

Nutritional status of critically ill neurosurgical patients in Albania

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Abstract

Aim: Nutritional status has been proven to affect surgical outcome in various studies worldwide. In the present study, we aim to give an epidemiological overview of patients admitted at the Neurosurgical Intensive Care Unit (ICU) in Tirana, the type of nutrition and outcome at discharge.

Methods: This was a prospective cohort study including 154 adult patients admitted at the ICU of Neurological Hospital at the University Hospital Center "Mother Theresa" in Tirana over the period January 2009 - December 2012. Patients were assigned into the early and late initiation of parenteral nutrition.

Results: Space-occupying and vascular lesions were observed in 74 or 48% (95% CI=40.2-55.8) of the cases, while in 6 or 4% (95% CI=1.8-8.3) of the patients other lesions were observed. Seven (4.5%) patients manifested MODS, 14 (9.1%) patients manifested septic shock, and in 56 (36.4%) patients SIRS did not evolve. Assessment of the nutritional status of patients revealed that 42% were severely malnourished, 36% were moderately malnourished, whereas 22% had a normal nutritional status. Patients in late nutrition were more likely to have a fatal outcome as compared to patients in early nutrition (OR=5.0, 95% CI=2.1-11.9, P<0.01).

Conclusion: Our findings from Tirana indicate that an early nutritional intervention may help in improving the outcome of such patients and might reduce the economic burden of the healthcare setting and the individuals.

Keywords: neurosurgery, nutritional status, outcome, subjective global assessment.

Introduction

Critically ill patients requiring vital organ support in the intensive care unit (ICU) commonly have anorexia and may be unable to feed volitionally by mouth for periods ranging from days to months. Unless such patients are provided with macronutrients in the form of enteral or parenteral nutrition, they accumulate an energy deficit that rapidly reaches proportions that contribute to lean-tissue wasting and that are associated with adverse outcomes. The catabolic response to acute critical illness is much more pronounced than that evoked by fasting in healthy persons, since the energy deficit in acutely ill patients is often superimposed on immobilization and pronounced inflammatory and endocrine stress responses. The bearing of nutritional status on the outcome of critically ill medical and surgical patients has been amply emphasized in the literature (1,2). The outcome of patients admitted to a neurosurgical intensive care unit (NICU) is varied with mortality ranging from 30% to 50% in case of head injury and 2-8% in case of elective surgical procedures done for aneurysms, glioma, meningioma and other conditions (3,4). Malnutrition is known to affect the outcome adversely with malnourished patients having a higher incidence of post-operative complications and a timely assessment and intervention can be helpful in reducing the morbidity and mortality in the critically ill patients (5). Various parameters suggestive of severe malnutrition such as serum albumin and subjective global assessment have been found to correlate well with the poor outcome of critically ill patients (6-8). In the present study, we aim to give an epidemiological overview of patients admitted to NICU, the type of nutrition and outcome at discharge.

Methods

This is a prospective cohort study including 154 adult patients admitted at the Intensive Care Unit

(ICU) of the Neurological Hospital at the University Hospital Center "Mother Theresa" in Tirana over the period January 2009 - December 2012. Patients were assigned into the early and late initiation of parenteral nutrition.

Baseline demographic and clinical characteristics of the patients were well matched between the two study groups. Daily records were kept regarding all intensive care treatments and procedures, new bacterial or fungal infections, the results of blood and urine chemical analyses and hematologic studies, and markers of inflammation. Also recorded were the total energy intake delivered daily by means of enteral and parenteral nutrition, interruptions of delivery of enteral nutrition, and feeding-related complications. In addition, whenever practically feasible, the functional status of patients before hospital discharge was quantified.

Statistical analysis

Statistical analysis was performed with SPSS 16.0 software. Descriptive statistical analysis was done and the mean age, duration of hospital stay and duration of ICU stay were calculated. Chi-square (χ^2) test was performed to find the associations. Odds ratio (OR) with 95% confidence interval was calculated to find the risk factors. $P < 0.05$ was considered to be statistically significant.

Results

In the study participated 154 patients, whose mean age was 53.9 ± 4.3 years. Minimum age was 17 years old, while the oldest age 83 years (median age: 53 years). Socio-demographic profile of the patients is presented in Table 1.

Space-occupying and vascular lesions were observed in 74 or 48% (95% CI: 40.2 - 55.8) of the cases respectively, while in 6 or 4% (95% CI: 1.8 - 8.3) patients other lesions were observed. The difference is statistically significant ($\chi^2_{\text{goodness of fit}} = 60.0$ $P < 0.01$).

Table 1. Socio-demographic profile of the patients

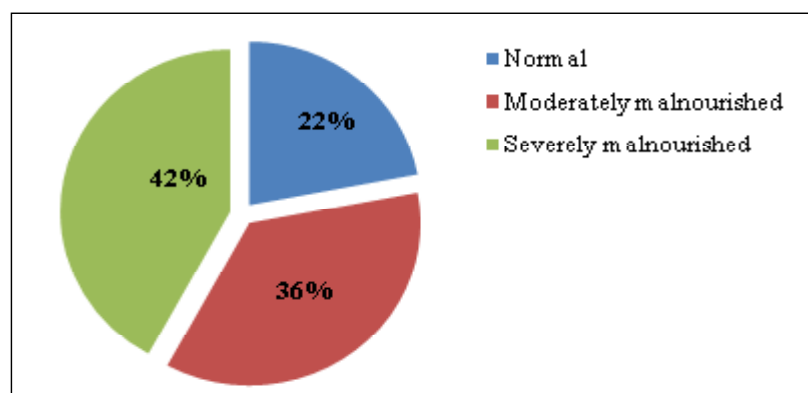
Variables	N	Percent	P
Gender			
Female	80	51.9	>0.05
Male	74	48.1	
Age, M (SD)	53.9 (14.3)		
Diagnosis			
Space-occupying lesions	74	48	<0.01
Vascular lesions	74	48	
Other	6	4	
Hospitalization, M (SD)	11.7 (10.4)		
Type of admission			
Planned	74	48	<0.01
Urgent	8	5.2	
Urgent & intervention	72	46.8	
Mechanical ventilation, M (SD)	8.8 (6.7)		
Nutrition			
Early	73	47	>0.05
Late	81	53	
Years			
2009	36	23.4	0.01
2010	38	24.7	
2011	26	16.9	
2012	54	35.1	

Seven (4.5%) patients manifested MODS, 14 (9.1%) patients manifested septic shock, and in 56 (36.4%) patients SIRS has not evolved.

Assessment of the nutritional status of patients

revealed that 42% were severely malnourished, 36% were moderately malnourished, whereas 22% had a normal nutritional status (Figure 1).

Figure 1. Nutritional status of the patients according to subjective global assessment



HTA prevalence was observed in 63 (40.9%) patients with statistically significant difference with other diagnoses ($\chi^2_{\text{goodness of fit}}=207.0$, $P<0.01$) followed by diabetes (12.3%), COPD (1.3%), asthma and diverticuli Meckel in 0.6% of patients respectively.

Specimens for bacteriological examination are taken by all patients. Blood samples, bronchial secretions and urine were obtained from all patients, and LCS is taken from 5 (3.2%) patients. It was noted that half of the patients, 77 (50%) manifested sepsis with a significant difference with other types of complications ($\chi^2_{\text{goodness of fit}}=87.8$, $P<0.01$).

In total, 54 (35.1%) of patients were with subarachnoidal hemorrhage: 28 (38.4%) of patients in early nutrition and 36 (44.4%) of patients in late nutrition with no statistically significant difference between them, $P=0.5$. All these patients presented with SIRS at admission.

Five (5.5%) of patients with subarachnoidal hemorrhage in early nutrition and 14 (16.0%) of patients in late nutrition ended in death with a statistically significant difference between them, $P=0.04$. The cause of death among all patients with subarachnoidal hemorrhage was MODS.

There were 39 (25%) patients (95%CI=18.8-32.3) who died, of whom 8 or 11% were with early nutrition versus 31 (38.3%) patients with late nutrition, with statistically significant difference between them, $P<0.01$.

Patients in late nutrition were more likely to have a fatal outcome as compared to patients in early nutrition (OR=5.0, 95%CI=2.1-11.9, $P<0.01$).

Discussion

The present study was at NICU in a neurosurgery clinic involving 154 patients older than 17 years of age with a median age 53 years. Median stay in the ICU was 10.8 days with the most common diagnosis being space-occupying and vascular lesions (48%) respectively and other lesions in 4% of patients. Nearly two thirds of them belonged to

a low socio-economic status. Most of these patients were malnourished, 36% having moderate malnutrition and 42% having severe malnutrition. A study found that the prevalence of malnutrition in hospitalized patients was higher than 25% in academic hospitals in the United States (9). Other studies like the one done showed that 50% of hospitalized patients have moderate malnutrition, with 5-10% being severely malnourished (10). High rates of malnutrition in our study might be due to the low socioeconomic status of the study population (11). Most hospitalized patients underwent urgent surgical intervention. Surgical interventions have been of different types, from embolism of aneurysm, bruising as well as drainage of cerebrospinal liquid. The number of patients who received early nutrition was almost equal to the number of patients who underwent late nutrition. Overweight patients prevail in the study, perhaps due to the major changes in the way of life in our country. It is a problem being more and more frequent and maybe in the future has to be one of the most troubling problems in the field of anesthesia and reanimation (12). Sepsis is the most frequent complication manifested in patients, a fearsome complication throughout the world especially nowadays with the emergence of antibiotic resistance, which is becoming a problem especially in developed countries (13). On admission, we noticed no difference in the number of patients with SIRS according to the type of nutrition. Early initiation of parenteral nutrition was associated with a short duration of mechanical ventilation, ICU stay, with a lower mortality rate as compared with patients with late nutrition (14). In our study, this is the main result, seemingly simple but nowadays it has become an issue of discussion, especially in the field of neurosciences intensive therapy and that probably differs little from the general reanimation. Clarification of this issue will probably take time, as to better understanding of the problems of cerebral metabolism of food substances. The number of patients with new

infections (lung, blood, urinary tract) was more frequent in patients with late nutrition. Early nutrition is a protective factor against death. Septic shock and MODS are independent risk factors for death (15). A higher survival rate was observed in patients with SIRS and sepsis. No difference was observed regarding the number of patients with subarachnoidal hemorrhage at admission, but a greater number of patients in the group of early nutrition remained with SIRS. On the other hand, patients with subarachnoidal hemorrhage developed more often, sepsis, septic shock and MODS and had a higher mortality than patients with early nutrition (16). Nutritional

status has been proven to affect surgical outcome in various studies worldwide. Accurate nutritional assessment tools can help the clinician in taking appropriate steps at the right time in order to improve the surgical outcome. This is especially relevant in neurosurgical cases because of the long hospital stay and high incidence of complications. Thus, a poor outcome of critically ill patients might be due to malnutrition and late nutrition rather than lack of cutting edge technology. Therefore, an early nutritional intervention strategy for patients with malnutrition should be in place and might help in improving the outcome.

Conflicts of interest: None declared.

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