Original Research

NUTRITIONAL STATUS OF PATIENTS PRIOR TO GASTROINTESTINAL SURGERY AT VIETNAM-GERMANY FRIENDSHIP HOSPITAL IN 2021-2022

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ABSTRACT

Aims: To describe the nutritional status of patients prior to gastrointestinal surgery.

Methods: A cross-sectional study was conducted on 90 patients prior to gastrointestinal surgery at Vietnam-Germany Friendship Hospital. The nutritional status of the patients were assessed using body mass index (BMI), mid-upper arm circumference (MUAC), biochemical index and risk assessment of malnutrition according to the subjective global assessment (SGA).

Results: The rates of chronic energy deficiency, low MUAC, hypoalbuminemia, and anemia were 17.8, 23.3, 26.1, and 51.8%, respectively. By SGA method, the patients had a 55.6% risk of malnutrition (34.5% moderate and 21.1% severe malnutrition). The rate of unwanted weight loss >10% was 26.7%. About 30% of the patients had a combination of three or more nutritional conditions. The combination between low-albumin and anemia accounted for 38.4%.

Conclusion: The study indicates an alarmingly high rate of malnutrition status and anemia before gastrointestinal operation, as well as elevated risk of developing malnutrition during hospitalization.

Keywords: *malnutrition, before surgery, unwanted weight loss, gastrointestinal.*

I. INTRODUCTION

Preoperative malnutrition is a factor that increases the risk of illness and death. Malnutrition increases postoperative complications, infections, prolonged hospital stays as well as elevated treatment costs. Many studies indicate that malnutrition is a common condition in people with surgical diseases. About 40−50% of patients are malnourished at the time of admission [1]. According to the study by Correia et al. in Latin American hospitals in 2017, rates of malnutrition ranged from 2.6% to 73.2%, and high rate of malnutrition was observed in patients with gastrointestinal surgery [2]. Malnutrition patients undergoing gastrointestinal surgery face a higher risk of depletion of stored nutrients due to inadequate nutrition intake, reduced absorption, and inappropriate intensive care after surgery. Vietnam-Germany Friendship Hospital is one of the largest surgical centers in Vietnam, with about 2000 cases of emergency and session surgery, treating more than 6000 patients with gastrointestinal problems. Therefore, determining nutritional status and

giving an appropriate intervention for the patients before surgery are extremely necessary. For this reason, we conducted the study to evaluate the nutritional status of patients prior to gastrointestinal surgery at the Vietnam-Germany Friendship Hospital in 2021−2022.

II. METHODS

2.1. Study design

A cross-sectional study was designed to identify the nutritional status of patients before gastrointestinal surgery at Vietnam-Germany Friendship Hospital in 2021−2022. The patients were fully explained about the research purpose and voluntarily participates. All the information was used only for research purposes. The study was approved by the Scientific Council of the Institute of Preventive Medicine and Public Health Training, Hanoi Medical University. This study was approved by the Ethics Committee of the Hanoi Medical University, Vietnam (No. 1394/QĐ-ĐHYHN). Written informed consent was provided by each participant before entering the study.

2.2. Subjects and sampling

Inclusion criteria: Patients aged ≥ 20 years with one of the surgical sites including esophagus, stomach, small intestine, colon and rectum.

Exclusion criteria:

+ Patients with emergency gastrointestinal surgery (appendix, hollow organ perforation…);
+ The patients who are not able to provide information, data (dumb, deaf, staggered, intellectual impairment...), or don't want to participate;
+ Patients with defects affecting anthropomorphism: scoliosis, unable to stand;
+ Patients with other coordinated diseases such as liver failure, kidney failure, heart failure, and ventilator.

Research location: The study was conducted in departments at Vietnam-Germany Friendship Hospital including: Department of Gastrointestinal Emergency Surgery, Department of Oncology and Department of Colorectal Surgery-Biosphere.

Sample size

Sample size of 84 was estimated according to the formula*:*

$$n = Z^2_{(1-\alpha/2)} \frac{p\,(1\text{-}p)}{(\varepsilon.p)^2}$$

- *n*: sample size;
- *p* = 0.339: rate of malnutrition patients before gastrointestinal surgery [3].
- *ε* = 0.3: relative precision.
- $Z_{(1-\alpha/2)}$ = 1.96, α = 0.05.

Sample selection method

Between October 2021 and May 2022, 90 patients who met both inclusion and exclusion criteria were recruited in the study.

2.3. Data collection

General information including age, gender, occupation, place of residence, medical history was collected using a set of direct interview questions. Clinical and biochemical characteristics were collected from medical records. Weight,

height, and mid-upper arm circumference (MUAC) of the participants were measured by specialized balance and ruler.

The subjective global assessment (SGA) was used as a nutrition assessment tool that refers to an overall evaluation of a patient's history and physical examination and uses structured clinical parameters to diagnose malnutrition [4].

Evaluation criteria:

+ Nutritional status is classified according to Asian's criteria for body mass index (BMI) [5]: chronic energy deficiency (CED) (BMI <18.5 kg/m^2), normal range (BMI: 18.5–22.9 kg/m^2), overweight and obesity (BMI ≥ 23.0 kg/m^2).

+ Malnutrition is classified as when MUAC <23 cm for women or <24 cm for men [6].

+ SGA is classified in 3 levels [4]:
  * SGA-A: No risk of malnutrition
  * SGA-B: Moderate risk of malnutrition
  * SGA-C: Risk of severe malnutrition.

+ Hypoalbuminemia is identified when serum albumin < 35 g/L. Three levels of low albumin are mild (28–34.9 g/L), moderate (21–27.9 g/L), and severe (< 21 g/L) [7].

+ Anemia is diagnosed when serum hemoglobin < 130 g/L for men and < 120 g/L for women [8].

2.4. Statistical analysis

The data was cleaned and entered using Redcap software. Statistical analysis was performed on STATA14.0. Categorical variables were shown as number (%) and compared among groups using Chi-square test.

III. RESULTS

Of the total 90 recruited patients, the highest was 38 (42.2%) stomach patients, followed by 25 (27.8%) colon patients, 16 (17.8%) rectal patients, 6 (6.7%) esophageal patients, and 5 (5.5%) small intestine patients.

Table 1. *Classification of patients by age group and gender*

Age	Men (*n* = 56)	Women (*n*=34)	Total (*n*=90)
20–40 years	5 (8.9)	1 (2.9)	6 (6.7)
41−60 years	25 (44.6)	10 (29.4)	35 (38.9)
> 60 years	26 (46.5)	23 (67.7)	49 (54.4)

Data are n (%).

The oldest subject had 91 years old and the youngest had 21 years old. Table 1 shows characteristics of age in the patients. The largest age group was observed in the over 60 years, followed by the 41−60 years.

As shown in Table 2, the rates of CED, low MUAC, low albumin, and anemia were 17.8, 23.3, 26.1, and 51.8%, respectively. There was no statistical difference between men and women in nutritional problems ($p > 0.05$).

Table 2. *Nutritional status of preoperative patients by body mass index, mid-upper arm circumference, and biochemical analysis*

	Men ($n=56$)	Women ($n=34$)	Total ($n=90$)	p-value
BMI-based nutritional status				
<18.5 kg/m^2	10 (17.9)	6 (17.6)	16 (17.8)	
18.5–22.9 kg/m^2	28 (50.0)	21 (61.8)	49 (54.4)	> 0.05
≥ 23 kg/m^2	18 (32.1)	7 (20.6)	25 (27.8)	
MUAC-based nutritional status				
Malnutrition	13 (23.2)	8 (23.5)	21 (23.3)	> 0.05
Normal	43 (76.8)	26 (76.5)	69 (76.7)	
Albumin level				
Normal	28 (71.8)	20 (76.9)	48 (73.9)	> 0.05
Mild	10 (25.6)	6 (23.1)	16 (24.6)	
Moderate	1 (2.6)	0 (0.0)	1 (1.5)	
Hemoglobin level				
Anemia	25 (46.3)	19 (61.3)	44 (51.8)	> 0.05
No-anemia	29 (53.7)	12 (38.7)	41 (48.2)	

Data are n (%). p-value by χ^2 test.
BMI, body mass index; MUAC, mid-upper arm circumference.

Figure 1 shows the combined rate of 97.7% of common nutritional problems before surgery. About 30% of the patients had a combination of three or more nutritional conditions. The combination between low-albumin and anemia accounted for 38.4%.
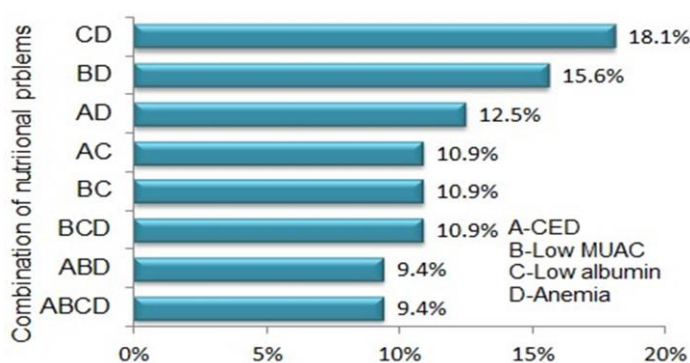

Figure 1. *Combined rates of nutritional status of patients before surgery*

Table 3. *Body mass index levels in different groups of surgical patients*

Surgical site	BMI <18.5 kg/m^2 (*n*=16)		BMI: 18.5–22.9 kg/m^2 (*n*=49)		BMI ≥ 23 kg/m^2 (*n*=25)	
Esophageal (*n*= 6)	1	1.1	3	3.3	2	2.2
Stomach (*n=38*)	8	8.9	21	23.3	9	10.0
Small intestine (*n=5*)	3	3.3	1	1.1	1	1.1
Colon (*n=25*)	3	3.3	13	14.4	9	10.0
Rectal (*n=16*)	1	1.1	11	12.2	4	4.4
Total	16	17.8	49	54.4	25	27.8

Data are n (%).

Table 3 shows the nutritional status by BMI levels in different groups of surgical patients. The rate of CED in the stomach disease group accounted for 8.9%, then the group of small intestine accounts for 3.3%.
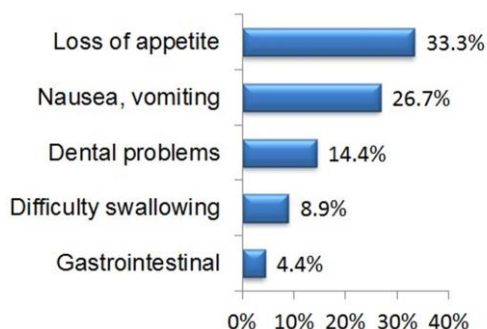

Figure 2. *The patients' difficulties in eating in the last month*

The findings of SGA in patients before surgery indicated that the rates of no risk of malnutrition (SGA-A), moderate malnutrition (SGA-B) and severe malnutrition (SGA-C) were 44.4%, 34.5%, and 21.1%, respectively. The rates of patients lost >10%, 5–10%, and unwanted weight during the 6 month period before hospitalization were respectively 26.7, 23.3 and 18.9.

Figure 2 shows that the highest rate of 33.3% of patients experienced anorexia, next 26.7% of patients had problems with nausea and vomiting. The proportion of patients with dental problems was 14.4% and difficulty swallowing was 8.9%.

IV. DISCUSSION

In the present study, we have found that almost patients had at least one problem in four conditions: CED (17.8%), low MUAC (23.3%), low albumin (26.1%), and anemia (51.8%). The combination of the conditions accounted for 97.7% in the patients before surgery.

The study shows that the rate of CED was 17.8% in the admitted patients for gastrointestinal surgery. The result of this study are lower than that (24%) in patients before gastrointestinal cancer surgery in Vietnam-Germany Friendship Hospital in 2019 [9]. A multicenter study from 56 hospitals in Australia and New Zealand reported 32% of CED in acute care hospital patients [10].

In our study, patients with gastric bypass surgery had the highest rate of malnutrition (50%), followed by the

small intestine and colon surgery (18.8%). The esophagus and rectum disease patients had a lower risk of malnutrition (6.2%). Our finding is similar to that in Chu Thi Tuyet's study: the rate of stomach surgery malnutrition was the highest (45.7%) [3]. This high rate may be due to the fact that the stomach is where the foods are stored. When foods enter the stomach, they trigger a stimulating reaction, causing pain, leading to the patient's hesitation toward eating or unable to eat. If this lasts for a long time patients will suffer malnutrition.

The rate of patients at risk of malnutrition based on SGA in our study was 55.6% (SGA-C: 21.1%). A study of Young et al (2016) in elective non-laparoscopic abdominal operations at Bach Mai Hospital reported a malnutrition rate according to the SGA at 50% (SGA-C: 22%) [11]. According to Thieme's study in Brazil (2013) on 125 patients undergoing gastrointestinal surgery, the rate of malnutrition assessed by SGA was 66% (SGA-C: 17.6%) [12] Another study by Kaya and Pekcan found that the rate of malnutrition as assessed by the SGA in patients before gastrointestinal cancer surgery was 90.9% (SGA-C: 41.8%) [13]. Overall, although the percentage of patients at risk of malnutrition by the SGA are varied, they are remained high across studies. This can be explained by the fact that most people with gastrointestinal surgery have anorexia and nausea. In addition, these are accompanied by eating difficulties such as dental problems, toothache, mouth ulcers. Some people with esophageal surgery have swallowing problems due to pain,

choking, leading to unwanted weight loss. In our study, the percentage of patients who lost unwanted weight in the 6 months before surgery was 68.9%, weight loss >10% up to 26.7%. This high rate of weight loss before surgery is explained by the patients having eating difficulties, for instance, loss of appetite (33.3%), nausea and vomiting (26.7%), and dental problems (14.4%).

Decreased serum albumin levels have been linked to an increase in morbidity and mortality in patients treated in hospitals [14] The results of the study showed that the rate of malnutrition by serum albumin indicator was 26.1%. Our results are close to Chu Thi Tuyet's results with 28.2% of malnutrition by albumin classification [3]. The rate of people suffered from anemia was high (51.8%). The percentage of patients with reduced blood albumin combined with anemia accounted for 18.8%. Lower albumin and anemia are the predictors of postoperative complications [15]. Overall, the rates of malnutrition in the patient identified by various approaches are significantly high. Thus, it is necessary to assist the patient reduce anxiety, fatigue, as well as provide them with counseling and nutritional support.

It is important that patients entering the gastrointestinal surgery hospital should be screened and evaluated for nutritional status to detect nutritional risks such as BMI <18.5 kg/m^2, albumin <35g/L, anemia, unintentional weight loss >10% for timely nutrition intervention. Personalized nutrition counseling is needed to help patients overcome unwanted weight loss and improve nutritional status.

V. CONCLUSION

The study highlights an alarmingly high rate of malnutrition and anemia before gastrointestinal operation, as well as elevated risk of developing malnutrition during hospitalization in patients with gastrointestinal surgery. It is necessary to screen and evaluate the admitted the patients to provide an appropriate intervention for individuals with anemia and risk of developing malnutrition.

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