Tạp chí Sức khỏe và Lão hóa
Journal of Health and Aging
DOI: 10.63947
Xuất bản trực tuyến tại https://tcsuckhoelaohoa.vn

Original Research

INCIDENCE OF PREOPERATIVE ANEMIA IN PATIENT WITH GASTROINTESTINAL CANCER

Truong Van Anh[1], Nguyen Thi Hoang Phuoc[1], Ngo Thi Oanh[1*]

1. Department of Anesthesiology & Intensive Care, Thong Nhat Hospital, Vietnam

* *Corresponding author: Specialist Level II Dr. Truong Van Anh;* ✉ *vananhgmhs@gmail.com*

ABSTRACT: Objective: To evaluate the prevalence of preoperative anemia in patients with gastrointestinal cancer and assess the rate of anemia treatment prior to surgery. Subjects and Methods: A prospective cross-sectional descriptive study with analytical components was conducted on patients with gastrointestinal cancer scheduled for elective surgery at Thong Nhat Hospital from January to October 2024. Results: Preoperative anemia was observed in 49.2% of patients, with 72.4% of these cases occurring in elderly individuals (≥60 years old). Among the 58 patients diagnosed with anemia, 20.7% received preoperative iron supplementation, while 15.5% required blood transfusions before surgery. Conclusion: The prevalence of preoperative anemia in patients with gastrointestinal cancer is high, yet the rate of preoperative iron supplementation remains low. Routine screening and early intervention are essential to optimize hemoglobin levels prior to surgery and improve clinical outcomes.

Keywords: Preoperative anemia, gastrointestinal cancer

Ngày nhận bài: 05/05/2025 Ngày chấp nhận: 20/05/2025 Ngày đăng bài: 27/05/2025

1. INTRODUCTION

Untreated preoperative anemia and acute blood loss during surgery can increase perioperative risk [1]. Anemia is associated with increased likelihood of blood transfusion, increased complication rates and postoperative mortality. The optimal approach to diagnose and manage perioperative anemia has not been fully established. Early identification and effective treatment of anemia has the potential to improve clinical outcomes in surgical patients [2]. The presence of severe, moderate, and even mild preoperative anemia is an independent risk factor causing multiple complications and prolonged hospital stay after gastrointestinal cancer surgery [3,4].

Anemia is a common condition in cancer patients. The prevalence of anemia varies among different types of gastrointestinal cancers, ranging from 30-75%. Preoperative anemia in patients with gastrointestinal cancer is often overlooked and inadequately treated. It is necessary to assess preoperative anemia status and preoperative treatment status, plan anemia management and appropriate intervention, to improve clinical outcomes for patients. Therefore, we conducted this study to answer the question: "What is the rate of preoperative anemia in patients with gastrointestinal cancer?"

2. SUBJECTS AND METHODS

2.1. Study Design

Prospective cross-sectional descriptive study method.

2.2. Location and Time of Study

The study was conducted at Thong Nhat Hospital - Ministry of Health from January to October 2024.

2.3. Study Subjects

All patients with gastrointestinal cancer scheduled for elective surgery including esophageal cancer, gastric cancer, colorectal cancer, rectal cancer.

2.4. Sample Size and Sampling

The study sample size was calculated based on the proportion estimation formula:

$$n=Z_{(1-\alpha/2)}^2 \ (p(1-p))/d^2$$

According to Shander A , the rate of preoperative anemia is 39.1%, with d = 10% margin of error, type 1 error α = 5%, substituting into the formula we get n = 92. Anticipating 10% sample loss, the minimum sample size is 101 cases [2].

Selection criteria: Patients definitively diagnosed with gastrointestinal cancer or suspected gastrointestinal cancer scheduled for elective surgery, including esophageal cancer, gastric cancer, colorectal cancer, rectal cancer.

Exclusion criteria: Patients with hematological diseases causing anemia, bone marrow failure, hemolysis. Patients with histopathological results not confirming cancer.

2.5. Variables/Indicators/Content/ Research Topics

Outcome variable: : Anemia when Hb < 13 g/dl in males and Hb < 12 g/dl in non-pregnant females [5].

Anemia grading [6]: Mild anemia: Hb 90 - 120 g/l, moderate anemia: Hb 60 - < 90 g/l, severe anemia: Hb 30 - < 60 g/l.

Control variables: age, MCV (mean corpuscular volume), MCH (mean corpuscular hemoglobin), preoperative albumin, tumor location, preoperative iron supplementation, preoperative blood transfusion, accompanying medical conditions, physical status according to ASA, nutritional status according to BMI.

2.6. Data Processing and Analysis

Statistical processing using SPSS software.

2.7. Research Ethics

Approval decision number 233/ QD-BVTN dated 26/02/2024, project completion decision number 1739/QD-BVTN dated 02/12/2024 from the Director of Thong Nhat Hospital.

3. RESULTS

The study from January to October 2024 at Thong Nhat Hospital on 118 patients with gastrointestinal cancer yielded results as follows (Table 1).

The rate of preoperative anemia in patients with gastrointestinal cancer was 49.2%.

Table 1. Characteristics of the study population

Characteristics	Number (n = 118)	Percentage (%)
Age (years)	64,19 ± 12,7 *	
Gender		
Male	82	30,5
Female	36	69,5
Nutritional status by BMI		
Underweight	4	3,4
Normal	94	79,7
Overweight	16	13,6
Obese	4	3,4
ASA Classification		
ASA I	1	0,8
ASA II	86	72,9
ASA III	31	26,3
Degree of anemia		
Mild	47	39,8
Moderate	6	5,1
Severe	5	4,2
Preoperative albumin (g/l)	37,3 ± 4,25	
Hb (g/dl)	12,17 ± 2,39	
MCV (fL)	82,49 ± 11,43	
MCH (pg)	27,67 ± 3,83	
MCHC	33,24 ± 1,75	

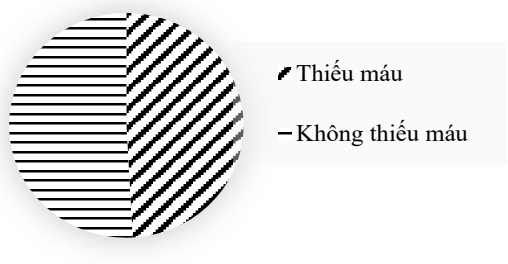

Chart 1: Preoperative anemia rate

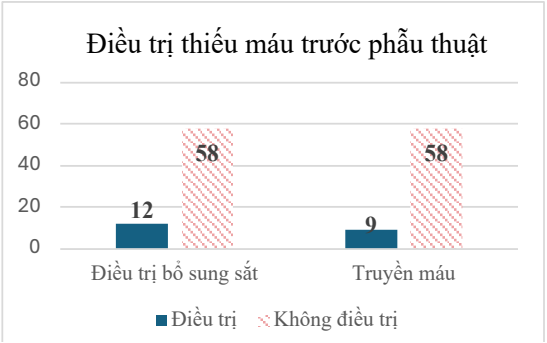

Chart 2: Rate of preoperative anemia

Table 2. Patient characteristics and preoperative anemia

Characteristics	Anemia, n (%)		P
	Yes (n=58)	No (n=60)	
Age	66,31 ± 12,53 *	62,13 ± 12,62 *	0,074 β
Age group			0,291 **
Adults	16 (27,6)	22 (36,7)	
Elderly (≥ 60)	42 (72,4)	38 (63,3)	
Gender			0,085 **
Male	*36 (62,1)*	*46 (76,7)*	
Female	22 (37,9)	14 (23,3)	
Nutritional status by BMI			0,349 ***
Underweight (< 18.5 kg/m2)	3 (5,2)	1 (1,7)	
Normal (18.5 – 24.9 kg/m2)	48 (82,8)	46 (76,7)	
Overweight (25 – 29.9 kg/m2)	5 (8,6)	11 (18,3)	
Obese (≥ 30 kg/m2)	2 (3,4)	2 (3,3)	
ASA Classification			0,000 ***
ASA I	0	1 (1,7)	
ASA II	34 (58,6)	52 (86,7)	
ASA III	24 (41,4)	7 (11,7)	
Preoperative albumin (g/l)	35,98 ± 3,8	38,6 ± 4,3	0,01 α
MCV (fL)	78,35 ± 12,75	86,49 ± 8,31	0,000 β
MCH (pg)	25,87 ± 4,4	29,4 ± 2	0,000 β
MCHC	32,68 ± 2	33,79 ± 1,27	0,01 α
Comorbid medical conditions			
Hypertension	37 (63,8)	28 (46,7)	0,062 **
Heart failure	2 (3,4)	2 (3,3)	1,000 ***
COPD	6 (10,3)	5 (8,3)	0,707 **
Diabetes	21 (36,2)	18 (30)	0,474 **
Liver cirrhosis	1 (1,7)	1 (1,7)	1,000 ***
Kidney failure	8 (13,8)	2 (3,3)	0,051 ***

Characteristics	Anemia, n (%)		P
	Yes (n=58)	No (n=60)	
Tumor location			0,238 ***
Esophagus	1 (1,7)	1 (1,7)	
Stomach	10 (17,2)	15 (25)	
Colon	39 (67,2)	30 (50)	
Rectum	8 (13,8)	14 (23,3)	

* Mean ± standard deviation **Chi-square ***Fisher

α T test, unequal variance β T test, equal variance

Among 58 cases of anemia: macrocytic cells accounted for 2%, normocytic cells 33%, and microcytic cells accounted for 65%, hypochromic cells accounted for 95%, with the remaining 5% being normochromic.

Among 58 recorded cases of anemia, 20.7% of patients received preoperative iron supplementation.

In the anemic group, the rate of patients with ASA II was higher than patients with ASA I and III, similar to the non-anemic group, this difference was statistically significant (P<0.05). Mean corpuscular hemoglobin (MCH) in the anemic group was smaller than in the non-anemic group, the difference was statistically significant (P<0.05). Preoperative albumin in the anemic group was lower than in the non-anemic group, the difference was statistically significant (P<0.05) (Table 2).

The most common cancer in both groups was colorectal cancer. The relationship between cancer-related factors and anemia status was not statistically significant.

4. DISCUSSION

According to Shander A and colleagues, the rate of preoperative anemia is approximately 39.1% depending on the definition of anemia according to hemoglobin levels in each study. The results differ from our study possibly because our study was conducted on gastrointestinal cancer patients while Shander A's study was conducted on all types of surgery. Early identification and effective treatment of anemia has the potential to reduce surgery-related complications and improve clinical outcomes [2].

The study by Ngo Thi Linh and colleagues on 125 patients, evaluating nutritional status and complications of patients with gastrointestinal cancer, found a preoperative anemia rate of 27.2%, mean age 60.3 ± 14.0. Our study had a preoperative anemia rate of 49.2%, much higher than Ngo Thi Linh's study, and the mean age in our study was also higher at 64.19 ± 12.7. In our study, colorectal surgery accounted for 67.2%, while in Ngo Thi Linh's study, the rates of colorectal and gastric surgery were nearly equivalent: 32% and 32.8%. This difference may be due to the different disease characteristics of each hospital [7].

The study by Ristescu I and colleagues on colorectal cancer patients found a preoperative anemia rate of 52.3%, mean age 65.6 ± 11.1. Ristescu I's study results were similar in terms of mean age compared to our study, but the preoperative anemia rate was higher than our study, possibly due to different study populations. The preoperative blood transfusion rate was 2.3%, lower than our study's 15.5% [3].

The study by Leichtle SW and colleagues on colorectal cancer patients showed: severe anemia 1.3%, moderate anemia 7.4%, and mild anemia 38.7%. No anemia 52.6% was consistent with our study. The causes of anemia may be due to occult or

obvious gastrointestinal bleeding, bone marrow suppression, iron deficiency, and side effects of adjuvant therapy [4].

Author Bui Thi Duyen and colleagues evaluated the nutritional status of patients before and after gastrointestinal surgery at Military Hospital 175. A cross-sectional descriptive study was conducted on 98 patients undergoing gastrointestinal surgery, with a preoperative anemia rate of 48%. Bui Thi Duyen's study population included emergency surgery cases, but the results were still quite similar to our results [8].

Limitations of our study include conducting it in a relatively short time period and not yet surveying the effects of preoperative anemia on complications and postoperative mortality.

5. CONCLUSION

The presence of preoperative anemia is now recognized as an independent risk factor for postoperative complications and mortality. Anemia should be accurately diagnosed and appropriately treated medically.

REFERENCES

[1] Partridge J, Harari D, Gossage J, Dhesi J. Anaemia in the older surgical patient: a review of prevalence, causes, implications and management. J R Soc Med. 2013 Jul;106(7):269-77. doi: 10.1177/0141076813479580. Epub 2013 Jun 6. PMID: 23759887; PMCID: PMC3704065.

[2] Shander A, Corwin HL, Meier J, Auerbach M, Bisbe E, Blitz J, Erhard J, Faraoni D, Farmer SL, Frank SM, Girelli D, Hall T, Hardy JF, Hofmann A, Lee CK, Leung TW, Ozawa S, Sathar J, Spahn DR, Torres R, Warner MA, Muñoz M. Recommendations From the International Consensus Conference on Anemia Management in Surgical Patients (ICCAMS). Ann Surg. 2023 Apr 1;277(4):581-590. doi: 10.1097/SLA.0000000000005721. Epub 2022 Sep 21. PMID: 36134567; PMCID: PMC9994846.

[3] Ristescu I, Pintilie G, Filip D, Jitca M, Fecheta R, Florescu I, Scripcariu V, Filipescu D, Grigoraş I. Perioperative Anemia and Transfusion in Colorectal Cancer Patients. Chirurgia (Bucur). 2019 Mar-Apr;114(2):234-242. doi: 10.21614/chirurgia.114.2.234. PMID: 31060656.

[4] Leichtle SW, Mouawad NJ, Lampman R, Singal B, Cleary RK. Does preoperative anemia adversely affect colon and rectal surgery outcomes? J Am Coll Surg. 2011 Feb;212(2):187-94. doi: 10.1016/j.jamcollsurg.2010.09.013. PMID: 21276532.

[5] World Health Organization. Haemoglobin concentration for the diagnosis of anaemia and assessment of severity. https://iris.who.int/bitstream/handle/10665/85839/WHO_NMH_NHD_MNM_11.1_eng.pdf?sequence=22. 2021.

[6] Bộ y tế. Quyết định số 1832/QĐ-BYT. Hướng dẫn chẩn đoán và điều trị một số bệnh lý huyết học. 2022:10.

[7] Ngô Thị Linh, Phạm Văn Phú, Tình trạng dinh dưỡng và biến chứng của bệnh nhân ung thư đường tiêu hóa tại Bệnh viện Hữu Nghị Việt Đức; Tạp chí Y học Cộng đồng, 2020, 4(57): 83-89.

[8] Bùi Thị Duyên, Nguyễn Quang Dũng. Tình trạng dinh dưỡng trước và sau phẫu thuật của người bệnh phẫu thuật đường tiêu hóa tại Bệnh viện Quân Y 175 năm 2020. Tạp chí dinh dưỡng và thực phẩm, 2021, 17(2): 13-44.