DOI: 10.4274/anatoljmed.2025.28291
Anatol J Gen Med Res 2025;35(3):294-300

CLINICAL RESEARCH / KLİNİK ARAŞTIRMA

ANATOLIAN JOURNAL of GENERAL MEDICAL RESEARCH

Comparison of Clinicopathological Features in Gastric Cancer Patients with and without Bleeding at Initial Presentation

İlk Başvuru Anında Kanama Bulgusu Olan ve Olmayan Mide Kanseri Hastalarında Klinikopatolojik Özelliklerin Karşılaştırılması

Seval Akay[1], **Kamil Pehlivanoğlu**[2]

[1]İzmir City Hospital, Clinic of Medical Oncology, İzmir, Türkiye
[2]University of Health Sciences Türkiye, İzmir Tepecik Education and Research Hospital, Department of General Surgery, İzmir, Türkiye

Cite as: Akay S, Pehlivanoğlu K. Comparison of clinicopathological features in gastric cancer patients with and without bleeding at initial presentation. Anatol J Gen Med Res. 2025;35(3):294-300

Abstract

Objective: We aimed to investigate whether the presence of bleeding complaints at initial presentation affected laboratory and histopathological features in patients diagnosed with gastric cancer, dividing the patients into two groups: those with and those without such complaints.

Methods: Data from 148 patients diagnosed with gastric cancer were retrospectively analyzed using the hospital's computerized medical record system. Patients were grouped based on the presence or absence of hematemesis or endoscopic signs of bleeding, and compared with respect to age, sex, tumor location, disease stage, hemogram parameters, neutrophil-to-lymphocyte ratio (NLR), mean platelet volume (MPV)-to-platelet ratio (PLT), and blood group characteristics. Tumors located in the fundus or cardia were classified as proximal gastric tumors. Non-parametric variables were analyzed using the Mann-Whitney U test, parametric variables were analyzed using the independent samples t-test, and categorical variables were analyzed using the chi-square test. A p-value of ≤0.05 was considered statistically significant.

Results: Among the 148 patients included in the study (median age: 61.09 years; range: 29-87 years), 67 presented with bleeding symptoms, while 81 did not. There was no statistically significant difference in age or sex distribution between the two groups. Tumor localization, histological subtype, disease stage, and blood group characteristics were also similar between groups. Although the hemoglobin levels were lower in the bleeding group, this difference was not statistically significant (p=0.352). However, neutrophil counts were significantly higher (p=0.020) and lymphocyte counts significantly lower (p=0.007) in patients with bleeding. No significant differences were observed in platelet count, MPV, NLR, or MPV/PLT. The presence of bleeding was not associated with the need for neoadjuvant chemotherapy (p=0.155).

Conclusion: The presence of bleeding at initial presentation in patients with gastric cancer was not associated with differences in demographic features, tumor localization, histopathological subtype, or clinical stage. However, altered neutrophil and lymphocyte counts suggest that the bleeding may indicate an acute inflammatory response. These findings highlight the potential role of hematologic parameters as adjunctive markers in the initial assessment of gastric cancer patients presenting with gastrointestinal bleeding.

Keywords: Gastric cancer, upper gastrointestinal bleeding, hematologic parameters, tumor localization, neutrophil-to-lymphocyte ratio (NLR)

Address for Correspondence/Yazışma Adresi: Seval Akay, MD, İzmir City Hospital, Clinic of Medical Oncology, İzmir, Türkiye
E-mail: drsevalakay@hotmail.com
ORCID ID: orcid.org/0000-0002-1235-6739

Received/Geliş tarihi: 11.09.2025
Accepted/Kabul tarihi: 27.10.2025
Published date/Yayınlanma tarihi: 30.12.2025

Öz

Amaç: Bu çalışmada, mide kanseri tanısı alan hastalarda ilk başvuruda kanama semptomlarının varlığının laboratuvar ve histopatolojik özellikler üzerine etkisini araştırmayı amaçladık.

Yöntem: Mide kanseri tanısı alan 148 hasta retrospektif olarak değerlendirildi. Hastalar hematemez veya endoskopik kanama bulgularının varlığına göre kanamalı ve kanamasız olmak üzere iki gruba ayrıldı. Yaş, cinsiyet, tümör lokalizasyonu, hastalık evresi, hemogram parametreleri, nötrofil-lenfosit oranı (NLR), ortalama trombosit hacmi (MPV)-trombosit oranı (PLT) ve kan grubu özellikleri açısından karşılaştırmalar yapıldı. Fundus ve kardiya yerleşimli tümörler proksimal mide tümörü olarak sınıflandırıldı. Parametrik olmayan değişkenler Mann-Whitney U testi, parametrik değişkenler bağımsız örneklem t-testi ve kategorik değişkenler ki-kare testi ile analiz edildi; p≤0,05 anlamlı kabul edildi.

Bulgular: Çalışmaya alınan 148 hastanın (medyan yaş: 61,09; aralık: 29-87) 67'sinde kanama semptomu mevcutken 81'inde yoktu. Gruplar arasında yaş, cinsiyet, tümör lokalizasyonu, histolojik tip, evre ve kan grubu açısından anlamlı fark saptanmadı. Kanamalı grupta hemoglobin düzeyleri daha düşük olmakla birlikte bu fark anlamlı değildi (p=0,352). Buna karşın nötrofil sayısı belirgin yüksek (p=0,020), lenfosit sayısı ise anlamlı düşük (p=0,007) bulundu. Trombosit sayısı, MPV, NLR ve MPV/PLT oranlarında anlamlı fark görülmedi. Kanama varlığı neoadjuvan kemoterapi ihtiyacıyla ilişkili değildi (p=0,155).

Sonuç: Mide kanserli hastalarda ilk başvuruda kanama varlığı; demografik özellikler, tümör lokalizasyonu, histopatolojik alt tip veya klinik evre ile ilişkili bulunmadı. Ancak nötrofil ve lenfosit düzeylerindeki değişiklikler kanamanın akut inflamatuvar yanıtı yansıtabileceğini göstermektedir. Bu bulgular, gastrointestinal kanama ile başvuran mide kanserli hastalarda hematolojik parametrelerin başlangıç değerlendirmesinde yardımcı biyobelirteçler olabileceğini düşündürmektedir.

Anahtar Kelimeler: Mide kanseri, üst gastrointestinal sistem kanaması, hematolojik parametreler, tümör lokalizasyonu, nötrofil-lenfosit oranı (NLR)

Introduction

Gastric cancer ranks as the fifth most common malignancy worldwide[1]. Its clinical presentation is highly variable, and a significant proportion of patients are diagnosed at an advanced stage. While most patients present with non-acute constitutional symptoms such as weight loss, abdominal pain, and fatigue, gastric cancer may also manifest with acute complications including hematemesis, tumor or organ perforation, or gastric outlet obstruction-conditions that have been associated with poor overall survival[2,3]. In fact, the overall survival of patients presenting with such acute symptoms has been reported to be as short as six months[4]. However, improved diagnostic tools and advancements in treatment have contributed to better overall survival rates in recent years.

Bleeding due to malignancy accounts for approximately 3% of upper gastrointestinal (GI) bleeding cases[5]. Regardless of etiology, upper GI bleeding is associated with a mortality rate ranging from 2% to 10%[6]. Although bleeding is a significant clinical feature of gastric cancer, it is not always evident. Some patients present with overt symptoms such as hematemesis or melena, whereas others have minor bleeding confirmed only by microcytic anemia or show no signs of bleeding.

This study aims to compare the clinical and pathological characteristics of gastric cancer patients based on the presence or absence of bleeding at the time of initial presentation. The findings are expected to enhance our understanding of the diverse clinical manifestations of gastric cancer and contribute to the development of improved diagnostic and therapeutic strategies.

Materials and Methods

The study was approved by the Ethics Committee of University of Health Sciences Türkiye, İzmir Tepecik Education and Research Hospital (approval no: 2025/05-23, date: 12.06.2025). Given the retrospective design, the requirement for informed consent was waived.

This was a retrospective, single-center cohort study conducted between 2011 and 2023. A total of 148 consecutive patients diagnosed with gastric cancer during this period were included. Patients with prior gastric surgery affecting bleeding risk, hematologic disorders that could alter laboratory parameters, or incomplete clinical data were excluded.

Patients were stratified into two groups based on their bleeding status at initial presentation. The bleeding group included patients presenting with hematemesis, melena, or endoscopic evidence of bleeding. The non-bleeding group consisted of patients who had no clinical or endoscopic signs of upper GI bleeding at diagnosis.

Data were extracted from the hospital's electronic medical records, including several key variables. Demographic data included age, sex, and blood group. Tumor characteristics included location (categorized as proximal-cardia/fundus/corpus-, or antrum), histopathology, and clinical stage

according to the American Joint Committee on cancer tumor node metastasis classification. Laboratory parameters at presentation were recorded, including hemoglobin, leukocyte count, neutrophil count, lymphocyte count, platelet count, mean platelet volume (MPV), neutrophil-to-lymphocyte ratio (NLR), and MPV-to-platelet ratio (PLT). Treatment data included whether patients received neoadjuvant chemotherapy.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics, version 20 (IBM Corp., Armonk, NY, USA). Normality was assessed with the Kolmogorov-Smirnov test. Normally distributed variables were reported as mean ± standard deviation and compared using the independent samples t-test. Non-normally distributed variables were presented as medians (interquartile ranges) and compared with the Mann-Whitney U test. Categorical variables were analyzed using the chi-square test or Fisher's exact test as appropriate. A p-value ≤0.05 was considered statistically significant.

Results

A total of 148 patients aged 29-87 years were included in the study; the median age was 61.09 years. Among the 67 patients who presented with GI bleeding (age range 37-84 years), the mean age was 61.18 years; among the 80 patients without bleeding (age range 29-87 years), the mean age was 61.01 years. According to the Kolmogorov-Smirnov test, the age distributions in both groups were normal. When patients were stratified using age thresholds of ≥50, ≥60, and ≥70 years, no statistically significant association was found between age and bleeding at presentation (p=0.767, p=0.305, and p=0.540, respectively).

Of the 148 patients, 64% were male (n=95) and 36% were female (n=53). There was no significant difference in sex between patients with bleeding at diagnosis and those without (p=0.732). Tumor histopathology was also similar between the two groups (Table 1).

Table 1. Comparison of hematological parameters between gastric cancer patients with and without gastrointestinal bleeding at initial presentation

	Median	Standard deviation	p-value
Age			
*absent	61.01	11.87	0.930
*present	61.18	10.94	
Hemoglobin			
*absent	12.10	2.22	0.352
*present	11.07	2.34	
Leucocyte			
*absent	7760	2568	0.061
*present	8830	4219	
Neutrophyl			
*absent	5010	2426	0.020
*present	6230	3825	
Lymphocyte			
*absent	1940	802	0.007
*present	1590	732	
Platelet			
*absent	266260	103518	0.607
*present	276400	135491	
MPV			
*absent	8.60	1.06	0.274
*present	8.50	1.20	

Table 1. Continued

	Median	Standard deviation	p-value
Neutrophyl/lymphocyte			
*absent	3.92	6.77	0.118
*present	6.93	15.55	
MPV/platelet			
*absent	0.04	0.03	0.324
*present	0.03	0.01	

*: Refers to bleeding, MPV: Mean platelet volume

Regarding blood types, 35.2% of patients were blood group 0, 47.7% group A, 8.6% group B, and 8.6% group AB. No significant association was found between blood group and the presence of bleeding (p=0.556). Additionally, no significant differences were observed according to the presence of A or B antigens or antibodies (p=0.947 and p=0.179, respectively).

Tumor localization was as follows: corpus (41.2%), antrum (35.8%), and proximal stomach (fundus and/or cardia) (23%). Tumor location did not differ significantly between the bleeding and non-bleeding groups (p=0.403) (Figure1).

The presence of metastasis at diagnosis did not differ significantly between groups (p=0.056).

When hematological parameters were compared, the median leukocyte count was significantly higher in patients presenting with bleeding (p=0.001), and the neutrophil count was also significantly elevated in this group (p=0.035). The median lymphocyte count tended to be lower in bleeding patients (p=0.007). However, there was no significant difference in hemoglobin (p=0.601), platelet count (p=0.607), MPV (p=0.274), NLR (p=0.118), or MPV-to-PLT (p=0.324) between the two groups.

Lymphocyte count was normally distributed in non-bleeding patients, with a median of 1.90 x10^9/L; in bleeding patients it was non-normally distributed, with a median of 1.50 x10^9/L (p=0.025) (Table 2).

Histopathological evaluation of surgical specimens revealed no significant difference in tumor type between groups (p=0.877) (Table 3).

Among patients who received neoadjuvant chemotherapy, 45.5% were in the bleeding group and 54.5% in the non-bleeding group; this difference was not statistically significant (p=0.155).

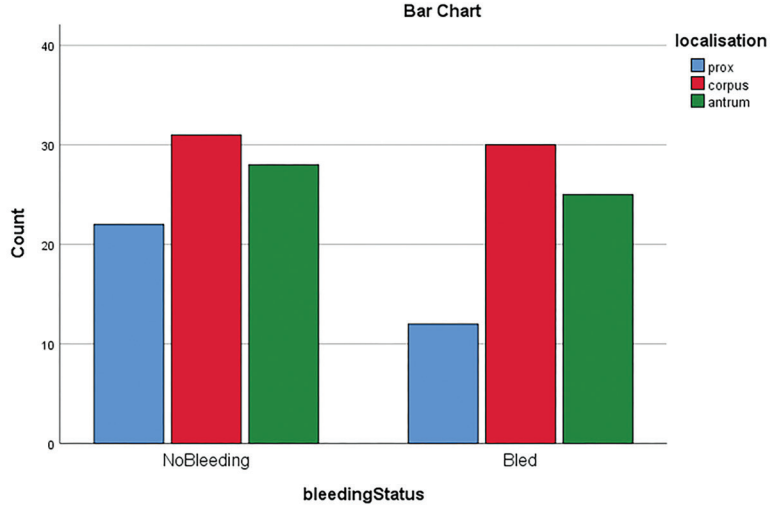

Figure 1. Distribution of tumor localization according to the presence or absence of gastrointestinal bleeding at initial presentation

Table 2. Comparison of clinicopathological and demographic characteristics between gastric cancer patients with and without gastrointestinal bleeding at initial presentation

Parameters	No bleeding	Bleeding	p-value
Sex			
Female	30	23	0.732
Male	51	44	
Location			
True gastric	63	57	0.259
Cardia	18	10	
Location			
Cardia	17	10	
Fundus	5	2	0.557
Corpus	31	30	
Antrum	28	25	
Blood group			
0	26	19	
A	34	27	0.566
B	4	7	
AB	5	6	
Group A			
Antigen-A	39	33	0.947
Antibody-A	30	26	
Group-B			
Antigen-B	9	13	0.179
Antibody-B	60	46	
Pathology			
Adenocarcinoma	69	54	
Neuroendocrine	7	8	0.877
GIST*	2	2	
Squamous cell	2	1	
Stage			
Stage 1	25	17	
Stage 2	14	15	0.826
Stage 3	19	16	
Stage 4	1	1	

GIST: Gastrointestinal stromal tumor

Table 3. Distribution of histopathological subtypes based on bleeding status at initial presentation in gastric cancer patients

Operation material	No bleeding (n)	Bleeding (n)	Total
Adenocarcinoma	69	54	123
Neuroendocrin carcinoma	7	8	15
GIST	2	2	4
Squamous cell carcinoma	2	1	3

GIST: Gastrointestinal stromal tumor

Discussion

In this retrospective study, clinical and laboratory parameters of patients diagnosed with gastric cancer were compared between those with and those without bleeding symptoms at initial presentation. Although hemoglobin levels were lower in patients presenting with bleeding, this difference did not reach statistical significance. This may be attributed to the acute or chronic nature of the bleeding, the hemodynamic stability of the patients, or the extent of blood loss. Additionally, the limited sample size may have contributed to the lack of statistical significance. While some studies have reported a higher incidence of GI bleeding among males and older patients, our findings did not confirm this association[7].

Inflammation is increasingly recognized as both an initiator and a promoter of cancer pathogenesis. Biological mediators released during the inflammatory process can cause structural damage to DNA, inhibit apoptosis, and facilitate tumor cell proliferation and metastasis. Consequently, inflammatory markers have been widely investigated in various types of cancer in recent years[8,9]. Among these, neutrophil, lymphocyte, and platelet counts, as well as ratios such as NLR and MPV-to-PLT, have been frequently evaluated.

In patients presenting to emergency departments with non-malignant upper GI bleeding, higher NLRs have been associated with increased mortality, whereas hemoglobin and hematocrit levels, leukocyte and platelet counts, and MPV were not significantly correlated with mortality[10]. However, no well-established thresholds or values have been defined specifically for bleeding attributable to gastric cancer. In our study, significantly elevated neutrophil counts and reduced lymphocyte levels in the bleeding group may reflect an acute inflammatory response to tumor-induced mucosal injury or suggest processes such as microbial translocation. Previous research has shown that lymphocyte counts-indicators of key players in the anti-tumor immune response-are often reduced in cancer patients[11].

Bleeding may result not only from tumor characteristics but also from acquired or iatrogenic causes. Major risk factors for GI bleeding include *Helicobacter pylori* infection, non-steroidal anti-inflammatory drug use, stress, and gastric acid secretion[12]. In this study, these factors were not assessed, and bleeding was analyzed only in relation to tumor histology and stage.

We found no significant association between bleeding and tumor localization, histological subtype, tumor stage, or demographic characteristics such as age and sex. This suggests that bleeding in gastric cancer may not depend solely on anatomical or histological features, but may involve more complex biological mechanisms. Previous studies have similarly reported no strong correlation between tumor location and bleeding in gastric cancer patients.

Study Limitations

This study has several limitations. Firstly, its retrospective, single-center design limits the generalizability of the findings. Furthermore, bleeding severity was not graded, and distinguishing acute from chronic bleeding was not possible, complicating the interpretation of the results. The standardization of laboratory tests and the timing of measurements, particularly the reliance on initial hemogram values at admission, may also have influenced the findings. Lastly, other genetic or iatrogenic factors that may predispose to bleeding were not assessed and could be explored in future research.

Conclusion

In this retrospective study, the presence of GI bleeding at initial presentation in patients with gastric cancer was not associated with significant differences in demographic characteristics, tumor location, histopathological subtype, or clinical stage. However, significantly elevated neutrophil counts and decreased lymphocyte levels in the bleeding group suggest an acute inflammatory response potentially linked to tumor-related mucosal injury. These findings underscore the potential utility of hematological parameters, particularly neutrophil and lymphocyte counts, as adjunctive markers in the early evaluation of gastric cancer patients presenting with bleeding. Further prospective studies are warranted to validate these associations and explore their prognostic implications.

Ethics

Ethics Committee Approval: The study was approved by the Ethics Committee of University of Health Sciences Türkiye, İzmir Tepecik Education and Research Hospital (approval no: 2025/05-23, date: 12.06.2025).

Informed Consent: Given the retrospective design, the requirement for informed consent was waived.

Footnotes

Authorship Contributions

Surgical and Medical Practises: K.P., Concept: S.A., K.P., Design: S.A., K.P., Data Collection or Processing: S.A., Analysis or Interpretation: S.A., Literature Search: S.A., Writing: S.A.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. World Health Organization. International Agency for Research on Cancer: global cancer observatory. Available from: https://gco.iarc.who.int/media/globocan/factsheets/populations/900-world-fact-sheet.pdf
2. Kim HM, Kang D, Park JY, Cho YK, Choi MG, Park JM. Mortality risk scoring system in patients after bleeding from cancers in the upper gastrointestinal tract. Gut Liver. 2024;18:222-30.
3. Zhang J, Li K, Zhang Z, et al. Short-and long-term outcomes of one-stage versus two-stage gastrectomy for perforated gastric cancer: a multicenter retrospective propensity score-matched study. World J Surg Oncol. 2024;22:7.
4. Jeong SH, Park M, Seo KW, Min JS. Advances in surgical management of malignant gastric outlet obstruction. Cancers. 2025;17:2567.
5. Alali AA, Barkun AN. An update on the management of non-variceal upper gastrointestinal bleeding. Gastroenterol Rep (Oxf). 2023;11:goad011.
6. Antunes C, Tian C, Copelin II EL. Upper gastrointestinal bleeding. Treasure Island (FL): StatPearls Publishing; 2024.
7. van Leerdam ME, Vreeburg EM, Rauws EA, et al. Acute upper GI bleeding: did anything change? Time trend analysis of incidence and outcome of acute upper GI bleeding between 1993/1994 and 2000. Am J Gastroenterol. 2003;98:1494-9.
8. Çelik A, Armağan HH, Karaman K, et al. Retrospective review of hemogram parameters and vital findings in patients with non-variceal upper gastrointestinal tract bleeding. Med J SDU. 2024;31:45-51.
9. Dirican N, Anar C, Atalay Ş, et al. Effects on prognosis of hematologic parameters in patient with small cell lung cancer. Cukurova Med J. 2016;41:333-41.
10. Sargın M, Şahin M, Yalçın HR. Are hematological markers helpful in predicting the difference between endometrial intraepithelial neoplasia and grade 1 endometrioid endometrial carcinoma in the preoperative period? Jinekoloji Obstetrik Neonatol Tıp Dergisi. 2025;22:101-6.
11. Dertli R, Toka B, Asıl M, et al. Can neutrophil-lymphocyte ratio predict mortality in acute non-variceal upper gastrointestinal bleeding? Ulus Travma Acil Cerrahi Derg. 2022;28:626-33.
12. Dunn GP, Old LJ, Schreiber RD. The immunobiology of cancer immunosurveillance and immunoediting. Immunity. 2004;21:137-48.