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El Saied E. Shabaan
Mataria Teaching Hospital

Tarek A. Fouad
Mataria Teaching Hospital, drtarek73@yahoo.com

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Original Article

Comparison of AIMS65, Glasgow–Blatchford, and pre-endoscopy Rockall scoring systems for risk stratification in Egyptian patients with upper gastrointestinal bleeding

Tarek A. Fouad, El Saied E. Shabaan

Department Internal Medicine, GIT Unit, Mataria Teaching Hospital, Cairo, Egypt

Abstract

Background

Upper gastrointestinal bleeding (UGIB) is a serious medical emergency. Many scoring systems have been developed to predict bleeding outcomes for patients with UGIB. Recently, the guidelines recommend use of risk scores in UGIB to facilitate accurate triage and assist in clinical decisions. The aim of this study was to compare the AIMS65 with the Glasgow–Blatchford score (GBS) and the pre-endoscopy Rockall score (PRS) for risk stratification among Egyptian patients with UGIB.

Patients and methods

This prospective study involved 74 adult patients with UGIB. Clinical data, biochemical data, transfusion requirements, endoscopic interventions, and duration of hospitalization were collected. AIMS65, GBS, and PRS scores were calculated for each patient. The ability of these scores to predict clinical outcomes was determined.

Results

In receiver operating characteristic curve analysis, AIMS65 and GBS were better than PRS when predicting in-hospital mortality (0.95 vs 0.88 vs 0.83). However, the three scoring systems were similar in the prediction of the need for blood transfusion (0.74 vs 0.77 vs 0.69). They had less predictive values regarding endoscopic intervention (0.59 vs 0.57 vs 0.65) and duration of hospitalization (0.57 vs 0.57 vs 0.65). AIMS65 less than or equal to 2 can predict low-risk patients with sensitivity of 100% but with low specificity of 31%. AIMS65 score less than or equal to 2 with hemoglobin greater than 8 g/dl and no history of Chronic Liver Disease was able to detect the low-risk patients with specificity of 82% and 100% sensitivity.

Conclusion

Among Egyptian patients with UGIB, AIMS65 is comparable to GBS and better than pre-endoscopic Rockall score in detecting in-hospital mortality. The three scoring systems are similar in detecting the need for blood transfusion but they had less predictive values regarding endoscopic intervention and duration of hospitalization. In addition, AIMS65 score less than or equal to 2 with hemoglobin greater than 8 g/dl and no history of CLD can detect the low-risk patients who can be managed as outpatient and do endoscopy in scheduled time with specificity of 82% and 100% sensitivity. This finding needs more studies on a large number of patients to validate our assumption.

Keywords: Upper gastrointestinal bleeding, AIMS65, Glasgow-Blatchford score, pre-endoscopy Rockall score

Introduction

Upper gastrointestinal bleeding (UGIB) is one of the common causes of admission to hospital and a serious medical emergency all over the world with a high mortality rate (4–14%) [1,2].

For prediction of UGIB outcomes, many scoring systems had been developed. The Glasgow–Blatchford score (GBS) (Table 1) and Rockall score (RS) are the most commonly used scoring systems in clinical practice [3,4] and have been reported to be

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Correspondence to: Tarek A. Fouad, MD, GIT Unit, Mataria Teaching Hospital, Mataria Square, Cairo, Egypt, Tel: 01001589241, Tel and Fax: 0222506090. E-mail: drtarek73@yahoo.com

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useful in predicting mortality, need for intervention, length of hospital stay, and need for transfusion [5].

However, there are limitations in these scoring systems. The GBS has complex nature of score calculation, whereas RS requires endoscopy to calculate the score and therefore is unsuitable for pre-endoscopic triage [6]. The pre-endoscopy Rockall score (PRS) (Table 2) had been developed to make clinical predictions before endoscopy became possible [7].

Recently, the AIMS65 scoring system was developed to determine the prognosis of patients with UGIB [6]. The AIMS65 score is based on albumin levels, international normalized ratio, altered mental status, systolic blood pressure, and whether age is 65 years and older. One point is assigned to each variable that increases the risk of clinical outcomes (Table 3).

Compared with other scoring systems, the AIMS65 has the advantage of being simple to perform in an emergency situation [8,9].

Recently, the guidelines recommend use of risk scores in UGIB to facilitate accurate triage and assist in clinical decisions such as endoscopic timing and level of care [10].

It is important for physicians to identify UGIB patients who are at higher risk and may require urgent endoscopy or management in intensive care units and identify patients at low risk who could be managed as outpatients.

The causes of UGIB differ among countries. The prevalence of variceal bleeding is higher in Egypt than in Western countries [11]. Limited data are available on validation of scoring systems in Egyptian patients with UGIB.

The aim of this study was to compare the AIMS65 with GBS and PRS scores for risk stratification among Egyptian patients with UGIB.

Patients and methods

All patients who were 18 years old or older, with evidence of UGIB who presented to the Emergency Department of Mataria Teaching Hospital, Cairo, Egypt, and admitted during the period from March 2019 to October 2019 were included in the study.

UGIB was confirmed by the presence of hematemesis, coffee-ground vomiting, or melena.

Each patient was subjected to complete history taking, including age and sex, comorbidities, and medications that contribute to bleeding (aspirin, clopidogrel, warfarin, nonsteroidal anti-inflammatory drugs, and other antithrombotic agents). Comorbidity was defined as follows: cardiac diseases; chronic pulmonary diseases; acute or chronic liver disease; acute or chronic renal disease; hematological diseases, including leukemia and lymphoma; and malignancy. Complete clinical examination included pulse rate and blood pressure, and the Glasgow coma scale at presentation and laboratory investigations, such as hemoglobin (Hb), international normalized ratio, albumin, creatinine, and blood urea nitrogen were recorded.

In-hospital mortality was defined as death owing to any cause during index hospitalization.

These data were used to calculate the AIMS65, GBS, and PRS scores for each patient (Tables 1–3).

Table 1: Glasgow-Blatchford score

Clinical parameter at presentation	Score
Systolic BP (mmHg)	
>110	0
100-109	1
90-99	2
<90	3
Blood urea nitrogen (mg/dl)	
<18	0
18-22	2
22-28	3
28-69	4
>70	6
Hemoglobin for men (g/dl)	
>13	0
12-12.9	1
10-11.9	3
<10	6
Hemoglobin for women (g/dl)	
>12	0
10-11.9	1
<10	6
Other risk factors	
Pulse ≥100/bpm	1
Melena	1
Syncope	2
Liver disease	2
Heart failure	2
Maximum score	**23**

BP, blood pressure.

Table 2: Pre-endoscopic Rockall score

Variables	Score
Age (years)	
<60	0
60-79	1
>80	2
Shock	
No shock	0
Pulse >100, Systolic BP >100 mmHg	1
Systolic BP <100 mmHg	2
Comorbidity	
No comorbidity	0
Ischemic heart disease - congestive heart failure	2
Renal failure-hepatic failure-metastatic cancer-other major illness	3
Maximum score	7

BP, blood pressure.

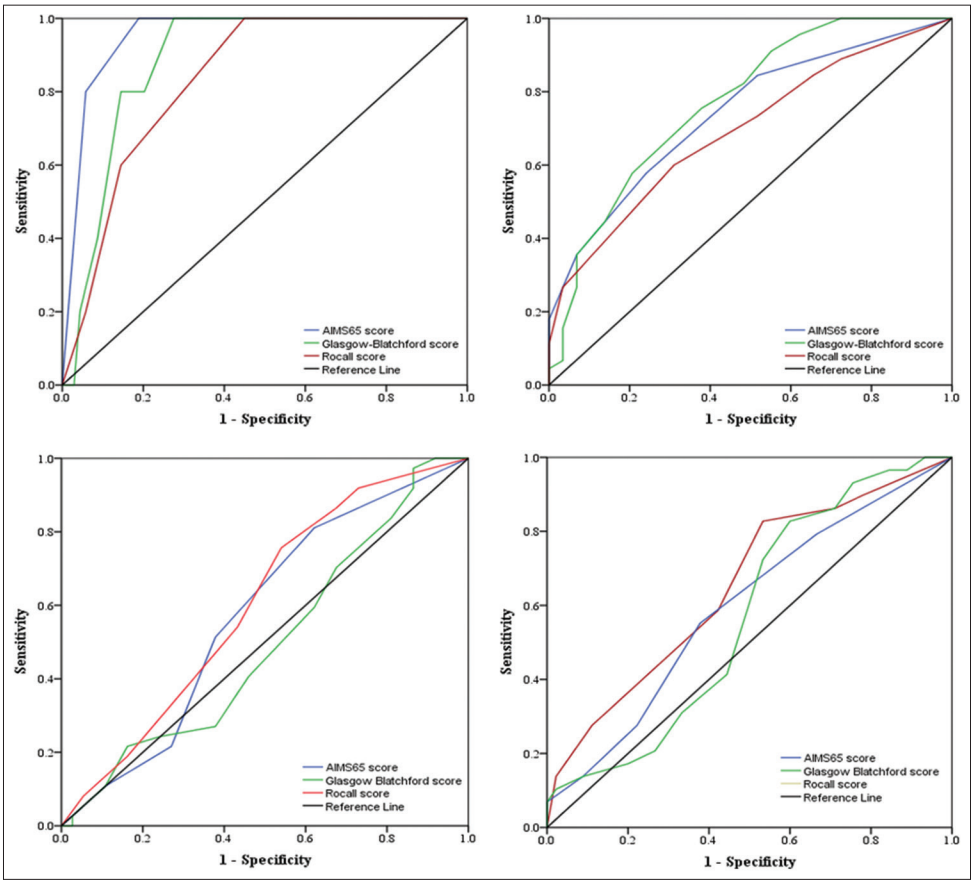

Figure 1: Receiver operating characteristic curves comparing the prediction of (a) mortality, (b) blood transfusion, (c) duration of hospitalization, and (d) endoscopic intervention in patients with upper gastrointestinal bleeding based on AIMS65, Glasgow–Blatchford, and pre-endoscopic Rockall scores.

Table 3: AIMS65 score

Risk factor	Score
Albumin <3.0 mg/dl	1
INR >1.5	1
Altered mental status, GCS <14	1
Systolic BP <90 mmHg	1
Age >65 years	1
Maximum score	5

BP, blood pressure; GCS, Glasgow coma scale; INR, international normalized ratio.

All patients were resuscitated with fluids and packed red blood cells and admitted to Hematemesis and Hepatic Care Unit of Mataria Teaching Hospital and underwent upper endoscopy as soon as possible usually within 24 h.

The need for transfusion was determined by the treating physicians. The policy was to administer red blood cells at a hemoglobin threshold of 8 g/dl, or as guided by the physician in patients with severe hemorrhage [12].

The number of units of blood transfusion required and duration of hospitalization were also recorded.

All patients received high-dose PPIs by intravenous bolus followed by infusion (omeprazole or pantoprazole 80 mg as an initial bolus followed by continuous infusion of 8 mg/h for 72 h) to patients with high-risk ulcer stigmata who required endoscopic treatment, and to other selected patients depending on clinical judgment.

For patients with suspected variceal bleeding, the patients received sandostatin intravenously. After a bolus of 100 μg, a continuous infusion with 50 μg per hour was instilled for 5 days. All patients got 2 g ceftriaxone once a day for 5 days.

Endoscopy was performed usually within 24 h after the patients were hemodynamically stabilized and conscious level was fair.

Upper gastrointestinal endoscopy was done using the videoendoscope Pentax EG-3490 K or Pentax EG-3890LK (Pentax, Tokyo, Japan).

After identification of the bleeding lesion (variceal or nonvariceal source), appropriate endoscopic hemostatic procedure was applied.

Band ligation or injection of tissue glue was performed in cases of esophageal or gastric variceal bleeding, respectively.

For patients with high-risk ulcer stigmata, injection of dilute adrenaline (epinephrine) into and around the bleeding point, thermal contact, or clips were performed.

Gastric antral vascular ectasia and Dieulafoy lesion was treated endoscopically using argon plasma coagulation.

Table 4: Patients' demographic, clinical, and laboratory characteristics

Relevant data	Value [*n* (%)]
Number of patients	74
Age (years)	58.41±12.89
Range	21-92
Sex (male/female)	34 (45.95)/40 (54.05)
Presentation	
Hematemesis	38 (51.3)
Melena	10 (13.5)
Hematemesis and melena	23 (31)
Hematemesis, melena, and syncope	3 (4)
Comorbidities	
No	18 (24.32)
Liver disease	34 (45.95)
Diabetes mellitus	24 (32.43)
Hypertension	12 (16.22)
Heart disease	13 (17.57)
Cerebrovascular disease	5 (6.76)
Renal disease	2 (2.70)
Different malignancies	5 (6.76)
Medication	
No	64 (86.49)
NSAID	9 (12.16)
Anticoagulants	1 (1.35)
Systolic blood pressure (mmHg)	96.7±16.05
Diastolic blood pressure (mmHg)	62±10.9
Pulse rate (beats/min)	98.75±8.86
Glasgow coma scale	14.52±1.58
Hb (g/dl)	8.2±2.2
Albumin (g/dl)	3.12±0.59
INR	1.58±0.61
Creatinine (mg/dl)	1.12±0.59
BUN (mg/dl)	24.44±17.53

BUN, blood urea nitrogen; Hb, hemoglobin; INR, international normalized ratio.

Endoscopic findings and intervention were recorded.

Surgical intervention and length of hospital stay were also recorded, as was in-hospital mortality.

The study protocol was approved by the Research Ethical Committee of GOTHI, and informed consent was obtained from all of the included patients.

Statistical analysis

Statistical analysis was carried out using SPSS version 20.0 for Windows (SPSS Inc., Chicago, Illinois, USA). Values are shown as mean ± SD or median (interquartile range) for continuous variables, and as number (%) for numerical variables. Receiver operating characteristic (ROC) curve was used to describe and compare the ability of AIMS65, GBS, and PRS to predict mortality, blood transfusion, endoscopic intervention, and duration of hospitalization.

Optimal cutoff points were calculated using the Youden index, and possible maximum values for both sensitivity and specificity. To compare area under curve (AUC) of the studied scores, MedCalc version 19 (MedCalc Software Ltd, Ostend, Belgium) was used. The level of statistical significance was set at *P* less than 0.05.

Table 5: Endoscopic diagnosis and of studied patients

Endoscopic diagnosis	*n* (%)
Esophageal varices	22 (29.3)
Gastric varices	1 (1.3)
Esophageal and gastric varices	2 (2.6)
Gastric ulcer	8 (10.6)
Duodenal ulcer	10 (13.3)
Gastric ulcer and duodenal ulcer	2 (2.6)
Gastric erosions	10 (13.3)
Duodenal erosions	3 (3.9)
Gastric antral vascular ectasia (GAVE)	1 (1.3)
Esophageal varices and GAVE	1 (1.3)
Gastrointestinal malignancy	2 (2.6)
Mallory Weiss tear	2 (2.6)
Dieulafoy's lesion	1 (1.3)
Esophageal ulcer	5 (6.6)
Unidentified source	1 (1.3)
Endoscopy not done	4 (5.3)

Results

A total of 74 patients were included in the study. Demographic, clinical, and endoscopic characteristics of studied patients and their outcomes are shown in Tables 4–6. The AIMS65, GBS, and PRS scores of studied patients are shown in Tables 7–9. The comparison between ROC curves and AUC of different scoring systems for prediction of different outcomes are shown in Table 10 and Fig. 1.

Overall, 5 patients died while in the hospital (6.76%), comprising three males and two females, and four of them (80%) had history of CLD. Only one patient had endoscopy and band ligation but died after 4 days of admission, owing to hepatic encephalopathy and hepatic failure.

Three patients died within 24 h of admission owing to persistent bleeding and the fifth patient died after 15 days of admission owing to hepatic encephalopathy and hepatic failure.

All died patients had disturbed conscious level, and the Glasgow coma scale for died patients (9.5 ± 2.5) was significantly lower than survived patients (14.8 ± 0.56) (*P*=0.014).

Their mean AIMS65 score for died patients was 4 (range from 3 to 5). An AIMS65 cutoff score (that maximized the sum of the sensitivity and specificity) of three predicted in-hospital mortality with 100% sensitivity and 81.16% specificity (*P*=0.001).

The mean GBS for in-hospital died patients was 14.2 (range: 12–16). A GBS cutoff score of 12 predicted mortality with 100% sensitivity and 72.46% specificity (*P*=0.004).

The mean ERS for in-hospital died patients was 4.8 (range 4–6). An ERS cutoff score 4 predicted mortality with 100% sensitivity and 55.07% specificity (*P*=0.013).

Comparison of ROC analysis of studied scores showed that AIMS65 and GBS were superior to PRS in predicting mortality (P<0.001 and 0.010, respectively); however, there was no significant difference between both scores (P=0.154).

The AUC values for in-hospital mortality were 0.95 for AIMS65, 0.88 for GBS, and 0.83 for PRS.

Blood transfusion was required in 45 (60.8%) patients and the median transfusion was 1.5 units (range: 0–5).

On ROC analysis, AIMS65, GBS, and PRS were similar in predicting the patients who need blood transfusion, and the AUC values for the need of transfusion were 0.74 for AIMS65, 0.77 for GBS, and 0.69 for PRS, with no statistically significant difference among the three studied scores.

Endoscopic intervention was required in 28 (37.8%) patients. Variceal banding was the most commonly used intervention, which was done in 24 (32.4%) patients.

The AUC values for the prediction of the need of endoscopic intervention were AIMS65 = 0.59, GBS = 0.57, and PRS = 0.65, with no statistically significant difference among the three studied scores for predicting endoscopic intervention.

Only one patient was referred for surgical intervention. She was 74 years old with melena, and upper endoscopy could not determine the source of bleeding.

The mean duration of hospitalization of our patients was 4.87 days (range: 1–15 days).

The AUC values for the prediction of the duration of hospitalization were 0.57, 0.49, and 0.60 for AIMS65, GBS, and PRS, respectively, with no statistically significant difference among the three studied scores.

A total of 17 (22.97%) patients with AIMS65 score between 0 and 2 did not need neither blood transfusion nor surgical or endoscopic intervention and could be considered as low-risk patients. In our patients, AIMS65 score less than or equal to 2 could predict low-risk patients with sensitivity of 100% but low specificity of 31% (Table 7).

The GBS and PRS were less predictive for low-risk patients (Tables 8, 9).

Moreover, our patients who had AIMS65 score less than or equal to 2 and needed either blood transfusion or intervention usually had Hb less than 8 g/dl or had history of CLD.

If we excluded patients with AIMS65 score less than or equal to 2 with history of CLD or Hb less than 8, we can predict low-risk patients with 82% specificity and 100% sensitivity.

Consequently, AIMS65 score less than or equal to 2 without history of CLD or Hb less than 8 could be assumed to determine patients who can be managed as outpatient and do endoscopy in scheduled time.

Table 6: Outcomes of studied patients

Outcomes	*n* (%)
Endoscopic intervention	28 (37.3)
Endoscopic band ligation	21
Cyanoacrylate injection	1
Endoscopic band ligation and cyanoacrylate injection	2
Argon plasma coagulation (APC)	1
Endoscopic rubber band ligation and APC	1
Epinephrine injection	2
Surgical intervention	1
Blood transfusion	45 (60.8)
Number of blood units	
1	8 (10.81)
2	17 (22.97)
3	7 (9.46)
4	9 (12.16)
5	4 (5.4)
Duration of hospitalization (days)	4.87±2.3
Range	1-15
In-hospital mortality	5 (6.76)
Risk stratification	
Low risk	17 (22.97)
High risk	57 (77.03)

Discussion

According to the American Society of Gastrointestinal Endoscopy [13], the National Institute for Health and Clinical Excellence [14] guidelines, and the European Society of Gastrointestinal Endoscopy recommendations [15], it is recommend to use prognostic scoring systems for follow-up and treatment selection in patients with UGIB.

Early stratification of UGIB patients who are at high risk for adverse outcomes can result in rapid and intensive management with resultant decreased mortality and morbidity.

Table 7: AIMS65 score of the studied patients

AIMS65	Number of patients	Intervention	Blood transfusion	Died	Low risk patients
0	21	6	7	0	9
1	20	7	12	0	6
2	15	8	10	0	2
3	10	4	8	1	0
4	6	2	6	3	0
5	2	2	2	1	0

Low-risk patients: patients who did not need neither blood transfusion nor surgical or endoscopic intervention.

Table 8: GBS of the studied patients

GBS	Number of patients	Intervention	Blood transfusion	Died	Low risk patients
0	1	0	0	0	1
1	2	0	0	0	2
2	3	1	0	0	2
3	1	0	0	0	1
4	1	0	0	0	1
5	0				
6	5	1	2	0	2
7	4	2	2	0	1
8	6	1	4	0	2
9	6	3	4	0	2
10	13	9	8	0	1
11	8	3	6	0	1
12	6	3	4	1	0
13	4	1	4	0	0
14	6	1	5	2	1
15	4	1	3	1	0
16	2	1	1	1	0
17	1	1	1	0	0
18	1	1	1	0	0

GBS, Glasgow-Blatchford score.

Table 9: PRS of the studied patients

PRS	Number of patients	Intervention	Blood transfusion	Died	Low risk patients
0	13	3	5	0	6
1	4	1	2	0	2
2	9	1	4	0	3
3	12	7	6	0	2
4	23	9	15	2	4
5	8	4	7	2	0
6	5	4	5	1	0

PRS, pre-endoscopy Rockall score.

Table 10: Comparison of AUC of different scoring systems for prediction of different outcomes

Score system (cutoff)	AUC	95% CI	*P*	Sensitivity (%)	Specificity (%)
Mortality					
AIMS65 score (3)	0.95	0.87-1	0.001	100	81.16
GBS (12)	0.88	0.79-0.97	0.004	100	72.4
PRS (4)	0.835	0.7-0.96	0.013	100	55
Blood transfusion					
AIMS65 score (3)	0.74	0.62-0.85	0.001	35.5	93.
GBS (12)	0.77	0.65-0.88	>0.001	44.4	86.2
PRS (4)	0.69	0.57-0.81	0.005	60	68.9
Duration of hospitalization					
AIMS65 score (3)	0.57	0.44-0.7	0.256	21.6	72.9
GBS (12)	0.49	0.36-0.63	0.966	27	62.1
PRS (4)	0.60	0.47-0.73	0.129	54	56.7
Endoscopic intervention					
AIMS65 score (3)	0.59	0.46-0.72	0.173	27.5	77
GBS (12)	0.57	0.44-0.70	0.306	31	66
PRS (4)	0.65	0.52-0.78	0.028	58.6	57

95% CI, 95% confidence interval; AUC, area under the curve; GBS, Glasgow-Blatchford score; PRS, Pre-endoscopic Rockall Score.

The scoring system to be an effective tool for risk stratification should be easy to use and accurately predict bleeding outcomes [16].

In this study, ROC analysis showed that AIMS65 and GBS were better than PRS when predicting in-hospital mortality (AUC:

0.95 vs 0.88 vs 0.83). The three scoring systems were similar in prediction the need for blood transfusion (AUC: 0.74 vs 0.77 vs 0.69), but they had less predictive values regarding endoscopic intervention (0.59 vs0.57 vs 0.65) and duration of hospitalization (0.57 vs 0.57 vs 0.65).

This finding is in agreement with a study by Elif *et al*. [17], who reported that the AIMS65 and GBS scores were similar to predicting in-hospital mortality. Moreover, Zhong *et al*. [18], in a prospective study found that for the prediction of in-hospital mortality, there was no significant difference between AIMS65 and GBS.

However, a Korean study by Park *et al*., in 2016 [8], involving 523 patients with nonvariceal UGIB showed that AIMS65 score was useful for predicting the mortality, transfusion requirement, and endoscopic intervention. Kim *et al*. [19] studied 512 Korean patients with nonvariceal UGIB. The AIMS65 showed similar performance to the GBS in predicting mortality, ICU admission, and endoscopic intervention.

Other studies suggested that AIMS65 is better than other scoring systems. Robertson *et al.* [16] showed that the AIMS65 score was superior to both the GBS and the PRS in predicting inpatient mortality. Another study by Hyett *et al.* [20] reported that the AIMS65 score was superior to the GBS in predicting inpatient mortality, whereas the GBS is superior for predicting blood transfusion. Nakamura *et al*. [21] evaluated AIMS65 and GBS in Japanese patients with acute upper or lower gastrointestinal bleeding in a retrospective study and concluded that the AIMS65 score is useful for predicting the prognosis of patients with acute GI bleeding.

Saltzman *et al*. [6] suggested that the AIMS65 score can accurately predict in-hospital mortality and cost of treatment in cases of acute UGIB. The study by Chandra *et al*. [22] had shown that AIMS65 can predict mortality and cost of hospitalization in UGIB. Marwan *et al*. [23] found that the AIMS65 score is superior to the GBS for predicting in-hospital mortality and hospital length of stay for patients with UGIB.

One study by Choe *et al*. [24] showed that AIMS65 was not useful for predicting the need for endoscopic intervention and transfusion in Korean patients with UGIB. The same findings were observed in the current study regarding endoscopic intervention but disagree with our result regarding transfusion.

In contrast, other studies assumed that AIMS65 score was not suitable for risk stratification in patients with UGIB. Jung *et al*. [25] found that the AIMS65 score was insufficient for predicting outcomes in peptic ulcer bleeding. Another study by Kalkan *et al*. [26] showed that PRS is more useful for predicting mortality than the GBS and AIMS65 scores in elderly patients with UGIB; however, for predicting duration of hospitalization and the need for blood transfusion, the GBS is superior to the PRS and AIMS65 scores. Stanley *et al*. [27] added that the GBS was best at predicting intervention or death compared with PRS and AIMS65 score.

Moreover, Shafaghi *et al*. [28] studied retrospectively adult patients who were admitted to Razi Hospital (Rasht, Iran) with diagnosis of UGIB, and they concluded that neither of risk scores was highly accurate as a prognostic factor in their population.

In the current study, variceal bleeding was the leading cause of bleeding in about one-third of patients. An Egyptian study by Mohammad and Morsy [29] studied cirrhotic patients with acute variceal bleeding at Sohag University Hospital and reported that AIMS65 score has very good performance for predicting mortality in these patients.

Moreover, El-Deep *et al*. [30] studied Egyptian cirrhotic patients with UGIB in Menoufia University Hospital and mentioned that in-hospital mortality was accurately predicted by AIMS65.

Gaduputi *et al*. [31] investigated the correlation between the AIMS65 score and Endoscopic RS in cirrhotic and noncirrhotic patients in a retrospective study. They concluded that there is a statistically significant correlation between AIMS65 score and mortality and length of hospitalization in noncirrhotic patients, but AIMS65 score correlated only with mortality but not the length of hospitalization in cirrhotics.

Moreover, a prospective study by Rout *et al*. [32] aimed to assess the performance of AIMS65 and GBS scores in patients with variceal and nonvariceal UGIB. The accuracy of prognostic scores in predicting the adverse outcome including the intervention and mortality was higher in nonvariceal as compared with variceal UGIB and concluded that the prognostic scores such as GBS and AIMS65 predict intervention and mortality better among patients with nonvariceal than variceal UGIB.

In our study, Glasgow coma scale for died patients (9.5 ± 2.5) were significantly lower than survived patients (14.8 ± 0.56) (P=0.014). Chandnani *et al*. [33] studied Indian patients with UGIB prospectively. Variceal bleeding was the most common etiology (47.7%). A total of 30 patients died (10%). Glasgow coma scale less than or equal to 13.9 (P=0.001) was found to be a significant predictor of mortality.

The cutoff value is a value separating risk levels (high vs low risk). In the current study, an AIMS65 cut-off score of 3 predicted in-hospital mortality with 100% sensitivity and 81.16% specificity (P=0.001).

In agree with our results, the study by El-Deep *et al*. [30] found that the risk for in-hospital mortality increases in patients with an AIMS65 score greater than or equal to 3 and that this cutoff point can be selected as the marker of high-risk patients. Chandra *et al*. [22] also reported that the cutoff value that maximized the ability to predict in- hospital mortality for patients with UGIB was 3 for the AIMS65 score.

Although, Hyett *et al*. [20] found that the cutoff was 2 or more for the AIMS65 score for inpatient mortality. Sun *et al*. [9] also

mentioned that the AIMS65 score greater than or equal to 2 may be useful for predicting outcomes in patients with UGIB.

These conflicting results might be owing to different patient characteristics. Simon *et al*. [34] reported that it is important to compare the scoring systems within the same population and with a similar disease severity.

Stratification of UGIB patients who are at low risk for adverse outcomes can result in safe and early discharge of these patients leading to reduction in healthcare resource utilization [35].

In this study, 17 (22.97%) patients with AIMS65 score between 0 and 2 did not need neither blood transfusion nor surgical or endoscopic intervention and could be considered as low-risk patients. In our patients, AIMS65 score less than or equal to 2 could predict low-risk patients with sensitivity 100% but low specificity 31%.

Moreover, our patients who had AIMS65 score less than or equal to 2 and need either blood transfusion or intervention usually had Hb less than 8 g/dl or had history of CLD.

If we excluded patients with AIMS65 score less than or equal to 2 with history of CLD or Hb less than 8, we can predict low-risk patients with 82% specificity and 100% sensitivity.

Consequently, patients with AIMS65 score less than or equal to 2 without history of CLD or Hb less than 8 could be assumed to determine patients who can be managed as outpatient and do endoscopy in scheduled time.

This finding needs further evaluation and more studies on a large number of patients to validate this assumption.

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Conflicts of interest
There are no conflicts of interest.

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