STUDY SUMMARY

Protein Intake, Nutritional Status and Outcomes in ICU Survivors: A Single Center Cohort Study

Weijs P, Mogensen K, Rawn J, Christopher K. *Journal of Clinical Medicine* 2019;8:43.

Objective:

The purpose of this study is to determine if higher protein delivery during critical illness has a lower risk of post-discharge mortality and whether or not pre-existing malnutrition magnifies the risk of mortality.

Background:

Critical illness is associated with muscle protein catabolism and muscle wasting. This catabolism causes a dramatic loss of endogenous nitrogen as well as a reduction in the exogenous amino acid deposition into endogenous proteins. Protein intake recommended for the critically ill is 1.5-2.5g protein/kg/day, however, delivery is typically much less than recommended. Calorie-supplemented, protein deficient nutrition does not improve clinical outcomes. Higher than 1.2 g/kg/day protein provision is associated with reduced mortality in non-septic, non-energy overfed ICU patients. Data by Nicolo (JPEN 2016;40:45-51) and colleagues suggests that meeting > 80% of protein intake in the ICU is associated with decreased mortality.

Material and Methods:

This is a retrospective observational study of critically ill adult (> 18 years of age) medical patients admitted to the Brigham and Women's Hospital. Data query took place March 15, 2012. All study patients have the CPT code 99291 (critical care, first 30-74 minutes), nutrition risk assessment, protein intake records and experienced survival through hospital discharge. Four levels of malnutrition assessment include: malnutrition absent, at-risk for malnutrition, non-specific malnutrition and protein-energy malnutrition. All patients in the cohort have 90-day follow-up after hospital discharge or expired prior to 90-day post-hospitalization. Primary endpoint is all cause 90-day post-discharge mortality.

Results:

Selection criteria was met by 801 patients. Mean Age was 62.3 years, 55.3% male, 78.9% Caucasian. Majority of patients received registered dietitian (RD) assessment within 24 hours of ICU admission. Mean number of recorded nutrition delivery days was 15. A total of 8735 days of intake data was available.

- The mean peak protein delivery was 0.32g /kg/day.
- Mean hospital length of stay was 22.1 days. Post-discharge mortality for 30, 90 and 365 days was 7.1%, 13.9% and 24.5%, respectively.
- Higher protein delivery in ICU survivors was associated with a lower 90-day post-discharge mortality.

90-day post-discharge mortality was decreased 18% for each 1g/kg/day elevation in protein delivery during the ICU stay. For patients diagnosed with malnutrition, 90-day post-discharge mortality rate was 30% less for each 1g/kg increase in daily protein delivery following ICU admission.

- Mortality at 180-days post-discharge was significantly reduced for each 1g/kg elevation in daily protein delivery, as was 365-day and 720-day post-discharge mortality ($p<0.001$).
- Hospital length of stay was reduced by 0.87 days for each 1g/kg/day increase in protein delivery ($p=0.028$) compared with average length of stay for the like DRG-coded patients.

Discussion:

Improvement in daily protein delivery is associated with a significant decrease in the chance of post-discharge hospital mortality and of hospital length of stay. Strengths of the study include mixed effects models that allow for more complete data capture, reliable nutrition risk assessment by a trained RD and accurate Master Death File post-discharge mortality data. The major weakness is the observational design.

Conclusion:

Data demonstrates that providing higher daily protein delivery during hospitalization is associated with decreased mortality following discharge. Increased protein delivery during critical illness may assist with acute recovery and longer term outcomes.

Study summary prepared by Nestlé Health Science.

The complete study can be accessed at:
http:www.ncbi.nlm.nih.gov/pmc/articles/PMC6352154.

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