EVALUATION OF NUTRITIONAL STATUS IMPROVEMENT IN CANCER PATIENTS UNDERGOING PERCUTANEOUS ENDOSCOPIC GASTROSTOMY (PEG)

Nguyen Thi Lan Huong[1]*, Le Viet Nho[2], Doan Anh Tuan[1], Nguyen Ngoc Son[1], Tran Thi Thanh[1], Nguyen Van Hoa[1]

ABSTRACT

Objectives: Assessing the degree of improvement in nutritional status in cancer patients undergoing endoscopic gastrostomy (PEG).

Subjects and methods: A prospective longitudinal study was conducted, in 62 cancer patients who underwent percutaneous endoscopic gastrostomy.

Results: Pre-PEG, the mean BMI of the study cohort was 19.1 ± 2.3 kg/m²; the prevalence of underweight based on BMI was 38.7%, and 69.4% were malnourished according to SGA. Anemia was present in 32.3% of patients, and 22.6% had hypoalbuminemia. At 1 month post-PEG, body weight and BMI were largely unchanged; the prevalence of BMI-defined malnutrition decreased slightly, while SGA-defined malnutrition remained unchanged, with a shift toward a higher proportion of mild malnutrition and lower proportions of moderate and severe malnutrition. At 3 months post-PEG, mean body weight increased by 1.3 kg and mean BMI by 0.5 kg/m². The prevalence of BMI-defined malnutrition decreased from 38.7% to 27.4%, and SGA-defined malnutrition from 69.4% to 37.1%. Anemia increased from 32.3% to 58.1% at 3 months, whereas the prevalence of hypoalbuminemia decreased from 22.6% to 16.1%.

Conclusions: PEG in cancer patients helps maintain nutritional status during treatment at 1 month and improves nutritional status at 3 months.

Keywords: Percutaneous endoscopic gastrostomy (PEG), nutritional status in cancer patients.

[1]Da Nang Oncology Hospital
[2]School of Medicine and Pharmacy, The University of Danang

*Corresponding author: Nguyen Thi Lan Huong
Email: lanhuongyc87@gmail.com

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1. INTRODUCTION

Malnutrition is a common problem among cancer patients, with reported prevalence ranging from 20% to 70%. It has a direct impact on quality of life, increases the risk of treatment interruption, leads to higher complication rates, and may ultimately contribute to mortality [1]. Among nutritional support strategies, enteral nutrition is considered the first-line approach due to its ability to provide adequate nutritional intake, maintain intestinal mucosal integrity, and reduce complication rates compared with other methods [2,3].

However, in cancer patients, enteral feeding is often challenging due to tumor-related obstruction of the gastrointestinal tract, resulting in dysphagia in patients with head and neck cancers, esophageal cancer, and others. In addition, treatment-related toxicities such as radiotherapy-induced mucositis and mucosal burns, particularly in head and neck cancer patients, further impair swallowing function, despite preserved gastrointestinal absorptive capacity. In such cases, nasogastric tube placement or percutaneous endoscopic gastrostomy (PEG) is indicated to ensure adequate nutritional support.

Percutaneous endoscopic gastrostomy (PEG), first introduced in 1980, has become a widely used technique for long-term enteral nutritional support. Compared with nasogastric tube feeding, PEG is better tolerated, more suitable for prolonged use, associated with improved nutritional delivery, and generally has fewer complications [4].

Although numerous studies have evaluated PEG outcomes worldwide and in Vietnam, the impact of PEG on nutritional improvement in cancer patients remains insufficiently explored. Therefore, this study was conducted at Da Nang Oncology Hospital with the aim of:

- Describing the clinical characteristics of cancer patients undergoing PEG placement.

- Evaluating the improvement in nutritional status following PEG in cancer patients.

2. MATERIALS AND METHODS

2.1. Study population

The study population included cancer patients who underwent percutaneous endoscopic gastrostomy (PEG) at Da Nang Oncology Hospital from January 2024 to December 2024.

2.2. Inclusion criteria

Diagnosed with malignancy in clinical departments of the hospital.

Underwent percutaneous endoscopic gastrostomy (PEG).

Had complete follow-up data for at least 3 months after PEG placement.

2.3. Exclusion criteria

Complete esophageal obstruction preventing endoscopic access to the stomach, Gastrointestinal conditions causing gastric outlet obstruction.

Incomplete or missing medical records relevant to the study variables.

2.4. Study design and methods

Study design: A prospective longitudinal study was conducted.

Sample size and sampling method

A convenience sampling method was used. A total of 62 patients who met the inclusion criteria were enrolled during the study period.

Study materials

Medical records.

A medical weighing scale with an integrated height-measuring device.

The Subjective Global Assessment (SGA) tool for nutritional assessment.

Study procedures

Before percutaneous endoscopic gastrostomy (PEG) placement: clinical examination, laboratory and paraclinical investigations, measurement of body weight and height, BMI calculation, and nutritional status assessment using SGA.

Patients underwent percutaneous endoscopic gastrostomy in the endoscopy room; after the procedure, they were transferred back to the ward and received nutritional counseling within 24 hours.

After 1 month, body weight, BMI, and nutritional status according to SGA were reassessed.

After 3 months, body weight, BMI, and nutritional status according to SGA were reassessed; hemoglobin concentration and serum albumin level were recorded.

3. RESULTS

General characteristics of study participants.

Table 1. General characteristics

Characteristics		n (62)	Percentage %
Age range	< 40 years old	3	4,8
	40 – 59 years old	33	53,2
	≥ 60 years old	26	42,0
	Mean	57,7 ± 10,7 years old	
Gender	Male	50	80,6
	Female	12	19,4
Primary diagnosis	Head and neck cancer	49	79,0
	Esophageal cancer	11	17,8
	Other diagnoses	2	3,2
Stage	Stage I – II	6	9,7
	Stage III -IV	56	90,3
Treatment modalities	Chemotherapy	3	4,8
	Chemoradiotherapy	50	80,6
	Radiotherapy	7	11,3
	Palliative care	2	3,2

Comment: The mean age of the study population was 57.7±10.7 years, indicating a predominance of middle-aged and elderly patients. The male-to-female ratio was 4:1. Head and neck cancers accounted for 79% of cases, while esophageal cancer accounted for 17.8%. The majority of patients were diagnosed at an advanced stage (90.3%). Regarding treatment modalities, 80.6% of patients received concurrent chemoradiotherapy, while 11.3% underwent radiotherapy alone.

Improvement in nutritional status.

Table 2. Nutritional status before PEG placement

Characteristics		n (62)	Percentage %
Nutritional status according to BMI	Mean	19,1 ± 2,3 kg/m²	
	≥ 18,5kg/m²	38	61.3
	< 18,5kg/m²	24	38.7
Nutritional status according to SGA classification	SGA A	19	30.6
	SGA B	24	38.8
	SGA C	19	30.6
Hemoglobin (Hb) level	Normal	42	67.7
	Anemia	20	32.3
Serum albumin level	Normal	48	77.4
	Reduced	14	22.6

Comment: The mean BMI before PEG placement was 19.1 ± 2.3 kg/m², which was within the normal range. Malnutrition defined by BMI accounted for 38.7% of patients, while malnutrition assessed by SGA was higher at 69.4%. Additionally, 32.3% of patients had anemia, and 22.6% had hypoalbuminemia prior to PEG placement.

Table 3. Improvement in nutritional status according to body weight and BMI

Variables	Before PEG(0)	After 1 month(1)	After 3 months(2)	p(1-0)	p(2-0)
Weight	49,5 ± 7,7	49,7 ± 7,3	50,8 ± 7,2	0,488	< 0,001
BMI	19,1 ± 2,3	19,2 ± 2,2	19,6 ± 2,1	0,461	< 0,001

Comment: After 1 month of PEG placement, there was no significant change in body weight or BMI. However, after 3 months, both body weight and BMI showed a statistically significant increase in the study population.

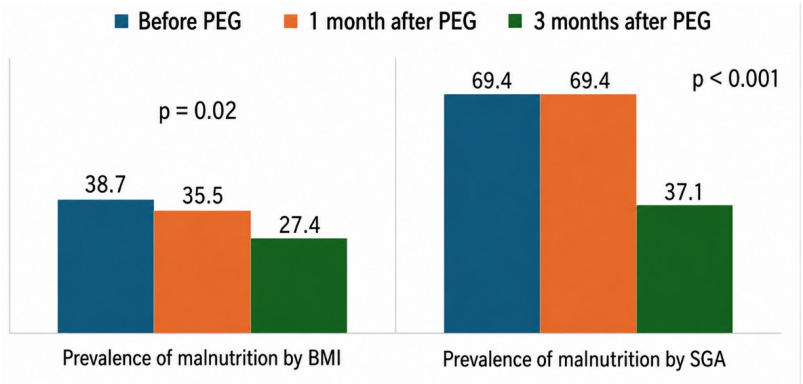

Chart 1. Changes in nutritional status based on BMI and SGA before and after PEG placement

Comment: At 1 month after PEG placement, there were no significant changes in the prevalence of malnutrition assessed by BMI and SGA. However, at 3 months post-PEG, the prevalence of malnutrition decreased significantly according to both BMI and SGA classifications, with a statistically significant difference ($p < 0.05$).

Table 4. Improvement in nutritional status according to SGA

SGA classification	Before PEG(0)	After 1 month(1)	After 3 months(2)	p(1-0)	p(2-0)
SGA A (n, %)	19 (30,6%)	19 (30,6%)	39 (62,9%)	0,002	< 0,001
SGA B (n, %)	24 (38,8%)	40 (64,5%)	21 (33,9%)		
SGA C (n, %)	19 (30,6%)	3 (4,8%)	2 (3,2%)		

Comment: At 1 month after PEG placement, there was no significant change in the overall prevalence of malnutrition according to SGA; however, there was a shift in distribution, with an increase in mild malnutrition (SGA B) and a decrease in moderate and severe malnutrition (SGA B and C). At 3 months after PEG placement, there was a marked improvement in nutritional status, with the proportion of well-nourished patients (SGA A) increasing from 30.6% to 62.9%.

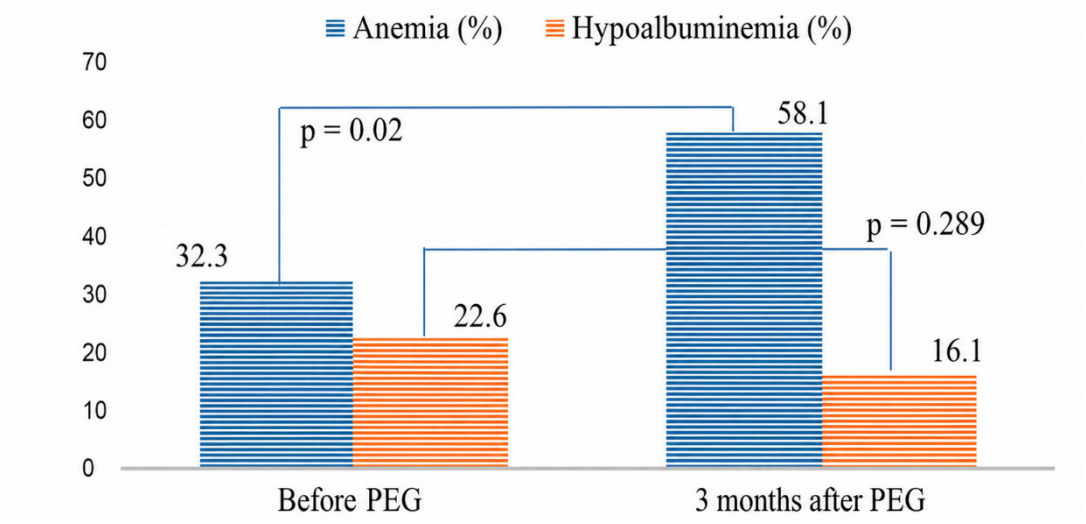

Chart 2. Changes in anemia and hypoalbuminemia before and 3 months after PEG

Comment: At 3 months after PEG placement, the prevalence of anemia showed a statistically significant increasing trend. In contrast, the proportion of patients with hypoalbuminemia decreased compared with the pre-PEG period; however, this difference was not statistically significant.

4. DISCUSSION

4.1. Characteristics of the study population

This study included 62 cancer patients who underwent PEG placement for enteral nutrition. The mean age was 57.7 ± 10.7 years, with 95.2% of patients aged over 40 years. The male-to-female

ratio was 4:1. Head and neck cancers and esophageal cancers accounted for 96.8% of PEG indications, and the majority of patients were diagnosed at advanced stages (stage III–IV), accounting for 90.3%. These findings are consistent with those reported by Diep BT et al., who found that head and neck and esophageal cancers accounted for 96.7% of PEG indications [5], and by Rabie AS et al., who reported a rate of 95% [6]. This highlights that PEG is primarily indicated in head and neck and esophageal cancer patients, as these malignancies often cause upper gastrointestinal obstruction or treatment-related swallowing impairment, leading to reduced oral intake, weight loss, and malnutrition. These results also suggest that head and neck and esophageal cancers are more common in middle-aged and older males, which may be associated with lifestyle, dietary habits, and behavioral risk factors.

Regarding treatment modalities, most patients in this study received chemoradiotherapy, a combined modality treatment involving chemotherapy and radiotherapy. This regimen is often prolonged and associated with treatment-related toxicities, particularly radiation-induced mucositis and swallowing dysfunction, which further contribute to impaired oral intake.

4.2. Improvement in nutritional status

The present study showed that the prevalence of malnutrition before PEG placement was 38.7% according to BMI and 69.4% according to SGA. These findings are consistent with previous studies, such as Nguyen TL, which reported a malnutrition rate of 78.6% [7], and Fernanda Silva R.M., who reported a rate of 71.1% [8]. These results confirm that malnutrition remains highly prevalent among cancer patients. At baseline, 35.5% of patients had anemia and 25.8% had hypoalbuminemia.

Regarding changes in nutritional status after PEG placement, at 1 month, there was a slight increase in mean body weight (0.2 kg) and BMI (0.1 kg/m²), although these changes were not statistically significant ($p > 0.05$). This is consistent with the clinical objective during active radiotherapy, which is to maintain body weight and prevent weight loss that may negatively affect treatment tolerance. At 3 months, after completion of cancer treatment in most patients, body weight increased by 1.3 kg and BMI increased by 0.5 kg/m² compared with baseline, with statistically significant differences ($p < 0.001$). These findings indicate that PEG feeding effectively maintained nutritional status during treatment and contributed to nutritional recovery in the post-treatment phase.

In terms of malnutrition according to BMI, the prevalence decreased by 3.2% at 1 month and by 11.3% at 3 months, with statistically significant differences over time. Similarly, SGA-based assessment showed no significant change at 1 month; however, at 3 months, the prevalence of malnutrition decreased from 69.4% to 37.1%. Although the overall prevalence of malnutrition did not change at 1 month, the proportion of severe malnutrition decreased markedly from 30% to 4.8%, while mild to moderate malnutrition increased from 38.8% to 64.5%, and this shift was statistically significant ($p < 0.05$). These findings suggest that PEG is an effective intervention in improving nutritional status among cancer patients. The observed improvements in weight, BMI, and SGA further support the role of PEG in preventing long-term malnutrition and supporting cancer treatment.

Regarding anemia and albumin levels, a statistically significant increase in anemia was observed at 3 months ($p < 0.05$). This may be explained by multiple mechanisms, including cancer-related chronic inflammation, treatment-induced bone marrow suppression, and tumor-related blood loss. Although PEG improves oral intake and protein-energy absorption, it

does not immediately correct micronutrient deficiencies or anemia caused by tumor burden and treatment effects. Serum albumin showed a slight improvement; This parameter serves as a prognostic indicator and reflects the degree of systemic inflammation ($p > 0.05$).

5. CONCLUSION

PEG feeding helped maintain nutritional status during the first month of treatment and contributed to significant nutritional improvement after 3 months.

These findings suggest that although macronutritional status, as assessed by BMI and SGA, improved after PEG placement, micronutrient deficiencies and anemia should be concurrently managed alongside caloric supplementation via PEG.

6. RECOMMENDATION

Early prophylactic PEG placement should be considered in cancer patients with swallowing difficulties who require long-term enteral nutrition support.

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