Feeding the Critically Ill Patient

STUDY SUMMARY

McClave SA, Martindale RG, Rice TW, Heyland DK

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Study Objective:

Nutrition therapy is an important part of the overall medical treatment provided to critically ill patients. The objective of this review paper is to provide details and interpretation of current published research surrounding the topic of specialized nutrition therapy in critically ill patients.

Background:

Recommendations for nutrition therapy of the critically ill are based on data from observational studies, small randomized controlled trials and meta-analyses. These data suggest that nutrition therapy provided early after admission to the ICU favourably alters outcomes. Benefits of nutrition therapy most likely depend on factors such as patient's severity of illness, route, dosing, timing and content of feeding, interruptions in delivery and patient mobility. Unfortunately, dogma, rather than evidence, often drives nutrition practice. This review article provides interpretation of the current nutrition literature, resulting in feeding recommendations with the intention of optimizing nutrition care of the critically ill patient.

Key Points of Authors:

- "**The value of early EN is supported by mechanistic data delineating its physiologic effects, which provide both non-nutritional and nutritional benefits to the critically ill patient."** Non-nutritional benefits of EN are provided by early infusion, including the maintenance of structural and functional gut integrity with decreased gut permeability. Immune mechanisms resulting from early feeding include attenuation of oxidative stress and the modulation of the inflammatory response. Nutrient delivery helps maintain lean body mass. Calorie deficit of 4,000-10,000 calories has been associated with increased organ failure, infection, hospital LOS and total complications.
- **"Dose, composition and level of infusion may be less important than just getting some EN started."** After early initiation of feeding, nutrition risk scores can be obtained to help direct appropriate nutrition management. Care of the tube-fed patient should include ongoing tolerance assessments and attempts at advancement of feeding to a goal rate that minimizes calorie deficit.
- **"Adequate feeding to target goal protein and calories becomes more important as [nutrition] risk increases."** High nutrition risk is defined by variables such as disease severity, pre-existing malnutrition, and anticipated prolonged stay in the ICU. High risk patients may be harmed by prolonged underfeeding. Adequate feeding becomes more important as nutrition risk increases. Data supporting withholding feeding early in the course of critical illness, as suggested by the post hoc analysis of the EPaNIC trial, is lacking.
- **"Although most patients in the critical care setting will tolerate a standard enteral formula, it is appropriate to consider use of various specialty formulas in an individual patient under specific conditions."** Use of specialty formulas should be made on a case-by-case basis and include formulas such as those containing arginine, fish oil, and nucleotides for elective surgery patients; small peptide, medium-chain triglyceride formulas for more efficient nitrogen and lipid absorption for the gut dysfunction patient; high-protein, low-calorie formulas for obese patients, and organ-failure formulas for patients with liver and/or kidney injury. Recent RCT with antioxidants failed to demonstrate benefit from additional antioxidant usage in critical illness. Probiotics may be beneficial, but the benefits may be species- and dose-specific.
- **"Institutional practice can be changed by adopting specific strategies to promote delivery of EN."** Most patients can be fed through gut dysfunction, such as segmental dysmotility, reduced villous height and absorptive surface, disrupted excretion of digestive enzymes, reduced production of epithelial hormones and secretory IgA, and alterations in gut microbiota. Delivery of EN may be promoted through the following steps:
  - Prescribe goal calories at 120% of estimated needs.
  - Volume-based feedings
  - Maximal therapy as a feeding initiation tactic, using such protocols as PEPuP or other nurse-driven protocols
  - Use of nutrition bundles that dictate such practices as initiation of EN within 24-48 hours of admission to the ICU; elevate HOB 30-45°; use of probiotics and/or prokinetics
- **"It is reasonable to initiate exclusive PN during the first week of hospitalization in the critically ill patient for whom EN is not feasible if the patient shows signs of malnutrition and is expected to be unable to receive any EN for a number of days."** If a patient was previously well-nourished and is at low to moderate nutritional risk, PN should be started only after 7 days of hospitalization in patients where EN is not possible. Adding PN as a supplement to EN should be considered in high nutritional-risk patients if EN consistently provides less than 60% of calorie and protein requirements. As an exclusive form of feeding, PN should be initiated at 80% of goal calories to reduce insulin resistance, avoid potential for overfeeding, and to potentially improve outcomes.

Conclusion:

"EN represents a ***primary therapeutic intervention*** designed to achieve metabolic manipulation rather than simply a form of supportive therapy designed to prevent the ravages of malnutrition alone." Nutrition therapy should be started immediately after initial resuscitative efforts to restore oxygenation and circulatory status. Nutrition care protocols are important in achieving optimal evidence-based nutrition care.

Summary prepared by Nestlé HealthCare Nutrition.

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