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ORIGINAL ARTICLE

Retrospective Study

Predictors of poor outcome in gastrointestinal bleeding in emergency department

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Abstract

AIM: To determine the prognostic risk factors of gastrointestinal bleeding in emergency department cases.

METHODS: The trial was a retrospective single-center study involving 600 patients over 18-years-old and carried out with approval by the Institutional Ethics Committee. Patient data included demographic characteristics, symptoms at admission, past medical history, vital signs, laboratory results, endoscopy and colonoscopy results, length of hospital stay, need of intensive care unit (ICU) admission, and mortality. Mortality rate was the principal endpoint of the study, while duration of hospital stay, required interventional treatment, and admission to the ICU were secondary endpoints.

RESULTS: The mean age of patients was 61.92-years-old. Among the 600 total patients, 363 (60.5%) underwent upper gastrointestinal endoscopy and the most frequent diagnoses were duodenal ulcer (19.2%) and gastric ulcer (12.8%). One-hundred-and-fifteen (19.2%) patients required endoscopic treatment, 20 (3.3%) required surgical treatment, and 5 (0.8%) required angiographic embolization. The mean length of hospital stay was 5.21 ± 5.85 d. The mortality rate was 6.3%. The ICU admission rate was 5.3%. Patients with syncope, higher blood glucose levels, and coronary artery disease had significantly higher ICU admission rates (P = 0.029, P = 0.043, and P = 0.002, respectively). Patients with low thrombocyte levels, high creatinine, high international normalized ratio, and high serum transaminase levels had significantly longer hospital stay (P = 0.02, P = 0.001, P = 0.019, and P = 0.005, respectively). Patients who died had significantly higher serum blood urea nitrogen and creatinine levels (P = 0.016 and P = 0.038), and significantly lower mean blood pressure and oxygen saturation (P = 0.004 and P = 0.049). Malignancy and low Glasgow coma scale (GCS) were independent predictive factors of mortality.

CONCLUSION: Prognostic factors for gastrointestinal bleeding in emergency room cases are malignancy, hypotension on admission, low GCS, and impaired kidney function.

Key words: Gastrointestinal bleeding; Poor prognosis; Mortality; Emergency department; Kidney function; Malignancy

Core tip: Early diagnosis and identification of patients at high risk of poor prognosis with gastrointestinal bleeding may increase survival rates. Identification of factors associated with prognosis based upon findings at admission to the emergency department will help to improve management of patients with gastrointestinal bleeding.

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INTRODUCTION

Gastrointestinal (GI) bleeding is one of the clinical conditions that results in approximately 7000 admissions to emergency medicine departments (EDs) annually[1]. Acute GI bleeding can be life threatening in some patients, and the overall rate of mortality for patients admitted with acute GI bleeding has been reported at 7% to 8.2%[1]. Moreover, a large proportion of these patients (reported at 19% to 28%) are admitted and monitored in the intensive care unit (ICU)[2]. Determining the clinical variables that will facilitate identification of patients with GI bleeding, who are at high risk for poor prognosis, may aid in improving initial triage as well as the timing of primary endoscopic hemostasis and the management of therapy[2]. In addition, identifying those patients who are at low risk (*i.e.*, those with minor bleeding) will allow for their treatment as outpatients[3].

The aim of this study was to determine risk factors of patients with GI bleeding upon admission to the emergency department in order to improve triaging of the patients according to high risk for mortality and needs for ICU hospitalization, longer hospital stay, and surgical treatment.

MATERIALS AND METHODS

Data collection

This trial was carried out as a retrospective single-center study performed in the ED setting. All adult patients (18 years or older) who were admitted to the ED at Hacettepe University Faculty of Medicine (Ankara, Turkey) between January 1, 2001 and December 31, 2010 were identified from the hospital database using ICD-10 codes. Each patient's medical records were obtained with approval by the institutional ethics committee (IRB No. 410.01-907). Those patients who had been transferred from other centers with a diagnosis of GI bleeding, those whose GI bleeding started after admission, and those with inadequate data in their medical records were excluded from the study.

Patient data collected for analysis included demographic characteristics, health-related complaints, medical history, vital signs, laboratory values, endoscopy and colonoscopy results, duration of follow-up, and mortality. Mortality rate was the principal endpoint of the study. Duration of hospital stay, required interventional treatment, and admission to the ICU were secondary endpoints.

Statistical analysis

The SPSS, version 18.0, was used for data analysis. Inter-group (2 groups) comparison was carried out using the independent samples *t*-test, χ^2 test, and Fisher's χ^2 analysis. Multiple (> 2) group comparison was carried out using one-way analysis of variance (ANOVA) with averaged values. To determine which group was responsible for differences found in the ANOVA results, the Tukey's honest significant difference test was used. Relationship between categorical variables was assessed by χ^2 analysis, and relationship between quantitative measurements was assessed by Pearson's correlation analysis. A P value of < 0.05 was considered statistically significant.

RESULTS

A total of 721 patients with GI bleeding symptoms had been admitted to the ED between January 1, 2001 and December 31, 2010. Of those, 600 patients met the inclusion criteria and were included in the study. Of the 121 patients that were excluded, 38 had been transferred from another hospital, 42 had GI bleeding that occurred in-hospital, and 41 had incomplete data. The mean age of the included patients was 61.92 years (male: 60.83 ± 25.34, female: 63.66 ± 17.93). The demographic and clinical features of the study population are shown in Table 1.

Of the 600 total patients, 86.7% had at least one comorbid disease, with the most frequent being hypertension (28.3%), diabetes mellitus (15.5%), and coronary artery disease (15.2%).

Of the 600 total patients, 60.5% underwent upper gastrointestinal endoscopy, with the most frequent pathological diagnoses being duodenal ulcer (19.2%) and gastric ulcer (12.8%). Normal endoscopic results were reported in 10.2% of the patients. Esophageal

Table 1 Demographic and clinical characteristics of patients

Characteristic	*n*
Sex	
Male	369
Female	231
Admission symptoms	
Melena	423
Hematemesis	142
Hematochezia	76
Syncope	34
Systolic blood pressure (mmHg)	
< 90	26
90-139	546
⩾ 140	28
Diastolic blood pressure (mmHg)	
< 60	55
60-89	539
⩾ 90	6
Heart rate (bpm)	
< 60	2
60-100	448
> 100	150
Respiratory rate (rpm)	
12-20	545
> 20	55
Oxygen saturation (%)	
< 92	14
⩾ 92	586
Glasgow coma score	
< 15	21
15	579

Mean values: Blood pressure, 82.8 ± 13.1 mmHg; Systolic blood pressure, 110.2 ± 18.2 mmHg; Diastolic blood pressure, 69.2 ± 11.8 mmHg; Heart rate, 92.7 ± 18.37 bpm; Respiratory rate, 18.2 ± 2.6 rpm; SaO_2, 95.15% ± 1.66%; Glasgow coma score, 14.93 ± 0.45.

pathologies, such as esophageal varices (4.9%) and esophagitis (1.7%), were detected in 7.7% of the patients who underwent upper gastrointestinal endoscopy. Forrest classifications[4] of endoscopic findings are given in Table 2.

Of the 600 total patients, 7.5% underwent colonoscopy, with 44.4% of those having normal colonoscopic findings and anal pathologies being the most frequently detected diagnoses (20.0%). Furthermore, active bleeding was observed in 6.7% of the patients during colonoscopy (Table 3).

Of the 600 total patients, 76.7% received medical treatment, with 19.2% requiring endoscopy, 3.3% requiring surgery, and 0.8% requiring angiographic embolization. Endoscopic treatments included sclerotherapy, laser treatment, argon plasma coagulation, and mechanical interventions such as hemoclips.

For the 600 total patients, the most frequent admission symptoms were hematemesis (30.3%), melena (20.1%), hematochezia (15.8%), and syncope (29.4%). Rate of interventional treatment, including endoscopic, surgery and angiographic embolization, was significantly higher for the patients with hematemesis than for the patients with other admission symptoms (P = 0.002). In addition, patients with elevated levels of blood urea nitrogen (BUN; ⩾ 23 mg/dL) had a higher interventional treatment rate than the patients treated with medical therapy (23.9% *vs* 13.9%, P = 0.006). Statistical analyses of the patients that required interventional therapy showed non-significant differences regarding comorbidities; specifically, the interventional therapy rate was 22.9% for patients with chronic hepatic disease, 27.4% for patients with peptic ulcer, 21.1% for patients with malignancy, 14.3% for patients with bleeding diathesis, 17.6% for patients with hypertension, 21.5% for patients with diabetes mellitus, and 22.0% for patients with coronary artery disease (all P > 0.05).

Patients that required erythrocyte suspension replacement had higher surgery rates than patients that did not require erythrocyte replacement (4.8% *vs* 1.7%; P = 0.03), while surgery rates did not differ in patients between fresh frozen plasma replaced (FFP) and non-replaced groups (4.3% *vs* 3.1%, P = 0.561). The laboratory values of patients for whom surgery was required are given in Table 4. Comorbidities and admission symptoms were not significantly associated with the treatment modality.

Of the 600 patients, 5.3% were treated in the ICU, including 14.7% of the patients who presented with syncope (P = 0.029), 2.1% of those with hematemesis (P = 0.051), 5.7% of those with melena (P = 0.560), and 5.3% of those with hematochezia (P = 0.971). The ICU admission rate was significantly higher in patients with syncope (14.7%, P = 0.029). The ICU admission rate was higher in patients with diabetes mellitus than non diabetes mellitus (9.7% *vs* 4.5%, P = 0.043). Also the ICU admission rate for patients with coronary artery diseases was higher than for patients who did not have coronary artery diseases (12.1% *vs* 4.1%, P = 0.002).

The laboratory results and vital signs of patients who were treated in the general wards/ED as compared to those treated in the ICU are presented in Table 5. Patients who were treated in the general wards/ED or ICU showed no statistically significant differences in systolic blood pressure, diastolic blood pressure, heart rate, Glasgow coma scale (GCS), or oxygen saturation (SpO_2). However, serum glucose levels were higher in the ICU admission group than in the patients treated in general wards/ED (171.47 mg *vs* 144.53 mg, P = 0.05).

For the 600 study patients, the mean length of hospital stay was 5.21 ± 5.85 d. Patients with comorbid diseases had a longer length of hospital stay than patients without comorbidities (5.52 d *vs* 3.16 d, P < 0.001). There were no statistical differences between admission symptoms and length of hospital stay. Patients with low thrombocyte level (< 150000/L), high creatinine level (> 1.2 mg/dL), high international normalized ratio (INR) (> 1.5), and high serum transaminase levels (AST, ALT) had significantly longer hospital stay than the patients with normal thrombocyte, creatinine, INR and serum transaminase level (P = 0.02, P = 0.001, P = 0.019, P = 0.005,

Table 2 Upper endoscopy results, treatment modalities and mortality rates

Forrest classification[4]	*n* (%)	Medical treatment	Endoscopic treatment[1]	Surgery	Angiographic embolization	Exitus
Spurting hemorrhage (1a)	41 (12.2)	0	39	0	2	0
Oozing hemorrhage (1b)	41 (12.2)	0	39	2	0	2
Visible vessel (2a)	16 (4.8)	2	13	1	0	1
Adherent clot (2b)	16 (4.8)	5	9	2	0	1
Flat pigmented hematin on ulcer base (2c)	3 (0.9)	3	0	0	0	0
Lesions without signs of recent hemorrhage/ fibrin-covered clean ulcer base (3)	218 (65.1)	216	0	2[2]	0	2[3]
Total	335 (100)	226	100	7	2	6

[1]Sclerotherapy, laser, argon plasma coagulation, mechanical modalities; [2]Patients who underwent surgery due to gastric malignancy; [3]Causes of mortality include septic shock and pneumonia; Forrest classification is a classification that attempt to standardize the characterization of peptic ulcers.

Table 3 Colonoscopy findings, treatment modality, and mortality rates

Colonoscopic findings	*n* (%)	Active bleeding -	Active bleeding +	Medical treatment	Endoscopic treatment	Surgery	Angiographic embolization	Exitus
Normal findings	20 (44.4)	20	0	19	0	0	0	1[1]
Anal pathologies	9 (20.0)	9	0	7	0	2	0	0
Recto-sigmoid pathologies	7 (15.6)	5	2	5	0	1	1	0
Other colon pathologies	4 (8.9)	3	1	3	1	0	1	0
Other pathologies	5 (11.1)	5	0	4	1	0	0	0
Total	45 (100)	42	3	38	2	3	2	1

[1]Cause of mortality was septic shock.

Table 4 Laboratory results and treatment modalities

	Medical treatment	Endoscopic treatment	Angiographic embolization	Surgery	*P* value
Hb (g/dL)	9.92	9.74	8.32	8.85	0.283
Htc (g/dL)	29.12	28.61	24.82	25.85	0.273
Thrombocytes (10^3/L)	251.59	272.61	282.40	291.95	0.162
BUN (mg/dL)	38.57	37.73	33.60	35.06	0.177
Creatinine (mg/dL)	1.15	1.07	1.17	1.07	0.864
Glucose, (mg/dL)	144.25	148.50	173.40	164.05	0.539
AST (IU/L)	33.59	24.33	66.20	59.75	0.635
ALT (IU/L)	26.10	20.21	62.80	29.25	0.825
aPTT (s)	31.36	26.92	31.80	26.83	0.818
INR (s)	2.22	1.59	2.40	2.25	0.831
Mean blood pressure (mmHg)	83.74	81.47	75.33	72.83	0.001
Pulse (bpm)	91.81	95.04	108.00	98.05	0.043

Data represent mean values. Hb: Hemoglobin; Htc: Hematocrit; BUN: Blood urea nitrogen; AST: Aspartate aminotransferase; ALT: Alanine aminotransferase; aPTT: Active partial thromboplastin; INR: International normalization ratio.

respectively).

The overall mortality rate of the total 600 patients was 6.3%, with 20 patients dying in the ED, 7 in the general wards, and 11 in the ICU. Eight patients died within 48 hours of admission. The mean age of the patients that survived was 61.53 ± 23.16 years and of the patients who died was 67.74 ± 15.70 years (P = 0.027). Univariate analysis of the clinical risk factors for mortality showed no statistically significant differences in sex or admission symptoms. However, serum BUN and creatinine levels were significantly higher, and mean blood pressure and $Sp0_2$ were significantly lower for the patients who died compared to those who survived (respectively 46.39 mg/dL *vs* 36.24 mg/dL, P = 0.016; 1.65 mg/dL *vs* 1.10 mg/dL, P = 0.038; 76.92 mmHg *vs* 83.28 mmHg, P = 0.004; 94.63% *vs* 95.18%, P = 0.049). Malignancy was the independent predictive factor of mortality for the patients included in the study (P < 0.001). On the other hand, none of the patients with a previous history of peptic ulcer became exitus in this study group (P = 0.014). Lower GCS was independently correlated with increased mortality (P < 0.001). The analyses of surviving patients' data and mortality are shown in Tables 6 and 7.

For the exitus group, GI endoscopy was performed in 21.1% of the patients and upper endoscopy and colonoscopy was performed in only 2.6%. The

Table 5 Comparison of laboratory results according to departments of admission

	General wards/ED	ICU	*P* value
Hb (g/dL)	9.89	8.82	0.051
Htc (g/dL)	29.04	25.96	0.054
Thrombocytes (10^3/L)	254.87	298.88	0.086
BUN (mg/dL)	36.86	37.38	0.909
Creatinine (mg/dL)	1.13	1.18	0.787
Glucose (mg/dL)	144.53	171.47	0.050
AST (IU/L)	33.21	106.59	0.131
ALT (IU/L)	24.63	88.81	0.238
aPTT (s)	30.57	28.36	0.402
INR (s)	2.11	2.61	0.370
Mean blood pressure (mmHg)	83.09	79.11	0.097
Pulse (bpm)	92.73	93.56	0.803
SpO_2 (%)	95.16	94.96	0.467

Data represent mean values. Hb: Hemoglobin; Htc: Hematocrit; BUN: Blood urea nitrogen; AST: Aspartate aminotransferase; ALT: Alanine aminotransferase; aPTT: Active partial thromboplastin; INR: International normalization ratio; ICU: Intensive care unit; ED: Emergency medicine department.

Table 6 Comparison of laboratory results for surviving and exitus patients

	Surviving	Exitus	*P* value
Hb (g/dL)	9.85	9.63	0.072
Htc (g/dL)	28.90	28.54	0.085
Thrombocytes (10^3/L)	259.06	230.05	0.280
BUN (mg/dL)	36.24	46.39	0.016
Creatinine (mg/dL)	1.10	1.65	0.038
Glucose (mg/dL)	144.56	166.76	0.268
AST (IU/L)	33.06	97.29	0.150
ALT (IU/L)	26.53	50.58	0.061
aPTT (s)	30.45	30.43	0.991
INR (s)	2.18	1.99	0.072
Mean blood pressure (mmHg)	83.28	76.92	0.004
Pulse (bpm)	92.51	96.68	0.175
SpO_2 (%)	95.18	94.63	0.049

Data represent mean values. Hb: Hemoglobin; Htc: Hematocrit; BUN: Blood urea nitrogen; AST: Aspartate aminotransferase; ALT: Alanine aminotransferase; aPTT: Active partial thromboplastin; INR: International normalization ratio.

diagnoses made from upper GI endoscopy included esophageal varices (25.0%), gastritis (25.0%), gastric ulcer (12.5%), and duodenal ulcer (37.5%). Colonoscopy results were normal for all patients in the exitus group. Endoscopic procedures were not performed in 30 of the patients due to hemodynamic instability (60.0%), high INR (13.3%), and refusal to accept the endoscopic procedure (26.6%). Causes of mortality are listed in Table 8, and malignancy was the most noted concomitant cause of mortality.

DISCUSSION

Acute GI bleeding is a frequent cause of mortality and morbidity. Optimal management of patients and prognostic factors have been defined in guidelines

Table 7 Comparison of surviving and exitus patient history, need for transfusion, and mortality *n* (%)

	Surviving	Exitus	*P* value
Medical history	562 (93.7)	38 (6.3)	
Liver disease			
+	42 (87.5)	6 (12.5)	0.730
-	520 (94.2)	32 (5.8)	
Peptic ulcer			
+	62 (100)	0 (0.0)	0.014
-	500 (92.9)	38 (7.1)	
Malignancy			
+	64 (84.2)	12 (15.8)	0.001
-	498 (95.0)	26 (5.0)	
Bleeding diathesis			
+	7 (100)	0 (0.0)	0.631
-	555 (93.6)	38 (6.4)	
Anal disease			
+	9 (100)	0 (0.0)	0.553
-	553 (93.6)	38 (6.4)	
Hypertension			
+	164 (96.5)	6 (3.5)	0.051
-	398 (92.6)	32 (7.4)	
Diabetes mellitus			
+	86 (92.5)	7 (7.5)	0.373
-	476 (93.9)	31 (6.1)	
Coronary artery disease			
+	85 (93.4)	6 (6.6)	0.530
-	477 (93.7)	32 (6.3)	
Comorbid disease			
+	77 (96.3)	3 (3.8)	0.227
-	485 (93.3)	35 (6.7)	
ES replacement			
+	291 (93.3)	21 (6.7)	0.400
-	271 (94.1)	17 (5.9)	
FFP replacement			
+	106 (92.2)	456 (94)	0.290
-	9 (7.8)	29 (6.0)	
GCS			
15	549 (94.8)	30 (5.2)	0.000
< 15	13 (61.9)	8 (38.1)	

ES: Erythrocyte suspension; FFP: Fresh frozen plasma; GCS: Glasgow coma score.

and previous trials for both upper and lower GI bleeding. Nonetheless, no studies in the literature to date have adequately examined all the prognostic factors of GI bleeding. To the best of our knowledge, the study described herein is one of the largest studies to have analyzed the prognostic factors of all adult patients with GI bleeding presenting to an ED. The results indicate that having a concomitant malignancy, decreased GCS, decreased mean arterial blood pressure, increased serum creatinine level, or increased BUN level is associated with increased mortality rate.

More than half of patients with GI bleeding have a comorbid disease and according to the literature the most frequent of these diseases are hypertension, diabetes mellitus, coronary artery diseases, malignancies, and hepatic diseases[5-7]. Clinical guidelines published in 2008 in Scotland cited a mortality rate of 4% in GI bleeding patients without comorbidities, with the mortality rate increasing

Table 8 Causes of mortality

Causes of mortality	*n* (%)
Malignancy[1]	14 (36.8)
Esophageal varices bleeding	8 (21.1)
Sepsis/septic shock	6 (15.8)
Renal failure	4 (10.5)
Multi organ failure	3 (7.9)
Others[2]	3 (7.9)
Total	38 (100)

[1]Gastric cancer, esophageal adenocancer, hepatocellular carcinoma; [2]Anticoagulant therapy for venous thromboembolism, mesenteric ischemia.

1.8 times in cases with heart failure, 3.8 times in cases with malignancy, and 2.0 times in cases with liver disease[1]. According to the National Institute for Health and Clinical Excellence 2012 guidelines, patients with GI bleeding who also have chronic diseases are at a higher risk of death[8]; similarly, 86.7% of patients in our study had at least one comorbidity. Furthermore, in our study, the patients with malignancy had significantly higher mortality rate. Patients with diabetes mellitus and coronary artery diseases, however, had significantly higher rates of ICU admission. Acute bleeding causes hemodynamic instability, and this condition worsens in the condition of coronary artery disease, particularly in patients with heart failure. Another factor underlying the higher ICU admission rate of patients with coronary artery disease was anticoagulant, antithrombotic and antiplatelet therapy[9].

Previous studies have indicated prognostic factors for GI bleeding. The main factors of poor prognosis include hypotension, anemia, advanced age, changes in mental status, comorbid diseases, and coagulopathy[10-12]. Some of these risk factors were also identified in our study. Markers of hemodynamic instability, such as hypotension, oxygen desaturation and decreased GCS, may reflect blood loss and bleeding rate. In our study, the patients with syncope had a higher ICU admission rate. This is not surprising, however, as syncope is one of the consequences of hemodynamic instability.

In our study population, patients with increased BUN and serum creatinine levels also experienced higher mortality. Uremic bleeding is a well-recognized complication in patients with renal failure, and it affects platelet aggregation and/or the coagulation cascade[13]. In patients with chronic kidney disease, GI bleeding is also a common complication[14]. In addition, elevated BUN level in patients with GI bleeding can be due to ingested blood protein[15]. Therefore, bleeding and uremia affect the occurrence of one another. The Blatchford scale uses BUN as one of the variables to determine the prognostic outcome of patients with upper GI bleeding[16]. Anand *et al*[17] showed that elevated serum creatinine levels are associated with increased rates of mortality and re-bleeding. In addition, hypovolemia causes acute renal failure in patients with severe bleeding[18].

In our study, a large majority of the patients required medical treatment, with a very small proportion of those requiring surgery. The study by Bor *et al*[19] demonstrated that bleeding stopped in 66.9% of patients upon receipt of medical treatment, with only 3.7% of those patients undergoing surgery (proportions that were very similar to those in our study). In our study population, malignancy and severe bleeding with hemodynamic deterioration were the most common indications for surgical treatment. Severe bleeding, however, may cause a decrease in mean arterial blood pressure and, not surprisingly in our study, was associated with emergency surgery.

The study by Bor *et al*[19] also showed a mean length of hospital stay of 7 ± 5.7 d, and another study by Morales Uribe *et al*[7,19] showed a mean length of 7 d. The length of hospital stay for our study population was 5.21 d, similar to those previous studies.

In conclusion, our study revealed that the most important factors in determining morbidity and mortality of GI bleeding cases presenting to the ED were the presence of malignancy, hypotension on admission, low GCS, and impaired kidney function. These findings should prompt the identification of patients who present a poor prognosis and will contribute to improving the management of patients with GI bleeding in the ED setting.

COMMENTS

Background

Acute gastrointestinal (GI) bleeding can be life threatening in some patients; overall, the rate of mortality in patients admitted to the emergency department with acute GI bleeding is reported to be 7% to 8.2%. Determining clinical variables to identify patients with GI bleeding, who are at high risk for poor prognosis, may aid improvements in the initial triage, the timing of primary endoscopic hemostasis, and the management of therapy.

Research frontiers

Early identification of poor prognostic findings in GI bleeding can improve morbidity and mortality rates.

Related publications

Previous studies have indicated prognostic factors for GI bleeding. The main prognostic factors for poor outcome include hypotension, anemia, advanced age, changes in mental status, comorbid diseases, and coagulopathy.

Innovations and breakthroughs

Previous publications have reported that hypotension, anemia, and changes in mental status are related to poor prognosis for GI bleeding. These factors were confirmed in this study, and malignancy and impaired renal function were also found to be related to poor prognosis. In addition, the authors identified high blood glucose levels and heart failure as related to higher intensive care unit admission rate.

Applications

The study results suggest that hypotension, impaired renal function, and malignancy are related to higher mortality in patients presenting to the emergency department with GI bleeding.

Terminology

Gastrointestinal bleeding is bleeding in the gastrointestinal tract, at any point from the esophagus to the rectum.

Peer-review

This is a good descriptive study in which the authors analyzed the prognostic factors of GI bleeding on admission to the emergency department. The results are interesting and suggest that hypotension, impaired renal function and malignancy are related to poor prognosis in the study population. High blood glucose levels and heart failure were also found to be related to higher rate of admission to the intensive care unit.

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