

Prognostic indices of upper gastrointestinal bleeding in patients in the Emergency Department

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Objectives Upper gastrointestinal bleeding (UGIB) is a common but potentially fatal condition often seen in the emergency department (ED). This study aimed to investigate prognostic factors, including the emergency department length of stay (ED LOS), office hours vs. non-office hours visits, performance of an esophagogastroduodenoscopy (EGD) including time from admission to performance of the EGD which could potentially affect in-hospital all-cause mortality.

Methods A retrospective study was conducted of patients with UGIB in the ED of Maharaj Nakorn Chiang Mai Hospital during 2017. Univariable and multivariable logistic regression were used.

Results A total of 132 patients were included with a total of 19 deaths (14.4%). Logistic regression showed the presence of any liver disease, systolic blood pressure < 90 mmHg, hemoglobin ≤ 7 g/dL, platelet count $\leq 100,000$ per mm³, International Normalized Ratio (INR) ≥ 1.2 , a high Glasgow-Blatchford bleeding score, intravenous fluid $\geq 1,000$ mL, administration of blood components, use of octreotide and/or tranexamic acid were found to be associated with increased mortality ($p < 0.05$). There was no evidence that either ED LOS ≥ 180 minutes after admission or a non-office hours visit were associated with mortality ($p > 0.05$) although EGD following admission was associated with decreased mortality (odds ratio [OR] 0.19, 95% confidence interval [CI] 0.07 to 0.52, $p = 0.001$). In multivariable analysis, only EGD following admission (OR 0.01, 95% CI 0.01 to 0.1, $p = 0.001$) was associated with decreased mortality. In multivariable subgroup analysis, no evidence was found that EGD within the first 24 hours after admission (early EGD) was related to decreased mortality compared with EGD after the first 24 hours (late EGD).

Conclusions EGD following hospital admission can decrease mortality. However, there was no evidence that a longer ED LOS, whether admission occurred during office hours or outside of office hours or early vs. late EGD were associated with in-hospital all-causes mortality. **Chiang Mai Medical Journal 2021;60(3):291-302. doi: 10.12982/CMUMEDJ.2021.26**

Keywords: esophagogastroduodenoscopy, gastrointestinal hemorrhage, emergency department length of stay, mortality

Introduction

Upper gastrointestinal bleeding (UGIB) is a serious and common condition in the emergency department (ED). The incidence rate is approximately 90 people per 100,000 population (1). UGIB requires proper and prompt management. Such treatment includes medical treatment, esophagogastroduodenoscopy (EGD), fluid and blood component transfusion, and other invasive procedures. Due to variation in the availability of resources in different hospitals, the patient

mortality rate in each hospital can vary widely, ranging from 3-10% (2-5).

Recent studies have tried to identify factors associated with the mortality of UGIB patients including age, hematemesis, syncope, comorbidities, chronic alcohol drinking, shock, low hemoglobin, low platelet count, increased level of blood urea nitrogen (BUN) level (2,5-8), and elevated the international normalized ratio (INR) (9-11).

In the area of general patient care, an increase in emergency department length of stay (ED

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LOS) has been shown to be related to mortality (12,13). Other factors potentially related to mortality which have been studied include whether the mortality rate is associated with the time a patient arrives at the hospital (during office hours vs. outside office hours). Some studies have reported that non-office hours arrivals are associated with an increase in the time from arrival at the ED to when the EGD was performed (time to EGD) (14-17). However, results of studies of the association between ED LOS and office hours vs. non-office hours arrival on mortality in UGIB patients have been inconclusive. There have been no previous studies of this relationship conducted in Thailand. We hypothesized that longer ED LOS, no EGD following admission and non-office hours visits could be associated with an increase in mortality.

Although there are currently recommendations that EGD be performed within 24 hours of admission to the ED (18), details of the appropriate timing are controversial (19-21). This study aimed to identify prognostic factors associated with in-hospital all-cause mortality including ED LOS, office hours vs non-office hours visits, and time from admission to EGD.

Methods

Study design

This retrospective prognostic analytic study was conducted and approved by the Ethics Committee of the Faculty of Medicine, Chiang Mai University (Study No.: 413/2018) on 30 October 2018. Written informed consent was waived due to the retrospective design. Patient identification data was protected for privacy reasons, so another person could not access sensitive data. This study was registered in the Thai Clinical Trials Registry (www.thaiclinicaltrials.org, TCTR20201201005).

Study setting and population

Patients with UGIB treated in the ED of Maharaj Nakorn Chiang Mai Hospital, a university-based, tertiary care hospital during 2017 were included. The inclusion criteria were all patients treated in the ED that met the criteria

specified in the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) code as UGIB and related codes (K25-K29, K31.811, K57, K62.5, and K92.0-K92.2). Patients who were under 18 years old, pregnant, referred to another hospital, or denied initial treatment were excluded.

Data collection

Patients' data in the hospital electronic medical records were retrospectively reviewed by a clinician-researcher using ICD-10 codes. Independent variables, including baseline characteristics and potential prognostic factors were collected.

Baseline characteristics, including age, sex, severity of UGIB, provisional diagnosis as variceal bleeding, level on the Canadian Emergency Department Triage and Acuity Scale (CTAS) (which is routinely used in our hospital), comorbidities, current use of nonsteroidal anti-inflammatory drugs (NSAIDs), antiplatelets, anticoagulants or steroids, a history of smoking or chronic alcohol consumption, previous UGIB, presence of esophageal varices and peptic ulcers, and signs of chronic liver disease were collected. Severity of UGIB was classified as massive or non-massive. Massive UGIB was defined as a patient who presented in the ED with evidence of UGIB with hemodynamic instability including systolic blood pressure (SBP) < 90 millimeters of mercury (mm Hg), shock index (pulse rate/SBP ratio) > 1, signs of hypoperfusion (confusion, delayed capillary refilled time, oliguria or anuria) or who required blood transfusion of at least 4 units in a 24-hour period (22).

Potential prognostic factors pre-specified based on evidence from previous studies included age, symptoms, comorbidities, vital signs, hemoglobin level, platelet count, BUN, INR, pre-endoscopic Rockall score, Glasgow-Blatchford bleeding score, administration of intravenous fluid, blood components, use of proton pump inhibitors, octreotide, and tranexamic acid (7,23,24). We categorized ED LOS as either ≥ 180 or < 180 minutes. Based on a pilot chart review of LOS in resuscitation patients in our ED, the average LOS was maintained at < 180 minutes to prevent ED

overcrowding. We also recorded whether the ED visit occurred during office hours or during non-office hour periods as well as the time to EGD. We noted whether the patient received EGD after admission or not and whether the time to EGD was less than 24 hours (early EGD) or ≥ 24 hours (late EGD) after admission based on current recommendations that EGD be administered within 24 hours (18).

Outcome measures

The study aimed to identify prognostic factors associated with in-hospital all-cause mortality. Subgroup analysis was conducted to compare in-hospital all-cause mortality between late versus early EGD in patients who had EGD performed after admission.

Study size estimation

We based the sample size on the odds ratio of mortality in patients with UGIB who had EGD performed (0.38) and the incidence of EGD in the survival group (76%) (4). The sample size, 120 patients, was calculated with an alpha level of 0.05 and a power of 80%.

Statistical analysis

Descriptive data are presented as a number, percentage, mean, median, standard deviation (SD), or interquartile range (IQR) as appropriate. Categorical data were compared using the chi-square test or Fisher exact test. Continuous data with a normal distribution were compared using the t-test. Continuous data with no normal distribution were compared by means of the Mann-Whitney U test or the Kruskal-Wallis test, depending on the number of groups. The Shapiro-Wilk test and data visualization were used to test for a normal distribution. Missing data was handled with the multiple imputation method. Univariable and multivariable logistic regression, including subgroup analysis, were used to analyze factors potentially associated with mortality in UGIB. Statistically significant factors in univariable analysis ($p < 0.05$) and prespecified factors of interest including ED LOS, ED visit during office

hours or non-office hours and EGD following hospital admission were analyzed using multivariable analysis. Statistical significance was established as $p < 0.05$. Stata version 16 (Stata Corp LLC, College Station, TX, USA) was used for calculation and analysis. The datasets are available from the corresponding author on reasonable request.

Results

One hundred seventy-one patients met the initial inclusion criteria. However, after exclusion criteria were applied, 39 of those patients were excluded (Figure 1).

Of the 132 patients included, 85.6% were male. The median age was 55 years (IQR 41 to 65). Sixty-seven percent had at least one underlying disease. The most common comorbidity was liver diseases (32.8%) followed by cirrhosis (18.2%), malignancies (18.2%), renal diseases (13%), heart diseases (11.5%), and respiratory diseases (7.6%). Current medications consisted of NSAIDs (18.2%), antiplatelets (12.2%), steroids (6.8%), and anticoagulants (5.3%). Sixteen percent of the patients had massive bleeding, while 20.5% had variceal bleeding. Nineteen patients (14.4%) were in the death group. There were no statistically significant differences in baseline characteristics between the survival group and death group with the exception of the severity of disease (massive and non-massive UGIB), provisional diagnosis (variceal and non-variceal bleeding), triage level, and the comorbidity liver disease (Table 1). The massive bleeding group had a higher incidence of mortality than the non-massive bleeding group (odds ratio [OR] 5.59, 95% confidence interval [CI] 1.90 to 16.45, $p = 0.003$). No missing data was found.

Univariable logistic regression to determine the association between various variables and the mortality of UGIB patients found that any liver diseases as a comorbidity, systolic blood pressure < 90 mmHg, hemoglobin ≤ 7 g/dL, platelet count $\leq 100,000$ /mm³, INR ≥ 1.2 , Glasgow-Blatchford bleeding score (GBS), intravenous fluid $\geq 1,000$ milliliters (mL), the use of blood components, octreotide, and tranexamic acid were all associated

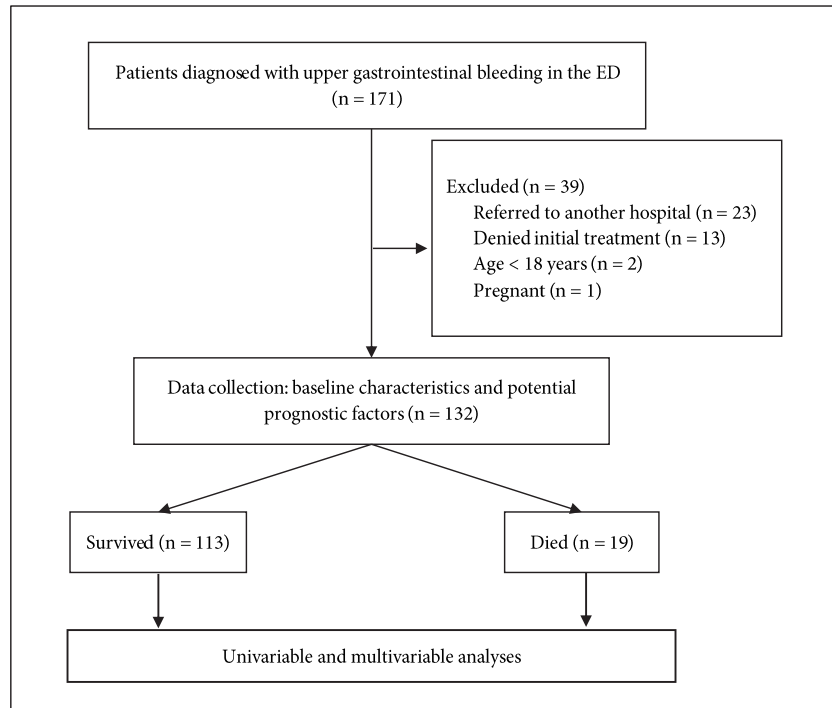


Figure 1. Study flow

Table 1. Baseline characteristics

Characteristics	Overall (n = 132)	Survived (n = 113)	Died (n = 19)	p-value*
Age – years (IQR) [†]	55 (41-65)	54 (34-64)	56 (51-74)	0.069
≥ 60 – n (%)	45	37 (82.2)	8 (17.8)	0.442
< 60 – n (%)	87	76 (87.4)	11 (12.6)	
Male – n (%)	113	94 (83.2)	19 (16.8)	0.073
Symptoms				
Hematemesis – n (%)	67	59 (88.1)	8 (11.9)	0.464
Hematochezia – n (%)	18	13 (72.2)	5 (27.8)	0.141
Syncope	37	32 (86.5)	5 (13.5)	1
Severity of UGIB – n (%)				
Massive	21	13 (61.9)	8 (38.1)	0.003
Non-massive	111	100 (90.1)	11 (9.9)	
Provisional diagnosis – n (%)				
Variceal bleeding	27	19 (70.4)	8 (29.6)	0.026
Non-variceal bleeding	105	94 (89.5)	11 (10.5)	
CTAS Triage level – n (%)				
Resuscitation	10	5 (50)	5 (50)	0.004
Emergent	33	25 (75.8)	8 (24.2)	
Urgent	81	75 (92.6)	6 (7.4)	
Less urgent	5	5 (100)	0 (0)	
Not urgent	3	3 (100)	0 (0)	

Table 1. Baseline characteristics

Characteristics	Overall (n = 132)	Survived (n = 113)	Died (n = 19)	p-value*
Comorbidities – n (%)				
Any liver diseases	43	32 (74.4)	11 (25.6)	0.013
Cirrhosis	24	18 (75)	6 (25)	0.114
Malignancies	24	18 (75)	6 (25)	0.114
Renal diseases	17	14 (82.4)	3 (17.6)	0.713
Heart diseases	15	13 (86.7)	2 (13.3)	1
Respiratory diseases	10	10 (100)	0 (0)	0.356
One or more	89	74 (83.1)	15 (16.9)	0.299
Current medications – n (%)				
NSAIDs	24	23 (95.8)	1 (4.2)	0.195
Antiplatelet	16	13 (81.3)	3 (18.8)	0.462
Anticoagulant	7	7 (100)	0 (0)	0.593
Steroid	9	8 (88.9)	1 (11.1)	1
History of smoking – n (%)	55	46 (83.6)	9 (16.4)	0.611
Chronic alcohol consumption – n (%)	78	64 (82.1)	14 (17.9)	0.123
History of UGIB – n (%)	38	33 (86.8)	5 (13.2)	1
History of varices – n (%)	20	15 (75)	5 (25)	0.156
History of peptic ulcer – n (%)	16	14 (87.5)	2 (12.5)	1
Signs of chronic liver disease – n (%)	33	26 (78.8)	7 (21.2)	0.251
Vital signs				
Systolic blood pressure – mmHg				
< 90 – n (%)	12	7 (58.3)	5 (41.7)	0.015
≥ 90 – n (%)	120	106 (88.3)	14 (11.7)	
Pulse rate – beats per minute				
≥ 100 – n (%)	64	53 (82.8)	11 (17.2)	0.460
< 100 – n (%)	68	60 (88.2)	8 (11.8)	
Respiratory rate – breaths per minute				
> 20 – n (%)	26	20 (76.9)	6 (23.1)	0.093
≤ 20 – n (%)	102	92 (90.2)	10 (9.8)	
Laboratory investigation				
Hemoglobin – g/dL				
≤ 7 – n (%)	30	22 (73.3)	8 (26.7)	0.031
> 7 – n (%)	101	91 (90.1)	10 (9.9)	
Platelet count – x 10 ³ /mm ³				
≤ 100 – n (%)	32	23 (71.9)	9 (28.1)	0.015
> 100 – n (%)	99	90 (90.9)	9 (9.1)	
BUN – mg/dL				
> 20 – n (%)	70	61 (87.1)	9 (12.9)	0.622
≤ 20 – n (%)	60	50 (83.3)	10 (16.7)	
INR				
≥ 1.2 – n (%)	57	42 (73.7)	15 (26.3)	0.001
< 1.2 – n (%)	74	70 (94.6)	4 (5.4)	
Pre-endoscopic Rockall score (IQR) [†]	3 (2-4)	3 (1-4)	4 (3-4)	0.045
Glasgow-Blatchford bleeding score (IQR) [†]	9 (4-13)	9 (4-13)	11 (9-14)	0.043

Table 1. Baseline characteristics

Characteristics	Overall (n = 132)	Survived (n = 113)	Died (n = 19)	p-value*
Treatment				
Intravenous fluid $\geq 1,000$ mL – n (%)	26	17 (65.4)	9 (34.6)	0.003
Blood component – n (%)	21	13 (61.9)	8 (38.1)	0.003
Proton-pump inhibitor – n (%)	116	101 (87.1)	15 (12.9)	0.248
Octreotide – n (%)	29	21 (72.4)	8 (27.6)	0.034
Tranexamic acid – n (%)	26	19 (73.1)	7 (26.9)	0.059
ED LOS – minutes				
≥ 180 – n (%)	66	56 (84.8)	10 (15.2)	1
< 180 – n (%)	66	57 (86.4)	9 (13.6)	
ED visit				
Non-office hours – n (%)	99	85 (85.9)	14 (14.1)	1
Office hours – n (%)	33	28 (84.8)	5 (15.2)	
EGD following admission – n (%)				
Yes	98	90 (91.8)	8 (8.2)	0.001
No	34	23 (67.6)	11 (32.4)	
EGD diagnosis – n (%) [‡]				
Variceal bleeding	40	35 (87.5)	5 (12.5)	0.124
Non-variceal bleeding	56	54 (96.4)	2 (3.6)	

* $p < 0.05$ are defined as statistically significant.

[‡]; Data presented as median (interquartile range), [‡]; patients with EGD following admission,

BUN, blood urea nitrogen; CTAS, Canadian Emergency Department Triage and Acuity Scale; ED, emergency department; EGD, esophagogastroduodenoscopy; INR, International Normalized Ratio; IQR, interquartile range; LOS, length of stay; NSAIDs, Nonsteroidal anti-inflammatory drugs; UGIB, Upper gastrointestinal bleeding; g/dL, gram per deciliter; mg/dL, milligram per deciliter; mm³, cubic millimeter; mL, milliliter; mmHg, millimeter of mercury.

with higher mortality (Table 2,3).

Using univariable logistic regression, no evidence was found that ED LOS ≥ 180 minutes was associated with mortality (OR 1.13, 95%CI 0.43 to 2.99, $p = 0.804$). Visiting the ED during office hours versus during non-office hours was not associated with mortality (OR 0.92, 95%CI 0.31 to 2.79, $p = 0.886$). No associations persisted in the multivariable regression. To explore the association of ED LOS ≥ 120 , ≥ 150 , and ≥ 210 minutes and mortality, we performed univariable post-hoc analysis which found no evidence that either ED LOS ≥ 120 (OR 1.29, 95%CI 0.35 to 4.82, $p = 0.705$), ≥ 150 (OR 2.14, 95%CI 0.66 to 6.86, $p = 0.203$) or ≥ 210 minutes (OR 1.58, 95%CI 0.59 to 4.21, $p = 0.359$) were associated

with mortality. Post-hoc multivariable analysis similarly found no evidence that ED LOS ≥ 120 (OR 0.61, 95%CI 0.04 to 8.79, $p = 0.720$) or ≥ 150 (OR 3.33, 95%CI 0.32 to 34.47, $p = 0.314$) or ≥ 210 minutes (OR 2.04, 95%CI 0.34 to 12.37, $p = 0.438$) were associated with mortality.

Univariable and multivariable logistic regression showed that the mortality of patients who had EGD performed at admission was lower than those who did not have EGD performed at admission. There was no evidence of differences in EGD following admission between non-massive (72.1%) and massive UGIB (85.7%) ($p = 0.277$). Among the 34 patients with no EGD following admission, 3 patients (8.8%) with massive UGIB and 8 patients (23.5%) with non-massive UGIB

Table 2. Univariable analysis of association of potential prognostic factors with mortality

Variables	Univariable analysis	
	Odds ratio (95% CI)	<i>p</i> -value*
Age – years		
≥ 60 – n (%)	1.49 (0.55-4.03)	0.428
< 60 – n (%)	Ref	
Symptoms		
Hematemesis – n (%)	0.67 (0.25-1.78)	0.417
Hematochezia – n (%)	2.69 (0.83-8.71)	0.098
Syncope	0.90 (0.30-2.72)	0.857
Comorbidities – n (%)		
Any liver diseases – n (%)	3.98 (1.42-11.17)	0.009
Liver cirrhosis – n (%)	2.44 (0.82-7.25)	0.110
Vital signs		
Systolic blood pressure – mmHg		
< 90 – n (%)	5.41 (1.51-19.37)	0.010
≥ 90 – n (%)	Ref	
Pulse rate – beats per minute		
≥ 100 – n (%)	1.56 (0.58-4.16)	0.378
< 100 – n (%)	Ref	
Respiratory rate – breaths per minute		
> 20 – n (%)	2.76 (0.90-8.47)	0.076
≤ 20 – n (%)	Ref	
Laboratory investigation		
Hemoglobin – g/dL		
≤ 7 – n (%)	3.31 (1.17-9.36)	0.024
> 7 – n (%)	Ref	
Platelet count – x 10 ³ /mm ³		
≤ 100 – n (%)	3.91 (1.40-10.97)	0.010
> 100 – n (%)	Ref	
BUN – mg/dL		
> 20 – n (%)	0.74 (0.28-1.96)	0.541
≤ 20 – n (%)	Ref	
INR		
≥ 1.2 – n (%)	6.25 (1.95-20.09)	0.002
< 1.2 – n (%)	Ref	
Pre-endoscopic Rockall score	1.21 (0.94-1.56)	0.133
Glasgow-Blatchford bleeding score	1.13 (1.01-1.27)	0.034
Treatment		
Intravenous fluid ≥ 1,000 mL – n (%)	5.08 (1.80-14.35)	0.002
Blood component use – n (%)	5.59 (1.90-16.45)	0.002
Proton-pump inhibitor use – n (%)	0.45 (0.13-1.56)	0.207
Octreotide use – n (%)	3.19 (1.14-8.90)	0.027
Tranexamic acid use – n (%)	2.89 (1.01-8.28)	0.049
ED LOS – minutes		
≥ 180 – n (%)	1.13 (0.43-2.99)	0.804
< 180 – n (%)	Ref	
ED visit		
Non-office hours – n (%)	0.92 (0.31-2.79)	0.886
Office hours – n (%)	Ref	
EGD following hospital admission – n (%)		
Yes	0.19 (0.07-0.52)	0.001
No	Ref	

**p* < 0.05 are defined as statistically significant.

Abbreviations: BUN, blood urea nitrogen; CI, confidence interval; ED, emergency department; EGD, esophagogastroduodenoscopy; INR, International Normalized Ratio; LOS, length of stay; Ref, reference; g/dL, gram per deciliter; mg/dL, milligram per deciliter; mm³, cubic millimeter; mL, milliliter; mmHg, millimeter of mercury.

Table 3. Multivariable analysis of association of potential prognostic factors with mortality

Variables	Multivariable analysis	
	Odds ratio (95% CI)	<i>p</i> -value*
Any liver diseases – n (%)	6.84 (0.94-49.62)	0.057
Vital signs		
Systolic blood pressure – mmHg		
< 90 – n (%)	4.58 (0.44-47.4)	0.202
≥ 90 – n (%)	Ref	
Laboratory investigation		
Hemoglobin – g/dL		
≤ 7 – n (%)	1.98 (0.23-17.49)	0.537
> 7 – n (%)	Ref	
Platelet count – $\times 10^3/\text{mm}^3$		
≤ 100 – n (%)	2.6 (0.34-19.81)	0.355
> 100 – n (%)	Ref	
INR		
≥ 1.2 – n (%)	21.5 (0.81-572.72)	0.067
< 1.2 – n (%)	Ref	
Glasgow-Blatchford bleeding score	0.94 (0.76-1.17)	0.572
Treatment		
Intravenous fluid ≥ 1,000 mL – n (%)	2.45 (0.26-23.5)	0.436
Blood component use – n (%)	4.58 (0.38-55.3)	0.231
Octreotide use – n (%)	1.14 (0.14-9.59)	0.905
Tranexamic acid use – n (%)	5.68 (0.63-51.27)	0.122
ED LOS – minutes		
≥ 180 – n (%)	0.86 (0.15-5.02)	0.864
< 180 – n (%)	Ref	
ED visit		
Non-office hours – n (%)	0.32 (0.05-2.04)	0.227
Office hours – n (%)	Ref	
EGD following hospital admission – n (%)		
Yes	0.01 (0.01-0.1)	0.001
No	Ref	

* $p < 0.05$ are defined as statistically significant.

Abbreviations: CI, confidence interval; ED, emergency department; EGD, esophagogastroduodenoscopy; INR, International Normalized Ratio; LOS, length of stay; Ref, reference; g/dL, gram per deciliter; mg/dL, milligram per deciliter; mm^3 , cubic millimeter; mL, milliliter; mmHg, millimeter of mercury

did not have EGD following hospital admission due to their death occurring before EGD could be performed. Patients with non-massive UGIB had a lower incidence of mortality (OR 0.18, 95%CI 0.06 to 0.53, $p = 0.002$). Among the 98 patients with EGD following admission, the number of patients with non-massive UGIB was higher (81.6%) than those with massive UGIB.

Ninety-eight patients (74.2%) had EGD performed following admission. Of those, 41.8%

had early EGD within 24 hours of admission and 58.2% had late EGD. In univariable subgroup analysis of early EGD and late EGD, the patients with late EGD had lower mortality (OR 0.09, 95%CI 0.01 to 0.74, $p = 0.025$). After adjusting for other prognostic factors with multivariable analysis, it was found that mortality with late EGD was not significantly different than with early EGD (OR 0.01, 95%CI < 0.01 to 7.24, $p = 0.122$).

Discussion

Among patients visiting the ED, those with UGIB have a serious condition which can result in death. We found that the in-hospital all-cause mortality was 14.4% and higher in patients who did not receive EGD following hospital admission (32.3%). Hearnshaw et al. similarly reported that overall mortality was 10% and 45% in patients those not receiving EGD following hospital admission (4). However, Kaya et al. and Imperiale et al. found lower overall mortality (6.3% and 3.1%, respectively) in hospitals in developed countries. That difference might be due to the fact that developing countries generally have more limited facilities (2,5). For example, a hierarchical system for referral of patients to an EGD-capable hospital in a developing country might result in delayed treatment. We compared our results with a previous study in Thailand which is similar in context. The present study found mortality from variceal and non-variceal bleeding were 12.5% and 3.6%, respectively. Those results are similar to Sangchan et al. which reported the mortality rate from variceal and non-variceal bleeding in tertiary care hospitals in Thailand to be 12.4% and 7.4%, respectively (25).

Using univariable analysis, we found that comorbidities, including any liver diseases, systolic blood pressure < 90 mmHg, hemoglobin ≤ 7 g/dL, platelet count $\leq 100,000/\text{mm}^3$, INR ≥ 1.2 , Glasgow-Blatchford bleeding score, intravenous fluid use $\geq 1,000$ mL, use of blood components, octreotide, and tranexamic acid were associated with increased mortality, but that the mortality rate of patients who received EGD following admission declined. Our results are consistent with many other studies that found those variables to be associated with mortality in UGIB patients. Variables previously found to be associated with mortality were comorbidities, shock, low hemoglobin, and elevated INR (2,5,6,8-11,26,27).

After multivariable logistic regression was applied in our study, only EGD following admission was found to significantly decrease mortality compared with no EGD following admission. However, Quan et al. found no evidence that

EGD following admission was related to the adjusted odds ratio of in-hospital mortality. This difference might be the inclusion in the Quan study of only patients who presented with UGIB secondary to peptic ulcer disease which less severe than variceal bleeding (28), whereas our study included patients who presented with UGIB from all causes, including variceal bleeding.

Surprisingly, we found no evidence that prolonged ED LOS was associated with mortality. These results differ from our initial hypothesis that prolonged ED LOS would be expected to be associated with higher mortality. In investigations of other common emergency conditions, previous studies have found that prolonged ED LOS is associated with increased hospital mortality in patients with sepsis (29). A possible explanation is that the quality and seamlessness of care in the ED, the intensive care units (ICU), and the general wards might be similar to that in an academic hospital setting. Patients with unstable hemodynamics whose mortality is higher might be rapidly transferred to the ICU in which case ED LOS might not be associated with mortality. No previous comparative study has investigated the effect association of ED LOS with mortality in patients with UGIB. However, shortening the ED LOS might, in real clinical practice, be considered a means of minimizing the risk of ED overcrowding, a factor that should be investigated in further studies.

Findings of previous studies regarding the association of arrival during office hours versus non-office hours and time to EGD with mortality have been inconsistent. Shaheen et al. reported that arrival during non-office hours was associated with both increased mortality and a longer time to EGD (14). However, a systematic review and network meta-analysis as well as other studies conducted in an EGD-capable hospital such as the hospital in the present study found no difference between office hours and non-office hours visits in mortality or time to EGD (30,31), results which are in agreement with the present study: after adjusting for the effect of time to EGD using multivariable analysis, no evidence was found

of an association between office hours and non-office hours on mortality. Medical centers which are capable of performing EGD have a specialist team (including residents, fellows, and attending staff in many fields), as well as sufficient laboratory examination facilities and medical equipment always available. Patients who visit during non-office hours can be cared for to the same standard as those who visit during office hours.

We found that mortality among patients who received EGD following hospital admission was lower compared with patients who did not receive EGD following admission. Non-massive UGIB was also associated with lower mortality compared to massive UGIB, and the number of patients with non-massive UGIB represented the majority of patients who received EGD following admission. However, there were 8 patients with non-massive UGIB (23.5%) who did not receive EGD following hospital admission due to end-of-life conditions which lead to their death before EGD could be performed.

We found no evidence of a difference in mortality with early EGD (within 24 hours of admission) compared with late EGD in subgroup analyses. A previous study likewise found no mortality benefit with early EGD (32,33). Laursen et al. also reported that EGD within 24 hours of admission was not associated with a reduction of in-hospital mortality (20). Another study found no difference in 30-day mortality between patients receiving EGD within 6 hours of admission and those receiving EGD at between 6 and 24 hours (34).

Limitations

There were some limitations in our study. Details of some prior treatments by other hospitals, the dosage of medications, length of stay of critical care unit, and total length of hospital stay were not included in the analysis because they were not directly related to our primary objective. Further research regarding these factors and their association with mortality should be investigated.

Conclusions

No evidence was found that either ED LOS or office hours vs. non-office hours visits were associated with in-hospital all-cause mortality. Although EGD following hospital admission may decrease mortality, early EGD within 24 hours of hospital admission versus late EGD might not be associated with mortality.

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Conflicts of interest

None.

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ปัจจัยพยากรณ์โรคของผู้ป่วยที่มีภาวะเลือดออกในทางเดินอาหารส่วนต้นในแผนกฉุกเฉิน

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วัตถุประสงค์ ภาวะเลือดออกในทางเดินอาหารส่วนต้นเป็นภาวะที่พบได้บ่อยและก่อให้เกิดการเสียชีวิต วัตถุประสงค์ของการวิจัยนี้เพื่อระบุปัจจัยพยากรณ์โรครวมถึงระยะเวลาการอยู่ในแผนกฉุกเฉิน ช่วงเวลาที่ผู้ป่วยมาพบแพทย์ว่าเป็นในเวลาราชการหรือนอกเวลาราชการ การได้รับการส่องกล้องทางเดินอาหารส่วนต้นภายในการนอนโรงพยาบาล ครั้งนั้นและระยะเวลาที่ผู้ป่วยได้รับการส่องกล้องทางเดินอาหารส่วนต้นที่มีผลต่ออัตราการเสียชีวิตในโรงพยาบาลจากทุกสาเหตุ

วิธีการ เป็นการวิจัยโดยติดตามย้อนหลังในผู้ป่วยที่มาด้วยภาวะเลือดออกในทางเดินอาหารส่วนต้นที่แผนกฉุกเฉินโรงพยาบาลมหาราชนครเชียงใหม่ในปี พ.ศ. 2560 โดยวิเคราะห์ด้วยการถดถอยโลจิสติกแบบตัวแปรเดียวและหลายตัวแปร

ผลการศึกษา ผู้ป่วยทั้งหมด 132 ราย เสียชีวิต 19 ราย (ร้อยละ 14.4) การวิเคราะห์การถดถอยโลจิสติกพบว่าผู้ป่วยที่เป็นโรคตับ ความดันโลหิตขณะหัวใจบีบตัว < 90 มิลลิเมตรปรอท ฮีมาโตคริต ≤ 7 กรัมต่อเดซิลิตร ปริมาณเกล็ดเลือด $\leq 100,000$ ต่อลูกบาศก์มิลลิเมตร international normalized ratio (INR) ≥ 1.2 คะแนนกลาสโกว์ แบริดฟอร์ตสูง ปริมาณสารน้ำที่ให้ทางหลอดเลือดดำ $\geq 1,000$ มิลลิลิตร ปริมาณส่วนประกอบของเลือดที่ได้รับ การได้รับยาแอสไพรินหรือไทด์ การได้รับยาพาราเซตามอล เพิ่มอัตราการเสียชีวิต ($p < 0.05$) ไม่พบหลักฐานว่าระยะเวลาการอยู่ในแผนกฉุกเฉินที่นาน ≥ 180 นาที และช่วงเวลาที่ผู้ป่วยมาพบแพทย์ว่าเป็นในเวลาราชการหรือนอกเวลาราชการสัมพันธ์กับอัตราการเสียชีวิตในโรงพยาบาลจากทุกสาเหตุ ($p > 0.05$). การได้รับการส่องกล้องทางเดินอาหารส่วนต้นภายในการนอนโรงพยาบาล ครั้งนั้นสัมพันธ์กับการลดอัตราการเสียชีวิตในโรงพยาบาลจากทุกสาเหตุ (อัตราความเสี่ยง [odds ratio; OR] 0.19, ช่วงความเชื่อมั่นร้อยละ 95 [95% confidence interval; 95% CI] 0.07 to 0.52, $p = 0.001$). สำหรับการวิเคราะห์แบบหลายตัวแปรพบว่ามีการได้รับการส่องกล้องทางเดินอาหารส่วนต้นภายในการนอนโรงพยาบาลครั้งนั้น (OR 0.01, 95% CI 0.01 to 0.1, $p = 0.001$) ช่วยลดอัตราการเสียชีวิตในโรงพยาบาลจากทุกสาเหตุ สำหรับการวิเคราะห์กลุ่มย่อยแบบหลายตัวแปรไม่พบหลักฐานว่าการได้รับการส่องกล้องทางเดินอาหารส่วนต้นภายใน 24 ชั่วโมงแรกสัมพันธ์กับอัตราการเสียชีวิตในโรงพยาบาลจากทุกสาเหตุเมื่อเปรียบเทียบกับที่ไม่ได้รับการส่องกล้องทางเดินอาหารส่วนต้นภายใน 24 ชั่วโมงแรก

สรุป การได้รับการส่องกล้องทางเดินอาหารส่วนต้นภายในการนอนโรงพยาบาลครั้งนั้นช่วยลดอัตราการเสียชีวิตในโรงพยาบาลจากทุกสาเหตุ แต่อย่างไรก็ตามไม่พบหลักฐานที่แสดงว่าระยะเวลาการอยู่ในแผนกฉุกเฉินที่นาน ช่วงเวลาที่ผู้ป่วยมาพบแพทย์และการได้รับการส่องกล้องทางเดินอาหารส่วนต้นภายใน 24 ชั่วโมงแรกสัมพันธ์กับอัตราการเสียชีวิต

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คำสำคัญ: การส่องกล้องทางเดินอาหารส่วนต้น ภาวะเลือดออกในทางเดินอาหารส่วนต้น ระยะเวลาการอยู่ในแผนกฉุกเฉิน อัตราการเสียชีวิต