Issue 8

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Nutrition Information Byte

Critical Care Nutrition

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Enhanced Protein-Energy Provision via the Enteral Route Feeding Protocol in Critically Ill Patients: The PEP uP Protocol

Study Rationale

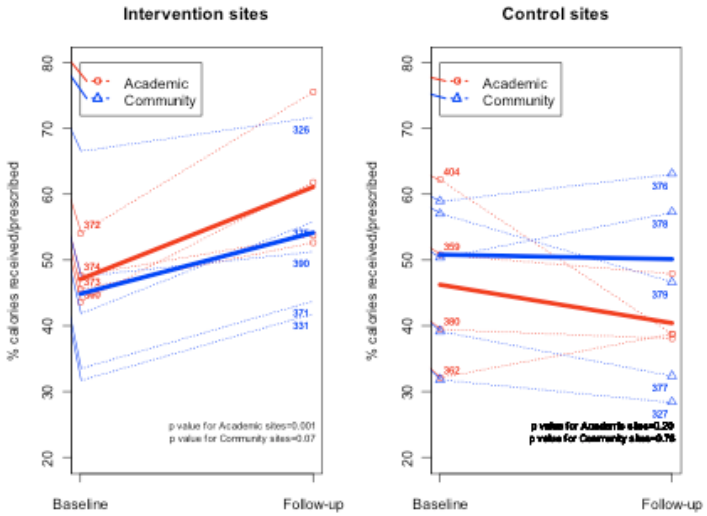
Several observational studies have described **an association between inadequate feeding and poor clinical outcomes in critically ill patients (1-3)**. Despite repeated efforts to improve the amount of calories delivered via the enteral route, nutrition therapy remains suboptimal in the ICU (4-6). If we are to be successful at increasing the provision of calories and protein via the enteral route, a new paradigm is required. Historically, feeding protocols have been used to guide the delivery of enteral nutrition (EN) but they frequently utilize conservative, reactionary approaches to optimizing nutrition. For example, enteral feeds are started at low rates, are advanced slowly, and maintained at a target maintenance rate with no provisions to compensate for loss of feeding time due to frequent interruptions. Moreover, motility agents are only initiated after manifestations of delayed gastric emptying develop. **The result is a form of iatrogenic malnutrition in which critically ill patients consistently receive less than their prescribed nutritional needs.**

The PEP uP Protocol

We propose a new approach that protocolizes an enhanced approach to providing EN and shifts the paradigm from reactionary to proactive followed by de-escalation if nutrition therapy is not needed. **Please see next page for a list of the key components of this new protocol.**

Nurses Education

Since the bedside nurses initiate and utilize feeding protocols to achieve target goals, we will couple this newer generational feeding protocol with a comprehensive nurse-directed nutritional educational intervention that will focus on its safe and effective implementation. This focus on nursing nutrition education represents a major shift away from traditional education which has focused on dietitians and physicians.



The PEP uP Cluster Randomized Controlled Study

In 2010-2011, 18 sites from the US and Canada participated in a cluster randomized controlled trial, to evaluate the PEP uP Protocol and nursing education package. Use of the PEP UP protocol resulted in significantly more total protein (47.0 vs. 33.5 %, p<0.0001) and calorie (42.7 vs. 31.9 %, p<0.0001) delivery than compared to baseline and compared to the control group in the follow up phase (47.0 vs. 33.5 %, p=0.003 for protein, 42.7 vs. 33.4 %, p=0.006 for calories). There were no differences in complication rates, and nurses considered the protocol to be safe and easy to use.

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Key Components of The PEP uP Protocol:

1) **Starting feeds at the target rate** based on increasing evidence that some patients tolerate starting nutrition at higher rate of delivery and that slow start ups are not necessary (8,9). For patients who are hemodynamically stable, we propose to shift from an hourly rate target goal to **a 24 hour volume goal** and give nurses guidance on how to make up this volume if there was an interruption for non-gastrointestinal reasons (10). This 'volume-based' goal represents a significant shift in practice from traditional hourly rate goals in which nurses can increase the hourly rate depending on how many hours they have left in the day to ensure that the patient receives the 24 hour volume within the day.
2) For patients who are deemed unsuitable for high volume intragastric feeds, we provide an option to initiate **'trophic feeds'** at a low volume of a concentrated feeding solution. By 'trophic', we mean a minimal volume of EN designed to maintain gastrointestinal structure and function, not designed to meet the patients caloric or protein needs. When deemed suitable, trophic feeds can be advanced to full feeds.
3) To optimize tolerance in the early phase of critical illness, we propose to use a **semi elemental feeding solution** (Peptamen 1.5) instead of a standard polymeric solution. There is some evidence that these semi elemental solutions are better assimilated than polymeric solutions in the critical care setting (11). These solutions can be changed to a more traditional polymeric solution once the patient is tolerating adequate amounts of nutrition.
4) Rather than wait for a protein debt to accumulate because of inadequate delivery of EN, **protein supplements are prescribed at initiation of EN** and can be discontinued if EN is well tolerated.
5) We propose to **start motility agents at the same time EN is started** with a re-evaluation in the days following to see if it is necessary and we raised the gastric residual volume threshold to 300 ml. It has been shown in one randomized trial that a feeding protocol that starts a motility agent empirically at the time of initiation of feeds and uses a higher threshold for a critical gastric residual volume improves nutritional adequacy (12).
6) Monitor **nutritional adequacy** daily: (volume of EN rec'd in last 24 hour period/prescribed 24 hour target volume) and report this percentage intake on daily rounds.

PEPUP

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