

## PROTINVENT study: protein intake timing and dose for the critically ill



Optimal protein intake during critical illness is unknown. In order to achieve a personalised nutritional approach, Dutch researchers conducted the PROTein INtake and clinical outcomes of adult critically ill patients on prolonged mechanical VENTilation (PROTINVENT) study. The study's primary aim was to determine the best timing and dose of protein intake to support the lowest 6-month mortality in critically ill patients.

Study results suggest that although overall low protein intake is associated with the highest mortality risk, high protein intake during the first 3–5 days of ICU stay is also associated with increased long-term mortality. Therefore, timing of high protein intake may be relevant for optimising ICU, in-hospital and long-term mortality outcomes.

For this single-centre study, researchers retrospectively collected nutritional and clinical data on the first 7 days of ICU admission of adult critically ill patients, who were mechanically ventilated in the ICU for at least 7 days and admitted between 1 January 2011 and 31 December 2015. Based on recent literature, patients were divided into 3 protein intake categories, <0.8 g/kg/day, 0.8–1.2 g/kg/day and >1.2 g/kg/day. The study also examined the effect of timing and dose of protein intake on ICU and hospital length of stay (LOS), ICU and hospital mortality, ventilation duration and need for renal replacement therapy (RRT).

A total of 455 patients were included in the analysis. The researchers found a time-dependent association of protein intake and mortality; low protein intake (<0.8 g/kg/day) before day 3 and high protein intake (>0.8 g/kg/day) after day 3 was associated with lower 6-month mortality, compared to patients with overall high protein intake. In addition, lowest 6-month mortality was observed when increasing protein intake from <0.8 g/kg/day on day 1–2 to 0.8–1.2 g/kg/day on day 3–5 and >1.2 g/kg/day after day 5.

Notably, overall low protein intake was associated with the highest ICU, in-hospital and 6-month mortality. No differences in ICU LOS, need for RRT or ventilation duration were found.

The PROTINVENT study's results are in line with the findings of previous research, which demonstrated comparing early and late parenteral nutrition (PN) to supplement enteral (EN), that providing higher amounts of protein might lead to inhibition of autophagy, which in turn leads to persisting cell damage and cell dysfunction and worse clinical outcomes.

The present findings suggest that although overall low protein intake is associated with the worst short- and long-term outcomes, it may be beneficial in the first 3 days of ICU admission in adult ICU patients. After day 3 higher protein intake is associated with better outcome. This should change our ideas on aggressive early build-up schedules particularly for protein intake. While these findings are not contradictory to recent practice guidelines, nonetheless these suggest that another approach in the early phase would be needed.

Source: [Clinical Nutrition](#)

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