NUTRITIONAL STATUS OF PATIENTS UNDERGOING UPPER GASTROINTESTINAL CANCER SURGERY: A CROSS-SECTIONAL STUDY AT A SINGLE CENTRE

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Malnutrition is closely related to the outcome of disease treatment, especially in digestive cancer surgery. The aim of this study was to assess the nutritional condition of pre-operative patients with upper digestive cancers (including stomach and oesophagus) at the Department of General Surgery, Bach Mai Hospital in 2016. We conducted a cross-sectional descriptive analysis of 76 malignancies of the upper gastrointestinal tract with surgical treatments. The results revealed that the weight loss rate of hospitalized patients with gastric cancer and esophageal cancer was 76.6% and 66.7%, respectively. The rate of weight loss above 10% of body weight was 19.7%. The prevalence of chronic energy deficit was 29.9%. The risk of malnutrition according to SGA was 77.6%, of which mild to moderate and severe was 67.2% and 10.4%, respectively. The rate of low blood albumin level (less than 35 g/L) was 36.5%. The average net nutritional value was 1146.3 ± 592.7 Kcal (range 246.7 – 3653.5), which equals to 55.7% of the necessary daily intake. Protein, lipid, and glucid contents reached 73.4%, 57.8%, and 52.1% of the recommended levels, respectively. Conclusion: malnutrition was still prevalent among patients undergoing upper gastrointestinal cancer surgery, and pre-operative nutritional status does not achieve recommended levels.

Keywords: nutrition, surgery, cancer, upper digestive tract, esophageal cancer.

I. INTRODUCTION

Malnutrition in surgical patients is a risk factor for increased complications such as wound infection, delayed wound healing, infection, respiratory failure, and even death.[1,2] While the prevalence of malnutrition among hospitalized patients remains high, patients undergoing gastrointestinal surgery are more likely to be malnourished than patients with other diseases.[3-5] In addition, the postoperative period, besides being the cause of pre-existing malnutrition, the surgery itself changes the metabolism and physiology. Consequently, complications such as infection, blood loss, and stress make the situation of malnutrition more and more serious.[6] There is a higher risk of mortality and longer hospital stays in malnourished patients. A study by Moriana M in Spain in 2013 showed that 50% of hospitalized patients had malnutrition and the hospital stay of these patients (13.5 days) was longer than that of patients without malnutrition (6.7 days).[7] Therefore, the improvement of adequate and reasonable nutritional support for patients with gastrointestinal surgery is important and necessary.[8,9]

To improve quality of care and treatment for

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surgical patients, especially those undergoing gastrointestinal surgery, this research aims to examine the nutritional status of patients admitted to Bach Mai Hospital for upper digestive cancer surgery.

II. METHODS

1. Patient selection and study design

Between December 2015 and May 2016, a descriptive cross-sectional study was done at Bach Mai Hospital - one of the biggest hospitals in Vietnam. The study enrolled 76 participants who underwent programmed surgery for oesophageal or gastric cancer.

Exclude criteria were patients undergoing emergency surgery, diabetes, metabolic problems, or other concomitant conditions such as chronic liver failure, kidney failure, severe heart failure.

2. Data collection

The enumerators were trained to conduct data collection. The general data, including age, gender, date of admission, operative diagnosis, and albumin index (AI) of the patient were collected from the medical record. The patients were assessed for nutritional status on the day of admission for surgery, including anthropometric measurements such as weight, height, and BMI.

The nutritional history includes recent weight changes (last 6 months and 2 weeks), dietary changes, gastrointestinal symptoms (nausea, vomiting, diarrhea, anorexia), changes in current movements, and stress related to nutritional needs. The clinical examination revealed nutritional signs (subcutaneous fat loss, muscle atrophy, edema, ascites).

Collecting data on nutritional status and clinical examination using Subjective Global Assessment (SGA) questionnaires based on sample sheets.[11]

3. Nutrition assessment

Nutritional status is determined by BMI (as defined by the World Health Organization in 2000): chronic energy deficiency (CED) occurs when BMI is less than 18.5 (kg/m2); normal occurs when BMI is between 18.5 and 24.9 (kg/m2); overweight occurs when BMI is between 25 and 29.9 (kg/m2); and obesity occurs when BMI is greater than 30.0 (kg/m2).

SGA classification: no risk of malnutrition (SGA-A); mild to moderate risk (SGA-B); severe risk (SGA-C). If you're unable to choose between A and B, evaluate B; if you're unable to choose between B and C, choose B.

Malnutrition occurs when serum albumin levels fall below 35 g/L.

4. Statistical Analyses:

Categorical data was summarized using the number and percentage of cases. Means and ranges, or percentages, was used to convey values. Mean and standard deviation (SD) was used for continuous variables. Categorical data were compared using the chi-squared test. A p-value of 0.05 was judged to be significant.

All statistical analyses were performed using Epi Data 3.1 software (EpiData Association, Odense. Denmark). Statistical calculations were performed on Stata 12.0 software. Results were considered statistically significant when $p < 0.05$ with a two-tailed test.

5. Research ethics

All the patients were thoroughly informed about the purpose and content of the study. Written informed consent was obtained from all patients in our study, which was approved by the Human Subjects Protection Committee of Bach Mai Hospital was signed by the Director of Bach Mai Hospital.

The study data is highly protected, only being used for scientific research, creating

reports, and supplying each research object as needed. The research is only for the purpose of providing measures to improve the patient's health.

III. RESULTS

There were 76 participants in the study, including 53 men (69.7%) and 23 women (30.3%). The mean age was 56.7 ± 13.2 years) (range 27 - 79). There were 67 gastric cancers (88.2%) and 9 oesophageal cancers (11.8%). Pre-operative losing weight was 77.6% for gastric cancer and 66.7% for esophageal cancer, with weight loss of more than 10% accounting for 19.7%.

Table 1. Preoperative nutritional status

Nutritional status		Gastric cancer n (%)		Oesophageal cancer n (%)		p*
CED (n = 76)	No	50	(65.8)	6	(7.9)	> 0,05
	Yes	17	(22.4)	3	(3.9)	
SGA (n = 76)	SGA - A	15	(19.8)	0	(0)	> 0,05
	SGA - B	45	(59.2)	8	(10.5)	
	SGA - C	7	(9.2)	1	(1.3)	
Serum Albumin (n = 65)	≥ 35g/l	38	(58.5)	3	(4.6)	> 0,05
	< 35g/l	21	(32.3)	3	(4.6)	

**Fisher's exact test*

The chronic energy deficiency was of 26.3%, the risk of malnutrition was 80.2% and the decreased albumin was 36.9% for oesophageal and gastric cancers. Preoperative nutritional status detailed in **Table 1.**

Table 2. The relationship between serum albumin and SGA nutritional status

Albumin (g/l)	Nutritional status			
	SGA-A, n (%)	SGA-B, n (%)	SGA-C, n (%)	X^2 (p*)
Al ≥ 35	10 (15.3)	29 (44.6)	2 (3.1)	6.309 (< 0.05)
Al < 35	4 (6.2)	15 (23.1)	5 (7.7)	
Total	14 (21.5)	44 (67.7)	7 (10.8)	

**Fisher's exact test*

As shown in **Table 2**, patients with serum albumin levels < 35g/L frequently fall into the category at risk of malnutrition.

The average amount of energy consumed equals only 55.7% of the necessary dietary requirements. Glucid, total protein, and lipids in the real diet reached 52.1%, 73.4%, and 57.8% of the RNR, respectively. **Table 3** includes the following additional data in detail.

Table 3. Nutritional value pre-operative versus recommended nutritional requirements (RNR)

Energy and nutrients		$\bar{X}$ ± SD	Min - Max	RNR ($\bar{X}$)	(%) achieved
Energy (Kcal)		1146.3 ± 592.7	246.7 – 3653.5	2055	55.7
Protein (g)	Animal	31.1 ± 12.8	0 – 61.4	36.0	73.4
	Vegetable	21.2 ± 14.4	0 – 90.1	36.0	
Lipid (g)	Animal	17.1 ± 11.3	0 – 61.2	22.9	57.8
	Vegetable	8.5 ± 8.9	0 – 44.8	22.9	
Glucid (g)		187.1 ± 105,4	15.6 – 543.8	339.1	52.1

IV. DISCUSSION

The pre-operative weight loss compared to before the disease was 77.6% for gastric cancer and 66.7% for oesophageal cancer, of which a serious level of more than 10% accounted for 19.7%. This weight loss is caused by the fact that the majority of patients undergoing gastrointestinal surgery had symptoms of anorexia, indigestion, difficulty swallowing, fatigue, abdominal pain, or gastrointestinal bleeding. Additionally, the patient's diet was changed, with the patient consuming only soft foods such as porridge, vermicelli, and milk noodles, resulting in an energy imbalance.[5] Furthermore, psychological aspects associated with the disease and eating habits contribute to weight reduction.[3,8,10-12] Thus, explaining the disease in terms of the treatment schedule helps patients in understanding and reducing pessimistic anxiety. As a result, patients' evaluations, counseling, and nutritional support before to surgery should get increased attention.

The status of chronic energy deficiency (BMI < 18.5) was 26.3%. Low BMI is an index that is closely related to body fat and body mass, so it is an indicator recommended by WHO to assess the degree of lean or fat. A low BMI indicates a decrease in both body mass and fat caused by malnutrition. Tangvik (2015) found that cancer patients had a 44% malnutrition rate.[4] Chronic energy deficiency (BMI < 18.5) is a factor in increasing morbidity and mortality in patients with abdominal and cancer surgery.[13]

According to the SGA screening, the risk of malnutrition was 76.6%, with mild to moderate malnutrition accounting for 69.7% and severe malnutrition accounting for 10.5% **(Table 2)**. Our study's incidence of malnutrition is comparable to that of Pham VN (2006), who investigated the nutritional state of surgical patients at Can Tho Hospital in South of Vietnam and discovered a rate of malnutrition of 77.7% in patients after gastrointestinal surgery.[2]

SGA is a useful and simple measure of assessing nutritional status, utilized by many countries throughout the world.[14,15] The SGA approach can detect changes in weight, diet, gastrointestinal problems, functional problems, and clinical indicators that result from the patient's nutritional status during the course of the disease.[16]

Additionally, some additional research indicate that SGA also has a high risk of malnutrition in individuals with abdominal surgery. Garth et al (2010) examined 95 patients who had undergone gastrointestinal surgery, 48% of the people were malnourished.[17] In an assessment of 100 patients who had major

abdominal surgery, the study found that the percentage of patients who were malnourished according to SGA was 44.0% (or 18% of patients were malnourished).[19] In addition, research has shown that undernourishment is on the rise in hospitals, and the longer the patients are admitted, the greater the degree of undernourishment.[14,20]

The proportion of patients with albumin < 35 g/L is 45% **(Table 2)**. The serum albumin concentration before surgery is used not only to assess nutritional status and disease severity, but it also plays a role in the prognosis of complications and mortality after surgery.[21,22] The lower the serum albumin level, the higher the risk of postoperative complications and mortality.[8,15,23] Guerra et al emphasized the importance of transferin and prealbumin in determining nutritional status and discovered a difference in these indicators prior to and following surgery.[23] The patients with albumin < 35 g/L are often in the group at risk of malnutrition **(Table 2)**.

The real average nutritional value is 1146.3 ± 592.7 Kcal (range 246.7 - 3653.5) reaching 55.7% of the recommended nutritional needs. The glucid of the actual diet was 187.1 ± 105.4 g/day (range 15.6 - 543.8), total protein and lipids reached 73.4% and 57.8%, respectively, compared to the recommended needs. The authors such as Mislang, Chakravarty, Gath, Bozzetti recommend assessing the nutritional status of hospitalized patients so that preoperative nutritional support interventions are essential.[12,15,17,22] Many researchers concluded that malnutrition in surgical patients is a risk factor for increased complications such as wound infection, delayed wound healing, infection, respiratory failure, higher mortality, longer hospital stays, higher hospital costs, and even worse long-term outcomes.[9,11,13,24]

V. CONCLUSION

Patients undergoing surgery for oesophageal and gastric cancers had a relatively high rate of malnutrition. As such, patients who have a surgical indication should be examined to assess their nutritional status and receive nutritional advice before and after surgery. Especially, patients at risk of malnutrition need adequate nutritional support before surgery. The duration of support depends on the status of malnutrition as well as the feeding regime.

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Declaration of Interest statement:

The authors declare no conflict of interest.

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