unless specifically ordered by the physician

## Optional Orders

- Monitor blood glucose every \_\_\_\_ hours (default is every 6 hours)
- Call physician if blood glucose is greater than \_\_\_\_\_ mg/dL or less than \_\_\_\_ mg/dL
- For inadvertent gastric enteral feeding tube removal, nurse may reinsert tube and order abdominal x-ray for placement confirmation
- Metoclopramide 10 mg every 6 hours, if indicated/tolerated for increased gastric motility
- Erythromycin 12 mg every 6 hours, if indicated/tolerated for increased gastric motility

Physician Signature \_\_\_\_\_ Date and Time \_\_\_\_\_

Nurse Signature \_\_\_\_\_ Date and Time \_\_\_\_\_

### USE UNDER MEDICAL SUPERVISION

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