Dicle Tıp Dergisi / Dicle Med J (2025) 52 (2) : 207-217

www.diclemedj.org

Original Article / Özgün Araştırma

Upper Gastrointestinal Bleeding: A Comparative Analysis of Aims65, News+L, Rockall, and Gbs in Predicting in-Hospital Mortality

Remzi Çetinkaya[1], **Mehmet Üstündağ**[2], **Murat Orak**[2], **Recep Dursun**[2], **Cahfer Güloğlu**[2]

1 University of Health Sciences, Gazi Yaşargil Training and Research Hospital, Department of Emergency Medicine, Diyarbakır, Türkiye

2 Dicle University Faculty of Medicine, Department of Emergency Medicine, Diyarbakır, Türkiye

Received: 11.12.2024; Revised: 16.04.2025; Accepted: 16.04.2025

Abstract

Background: Acute upper gastrointestinal (GI) bleeding is a common and potentially life-threatening emergency frequently seen in emergency departments. Early and accurate risk stratification is essential for guiding clinical management. This study aimed to assess the effectiveness of various clinical scoring systems and laboratory parameters in predicting in-hospital mortality in patients with upper GI bleeding.

Methods: This retrospective study included patients aged 18 and older diagnosed with upper GI bleeding between January 1, 2016, and January 1, 2019. The Glasgow Blatchford Score (GBS), Pre-endoscopic Rockall Score (PRS), total Rockall Score, AIMS65, and NEWS+L scores were calculated. Laboratory parameters were also analyzed for their association with mortality.

Results: A total of 316 patients were included, with an in-hospital mortality rate of 13.3%. Among the scoring systems, AIMS65 and NEWS+L demonstrated higher predictive accuracy (AUC) for in-hospital mortality compared to PRS. GBS and total Rockall scores also performed better than PRS.

Conclusion: AIMS65 and NEWS+L scores were superior to PRS in predicting mortality. Additionally, low hemoglobin, elevated lactate, high neutrophil-to-lymphocyte (NLR) and platelet-to-lymphocyte (PLR) ratios, and increased urea-to-creatinine levels were associated with higher mortality risk.

Keywords: Upper gastrointestinal bleeding, Mortality Score, Endoscopy, Prognosis

DOI: 10.5798/dicletip.1722816

Correspondence / Yazışma Adresi: *Remzi Çetinkaya, S University of Health Sciences, Gazi Yaşargil Training and Research Hospital, Department of Emergency Medicine, Diyarbakır, Türkiye e-mail: cetinkayaremzi2121@gmail.com*

Üst Gastroıntestınal Kanama: Hastane içi Mortaliteyi Öngörmede Aıms65, News+L, Rockall ve Gbs Skorlarının Karşılaştırmalı Analizi

Öz

Giriş: Akut üst gastrointestinal (GİS) kanama, acil servislerde sık karşılaşılan ve potansiyel olarak hayatı tehdit eden bir acil durumdur. Erken ve doğru risk sınıflaması, klinik yönetimi yönlendirmek açısından hayati öneme sahiptir. Bu çalışmanın amacı, üst GİS kanamalı hastalarda hastane içi mortaliteyi öngörmede çeşitli klinik skorlama sistemleri ile laboratuvar parametrelerinin etkinliğini değerlendirmektir.

Yöntemler: Bu retrospektif çalışmaya, 1 Ocak 2016 ile 1 Ocak 2019 tarihleri arasında üst GİS kanaması tanısıyla acil servise başvuran 18 yaş ve üzeri hastalar dahil edildi. Bu hastalar için Glasgow Blatchford Skoru (GBS), Endoskopi Öncesi Rockall Skoru (PRS), toplam Rockall Skoru, AIMS65 ve NEWS+L skorları hesaplandı. Ayrıca mortalite ile ilişkili laboratuvar parametreleri analiz edildi.

Bulgular: Çalışmaya toplam 316 hasta dahil edildi ve hastane içi mortalite oranı %13,3 olarak belirlendi. Skorlama sistemleri karşılaştırıldığında, AIMS65 ve NEWS+L skorlarının hastane içi mortaliteyi öngörmede PRS'ye göre daha yüksek AUC değerine sahip olduğu görüldü. GBS ve toplam Rockall skorları da PRS'ye kıyasla daha iyi performans gösterdi.

Sonuç: AIMS65 ve NEWS+L skorları, hastane içi mortaliteyi öngörmede PRS'ye göre daha üstündür. Ayrıca, düşük hemoglobin, yüksek laktat, artmış nötrofil/lenfosit (NLR) ve trombosit/lenfosit (PLR) oranları ile artmış üre/kreatinin düzeyleri yüksek mortalite riskiyle ilişkilendirildi.

Anahtar kelimeler: Üst gis kanaması, Mortalite skoru, Endoskopi, Prognoz.

INTRODUCTION

Upper gastrointestinal (GI) bleeding originates from the region extending from the esophagus to the ligament of Treitz and accounts for 90% of all GI bleeding cases. It is a frequent cause of emergency department visits, with a particularly high prevalence among the elderly population[1]. In the United States, more than five hundred thousand patients are hospitalized each year due to upper gastrointestinal bleeding[2]. The mortality rate associated with the disease varies between 3% and 15%; this rate is even higher in patients with hemodynamic instability[3]. Due to the high mortality rate, many international guidelines recommend the use of scoring systems to predict adverse outcomes, rebleeding, and mortality risks in the management of patients with GI bleeding[4]. However, in routine clinical practice, no specific scoring system has been universally adopted for patients presenting to the emergency department[5].

There has been a notable increase in interest in the field of pre-endoscopic risk scores for upper gastrointestinal bleeding in recent times. Among the most extensively studied scores are the AIMS65 score, the Rockall score (GBS), and the Glasgow Blatchford score[6]. These scoring systems employ a range of clinical, hemodynamic, and easily accessible laboratory parameters[7]. Several studies have indicated that the utilisation of these scoring systems has a favourable impact on the survival of patient populations with upper GI bleeding[8].

The GBS is an important pre-endoscopic tool for risk assessment in upper GI bleeding patients, facilitating rapid triage in the emergency department. The GBS relies on basic clinical observations and laboratory parameters, obviating the need for endoscopic results. The advantage of this score is that it can be calculated shortly after hospital admission and can predict the need for urgent intervention. Any score greater than zero is interpreted as indicating the need for transfusion, endoscopy,

or surgical intervention. However, it is not sufficiently accurate for classifying mortality risk[9].

The AIMS65 score was devised with the objective of predicting the risk of mortality in hospitalized cases of upper GI bleeding. A patient with a score of 0 has a 0.3% likelihood of in-hospital mortality, while a patient with a score of 5 has a 24.5% likelihood[10].

The Rockall score is a commonly employed prognostic scale for the estimation of the risk of complications in cases of upper GI bleeding. It can be applied both before and after endoscopy. The Pre-endoscopy Rockall score(PRS) consists of three parameters: age, shock status, and comorbidities. A patient with a PRS of 0 has a 0.2% likelihood of mortality, while a patient with a score of 7 has a 50% likelihood[11].

The NEWS+L (National Early Warning Score + Lactate) is a scoring system used to assess the condition of patients in the emergency department and intensive care units. The NEWS+L score provides valuable information about the patient's overall condition by considering vital signs and lactate levels. In patients with GI bleeding, the use of this score enables early recognition and treatment[12].

The GBS, AIMS65, total Rockall Score, PRS and NEWS+L scores are shown in Table I,II,III,IV[9-12].

Table I: Glasgow Blatchford Score

GBS	Urea	6.5-8	2
		8-10	3
		10-25	4
		>25	6
	Hemoglobin men	12-13	1
		10-12	3
		<10	6
	Hemoglobin women	10-12	1
		<10	6
	Systolic blood pressure (SBP)	100-109	1
		90-99	2
		<90	3
	Pulse>100	1	
	Melena	1	
	Syncope	2	
	Liver disease	2	
	Heart failure	2	

Table II: National Early Warning Score + Lactate

NEWS+L	Respiratory rate	<8	3
		9-11	1
		12-20	0
		21-24	2
		>25	3
	Oxygen saturation	<91	3
		92-93	2
		94-95	1
		>95	0
	Oxygen requirement	Yes	2
		No	0
	Temperature	<35	3
		35.1-36	1
		36.1-38	0
		38.1-39	1
		>39.1	2
	Systolic blood pressure	<90	3
		91-100	2
		101-110	1
		111-219	0
		>220	3
	Pulse	<40	3
		41-50	1
		51-90	0
		91-110	1
		111-130	2
		>131	3
	Level of consciousness (AVPU)	Allert	0
		Non-allert	3
	Lactate level		

Table III: AIMS-65 Score

AİMS-65 Score	Albumin<3	1
	INR>1.5	1
	Mental status change GCS<14	1
	SBP<90	1
	Age>65	1

GCS: Glasgow Coma Scale, SBP: Systolic Blood Pressure

Table IV: Total Rockall Score and Pre-endoscopic Rockall Score

Total Rockall Score	Pre-endoscopic Rockall Score	Age	<60	0
			60-79	1
			>80	2
		Signs of shock	Pulse<100 and SBP>100	0
			Pulse>100 SBP>100	1
			Pulse>100 SBP<100	2
		Comorbidity	None	0
			congestive heart failure,ischemic heart disease	2
			Liver failure,böbrek yetmezliği ,metastatic malignancy	3
		Endoscopic diagnosis	Mallory Weiss	0
			All other diagnoses	1
			GIS malignancy	2
		Signs of major bleeding	Normal or only dark dot lesion	0
			Blood, adherent clots, visible or gushing bleeding in the upper gastrointestinal tract	2

The objective of our study is to evaluate the predictive capacity of clinical, laboratory and demographic variables, as well as the performance of scoring systems such as GBS, AIMS65, total Rockall Score, PRS and NEWS+L, in the prediction of in-hospital mortality in patients presenting to the emergency department with a diagnosed case of upper GI bleeding. Additionally, we seek to determine if any of these scores are superior to the others.

METHODS

This retrospective study was completed at a third-level university in the Southeastern region of Turkey. The study population comprised adults with upper GI bleeding who were admitted to the emergency department over the period 2016-2019. The diagnosis of upper GI bleeding was confirmed through esophagogastroduodenoscopy (EGD). Patients admitted with a preliminary diagnosis of UGIB but without undergoing EGD, those with upper GI bleeding caused by trauma, and those with incomplete data were excluded from the study. Ethical approval for the study was granted by the Dicle University Ethics Committee (Approval No: 93, dated February 14, 2019).

Patient demographics, including age, sex, medication history, and comorbid conditions, were analyzed using the hospital information system. Presenting complaints at the emergency department, vital parameters (body temperature, heart rate, arterial blood pressure, and oxygen saturation), blood transfusion status, and the number of transfused units were documented. Laboratory parameters such as hemoglobin, hematocrit, neutrophil-to-lymphocyte ratio, platelet-to-lymphocyte ratio, lactate, urea, and creatinine levels were evaluated. The Glasgow-Blatchford, Rockall, AIMS65, and NEWS+L scoring systems were used to assess the severity of upper GI bleeding. All scores were calculated manually by the authors. For the NEWS+L score, the vital parameters recorded at the time of initial presentation to the emergency department were used.

Patients were divided into two groups: survivor and deceased. The in-hospital mortality group consisted of patients who succumbed to their condition during hospitalization, whereas the discharged group comprised those who were successfully discharged alive from the hospital.

Statistical Analyses

All statistical analyses were conducted using IBM SPSS Statistics for Windows, Version 28.0 (IBM Corp., Armonk, NY, USA) and MedCalc Statistical Software, Version 20.218 (MedCalc Software Ltd., Ostend, Belgium). The normality of continuous variables was evaluated using the Kolmogorov-Smirnov test and histogram visualisations. Continuous variables were presented as mean ± standard deviation (SD) for data that were normally distributed, and as median [interquartile range (IQR)] for data that were not normally distributed. Categorical variables were presented as frequencies and percentages.

Comparisons between groups for continuous variables were conducted using the independent samples t-test for data that were normally distributed and the Mann-Whitney U test for data that were not normally distributed. Categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate. The mean differences between the groups were reported with 95% confidence intervals (CIs).

A receiver operating characteristic (ROC) curve analysis was conducted to evaluate the diagnostic accuracy of the scoring systems. The area under the curve (AUC) was calculated with 95% confidence intervals (CIs) to assess the discriminatory performance of the scoring systems. Optimal cutoff points were determined based on the Youden index. Sensitivity, specificity, positive likelihood ratios (+LR), and negative likelihood ratios (-LR) were reported for each scoring system. Pairwise comparisons of AUC values were conducted using the DeLong method. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The study cohort comprised a total of 316 patients. Among them, 86.7% (n=274) survived, while 13.3% (n=42) died during hospitalization. The mean age of the survivors (55.4 ± 20.0 years) was found to be markedly lower than that of the non-survivors (68.6 ± 14.8 years), with a difference of 13.14 years (95% CI: 8.0–18.3; p <0.001). There was no significant correlation between gender and survival status. (p = 0.689).

The frequency of syncope as a presenting symptom was significantly higher in the deceased group (14.3%, n=6) compared to the surviving group (2.2%, n=6) (p<0.001).

At diagnosis, mean systolic blood pressure was markedly lower in the non-survivors (93.9 ± 19.4 mmHg) as compared with the survivors (116.6 ± 16.8 mmHg), with a mean reduction of 22.7 mmHg (95% CI: 17.1–28.3; p <0.001). Similarly, mean diastolic blood pressure was lower in the non-survivor group (56.3 ± 12.1 mmHg) than in the survivor group (68.3 ± 12.6 mmHg), with a mean difference of 12 mmHg (95% CI: 7.9–16.1; p <0.001). Additionally, the non-survivor group exhibited a higher mean heart rate (122 ± 19.9 beats/min) compared to the survivor group (108 ± 17.7 beats/min), with a mean difference of 13.9 beats/min (95% CI: 8.0–19.7; p < 0.001).

There appears to be a notable difference in the prevalence of comorbid conditions, including congestive heart failure (CHF), diabetes mellitus (DM), hypertension (HT), chronic kidney disease (CKD), coronary artery disease (CAD), and malignancy, between the non-survivor and survivor groups. These differences were statistically significant (p = 0.005 for HT, p = 0.013 for CAD, and p < 0.001 for the other conditions). Nevertheless, no notable discrepancies were identified between the

groups with regard to the history of chronic liver disease and cerebrovascular disease (p = 0.250 and p = 0.332, respectively).

The mean haemoglobin level at presentation was markedly lower in the non-survivor group (7.2 ± 1.4 g/dL) than in the survivor group (9.3 ± 2.8 g/dL), with a mean difference of 2 g/dL (95% CI: 1.5–2.6; p <0.001). The mean lactate level was markedly higher in the non-survivor group (4.1 ± 2.4 mmol/L) than in the survivor group (1.92 ± 1.25 mmol/L), with a mean difference of 2.2 mmol/L (95% CI: 1.44–2.97; p <0.001). Furthermore, the median urea levels (125.5 [IQR: 85.75–201]) and creatinine levels (0.78 [IQR: 0.68–0.99]) were markedly elevated in the non-survivor group in comparative analysis with the survivor group (urea: 63 [IQR: 45–89]; creatinine: 1.74 [IQR: 1.1–2.98]; p <0.001 for both comparisons). The requirement for a blood transfusion was markedly increased in the group of patients who died (95.2%, n=40) in comparison to the group who survived (72.3%, n=198; p<0.001).

The GBS, the total Rockall score, the PRS, the NEWS-L score, the AIMS65 score and were all observed to be elevated to a significant degree in the non-survivor group in comparison with the survivor group (p <0.001 for all comparisons).

Table V: Patient characteristics

	Alive (n=274)	Death (n=42)	p value	mean difference (95% CI)
Age	55.4±20.0	68.6±14.8	<0.001	13.14 (8 - 18.3)
gender (male)	194 (70.8%)	31 (73.8%)	0.689	
Syncope	6 (2.2%)	6 (14.3%)	<0.001	
Systolic blood pressure	116.6±16.8	93.9±19.4	<0.001	22.7 (17.1 - 28.3)
Diastolic Blood Pressure	68.3±12.6	56.3±12.1	<0.001	12 (7.9 - 16.1)
Pulse	108±17.7	122+±19.9	<0.001	13.9 (8 - 19.7)
Congestive heart failure	16 (5.8%)	9 (21.4%)	<0.001	
Chronic liver disease	51 (18.6%)	11 (26.2%)	0.250	
Diabetes mellitus	62 (22.6%)	26 (61.9%)	<0.001	
Hypertension	89 (32.5%)	23 (54.8%)	0.005	
Cerebrovascular disease	18 (6.6%)	4 (9.5%)	0.332	
Chronic kidney disease	19 (6.9%)	13 (31%)	<0.001	
Coronary artery disease	52 (19%)	15 (35.7%)	0.013	
Malignancy	15 (5.5%)	10 (23.8%)	<0.001	
Hemoglobin	9.3±2.8	7.2±1.4	<0.001	2 (1.5 - 2.6)
Lactat	1.92±1.25	4.1±2.4	<0.001	2.2 (1.44 - 2.97)
NLR	6.25±4.29	19.09±14.82	<0.001	
PLR	151.68±137.43	245.99±192.77	<0.001	
Urea	63 (45 - 89)	125.5 (85.75 - 201)	<0.001	
Creatinine	0.78 (0.68 - 0.99)	1.74 (1.1 - 2.98)	<0.001	
Need for transfusion	198 (72.3%)	40 (95.2%)	0.001	
GBS	12 (9 - 14)	16.5 (15 - 17)	<0.001	
PRS	2 (1 - 4)	5 (4 - 6)	<0.001	
RockAll-Total	4 (3 - 6)	8 (7 - 9)	<0.001	
AIMS65	1 (0 - 2)	3 (3 - 4)	<0.001	
NEWS-L	4 (3 - 5)	14 (12 - 17.5)	<0.001	

NLR: Neutrophil-to-Lymphocyte Ratio PLR: Platelet-to-Lymphocyte Ratio, GBS: Glasgow-Blatchford Score, PRS: Pre-endoscopic Rockall Score, NEWS-L: National Early Warning Score + Lactate

Table VI displays the diagnostic accuracy analysis for predicting mortality using the GBS, PRS, total Rockall, AIMS65, and NEWS-L scores. The table includes the AUC (95% CI), optimal cutoff values identified through the Youden index, as well as sensitivity (95% CI) and specificity (95% CI).

Table VI: Cutoff score, Sensitivity, specificity, PLR, and NLR of different scoring systems in predicting mortality.

	AUC (95% CI)	Cut-Off	Sensitivity (95% CI)	Specificity (95% CI)	+LR (95% CI)	-LR (95% CI)
GBS	0.950 (0.920 - 9.72)	>14	90.48 (77.4 - 97.3)	86.5 (81.9 - 90.3)	6.7 (4.89 - 9.18)	0.11 (0.04-0.28)
PRS	0.873 (0.831 - 0.907)	>3	90.48 (77.4 - 97.3)	65.7 (59.7 - 71.3)	2.64 (2.18 - 3.19)	0.14 (0.06-0.37)
RockAll-Total	0.912 (0.875 - 0.941)	>6	88.1 (74.4 - 96)	85 (80.3 - 89)	5.89 (4.35 -7.97)	0.14 (0.06-0.32)
AIMS65	0.952 (0.923 - 0.973)	>2	88.1 (74.4 - 96)	91.6 (87.7 - 94.6)	10.49 (6.99-15.76)	0.13 (0.06 - 0.3)
NEWS-L	0.960 (0.932 - 0.979)	>9	87.8 (73.8 - 95.9)	97.45 (94.8 - 99)	34.37 (16.4-72.05)	0.13 (0.06-0.28)

GBS: Glasgow-Blatchford Score, PRS: Pre-endoscopic Rockall Score, NEWS-L: National Early Warning Score + Lactate

A comparison of the AUC values of the various scores revealed no statistically meaningful differences between AIMS65 and GBS (p = 0.91), AIMS65 and total Rockall (p = 0.259), or AIMS65 and NEWS-L (p = 0.603). The AIMS65 score exhibited a markedly broader AUC in comparison to the early Rockall score, with a difference of 0.08 (95% CI: 0.03–0.138; p = 0.04). Similarly, the GBS demonstrated a wider AUC than the early Rockall score, with a 95% CI of 0.03–0.133 and a p-value of 0.03. No statistical significance was observed between GBS and total Rockall (p = 0.246) or between GBS and NEWS-L (p = 0.540). The PRS exhibited a smaller AUC in comparison to the total Rockall score (0.06, 95% CI: 0.02–0.09; p < 0.001) and the NEWS-L score (0.09, 95% CI: 0.02–0.157; p = 0.007). No notable differences were identified in the total Rockall and NEWS-L scores (p = 0.2).

Table VII: Comparison of risk scores in mortality prediction

		GBS	PRS	Rockall-Total	NEWS+L
AIMS65	DBA (95% CI)		0.08 (0.03 - 0.13)	-	-
	P value	0.91	0.004	0.259	0.603
GBS	DBA (95% CI)		0.08 (0.03 - 0.13)	-	-
	P value		0.03	0.246	0.540
PRS	DBA (95% CI)			0.06 (0.02 - 0.09)	0.09 (0.02 - 0.15)
	P value			<0.001	0.007
Rockall-Total	DBA (95% CI)				-
	P value				0.20

GBS: Glasgow-Blatchford Score, PRS: Pre-endoscopic Rockall Score, NEWS-L: National Early Warning Score + Lactate

DISCUSSION

GI is a gastrointestinal emergency that carries a high risk of morbidity and mortality, with reported rates ranging from 3% to 10%[13]. In the United Kingdom, the mortality rate due to gastrointestinal bleeding ranges between 8% and 14%[14]. The mortality rate was determined to be 13% in the analysis of the data collected in our study. Although this is consistent with the rate reported in the United Kingdom, it exceeds the global average. The elevated mortality rate is attributed to three key factors: the advanced age of the patient population, the high prevalence of comorbidities, and the fact that the hospital is a tertiary care centre, which

results in a high admission rate of patients with unstable hemodynamics.

In the assessment of prognosis and risk following upper gastrointestinal bleeding, scoring systems that consider clinical, biochemical, and endoscopic features are essential[15]. Besides guiding endoscopic therapy, endoscopic hemostasis, blood transfusion requirements, and medical and surgical indications, these scoring systems also help determine the role of endoscopic therapy and endoscopic hemostasis[16]. Numerous studies have linked higher GBS, total Rockall scores, AIMS65 scores, and PRS scores with increased mortality[17-19,20]. A multicenter prospective study conducted in China also demonstrated that elevated PRS, AIMS65, and GBS scores increase mortality risk. In terms of predicting mortality, these scoring systems can be useful[21]. The GBS, the PRS, the total Rockall score, the AIMS65 score, and the NEWS-L score were significantly higher in the deceased than the survivors in our study. Based on these results, we can conclude that mortality can be predicted using these scoring systems.

The literature contains numerous studies investigating clinical risk scores in patients presenting with GI bleeding. The results of our study demonstrated that the AIMS65, GBS, total Rockall, and NEWS+L scores exhibited a statistically higher predictive capacity for mortality compared to PRS. Notably, among all scoring systems evaluated, the NEWS+L score yielded the highest AUC value, making it the most robust predictor of in-hospital mortality. The second highest AUC value was found to belong to the AIMS65 score. Both the AIMS65 and NEWS+L scores are useful tools for predicting in-hospital mortality in patients with gastrointestinal bleeding. However, there is no statistically significant difference between the two. In the study by Kılıç et al, PRS scores were not more accurate than AIMS65 scores in predicting mortality[22]. A study by Hyett et al found that the AIMS65 score outperformed the GBS in predicting in-hospital mortality in patients with upper GI bleeding[23]. Similarly, a study from Korea reported that while the AIMS65 score had a higher AUC value than other scoring systems, the differences between these systems were not statistically significant[24]. Among 424 patients with GI bleeding, Robertson et al. found that AIMS65 and total Rockall scores predicted in-hospital mortality more accurately than GBS and PRS25. Likewise, a multicenter study by Stanley et al. found that AIMS65 had a significantly higher AUROC for predicting mortality compared to the GBS, PRS, and total Rockall score[7]. A single-center retrospective study conducted in Australia also reported that AIMS65 demonstrated the best performance in predicting mortality[26]. These findings underscore the clinical utility of these scoring systems in assessing the prognosis of patients with GIB.

According to Stanley et al., the optimal thresholds for predicting mortality based on AIMS65, PRS, total Rockall scores, and GBS are 2 for AIMS65, 4 for PRS, and 5 for GBS7. Similarly, in the study by Kim et al., the cut-off values for high mortality risk were determined as >2 for AIMS65, >4 for PRS, >7 for the Rockall score, and >11 for GBS[24] . According to these findings, different risk scoring systems have optimal cut-off values for predicting mortality. Our findings indicate that a Glasgow-Blatchford Score of ≥14, a PRS score of ≥3, a total Rockall score of ≥6, an AIMS65 score of ≥2, and a NEWS+L score of ≥7 provide the most accurate combination of sensitivity and specificity for predicting mortality. These findings differ slightly from previous threshold values. The higher threshold values in our study may be attributed to our patient population characteristics or differences in the study design. This underscores the importance of re-evaluating and adapting risk-scoring systems for specific patient groups.

In our study, several key clinical and demographic factors were observed to influence in-hospital mortality. Advanced age, presentation with syncope, low blood pressure, elevated heart rate, and comorbid medical conditions such as HT, DM, CHF, CAD, CKD and malignancy were identified as potential contributors to increased mortality. For instance, the study conducted by Daniela Benedeto-Stojanov and colleagues demonstrated that advanced age, low blood pressure, and elevated heart rate are associated with increased mortality[27]. Additionally, the study by Dertli and colleagues found that tachycardia and hypotension are associated with increased mortality[28]. Following previous studies, these findings are consistent and supportive.

GI bleeding patients with unstable hemodynamics require immediate access to laboratory parameters to be effectively treated and managed. A complete blood count is a simple, cost-effective, and routinely performed diagnostic tool[29]. It has been shown that the NLR and PLR have a statistically significant correlation with inflammatory diseases, including malignant neoplasms and acute pancreatitis[30]. Our study revealed lower hemoglobin levels, higher lactate levels, higher PLR and NLR ratios, as well as higher urea and creatinine levels in deceased patients compared with survivors. Similarly, a study by Aydın et al demonstrated that elevated urea and creatinine concentrations, along with lower hemoglobin concentrations, are associated with increased mortality[17]. Researchers reported that elevated white blood cell (WBC) counts and NLR were related to mortality, but elevated lactate levels were not[18]. High levels of urea and creatinine, as well as high NLR and PLR, were associated with increased mortality, according to a study by Dertli et al[28]. Low hemoglobin and hematocrit concentrations, as well as elevated levels of lactate, urea, and creatinine, are associated with a higher mortality rate, according to Raj et al[19]. Consistent with the literature, our study found an association between easily accessible laboratory parameters (such as NLR, PLR, hemoglobin, BUN, creatinine, etc.) and gastrointestinal bleeding severity and prognosis. Monitoring these parameters can be a valuable tool in assessing patients' mortality risk and may provide guidance for rapid intervention in emergency departments.

Lımıtatıon

This study has several limitations. Its retrospective design, single-center setting, and relatively small sample size limit the generalizability of the findings. Validation through larger, multicenter, prospective studies is warranted. Additionally, as the data were extracted electronically from a medical record system, inaccuracies or incomplete information may have been included. The study population, consisting of patients admitted to a tertiary care hospital, may have had a higher proportion of severe medical conditions, potentially introducing selection bias. Moreover, some confounding factors and comorbidities might not have been adequately controlled. Finally, the observed associations between laboratory parameters and scoring systems represent correlations, not causations. Further research is needed to explore how these scoring systems interact with other clinical variables and how they evolve over time.

CONCLUSION

Laboratory parameters played a significant role in predicting in-hospital mortality following upper gastrointestinal bleeding in ourED study. Low hemoglobin levels, high lactate levels, elevated PLR, NLR, and increased urea and creatinine levels were associated with mortality. Furthermore, scoring systems such as AIMS65, GBS, Rockall, and especially NEWS+L were observed to be effective tools for predicting in-hospital mortality. Among these,

the NEWS+L score demonstrated the highest AUC value, making it the most reliable predictor of mortality in our cohort. The superior performance of the NEWS+L score suggests its potential as a preferred scoring system in emergency settings for early identification of high-risk patients. These findings highlight the critical role of clinical assessment and risk stratification for the optimal management of cases of upper GI bleeding.

Ethics Committee Approval: Ethical approval for the study was granted by the Dicle University Ethics Committee (Approval No: 93, dated February 14, 2019).

Conflict of Interest: The authors declared no conflicts of interest.

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

REFERENCES

1. Bodh V, Sharma B, Kumar R, Sharma R. Current trends in etiological profile of acute upper gastrointestinal bleeding in Northern India: a retrospective analysis of 5-year endoscopic data. J Dig Endosc. 2021;12(1):031-5.

2. Nable JV, Graham AC. Gastrointestinal bleeding. Emerg Med Clin North Am. 2016;34(2):309-25.

3. Li Y, Song Y. Diagnostic value of serum gastrin and epidermal growth factor to the gastric ulcer complicated with upper gastrointestinal hemorrhage. J Coll Physicians Surg Pak. 2020;30(12):1269-73.

4. Tatlıparmak AC, Dikme Ö, Dikme Ö, Topaçoğlu H. Cancer, platelet distribution width, and total protein levels as predictors of rebleeding in upper gastrointestinal bleeding. PeerJ. 2022;10:e14061.

5. Ebrahimi Bakhtavar H, Morteza Bagi HR, Rahmani F, Shahsavari Nia K, Ettehadi A. Clinical scoring systems in predicting the outcome of acute upper gastrointestinal bleeding; a narrative review. Emerg (Tehran). 2017;5(1):e36.

6. Saltzman JR, Tabak YP, Hyett BH, Sun X, Travis AC, Johannes RS. A simple risk score accurately predicts in-hospital mortality, length of stay, and cost in acute upper GI bleeding. Gastrointest Endosc. 2011;74(6):1215-24.

7. Stanley AJ, Laine L, Dalton HR, et al. Comparison of risk scoring systems for patients presenting with upper gastrointestinal bleeding: international multicentre prospective study. BMJ. 2017;356:j442.

8. Uçmak F, Tuncel ET. Varis dışı üst gastrointestinal sistem kanamalı hastalarda klinik seyri öngörmede endoskopi öncesi risk skorlarının etkinliği. Dicle Med J. 2024;50(1):98-105.

9. Mokhtare M, Bozorgi V, Agah S, et al. Comparison of Glasgow-Blatchford score and full Rockall score systems to predict clinical outcomes in patients with upper gastrointestinal bleeding. Clin Exp Gastroenterol. 2016;9:337-43.

10. Morarasu BC, Sorodoc V, Haisan A, et al. Age, blood tests and comorbidities and AIMS65 risk scores outperform Glasgow-Blatchford and pre-endoscopic Rockall score in patients with upper gastrointestinal bleeding. World J Clin Cases. 2023;11(19):4513-23.

11. Rockall TA, Logan RF, Devlin HB, Northfield T. Risk assessment after acute upper gastrointestinal haemorrhage. Gut. 1996;38(3):316-21.

12. Ozel M, Gaffari E, Topacoglu H, Karcıoğlu Ö. Use of National Early Warning Score and perfusion index in predicting outcomes of elderly emergency department patients. Gen Med J. 2023;33(1):36-40.

13. Gralnek I. M., Barkun A. N., & Bardou M. (2008). Management of acute bleeding from a peptic ulcer. New England Journal of Medicine, 359(9), 928-37.

14. Ak R, Hökenek NM. Comparison of AIMS65 and Glasgow Blatchford scores in predicting mortality in patients with upper gastrointestinal bleeding. Rev Assoc Med Bras (1992). 2021;67(5):766-70.

15. Wang CY, Qin J, Wang J, et al. Rockall score in predicting outcomes of elderly patients with acute upper gastrointestinal bleeding. World J Gastroenterol. 2013;19(22):3466-72.

16. Bozkurt S, Köse A, Arslan ED, et al. Validity of modified early warning, Glasgow Blatchford, and pre-endoscopic Rockall scores in predicting prognosis of patients presenting to emergency department with upper gastrointestinal bleeding. Scand J Trauma Resusc Emerg Med. 2015;23:1-9.

17. Aydin H, Berikol GB, Erdogan MO, Gemici E, Doğan H. CHAMPS score in predicting mortality of patients with acute nonvariceal upper gastrointestinal bleeding. Rev Assoc Med Bras (1992). 2023;69(4):e20221052.

18. Çomoğlu M, Acehan F. Üst gastrointestinal sistem kanaması ile başvuran hastalarda başvuru laktat düzeyi ve nötrofil-lenfosit oranının mortalite ile ilişkisi. Akad Gastroenterol Derg. 2023;22(2):119-26.

19. Raj A, Kaeley N, Prasad H, et al. Prospective observational study on clinical and epidemiological profile of adult patients presenting to the emergency department with suspected upper gastrointestinal bleed. BMC Emerg Med. 2023;23(1):107.

20. Altıntaş E, Ateş S, Ongar M, et al. Risk markers for mortality in hemodynamically stable patients admitted to the emergency department with a prediagnosis of upper gastrointestinal bleeding. Sağlık Bilimlerinde Değer. 2023;13(3):378-84.

21. Liu S, Zhang X, Walline JH, Yu X, Zhu H. Comparing the performance of the ABC, AIMS65, GBS, and pRS scores in predicting 90-day mortality or rebleeding among emergency department patients with acute upper gastrointestinal bleeding: a prospective multicenter study. J Transl Intern Med. 2021;9(2):114-22.

22. Kılıç M, Ak R, Alışkan H. Use of the AIMS65 and pre-endoscopy Rockall scores in the prediction of mortality in patients with upper gastrointestinal bleeding. Ulus Travma Acil Cerrahi Derg. 2022;29(1):100-4.

23. Hyett BH, Abougergi MS, Charpentier JP, et al. The AIMS65 score compared with the Glasgow-Blatchford score in predicting outcomes in upper GI bleeding. Gastrointest Endosc. 2013;77(4):551-7.

24. Kim MS, Choi J, Shin WC. AIMS65 scoring system is comparable to Glasgow-Blatchford score or Rockall score for prediction of clinical outcomes for non-variceal upper gastrointestinal bleeding. BMC Gastroenterol. 2019;19:1-8.

25. Robertson M, Majumdar A, Boyapati R, et al. Risk stratification in acute upper GI bleeding: comparison of the AIMS65 score with the Glasgow-Blatchford and Rockall scoring systems. Gastrointest Endosc. 2016;83(6):1151-60.

26. Abougergi MS, Charpentier JP, Bethea E, et al. A prospective, multicenter study of the AIMS65 score compared with the Glasgow-Blatchford score in predicting upper gastrointestinal hemorrhage outcomes. J Clin Gastroenterol. 2016;50(6):464-9.

27. Benedeto-Stojanov D, Bjelaković M, Stojanov D, Aleksovski B. Prediction of in-hospital mortality after acute upper gastrointestinal bleeding: cross-validation of several risk scoring systems. J Int Med Res. 2022;50(3):03000605221086442.

28. Dertli R, Toka B, Asıl M, et al. Can neutrophil-lymphocyte ratio predict mortality in acute non-variceal upper gastrointestinal bleeding? Turk J Trauma Emerg Surg. 2022;28(5):626.

29. Payza U. Hemogram parametrelerinin, inflamatuar barsak hastalığı olan hastalarda hastalık şiddeti, mortalite ve komplikasyonları öngörmedeki rolü. Dokuz Eylül Üniv Tıp Fak Derg. 2021;35(2):147-57.

30. Tian XC, Liu XL, Zeng FR, Chen Z, Wu DH. Platelet-to-lymphocyte ratio acts as an independent risk factor for patients with hepatitis B virus-related hepatocellular carcinoma who received transarterial chemoembolization. Eur Rev Med Pharmacol Sci. 2016;20(11).