

CLINICAL SUMMARY

Enhanced Protein-Energy Provision via the Enteral Route in Critically Ill Patients: a Single Center Feasibility Trial of the PEP uP Protocol¹

This pilot study¹ examined the feasibility, acceptability, and safety of a new feeding protocol designed to optimize delivery of enteral nutrition (EN).

This paper proposes a paradigm shift in how clinicians think about the delivery of enteral nutrition to critically ill patients. EN therapy should be maximized from the beginning, with the goal to optimize gastrointestinal tolerance. Strategies include the use of a small peptide formula that would be tolerated by the most number of patients.

Up to 64% of critically ill patients have gastrointestinal (GI) intolerance,²⁻⁵ which can lead to inadequate delivery of nutrients and contribute to poor clinical outcomes.^{2,4,5}

Critically ill patients often receive less than optimal enteral intake, and efforts throughout the last several years have not improved the amount of calories delivered via the enteral route. Nutrition support guidelines² promote monitoring patients for tolerance of enteral feedings (D2, Grade E), advocate the use of EN in the presence of an ileus (ie, reduced GI motility, D1, Grade E), and discourage inappropriate cessation of EN (D2, Grade B). Use of enteral feeding protocols is known to increase the amount fed via the enteral route and is encouraged in practice (D3, Grade C).²

This paper by Heyland et al¹ reports on a prospective ‘before and after’ study of 50 patients in one medical surgery tertiary care ICU that compared the standard feeding protocol (before group) to the new feeding protocol (after group). The ‘before’ group consisted of 20 patients and the ‘after’ group included 30 patients. Both groups stayed in the ICU for more than 3 days.

The innovative elements of the new feeding protocol included the following:

- Setting a daily volume goal, rather than an hourly feeding rate
- Using a peptide-based, 1.5 kcal/ml formula for initial use
- Initiating motility agents on day 1
- Utilizing protein supplements beginning on day 1
- Liberalizing the gastric residual volume from 200 ml to 250 ml
- Advocating trophic feeds when full feeds were not possible

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The primary outcome of this study was to assess the feasibility of the new feeding protocol. On a scale of 1 = totally unacceptable to 10 = totally acceptable, nurses rated the new protocol 7.1, indicating that the implementation of a more aggressive feeding strategy was acceptable to the critical care nursing staff.

Secondary outcomes included nutritional endpoints (adequacy of EN and timeliness of initiation of EN) and safety endpoints (episodes of vomiting, aspiration, and pneumonia). Although average values for energy and protein were slightly higher in the 'after' group, the differences were not significant when compared to the 'before' group. A subgroup analysis of 18 patients who were prescribed full volume feeds demonstrated significantly higher intakes of energy and protein vs the 'before' group (see table below). There were no safety concerns; occurrence of vomiting, aspiration, and pneumonia were similar between the 2 groups.

Table: Average values in a subgroup analysis of 18 patients prescribed full volume feeds vs the 'before' group.

The time that a patient is made *nil per os* (NPO) contributes to inadequate delivery of nutrients and can prolong the periods of ileus.²

Outcome Measure	Before Group n=20	After Subgroup n=18	P value
Energy, % of prescribed amount	58.8	83.2	0.02
Protein, % of prescribed amount	61.2	89.4	0.002

The authors concluded that the new feeding protocol was safe and acceptable to the critical care nursing staff. Limited data are available from this study to assess enhanced delivery of nutrients, and further trials are necessary to assess intake of nutrients and clinical outcomes.

NUTRITION CONCLUSIONS

This paper advocates a radical change in the approach to EN in the ICU in order to optimize chances for GI tolerance. Strategies include the following: use a peptide-based formula as the first formula choice, feed aggressively to meet the daily volume goal early in the ICU stay, initiate prokinetics early, and prevent ileus by feeding early.

References: 1. Heyland DK, Cahill NE, Dhaliwal R, Wang M, Day AG, Alenzi A, et al. Enhanced protein-energy provision via the enteral route in critically ill patients: a single center feasibility trial of the PEP uP protocol. *Crit Care*. 2010;14(2):R78. 2. McClave SA, Martindale RG, Vanek VW, McCarthy M, Roberts P, Taylor B, et al. Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). *JPEN J Parenter Enteral Nutr*. 2009;33(3):277-316. 3. Reintam A, Parm P, Kitus R, Kern H, Starkopf J. Gastrointestinal symptoms in intensive care patients. *Acta Anaesthesiol Scand*. 2009;53(3):318-324. 4. Montejo JC, Minambres E, Bordeje L, Mesejo A, Acosta J, Heras A, et al. Gastric residual volume during enteral nutrition in ICU patients: the REGANE study. *Intensive Care Med*. 2010;36(8):1386-1393. 5. 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):1955-1961.