

Does altering protein and energy change outcomes in the ICU?

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Protein and calories administered, during either enteral or parenteral routes, play a key role in the treatment of metabolic anomalies in critical illness. The energy requirement can be accurately measured by indirect calorimetry; however, the protein requirement in the severely catabolic patient is indeed difficult to estimate.^[1]

Rugeles *et al.* in this issue present a “double-blind,” single-center study on hypocaloric and high protein diet in the critically-ill.^[2] In the introduction, authors have implied that there is a difference in the ASPEN (American Society for Parenteral and Enteral Nutrition)^[3] and ESPEN (European Society for Parenteral and Enteral Nutrition published in 2006 and not 2007) guidelines. The difference is more striking with recommendations regarding parenteral nutrition (ASPEN after 7 days; ESPEN within 3 days if enteral not possible).^[3,4] There is general consensus about enteral nutrition, which starts early after hemodynamic stabilization.

Overfeeding is detrimental and leads to numerous side-effects such as hyperglycemia, fatty liver and elevated liver enzymes, higher incidence of infectious complications, and finally, increased mortality. In the obese, nutritional support with 10 – 20 kcal/kg of ideal body weight and 1.5 – 2 g protein/kg ideal body weight may be beneficial during the acute stress response.^[5]

This study has numerous limitations in design; one wonders how the study was blinded when one member of the ICU team was aware of the control and interventional group. How could the team be blinded when the interventional group got an additional two bolus feeds of the high protein mixture? The randomization envelopes

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were recycled if patients did not stay for the stipulated period, which is not the standard practice. Most studies follow up patients for a minimum of 28 days, whereas in this study, it was for only 21 days.

The SOFA score both in the interventional and the control group was low, suggesting that these patients had mild severity of illness. The delta SOFA score being the primary endpoint may be more representative of fluid resuscitation, vasopressor therapy, inotropes, and hematocrit correction rather than nutritional therapy. Moreover, the study does not give any data about fluid balance, vasopressors, inotropes, or blood transfusion.

The study does not reveal data on how soon or over what period of time the patients in the two arms achieved the nutritional goals, nor does it indicate rate of the intolerance to feeds or the frequency of diarrhea encountered.

The role of hypocaloric diets in critically ill may be controversial, and could cause harm as shown by an observational study in 167 ICU's in 21 countries in 2772 mechanically ventilated patients.^[6] This study showed that an increase of 1,000 cal per day was associated with reduced mortality [odds ratio for 60-day mortality 0.76; 95% confidence intervals (CI) 0.61-0.95, $P = 0.014$] and

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an increased number of ventilator-free days (3.5 VFD, 95% CI 1.2-5.9, $P = 0.003$). The effect of increased calories associated with lower mortality was observed in patients with a BMI < 25 and > or = 35 with no benefit for patients with a BMI 25 to 34. This was further confirmed in a French study where among 38 critically ill ventilated patients, non-survivors had higher mean energy deficit than survivors ($P = 0.004$).^[7]

Numerous studies have shown that most ICU patients do not achieve their calculated nutritional goals. The Canadian Critical Care nutrition team has created an algorithm for nutritional support called as PEP uP, which aims at achieving 80% of their protein and energy requirements.^[8] Thus, this algorithm-based approach might succeed in ensuring that high-risk patients achieve their nutritional goals.

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