Nutrition Under Noninvasive Ventilation in Critically Ill Patients: a Retrospective Monocentric Analysis

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BACKGROUND

Frailty is a multidimensional syndrome marked by loss of physical and cognitive reserve, leading to increased vulnerability to adverse events. Though commonly linked with aging, frailty can affect any age group. Older patients, especially those with chronic disease, malnutrition, sarcopenia, or acute conditions like acute respiratory failure (ARF), are particularly at risk of poor outcomes. Critically ill patients in Intensive Care Unit (ICU) are frequently malnourished. Noninvasive ventilation (NIV) often poses the necessity to start artificial nutrition, but data and recommendations regarding the appropriate nutritional support during NIV are still very limited. We aimed at describing the characteristics and nutritional management of elderly patients undergoing NIV in ICU, and to assess potential associations with patient outcomes.

METHODS

We reviewed the electronic records of adults aged 65 years or more undergoing NIV in our ICU for ARF for more than 48 hours, from March 2020 to January 2023. Population characteristics and nutritional management were described, as well as NIV settings, complications, need for tracheal intubation (ETI), ICU length of stay, and mortality.

RESULTS

Nutritional management	All patients (n = 60)	Enteral nutrition (n = 11)	Parenteral nutrition (n = 25)	Enteral + parenteral nutrition (n = 11)	Non-enteral/non-parenteral nutrition (n = 13)	p value (ANOVA)	
Daily caloric intake (kcal/kg/d)	9.8 (3.7 – 13)	9.3 (6.2 – 15.3)	10.9 (9.7 – 13)	10.7 (9 – 13)	0 (0 – 0)	<0.001	
Daily protein intake (g/kg/d)	0.4 (0.1 – 0.6)	0.4 (0.2 – 0.6)	0.5 (0.3 – 0.6)	0.5 (0.3 – 0.6)	0 (0 – 0)	<0.001	
Total maximal caloric intake (kcal)	1000 (554 – 1315)	1061 (675 – 1500)	1068 (958 – 1300)	1150 (794 – 1512)	0 (0 – 250)	<0.001	
Maximal caloric intake/kg (kcal/kg)	13.2 (8.1 – 18)	14.3 (8.9 – 19.9)	13.9 (11 – 18)	15.3 (12.2 – 20)	0 (0 – 0)	<0.001	
Maximal caloric intake (d)	1 (1 – 3)	2 (1 – 3)	2 (1 – 2)	3 (1 – 6)	0 (0 – 2)	0.003	
Time lag minimal-maximal caloric intake (d)	1 (0 – 3)	2 (1 – 4)	1 (0 – 2)	1 (0 – 6)	0 (0 – 2)	0.206	
Nutrition in ICU (d)	4 (2 – 9)	7 (4 – 10)	4 (2 – 5)	9 (8 – 14)	0 (0 – 0)	<0.001	PN vs NE+PN, all vs none
Time lag NIV-nutrition start (d)	0 (0 – 2)	0 (0 – 0)	1 (0 – 2)	1 (0 – 2)	1 (0 – 2)	0.114	
NIV treatment duration (d)	3 (2 – 5)	2 (1 – 3)	4 (2 – 6)	5 (4 – 9)	3 (2 – 3)	0.002	NE+PN vs NE & none
Total hours on NIV (h)	60 (42 – 91)	48 (29 – 76)	72 (46 – 140)	76 (48 – 137)	48 (37 – 74)	0.050	
ICU length of stay (d)	6 (4 – 9)	8 (4 – 14)	6 (4 – 7)	10 (9 – 14)	3 (3 – 4)	<0.001	NE & NE+PN vs none, PN vs NE+PN
ICU mortality (%)	14 (23)	4 (36)	4 (16)	5 (45)	1 (8)	0.093	
Infections (%)	15 (25)	4 (36)	5 (20)	2 (18)	4 (31)	0.685	
Pressure sores (%)	8 (13)	1 (9)	4 (16)	0 (0)	3 (23)	0.470	
Endotracheal intubation (%)	17 (28)	3 (27)	5 (20)	9 (82)	0 (0)	<0.001	NE+PN vs NE & vs PN & vs none

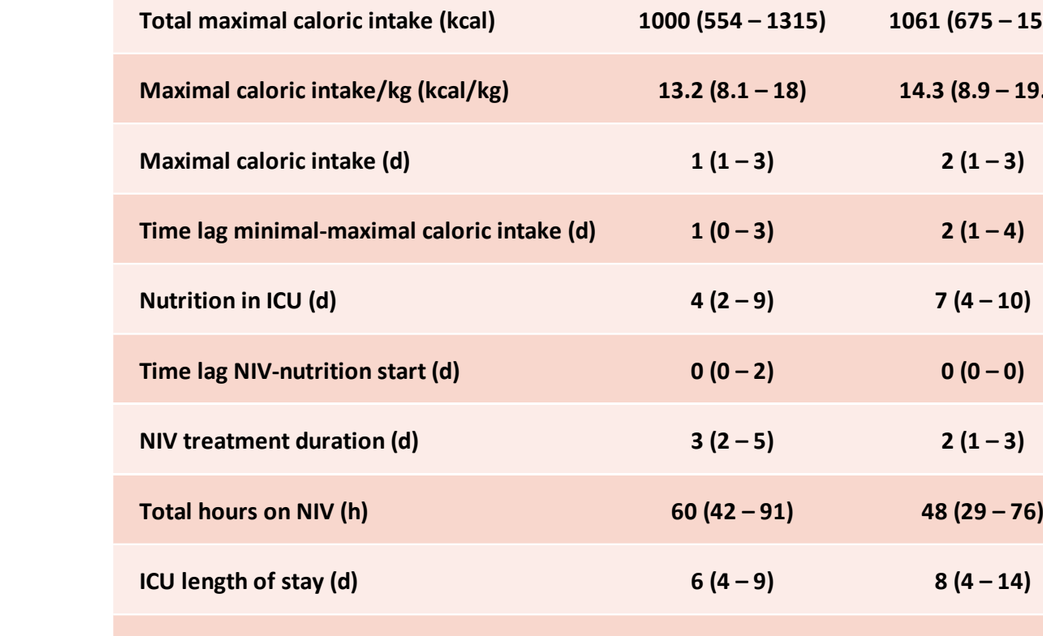

Figure 1. Trend of the mean difference between patient daily caloric intake and the recommended target of 20 KCal/Kg/die during the first 14 days of ICU stay.

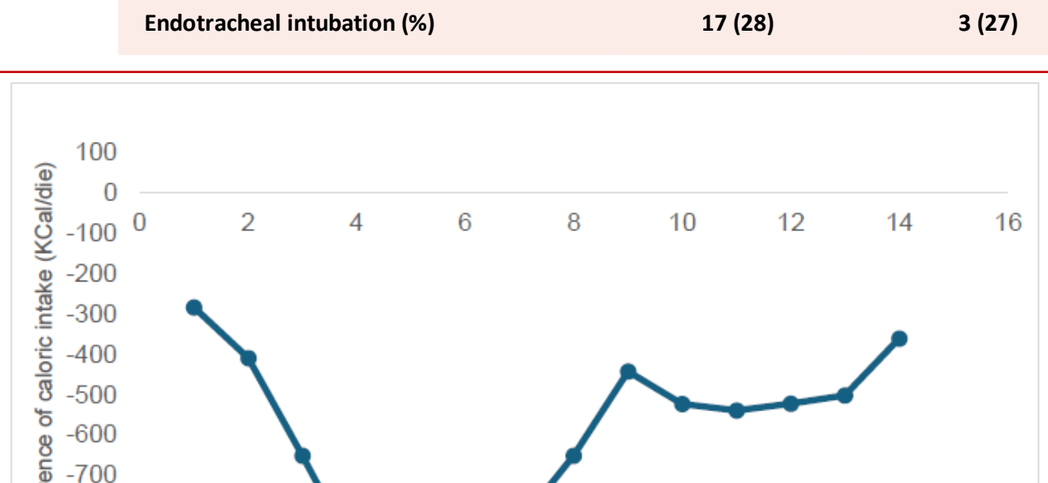

Figure 2. Trend of the mean difference between patient daily caloric intake and the recommended target of 20 KCal/Kg/die, based on different nutrition modalities during the first seven days of ICU stay.

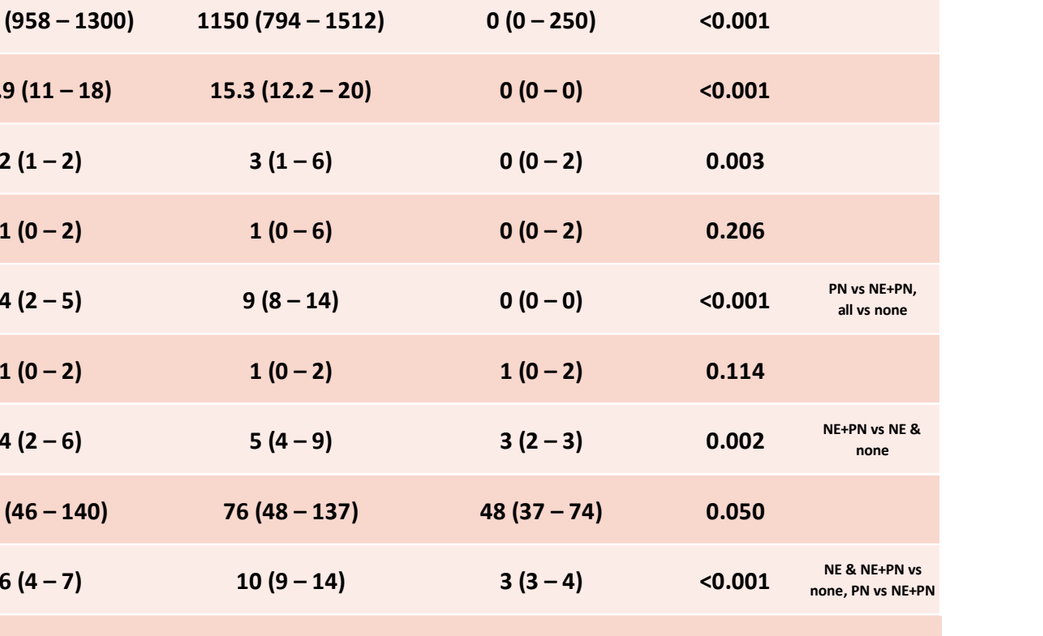

Figure 3. Trend of the mean difference between patient daily protein intake and the recommended target of 1.3 g/Kg/die during the first 14 days of ICU stay.

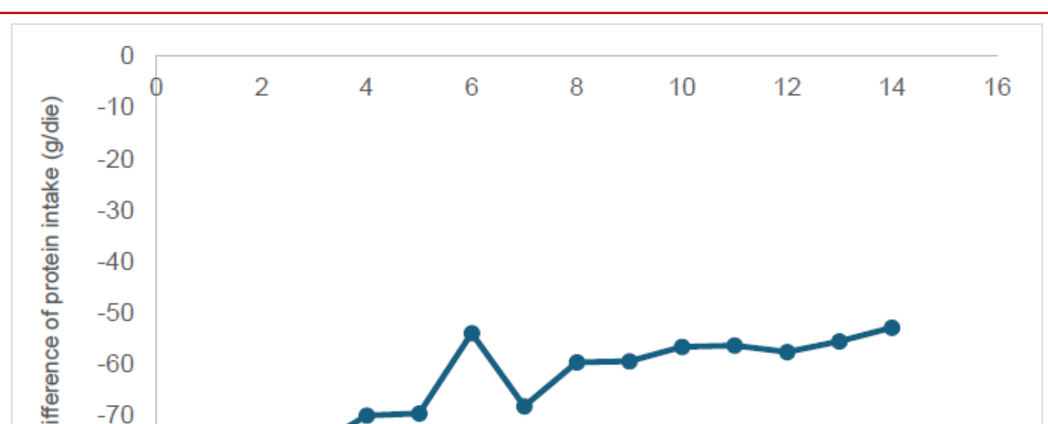

Figure 4. Trend of the mean difference between patient daily protein intake and the recommended target of 1.3 g/Kg/die, based on different nutrition modalities during the first seven days of ICU stay.

CONCLUSIONS

Elderly patients treated with NIV in ICU were given early nutritional support, but median caloric and protein intakes resulted globally low. Further prospective studies are necessary to determine the appropriate nutritional support for elderly critically ill patients undergoing NIV.