The impact of early protein intake and nutritional status in critically ill patients

S. M. Gomes[1], C. Carvalho[2], F. Borges[1], A. Ramos[2]
[1]Nutrition and Dietetic, [2]Intensive Care Medicine
Hospital de Cascais Dr. José de Almeida, Cascais, Portugal

RATIONAL

To assess the impact of early protein intake and nutritional status with the length of stay in the intensive care unit (ICU), days on invasive mechanical ventilation (IMV) and clinical outcome in the ICU - death or survival. It is important to assess nutritional status in critically ill patients. The time of protein and calorie target achievement should be considered separately.

METHODS

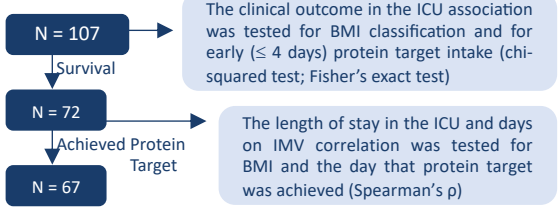
Retrospective observational analytical study of critically **ill adult patients, who received exclusively enteral and/or parenteral nutrition**, admitted to the ICU for at least 72h, between March 1st 2019 and February 29st 2020 (N=107).

Patients included **received nutrition** with:

- A protein target of 1.2-2 g/kg/day, not exceeding 70% of energy need in the early phase of acute illness[1,2]

The **nutritional status** was assessed by:

- Body Mass Index (BMI)[3,4]



A *p*-value<0.05 was considered statistically significant.

RESULTS

Of the 107 patients evaluated (34 female, mean age 68y), 55.1% reached the protein target in the first 4 days ($\bar{x}$=4.56±2.07). Normal weight was the most frequent BMI (34.6%); patients BMI mean was 27.88±5.88. Patients severity scores are shown in Table 1. Delayed (>4 days) protein target reach (*p*=0.038) and underweight (*p*=0.009) were related with mortality occurrence in the ICU – Table 2. It was observed a positive correlation (*n*=67; r_s=0.331; *p*=0.006) between the time that protein target was reached and the length of stay in the ICU (figure 1).

	TOTAL PATIENTS	SURVIVAL	DEATH	Early protein target intake (≤ 4 days)	Delayed protein target intake (>4 days)
N (%)	107 (100)	72 (67.3)	35 (32.7)	59 (55.10)	48 (44.9)
SOFA score, mean	8.82 ± 3.50	8.65 ± 3.52	9.17 ± 3.49	8.46 ± 3.53	9.27 ± 3.44
APACHE II score, mean	27.51 ± 8.50	26.93 ± 8.72	28.71 ± 8.02	26.17 ± 8.42	29.17 ± 8.38
SAPS II score, mean	60.36 ± 15.39	58.38 ± 15.52	64.43 ± 14.51	56.83 ± 14.41	64.69 ± 15.60

Table 1. Patients severity Scores

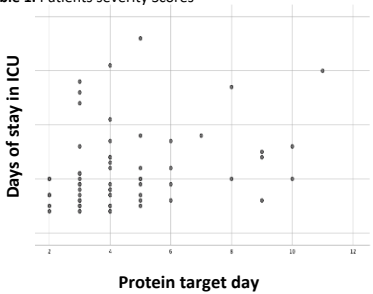


Figure 1. Correlation between the time that protein target was reached and the length of stay in the ICU

Early protein target intake (≤ 4 days)		Outcome in the ICU		Fisher's exact
		Survival	Death	
Yes	N (%)	45 (76.3)	14 (23.7)	0,038
Not	N (%)	27 (56.3)	21 (43.8)	
BMI classification		**Outcome in the ICU**		**chi-squared**
		Survival	Death	
Underweight	N (%)	2 (20.0)	8 (80.0)	0,009
Normal weight	N (%)	28 (75.7)	9 (24.3)	
Pre-obesity	N (%)	19 (70.4)	8 (29.6)	
Obesity	N (%)	23 (69.7)	10 (30.3)	

Table 2. Outcome results in ICU.

CONCLUSIONS

Delayed protein target provision and underweight were associated with the occurrence of mortality in the ICU. Patients who reached the protein intake target later stayed more days in the ICU. The IMV days were not affected by BMI and early protein intake.

REFERENCES

1. Singer P, Blaser AR, Berger MM, et al. ESPEN guideline on clinical nutrition in the intensive care unit. Clin Nutr 2019; 38:48-79.
2. McClave SA, Taylor BE, Martindale RG, et al. Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). JPEN J Parenter Enteral Nutr 2016; 40(2):159-211
3. Body mass index - BMI. WHO; [accessed 26 Apr 2020]. http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi
4. Lipschitz DA. Screening for nutritional status in the elderly. Prim Care 1994; 21:55-67.