NUTRITIONAL STATUS AND RELATED FACTORS IN STROKE PATIENTS WITH NASOGASTRIC TUBE FEEDING AT THE STROKE CENTER, PHU THO PROVINCE GENERAL HOSPITAL IN 2022

Nguyen Huy Ngoc[1*], Hoang Quoc Viet[2], Truong Khuu Doanh[3]

*[1]University of Medicine and Pharmacy, Vietnam National University, Hanoi -
144 Xuan Thuy, Dich Vong Hau Ward, Cau Giay Dist, Hanoi City, Vietnam
[2]Phu Tho Provincial General Hospital - Nguyen Tat Thanh Street, Tan Dan Ward, Viet Tri City, Phu Tho Province, Vietnam
[3]Brigade 574, Military Region 5 - Quang Nam Province, Vietnam*

ABSTRACT

Objectives: Assessment of nutritional status and related factors in stroke patients with nasogastric tube feeding at the stroke center, Phu Tho province general hospital.

Methods: Cross-sectional descriptive study.

Results: Our study subjects were predominantly male, with a male-to-female ratio of 1.6:1. The age group 66–79 accounted for the highest proportion at 43.4%. At the time of hospital admission, the majority of patients (80%) had normal nutritional status (BMI: 18.5–24.9), while only 19.7% were malnourished (BMI < 18.5). The prevalence of malnutrition (BMI < 18.5) was highest in the ≥80 age group and showed an increase at discharge compared to admission (44.4% vs. 38.9%). Using the Subjective Global Assessment (SGA) method to evaluate nutritional status, the highest malnutrition rate was observed in the ≥80 age group. According to the SGA evaluation, 57.9% of patients with moderate malnutrition had a BMI < 18.5, while 60% of patients with severe malnutrition also had a BMI < 18.5. There was an association between malnutrition status at discharge (as assessed by SGA) and factors such as infection, mechanical ventilation, and diarrhea. No significant differences in nutritional status were observed between the two types of stroke. However, there was a relationship between the NIHSS clinical score and malnutrition status at discharge; patients with severe clinical admission (NIHSS ≥ 16) had an increased risk of malnutrition at discharge.

Conclusion: Stroke patients receiving nasogastric tube feeding showed an increased rate of malnutrition compared to the time of hospital admission. The proportion of malnourished patients (BMI < 18.5) in the ≥80 age group was the highest at admission (38.9%) and further increased at discharge (44.4%). The rate of malnutrition based on SGA scores was higher in patients with the following conditions: mechanical ventilation; infections; diarrhea; and an NIHSS clinical score of ≥16 at the time of admission.

Keywords: Stroke, nutritional status, nasogastric tube feeding.

1. INTRODUCTION

Stroke is one of the leading conditions globally associated with nutrition, mortality, and severe disability. Studies have shown that malnutrition among hospitalized patients is a common issue, especially in stroke patients. The prevalence of malnutrition in this group ranges from 8% to 34%, depending on various influencing factors [1]. If not detected early and addressed promptly, the nutritional status of patients can continue to deteriorate, increasing risks such as infections, pressure ulcers, prolonged hospital stays, higher mortality rates, hospital readmissions, and a reduced quality of life [1].

Stroke patients often experience difficulties with oral feeding (due to pharyngeal paralysis, Dysphagia, etc.), making the placement of a nasogastric tube for nutrition necessary. However, this intervention also impacts the patient's nutritional status [2]. Some complications that may occur with nasogastric tube feeding include vomiting, diarrhea, electrolyte

imbalances, or malabsorption in patients. These factors increase the risk of malnutrition in stroke patients [1]. Factors proven to be associated with the risk of malnutrition in patients include advanced age, malnutrition at admission, a history of diabetes, and gastritis. Impaired consciousness in stroke patients often necessitates mechanical ventilation, which is also one of the factors that increase the risk of malnutrition [3],[4].

The Stroke Center at Phu Tho Province General Hospital admits approximately 3,000 stroke patients annually and cares for about 15 patients with dysphagia requiring nasogastric tube feeding each day. However, assessments of nutritional status and the effectiveness of nasogastric tube feeding in these patients remain limited. Therefore, we conducted this study with the following objectives: "Assessment of nutritional status and related factors in stroke patients with nasogastric tube feeding at the stroke center, Phu Tho province general hospital"

2. METHODS

2.1. Research subjects: Seventy-six patients diagnosed with stroke who were admitted within the first 24 hours and required nasogastric tube placement for nutritional support were treated at the Stroke Center, Phu Tho Province General Hospital, from March 2022 to August 2022.

- *Selection criteria:*

+ Stroke patients admitted within the first 24 hours who require nasogastric tube placement for nutritional support.

+ Agree to participate in the study.

- *Exclusion criteria:*

+ Patients and their families who do not participate in the interview.

+ Patients with immune deficiency; severe liver or kidney failure.

2.2. Research methods: Cross-sectional descriptive study.

2.3. Research content:

+ General characteristics of patients: age, gender, BMI.

+ Nutritional status of patients at the time of admission, on the 7th day, and at discharge, assessed by BMI and age group.

+ Nutritional status of patients at the time of admission, on the 7th day, and at discharge, assessed by SGA and age group.

+ Laboratory indices: Hemoglobin, Albumin, Total Lymphocytes.

+ Clinical characteristics, treatment, and NIHSS score.

2.4. Evaluation criteria in the study

+ Classification of Body Mass Index (BMI): BMI < 18.5: Malnutrition; BMI 18.5 - 24.9: Normal; BMI ≥ 25.0: Overweight, obesity.

+ Assessment of malnutrition risk according to SGA [5]: SGA A (9–12 points); Good nutrition; SGA B (4–8 points): Moderate malnutrition; SGA C (0–3 points): Severe malnutrition.

2.5. Statistical methods and data analysis: Data are processed and analyzed based on SPSS 22.0 software.

3. RESULTS

Table 1. General characteristics of research subjects

| Characteristics		Amount (n = 76)	Rate (%)
Gender	Male	47	61.8
	Female	29	38.2
Age groups	≤ 50	5	6.6
	51 - 65	20	26.3
	66 - 79	33	43.4
	≥ 80	18	23.7
BMI at admission	< 18,5	15	19.7
	18,5 – 24,9	60	80
	≥ 25	1	1.3

The male-to-female ratio is 1.6:1; the age group 66–79 has the highest proportion at 43.4%, while the ≤50 age group has the lowest at 6.6%. The oldest patient group, aged ≥ 80, makes up 23.7%. At the time of admission, the majority of patients (80%) had normal nutritional status with a BMI of 18.5–24.9, while 19.7% had a BMI < 18.5.
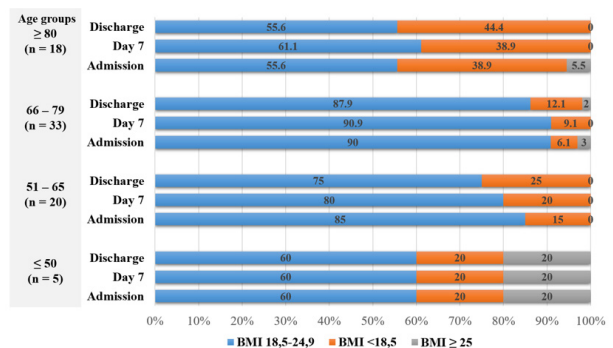
Chart 1. BMI characteristics at admission, on the 7th day, and at discharge by age group

The rate of malnutrition (BMI < 18.5) in the ≥80 age group was the highest and gradually increased at discharge, from 38.9% to 44.4%. The 66–79 age group

showed an increase in malnutrition from 6.1% at admission to 12.1% at discharge.
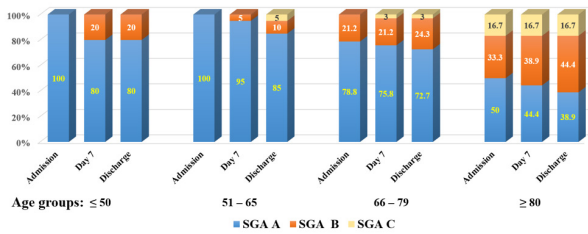
Chart 2. Nutritional status based on SGA at admission, on the 7th day, and at discharge by age group

The rate of malnutrition in the ≥80 age group was the highest, and the prevalence of malnutrition at discharge was higher than at admission, with 44.4% compared to 33.3% for moderate malnutrition. The rate of severe malnutrition in the ≥80 age group was also the highest, at 16.7%. The highest proportion of patients with normal nutritional status was found in the ≤50 and 51–65 age groups, both at admission and at discharge.

Table 2. Laboratory test characteristics at admission and discharge

Indices or Indicators		Admission	Discharge
		n (%)	n (%)
Albumin	Normal	63 (82.9)	33 (43.4)
	Decreased Albumin	10 (13.2)	43 (56.6)
	Increased Albumin	3 (3.9)	0 (0)
Total lympho	Normal	61 (80.3)	64 (84.2)
	Decreased total lympho	13 (17.1)	12 (15.8)
	Increased total lympho	2 (2.6)	0 (0)
Hemoglobin	Normal	48 (63.2)	10 (13.2)
	Decreased Hemoglobin	23 (30.3)	65 (85.5)
	Increased Hemoglobin	5 (6.6)	1 (1.3)

The rate of patients with decreased serum albumin was low at 13.2% at admission but increased to 56.6% at discharge. The rate of patients with decreased

hemoglobin also gradually increased from admission to discharge, from 30.3% to 85.5%.

Table 3. Factors related to nutritional status based on SGA at discharge

Characteristics	SGA A (n= 52)	SGA B (n = 19)	SGA C (n = 5)	p
	n (%)	n (%)	n (%)	
BMI				
BMI: 18.5 – 24.9	47 (90.4)	8 (42.1)	2 (40)	> 0.05
BMI < 18.5	4 (7.7)	11 (57.9)	3 (60)	
BMI ≥ 25	1 (1.9)	0 (0)	0 (0)	
Mechanical ventilation				
Yes	1 (1.9)	10 (52.6)	4 (80)	< 0.05
No	51 (98.1)	9 (48.4)	1 (20)	
Infections				
Yes	14 (26.9)	16 (84.2)	5 (100)	< 0.05
No	38 (73.1)	3 (15.8)	0 (0)	
Electrolyte imbalance				
	14 (26.9)	6 (31.6)	2 (40)	> 0.05
Diarrhea				
	7 (13.4)	6 (31.6)	3 (60)	< 0.05
Vomit				
	13 (25)	4 (21.1)	1 (20)	> 0.05
Parenteral nutrition				
	9 (17.3)	3 (15.8)	3 (60)	> 0.05
Stroke type				
Ischemic stroke	31 (59.6)	10 (52.6)	2 (40)	> 0.05
Hemorrhagic stroke	21 (40.4)	9 (48.4)	3 (60)	
NIHSS				
0 - 5	0 (0)	0 (0)	0 (0)	
6 - 15	26 (50)	4 (21.1)	1 (20)	< 0.05
16 -20	19 (36.5)	10 (52.6)	2 (40)	
> 20	7 (13.5)	5 (26.3)	2 (40)	

Among patients with malnutrition according to SGA, 57.9% of those with moderate malnutrition had a BMI < 18.5, and 60% of those with severe malnutrition had a BMI < 18.5; the difference was not statistically significant. There was a correlation between the SGA score

and factors such as mechanical ventilation, diarrhea, infection, and a severe NIHSS score. The difference was statistically significant with a p-value < 0.05.

4. DISCUSSION

Our study included 76 patients, of which 47 were male, accounting for 61.8%, and 29 were female, accounting for 38.2%. The male-to-female ratio was 1.6:1. The age group 66–79 had the highest proportion at 43.4%, while the <50 age group had the lowest at 6.6%.

At the time of admission, the majority of patients (80%) had normal nutritional status with a BMI of 18.5–24.9, while 19.7% were malnourished with a BMI < 18.5, and the lowest proportion of patients were obese, accounting for 1.3%. The rate of malnutrition (BMI < 18.5) in the ≥80 age group was the highest and gradually increased at discharge compared to admission, from 38.9% to 44.4%. The lowest rate of malnutrition was found in the 66–79 age group, with rates at admission and discharge being 6.1% and 12.1%, respectively. The highest rate of obesity (BMI ≥ 25) was found in the <50 age group, accounting for 20%. These results are consistent with the report from the FOOD Trial Collaboration program, which found that the rate of malnutrition in patients following acute stroke ranges from 8.0% to 34% [6]. After a stroke, the patient's care regimen changes, and their nutrition depends entirely on the family and healthcare staff. As a result, patients experience weight loss over the course of their treatment. Therefore, it is crucial to individualize the nutritional regimen that suits the patient during their hospital stay and upon discharge [7].

Using the SGA method for nutritional assessment, the rate of malnutrition in the ≥80 age group was the highest, and the rate of malnutrition at discharge was higher than at admission, with 44.4% compared to 33.3% for moderate malnutrition. The rate of severe malnutrition in the ≥ 80 age group was also the highest at 16.7%. The highest proportion of patients with normal nutritional status was found in the 51–65 age group, with 100% at admission and 85% at discharge. These results are consistent with a study conducted in 2014 on 1,030 patients over 65 years old in Turkey, where 19% of patients were malnourished and 29.1% were at risk of malnutrition [8].

Among the patients in the study, those with normal serum albumin levels at admission experienced a decrease over the course of their hospital stay, from 82.9% to 43.4%. For patients who had low albumin levels upon admission (13.2%), this increased to 56.6% at discharge. The rate of patients with decreased hemoglobin also gradually increased, from 30.3% at admission to 85.5% at discharge. By the time of discharge, only 13.2% of patients had normal hemoglobin levels. The total lymphocyte count did not show significant fluctuation during the hospitalization period. Our findings are consistent with the study of Ngo Lan Anh in a study of patients

on mechanical ventilation with nasogastric tube feeding at Thai Binh Provincial General Hospital, 42.9% of patients had decreased albumin levels, but most of them had only mild decreases (31.8%). There was no significant difference between genders or among age group [9].

In patients with malnutrition according to SGA, 57.9% of those with moderate malnutrition had a BMI < 18.5, and 60% of those with severe malnutrition had a BMI < 18.5; the difference was not statistically significant. The difference in results is due to the fact that the two methods have different criteria for assessment. BMI is calculated based on the ratio of weight to height and can be influenced by factors such as fluid balance, muscle atrophy, and others. SGA is a clinical technique for assessing nutritional status based on changes in weight, food intake, gastrointestinal symptoms, changes in physical function, comorbidities, and the effects of metabolic stress [5].

Among the malnourished patients according to SGA, 52.6% of those with moderate malnutrition were indicated for mechanical ventilation, while 80% of those with severe malnutrition were also indicated for mechanical ventilation; the difference was statistically significant with p < 0.05. The risk of malnutrition increased in patients with infections, with 80% of those with moderate malnutrition according to SGA having concurrent infections, while this rate was 100% for patients with severe malnutrition; the difference was statistically significant with p < 0.05. In the study by Ngo Lan Anh on patients receiving mechanical ventilation with tube feeding at Thai Binh Provincial General Hospital, the rate of malnutrition among patients was 16.5% [9].

A total of 31.6% of patients with moderate malnutrition had diarrhea, with the rate increasing to 60% in the severe malnutrition group. Additionally, 60% of patients with severe malnutrition received parenteral nutrition, while only 15.8% in the moderate malnutrition group did. Most malnourished patients had severe clinical conditions, with 78.9% and 80% of those in the moderate and severe malnutrition groups having NIHSS scores ≥ 16. The study of Bouziana suggests that an NIHSS > 16 warrants the placement of a nasogastric tube for feeding to prevent aspiration pneumonia; however, it cannot fully prevent infections caused by pneumonia. Therefore, this group is at a higher risk of malnutrition compared to those with lower NIHSS scores at the time of admission [10].

5. CONCLUSION

Stroke patients receiving nasogastric tube feeding showed an increased rate of malnutrition compared to the time of hospital admission. The proportion of malnourished patients (BMI < 18.5) in the ≥80 age group was the highest at admission (38.9%) and further

increased at discharge (44.4%). The rate of malnutrition based on SGA scores was higher in patients with the following conditions: mechanical ventilation; infections; diarrhea; and an NIHSS clinical score of ≥16 at the time of admission.

REFERENCES

[1] Ojo, O. and J. Brooke, The Use of Enteral Nutrition in the Management of Stroke. Nutrients, 2016. 8(12).

[2] Dennis, M.S., S.C. Lewis, and C. Warlow, Effect of timing and method of enteral tube feeding for dysphagic stroke patients (FOOD): a multicentre randomised controlled trial. Lancet, 2005. 365(9461): p. 764-72.

[3] Rabaut, J., et al., Clinical Outcomes and Patient Safety of Nasogastric Tube in Acute Stroke Patients. Dysphagia, 2022. 37(6): p. 1732-1739.

[4] Gong, L., Y. Wang, and J. Shi, Enteral nutrition management in stroke patients: a narrative review. Annals of Palliative Medicine, 2021. 10(10): p. 11191-11202.

[5] Martineau, J., et al., Malnutrition determined by the patient-generated subjective global assessment is associated with poor outcomes in acute stroke patients. Clin Nutr, 2005. 24(6): p. 1073-7.

[6] Poor nutritional status on admission predicts poor outcomes after stroke: observational data from the FOOD trial. Stroke, 2003. 34(6): p. 1450-6.

[7] Mahoney, C., et al., Nasogastric feeding for stroke patients: practice and education. Br J Nurs, 2015. 24(6): p. 319-20, 322-5.

[8] Gündüz, E., et al., Malnutrition in Community-Dwelling Elderly in Turkey: A Multicenter, Cross-Sectional Study. Med Sci Monit, 2015. 21: p. 2750-6.

[9] Ngo Lan Anh, The nutritional status and feeding conditions through a tube in mechanically ventilated patients at Thai Binh Provincial General Hospital in 2016. 2017, Thai Binh University of Medicine and Pharmacy.

[10] Bouziana, S.D. and K. Tziomalos, Malnutrition in patients with acute stroke. J Nutr Metab, 2011. 2011: p. 167898.