

## EARLY HIGH PROTEIN INTAKE IS ASSOCIATED WITH LOW MORTALITY

and energy overfeeding with high mortality in non-septic mechanically ventilated critically ill patients<sup>1</sup>

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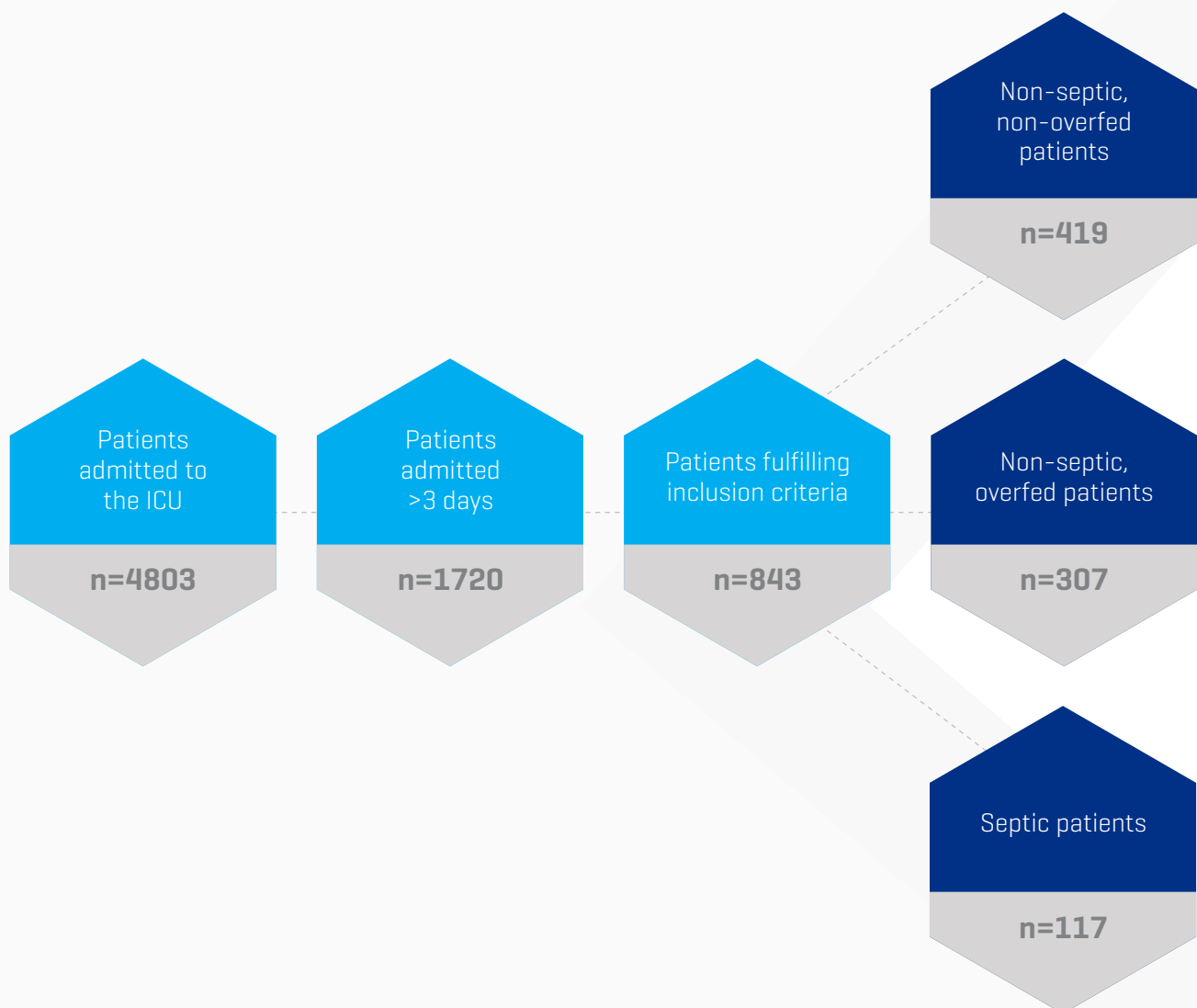
This post-hoc observational study in critically ill patients undergoing prolonged mechanical ventilation shows that early high protein intake [defined as intake at day 4] is associated with lower hospital mortality and early energy overfeeding is associated with higher mortality, independent of APACHE II score and the presence of sepsis.



## STUDY DESIGN

A post-hoc analysis of new [unpublished] prospective observational data from a mixed medical-surgical ICU of day 4 protein- and energy-intake and their association with hospital mortality.

- Conducted between August 2004 and March 2010 at a university hospital in Amsterdam
- Hemodynamically stable, mechanically ventilated, critically ill patients were included on days 3 to 5 when the predicted period of artificial nutrition was at least 5 to 7 additional days
- Additional inclusion criteria: <https://aspenjournals.onlinelibrary.wiley.com/doi/10.1177/0148607117721907>  
in criteria: indirect calorimetry performed during ICU admission; age >18 years; first ICU admission



Protein was provided with a target of 1.2 to 1.5 g/kg pre-admission body weight, and was adjusted for body mass index [BMI] <20 kg/m<sup>2</sup> to weight at BMI 20 kg/m<sup>2</sup> and for BMI >30 kg/m<sup>2</sup> to weight at BMI 27.5 kg/m<sup>2</sup>.

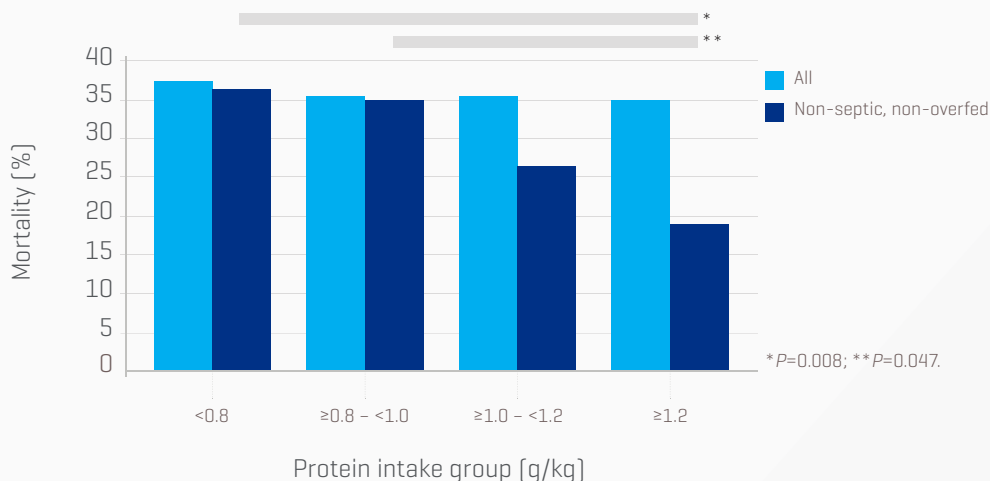
Energy requirements were initially calculated using the Harris and Benedict formula with an added 10% for activity and 20% for stress, and adjusted when indirect calorimetry was performed. Energy intake on day 4 was expressed as the ratio of early [day 4] energy intake vs. energy expenditure, measured a median of 5 days after admission by indirect calorimetry. Overfeeding was defined as a ratio of >1.1.

Of the 843 patients who fulfilled the inclusion criteria, 726 patients were non-septic.

## RESULTS

### In non-septic, non-overfed, critically ill adult patients, early high protein intake was associated with lower mortality.

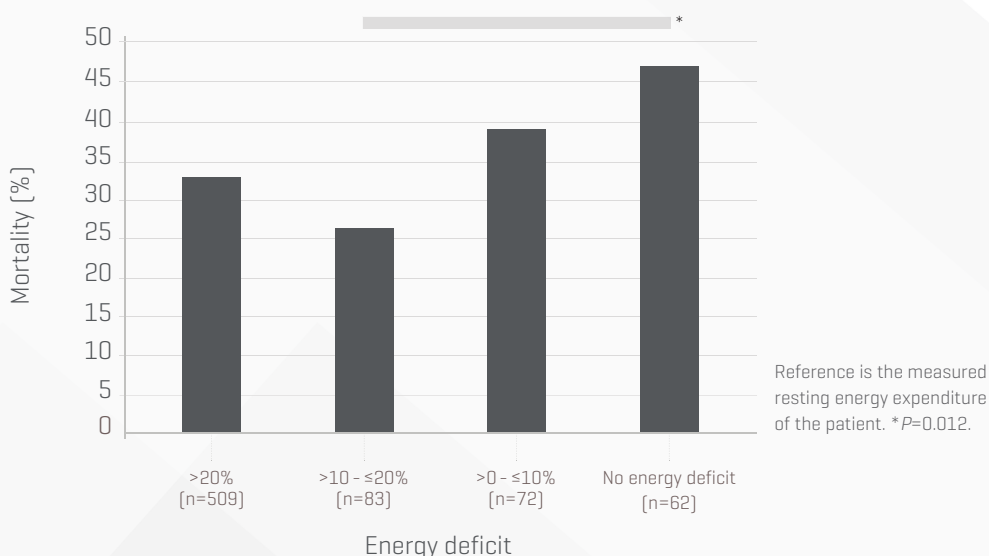
Hospital mortality for all patients per protein intake group and for all non-septic and non-overfed patients per protein intake group.



- In non-septic, non-overfed patients (n=419), the higher protein intake group was associated with lower mortality (P=0.033).
- Hospital mortality was 34.5% for day-4 protein intake <1.2 g/kg vs. 19.1% for day-4 protein intake ≥1.2 g/kg (P=0.015).
- Regression analysis with dummy variables for protein intake groups showed that the effect of protein was only significant at an intake level of ≥1.2 g/kg (OR=0.42; CI 0.21, 0.83; P=0.013).

### In non-septic, critically ill adult patients, mild early cumulative energy deficit (10-20%) was associated with lower mortality.

Hospital mortality for cumulative energy deficit over the first 4 days of ICU stay for non-septic patients (n=726; P=0.053).



- In non-septic, critically ill patients (n=726), mild [10-20%] underfeeding of energy in the early period of ICU stay was associated with lower mortality.

## A post-hoc observational study in mechanically ventilated critically ill adult patients showed that:

- Early high protein intake [defined as intake at day 4] is associated with lower hospital mortality, independent of APACHE II score and the presence of sepsis.
- Early energy overfeeding is associated with higher hospital mortality, independent of APACHE II score and the presence of sepsis.
- The benefit of early high protein intake was found only in non-septic, non-overfed adult patients, and not in patients with sepsis or early energy overfeeding.
- The lowest mortality was found in non-septic, non-overfed patients who received  $\geq 1.2$  g/kg protein [pre-admission weight].
- Findings justify the current recommendation on protein intake for patients without sepsis of at least 1.2 g/kg protein intake as early as day 4 of ICU admission.



Open Access Link:

<https://ccforum.biomedcentral.com/articles/10.1186/s13054-014-0701-z>

## REFERENCE

1. Weijs PJM, Looijaard WGMP, Beishuizen A, et al. Early high protein intake is associated with low mortality and energy overfeeding with high mortality in non-septic mechanically ventilated critically ill patients. *Crit Care* 2014;18(6):701.

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