Just Say No to Intensive Care Unit Starvation: A Nutrition Education Program for Surgery Residents
Shawn Spear, Vasiliy Sim, Frederick A. Moore and S. Rob Todd
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What is This?
Just Say No to Intensive Care Unit Starvation: 
A Nutrition Education Program for Surgery Residents

Shawn Spear, RD, CNSC; Vasiliy Sim, MD; Frederick A. Moore, MD; and S. Rob Todd, MD

Abstract

Background: In 2009, the Society of Critical Care Medicine (SCCM)/American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) published “Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient.” To improve our surgery residents’ understanding of intensive care unit (ICU) nutrition, we developed a nutrition education program based on these guidelines. The purpose of this pilot study was to assess its effectiveness. We hypothesized that our nutrition education program would improve our residents’ knowledge of ICU nutrition. Materials and Methods: This was a prospective observational pilot study performed in the surgical ICU of an academic medical center. Based on the SCCM/A.S.P.E.N. nutrition guidelines, we developed a nutrition education program (lectures covering selected guidelines and interactive case studies). Pre- and posttesting were performed to assess short-term comprehension. Long-term retention was assessed 3 months after the initial education program. The primary outcome measure was the change in ICU nutrition knowledge. Significance was set at \( P < .05 \). Results: Over 12 months, 8 surgery residents completed the nutrition education program. Their mean age was 27.8 ± 1.2 years, and 50% were male. The mean test scores were as follows: pretest, 45% ± 9%; posttest, 81% ± 5%; and 3-month test, 65% ± 8%. The differences between the pretest and both posttest scores were significant (\( P < .01 \)). Conclusion: Residents have little understanding of ICU nutrition. This is confirmed by the pretest results of the current study. Our nutrition education program improved both short-term and long-term ICU nutrition knowledge of our surgery residents. Future studies should evaluate the effect such education has on the clinical outcomes of ICU patients. (Nutr Clin Pract. 2013;28:387-391)

Keywords

medical education; nutritional support; physicians; hospital medical staff; guidelines; nutrition critical care guidelines

Background

The role of nutrition in medicine has changed from being an adjunctive therapy to a sophisticated, proactive therapy. Its optimization in critically ill patients is even more important due to higher catabolic rates. It is well documented that the implementation of evidence-based nutrition protocols significantly improves clinical outcomes in this population. As such, the Society of Critical Care Medicine (SCCM) and the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) published “Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient” in 2009. These guidelines offer recommendations supported by best evidence and expert opinion.

Although nutrition education has been integrated into medical school curriculums (the majority of schools providing at least 10 hours), only one-third exceed the 25 hours recommended by the National Academy of Sciences. A survey by Kahn documented that teaching medical students alone is insufficient if they don’t receive reinforcement from their residents and faculty. As such, it would seem to reason that nutrition education should be incorporated throughout one’s medical education to include residency and fellowship (graduate medical education). Unfortunately, graduate medical education is in even worse shape, with a complete absence of a standardized nutrition curriculum, limited number of dedicated educational hours, and increasing duty hour limits. When it comes to nutrition and the practicing physician, surveys establish that physicians’ desires to educate their students and patients are hampered by their deficient understanding of nutrition. Numerous Continuing Medical Education programs (ie, journal based, live, and web/audio-based presentations) exist; however, neither their utilization nor their success in altering physician practices has been documented. Nutrition education via intermittent lectures or shotgun 1- to 2-day courses for both residents and faculty increases their knowledge of nutrition, yet long-term retention is unknown.

From 1The Methodist Hospital, Houston, Texas; 2Brookdale University Hospital, Brooklyn, New York; 3University of Florida, Gainesville, Florida; and 4New York University School of Medicine, New York, New York.

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Corresponding Author:
S. Rob Todd, MD, New York University School of Medicine, 550 First Ave, NB15E9, New York, NY 10016, USA.
Email: srtodd@nyumc.org.
To improve our surgery residents’ understanding of nutrition in the intensive care unit (ICU), we developed and initiated an aggressive nutrition education program based on the 2009 SCCM/A.S.P.E.N. guidelines. Since it has been shown that physicians are more likely to learn when faced with patient-directed problems, we integrated case studies into our curriculum. The objective of this pilot study was to evaluate the effectiveness of our nutrition education program. We hypothesized that it would improve our residents’ knowledge of nutrition needs in the critically ill population, both short and long term.
Table 2. Sample Interactive Case Study Session From the Nutrition Education Program.

THE METHODIST HOSPITAL SURGICAL INTENSIVE CARE UNIT
Nutrition Support Module

Example 1
- A 67-year-old woman POD 1 from the percutaneous drainage of a peripancreatic abscess/phlegmon. She is NPO secondary to a workup for possible vocal cord (VC) paralysis/high risk of aspiration.

Past medical history:
- Gallstone pancreatitis—open cholecystectomy 2 months prior (bedridden since)

Anthropometrics:
- Height: 5′7″ Admit Weight: 170 lb/77.2 kg BMI: 26.6

Laboratory values:
- BUN: 14 mg/dL Cr: 0.4 mg/dL Phos: 2.8 mg/dL (2.4)

Gastrointestinal function:
- NGT: 400 mL, 2 soft BMs post-op, possible VC paralysis and high-risk aspiration

Nutrition risk factors or indicators of protein calorie malnutrition (PCM):
- 8% weight loss and bedridden/2 months
- Intake meeting <50% of needs over the past 5 days (per nutrition screen)

Indications for nutrition support therapy (enteral or parenteral):
- Predict continued NPO status >24–48 hours during workup for VC paralysis
- Benefits of “early enteral nutrition”?
- Enteral nutrition to maybe prevent ileus propagated by NPO status?

Estimated nutrition needs:
- Caloric needs: ~1925–2300/d (25–30/kg)
- Protein needs: ~90–155 g/d (1.2–2 g/kg)

Plan:
- Due to the high risk of aspiration, use nasojejunal enteral access
- Initiate high-protein tube feeds at 15 mL/h, increasing 15 mL/h every 12 hours to a goal rate 80 mL/h providing 1920 calories/d (25cal/kg) and 120 grams of protein/d (1.6 g/kg)
- Due to PCM, if nasojejunal access is unsuccessful or the patient develops tube feed intolerance, suggest the initiation of PN

BM, bowel movement; BMI, body mass index; BUN, blood urea nitrogen; Cr, creatinine; NGT, nasogastric tube; NPO, nil per os; Phos, phosphorous; PN, parenteral nutrition; POD, postoperative day.

Materials and Methods
This was a prospective observational pilot study performed in the surgical ICU (SICU) at The Methodist Hospital in Houston, Texas. The Methodist Hospital has 904 licensed beds, 73 operating suites, and 129 total ICU beds. It is a tertiary academic referral center affiliated with Weill Cornell Medical College. The Residency in General Surgery at The Methodist Hospital graduates 4 chief residents per year and supports 4 preliminary surgery resident positions at the postgraduate year (PGY) 1 and 2 levels. The SICU is a 27-bed unit that serves a diverse group of patients, including critically ill general, vascular, oncologic, transplant, thoracic, orthopedic, plastic, urologic, and head and neck surgical patients. On the basis of the SCCM/A.S.P.E.N. nutrition guidelines, we developed a nutrition education program for our surgery residents. It constituted two 1-hour lectures covering selected SCCM/A.S.P.E.N. nutrition guidelines, we developed a nutrition education program for our surgery residents. It constituted two 1-hour lectures covering selected SCCM/A.S.P.E.N. guidelines (25 of the 49) and interactive case studies (7 in total), all instituted by our SICU dietitian (Tables 1 and 2). The lectures reviewed the selected guidelines and the supporting (or lack thereof) evidence. As for the interactive case studies, the residents were assigned cases and instructed to draft a formal nutrition program based on the available data. These cases (and the residents’ responses) were then reviewed one-on-one with the dietitian. Surgical residents at the PGY 1 and 2 levels rotate through the SICU, all of whom participated in the program. We assessed only the PGY 1 residents for the purpose of this study as they had not been exposed to the SICU and its educational components. Pre- and posttesting (immediately following the aforementioned lectures) were performed to assess short-term comprehension of nutrition in the critically ill population. The test comprised 30 multiple-choice questions taken directly from the SCCM/A.S.P.E.N. nutrition guidelines, validated by our surgical intensivists and SICU dietitian (formal test-retest procedures were not performed) (Table 3). Long-term retention was assessed 3 months after the initial education program using the same test.

The primary outcome measure was surgery resident change in knowledge about nutrition in the ICU population. Numeric data are presented as mean ± standard deviation and proportions. In comparing test scores, a 1-way analysis of variance (ANOVA) analysis (Tukey-Kramer method) was performed. A P value of <.05 was significant. SPSS version 19 (SPSS, Inc, an IBM Company, Chicago, IL) was used for all statistical analyses. The collection and review of data were approved by The Methodist Hospital Research Institute Institutional Review Board.
Results
Over 12 months ending June 2010, 8 PGY 1 surgery residents completed the nutrition education program. Their mean age was 27.8 ± 1.2 years, and 50% were male. The mean pretest score prior to the nutrition education program was 45% ± 9%, whereas the immediate posttest score (short-term retention) was 81.5% ± 5%. When long-term retention was assessed 3 months later, the mean test score was 65% ± 8%. The differences between the pretest and both the posttest and 3-month test scores were significant ($P < .01$).

In assessing the individual guidelines addressed, the greatest knowledge improvement occurred with the following guidelines:

- **A5**: In the setting of hemodynamic compromise, EN [enteral nutrition] should be withheld until the patient is fully resuscitated and/or stable.
- **I1**: ICU patients with acute renal failure or acute kidney injury should be placed on standard enteral formulations, and standard ICU recommendations for protein and calorie provision should be followed.
- **K3**: Patients with severe acute pancreatitis may be fed enterally by the gastric or jejunal route.

Conclusion
In the critically ill population, nutrition is no longer considered adjunctive and instead is viewed as a sophisticated, proactive therapy. That being said, residents have little knowledge of the nutrition needs in critically ill patients. This concept was reinforced in the current study, as evidenced by our surgery residents’ poor performance on the pretest. Our nutrition education program improved both the short-term and long-term ICU nutrition...
knowledge of our surgery residents, as documented by persistently improved test scores 3 months following program administration. The fact that there was a significant decrease in the 3-month test scores indicates that residents might require regular reinforcement of the nutrition curriculum, such as ongoing integrated lectures throughout their residency. Scolapio et al.14 corroborated this finding in their gastroenterology (GI) fellows who participated in a nutrition education program.

Although there is agreement that the nutrition knowledge and education of our trainees are woefully inadequate, how much and often to offer it have yet to be determined. In concordance with our study, Kirdak et al.11 found that a 1-day nutrition course (rapid immersion) significantly improved short-term knowledge of the participating residents (and ultimately increased the number of nutrition consultations). In contrast to such “rapid immersion” courses, another alternative is the use of intermittent lectures . . . over time. Lazarus et al.9 documented that a combination of lectures and nutrition rounds over a 6-month period resulted in a small yet significant improvement in nutrition knowledge (and the frequency of discussing nutrition with patients). Although they evaluated the behavior change among physicians following a nutrition education program, they did not address whether such changes affected patient outcomes.

In the Scolapio et al.14 study, it was also noted that physician mentors with an expertise in nutrition were critical to improving the nutrition education experience of trainees.14 Of 53 GI fellows who participated in their course, only 43% indicated that they had a staff physician who was an expert in nutrition. Our bias is similar, in that a physician educator who is facile with nutrition knowledge will only serve to enrich and reinforce this element of one’s curriculum. We believe the same can be said of one’s dietitian. Our SICU dietitian was not only instrumental in the development of our nutrition education program but also served as the sole implementer. The Scolapio et al study substantiated this belief, as GI fellows indicated they were amenable to instruction from allied health staff members, to include dietitians.14

To our knowledge, the current pilot study is the first to assess the long-term retention of nutrition knowledge following an education program. Despite this strength, our study is not without limitations. Similar to the other studies mentioned, we did not assess whether improved nutrition knowledge translated into improved patient nutrition status and/or outcome. In addition, our study was performed at a single institution, examined a small sample size, and did not (could not) account for the experiential learning that was ongoing during the course of the study.

In conclusion, surgery residents in general have little understanding of ICU nutrition (as evidenced by our pretest results). We have documented that a multifaceted nutrition education program (such as ours) improves both short-term and long-term ICU nutrition knowledge. Such a program can effectively be implemented by a dietitian. Future studies should assess the effect such education has on the clinical outcomes of ICU patients.

References
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