

Glasgow-Blatchford versus Rockall Scoring Systems for Predicting Outcomes of Patients with Upper Gastrointestinal Bleeding

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Abstract Acute upper gastrointestinal bleeding is a common emergency and potentially fatal health problem that associated with high mortality and morbidity. Gastrointestinal endoscopy can identify the cause of bleeding and remains the cornerstone of diagnosis and therapy in gastrointestinal bleeding. **Aim:** The aim of this study is to compare between the Glasgow-Blatchford score and Rockall score in predicting the clinical outcomes of patients with upper gastrointestinal bleeding during hospitalization. **Study design:** Retrospective observational cohort research design was used to conduct this study. **Setting:** This study was conducted in the medicine department 1 and 2 at medical hospital affiliated to Ain Shams University Hospitals, Cairo, Egypt. **Subjects:** Purposive sample of 95 adult patients who were admitted to the previously mentioned settings from October 2020 to March 2021 were included in the study. **Data collection tools:** (1) Patients' Clinical Outcomes Assessment Questionnaire, (2) The Glasgow-Blatchford Scale, (3) The pre-endoscopic Rockall Score. **Results:** Regarding re-bleeding prediction, (AUC for GBS= 0.573, RS 0.534). As for mortality prediction, GBS was similar to RS (AUC 0.754 and 0.744 respectively). Regarding need for blood transfusion (AUC for GBS= 0.868 and 0.691 for RS), prediction of need for endoscopic intervention revealed that GBS was superior to RS (AUC 0.785 and 0.675 respectively). In terms of length of hospital stay, GBS and RS were quietly equivalent (AUC 0.654 and 0.657 respectively). **Conclusion:** The study concluded that there was no statistically significant difference between the Glasgow Blatchford Score and pre-endoscopic Rockall Score in predicting accuracy of clinical outcomes for patients with upper gastrointestinal bleeding. **Recommendations:** It is recommended that the pre-endoscopic Glasgow Blatchford Score and Rockall Score are considered useful tools that can be safely used to predict clinical outcomes of patients with gastrointestinal bleeding.

Keywords: *gastrointestinal bleeding, Glasgow Blatchford score, patients' outcomes, prediction, Rockall score*

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1. Introduction

Upper gastrointestinal bleeding (UGIB) is a life-threatening condition that associated with significant morbidity, mortality and economic burden on health care system. Upper GI bleeding is a common public health problem with an annual incidence of approximately 80 to 150 per 100,000 populations, with estimated mortality rates between 2% to 15% [1]. It is responsible for 250,000 to 300,000 hospital admissions and about 30,000 deaths per year in the United States [2].

Upper gastrointestinal bleeding is any blood loss that originates from a gastrointestinal source above the ligament of Treitz and usually presents either as hematemesis or melena, whereas lower gastrointestinal bleeding originates below Treitz ligament and most

commonly presents as hematochezia. Hematemesis is the regurgitation of blood or blood mixed with stomach contents. Melena is dark, black, and tarry feces that typically have a strong characteristic odor caused by the digestive enzyme activity and intestinal bacteria on hemoglobin. Hematochezia is the passing of bright red blood via the rectum [3].

Acute upper GI bleeding can be classified as variceal or non-variceal bleeding. Variceal bleeding is the major cause of upper gastrointestinal bleeding in liver cirrhotic patients and it is usually related to esophageal varices. While the non-variceal bleeding are attributed to peptic ulcer, reflux esophagitis, overuse of non-steroidal anti-inflammatory drugs (NSAIDs), low-dose aspirin use for prevention of cardiac and brain diseases, tumor, Helicobacter pylori infection, Mallory-Weiss tear, and the use of antiplatelet and anticoagulants medications [4,5].

Nurses play an important role in the initial assessment and evaluation of patients experiencing features of gastrointestinal (GIT) bleeding through taking complete health history to identify the source of bleeding, performing physical examination and interpret the results of laboratory tests to identify degree of patient's risk. Many risk assessment scores have been developed to predict clinical outcomes for patient with GI bleeding and assist in discriminating the patient's risk and the need for urgent upper digestive endoscopy. These include the Glasgow Blatchford Score (GBS) and the pre-endoscopic Rockall Score (RS) [6].

The GBS is a formal risk assessment tool for upper GI bleeding. It can help physician and nurses to determine the severity of bleeding and stratify patients accurately into those with very low risk who could be managed as outpatients and higher risk who might require urgent endoscopy intervention, management in the intensive care units, blood transfusion or surgery [7]. The GBS uses the patient's blood results, blood pressure, known history and presentation findings to identify patients who do not need to be admitted to hospital after acute UGIB [8].

The pre-endoscopy Rockall Scoring system aims at predicting mortality and re-bleeding for patients with UGIB through clinical parameters and without the need for endoscopic findings. This score combines five variables such as the patient's age, occurrence of shock assessed from systolic blood pressure and pulse rate, and patient's co morbidities [9].

The outcomes measure was defined by the World Health Organization as a "change in the health of an individual, group of people, or population that is attributable to an intervention or provided health care." Patient's outcomes can be seen as a complex construct that can be measured directly and indirectly over different periods of time. The outcomes can include mortality, readmission, length of hospitalization, signs and symptoms, laboratory values, diseases, and disability that health care organizations are trying to improve [10,11].

1.1. Significance of the Study

Upper gastrointestinal bleeding is a potentially fatal condition that requires nurses to assess patients immediately upon admission using an objective validated tool to stratify patients according to their risk degree for bleeding and identify those patients who are at risk for developing adverse outcomes. Early risk assessment for patients with gastrointestinal bleeding and accelerate treatment measures help to reduce mortality, morbidity, length of hospital stay, health care costs; eradicate the need for surgery and unnecessary admission to the intensive care unit (ICU), increase the efficiency of medical treatment and aid in making decision for appropriate medical and nursing interventions.

1.2. Aim of the Study

The aim of this study is to compare between the Glasgow-Blatchford score and Rockall score in predicting accuracy of the clinical outcomes for patients with upper gastrointestinal bleeding during hospitalization.

1.3. Research Hypothesis

This study hypothesized that Glasgow-Blatchford score has a higher predictive ability for outcomes of patients with upper gastrointestinal bleeding than Rockall score.

2. Methods

2.1. Research Design

Retrospective observational cohort research design was used to conduct this study. The outcomes were traced from medical records.

A retrospective study looks backwards and examines exposures to suspected risk. In a retrospective study, the outcome of interest has already occurred in each individual at the time the study is initiated. An investigator conducting a retrospective study typically utilizes administrative databases, medical records, or interviews with patients who are already known to have a disease or condition. The retrospective cohort design is the most powerful retrospective observational design in terms of the evidence yielded. They test associations associated with exposures and outcomes [12].

2.2. Setting

This study was conducted in the medicine department (1) and (2) at medical hospital affiliated to Ain Shams University Hospitals, Cairo, Egypt.

2.3. Subject

Purposive sample of 95 adult patients who met inclusion and exclusion criteria and were admitted to the previously mentioned settings from beginning of October 2020 to the end of March 2021 were included in the study.

Inclusion criteria

- Patients' age \geq 18 years old.
- Patients with symptoms of upper gastrointestinal bleeding (hematemesis, coffee ground vomiting, melena) on the day of admission.
- Patients who presented with features of mixed upper and lower gastrointestinal bleeding (e.g. coffee-ground vomiting and fresh per rectal bleeding or hematochezia) were also included.
- Patients who undergone upper gastrointestinal endoscopy.

Exclusion criteria:

- Patients with incomplete medical history.
- Unavailability of patient's data needed for calculation of score for both GBS and RS.
- The outcome of the patient not being known.
- Patients with only lower GI bleeding were excluded from this study.
- Patients who were discharged against medical advice.

2.4. Tools for Data Collection

2.4.1. Patients' Clinical Outcomes Assessment Questionnaire

This tool was developed by the researchers in English language after reviewing recent related literatures [1,3]. It

includes two parts: Part one includes patients' demographic characteristics such as age, gender, current medical diagnosis.

Part two includes patients' clinical outcomes data that are evaluated in this study. The outcomes included any clinical interventions need to be performed during the current hospitalization period, such as the need for blood transfusion, need for intervention either endoscopic or surgical. In addition to re-bleeding during current hospitalization, in-hospital death, and length of hospital stay.

2.4.2. The Glasgow-Blatchford Scale

The Glasgow-Blatchford bleeding score is a simple fast track screening tool that was developed by Blatchford et al. [13] in English language to assess patients with acute upper gastrointestinal bleeding who are at high or low risk for death and re-bleeding and to identify a patient's need for medical intervention such as a blood transfusion, endoscopic intervention and surgery.

This scale consists of eight (8) components that include hemodynamic parameters (pulse and systolic blood pressure), clinical data (melena, syncope, co-morbidities such as hepatic failure and heart failure) and laboratory variables (blood urea, hemoglobin).

The score of each item is as follows; pulse rate (1), blood pressure categories (1-3), blood urea categories (2-6), hemoglobin categories (1-6), co-morbidities (2 for cardiac failure, 2 for hepatic disease or any chronic diseases), melena (1), and syncope (2). The total score of the scale is (23), which indicate that patients are at high risk degree, while (zero) score indicate that patients are at low risk degree for re-bleeding and need for endoscopic intervention.

2.4.3. The Pre-endoscopic Rockall Score

The pre-endoscopic Rockall scoring (RS) system is a tool developed by Rockall et al. [14] in English language to assess the degree of risk of re-bleeding and death for patients who are admitted with UGIB. This score incorporates three (3) variables which include patient's age, shock (heart rate, systolic blood pressure), and co-morbidities. The score of each item is as follows; age categories (0-2), Shock (0-2), co-morbidities such as cardiac failure, renal or liver failure and disseminated malignancy or other major co-morbidities (0-3). The total score of the scale is seven (7), which indicate that patients are at high risk degree, while (zero) score indicate that patients are at low risk degree for re-bleeding, death and need for endoscopic intervention.

2.5. Tools Validity and Reliability

The tools were evaluated in terms of face and content validity by a panel of five experts (two professors, two assistant professors, and one lecturer) from medical surgical nursing and critical care nursing departments, Faculty of Nursing of Ain Shams University. The experts reviewed the tools for their matching with the research aim. No modifications were done. Reliability of the tools was tested before by the authors of the original study. The reliability was achieved via calculating area under receiver operating characteristic (ROC) curve; it was 0.92 for prediction of mortality and re-bleeding for GBS. Regarding reliability of pre-endoscopic RS, it was 0.70 for prediction of re-bleeding and 0.81 for mortality in the original study.

2.6. Pilot Study

A pilot study was conducted on 10% (9) of patients with the same selection criteria from the study settings to test clarity and applicability of the study tools, as well as to estimate the time needed for each tool to be filled in. No modifications were needed to be carried out because it is standardized tools. Patients of the pilot study were included in the main study subjects.

2.7. Ethical Considerations

The research approval was obtained from the ethical research committee at faculty of nursing before initiating the study. Permission to conduct the study was also obtained from the director of the medical hospital and director of medicine departments (1) and (2) before conducting the study. The researchers clarified the aim of the study in a letter issued to the hospital's director from the dean of faculty of nursing prior to data collection. The researchers maintained anonymity and confidentiality of subjects' data. Written informed consent was not obtained from patients due to the retrospective non-interventional nature of the study.

2.8. Procedure

- Data was collected during the pre-determined period by both researchers.
- The researchers visited the medical record department three days/ per week (Sunday, Wednesday, and Thursday) in the morning period from 9 am to 1 pm in order to collect data from patients' files admitted to the previous mentioned settings.
- Patients who fulfilled the inclusion criteria were selected by the researchers based on the data recorded in patients' files.
- The data needed to calculate the Glasgow-Blatchford Score and the pre-endoscopic Rockall Score were collected from the patients' files by both researchers.
- These data included variables such as patients' demographics data (age, gender, length of stay in hospital), laboratory data (hemoglobin, blood urea nitrogen), vital signs upon admission (heart rate and systolic blood pressure), manifestations on admission (presence of melena, hematemesis, syncope), history of cardiac diseases, hepatic diseases, other co-morbidities such as chronic pulmonary diseases, acute or chronic renal diseases, leukemia, lymphoma, and malignancy, use of NSAIDs and anti-coagulants drugs that contribute to bleeding. In hospital mortality, need for blood transfusion, endoscopic findings and any interventions are also collected in the pre prepared data form.
- These tools were filled in by the researchers; it had taken about 15 minutes to be filled in for every patient.
- The score of GBS and RS were calculated for each patient.
- The clinical outcomes were listed for every patient. Then all outcomes for all patients were calculated as a number and percentage.

2.9. Data Analysis

The collected data were tabulated and statistically analyzed using the statistical package for social science

software version 18 (SPSS Inc., Chicago, IL). Quantitative data were presented as mean. Qualitative data were expressed by frequencies (n) and percentage (%). The predictive accuracy of each scoring system was evaluated by a receiver operating characteristic (ROC) curve, and calculation of area under the curve (AUC) with 95% confidence intervals (CI). Sensitivity and specificity were calculated for different scores. P-value ≤ 0.05 was considered statistically significant.

3. Results

A total of 95 patients who met the inclusion criteria were available for the study over six months. As shown in Table 1, 48.4% of patients were below the age of sixty and 48.4% were between the ages of sixty and seventy-nine. The mean age in the studied patients was 58.27 (range, 18-84). Sixty-two (62.1%) of the study subjects were males and 37.9% were females.

In Table 2, the study results showed that 41.1% of patients under study had esophageal varices as revealed by the upper endoscopy and 34.7% of them had gastric ulcer that verified in 33 patients. While 7.4% of patients had gastro-duodenal erosion, 5.3% had gastric malignancy and only 3.2% of patients had gastritis as causes of acute upper gastrointestinal bleeding.

Table 1. Demographic characteristics of the study subjects (n= 95)

Patients' characteristics	No	%
Age		
< 60 years	46	48.4
60 - ≤ 79 years	46	48.4
≥ 80 years	3	3.2
Mean	58.27	
Gender		
Male	59	62.1
Female	36	37.9

Table 2. Endoscopic findings of the studied patients (n=95)

Endoscopic diagnosis	No	%
Varices	39	41.1
Gastric ulcer	33	34.7
Mallory Weiss tear	4	4.2
Gastrointestinal malignancy	5	5.3
Gastritis	3	3.2
Gastro-duodenal erosion	7	7.4
Vascular malformation	4	4.2

In relation to the clinical characteristics of the studied patients, Table 3 illustrates that 66.3% of patients had pulse rate less than 100 b/min on admission, 75.8% of patients, their systolic blood pressure range from 100-109, and syncope was verified in 9 (9.5%) patients. In addition, it was revealed that 31.6% of patients under study presented with melena on admission, 30.6% of them had hematemesis on admission and 37.8% of patients had hematemesis and melena as a common symptom of UGIB. Regarding hemoglobin, it was illustrated that and 78.9% of patients had hemoglobin level less than 10 mg/dl.

Regarding to drug history, it showed that 24.2% of patients reported anticoagulants use and 30.5% of them consuming NSAIDs. As regard to co morbidities, it was found that 41.1% of patients had hepatic diseases, 25.3% of them had history of heart failure, and 5.3% had malignancy. In addition, there was 30.5% of patients had other co morbidities, while more than one quarter (27.4%) of the studied patients had no major co morbidities.

Table 3. Clinical characteristics of the study subjects (n= 95)

Clinical characteristics	No	No	%
Heart rate	< 100 b/min	63	66.3
	≥ 100 b/min	32	33.7
Systolic blood pressure	=100 - 109	72	75.8
	= 90 - 99	2	2.1
	< 90	21	22.1
Syncope	---	9	9.5
Blood urea nitrogen	=19 and < 22.4	32	33.7
	≥ 22.4 and < 28	22	23.2
	≥ 28 and < 70	27	28.4
	≥ 70	14	14.7
Hemoglobin g/dl	Male (≥ 12 and < 13) Female (≥ 10 and < 12)	11	11.6
	Male (≥ 10 and < 12)	9	9.5
	Male (< 10) Female (< 10)	75	78.9
Presenting Symptoms on admission	Melena	30	31.6
	Hematemesis	29	30.6
	Melena and hematemesis	36	37.8
Drug history	No drug history	43	45.3
	Anticoagulant use	23	24.2
	NSAIDs use	29	30.5
Co morbidity*	No major co morbidity	26	27.4
	Hepatic disease	39	41.1
	Heart failure	24	25.3
	Renal Failure	3	3.2
	Malignancy	5	5.3
	Other co morbidities	29	30.5

* Some patients presented with more than one co morbidity.

Table 4. Percentage distribution of the studied patients regarding clinical outcomes and risk stratification (n= 95)

Clinical outcomes	No	%	
Length of hospital stay	< 2 days	33	34.7
	≥ 2 days	62	65.3
Blood transfusion required	75	78.9	
Endoscopic intervention	72	75.8	
Re-bleeding	11	11.6	
Mortality	9	9.5	
Risk stratification			
Low risk	GBS (score < 12)	25	26.3
	Pre-endoscopic RS (score < 2)	17	17.8
High risk	GBS (score ≥ 12)	70	73.7
	Pre-endoscopic RS (score ≥ 2)	78	82.2

Table 5. Difference between GBS and RS regarding the prediction of clinical outcomes (n=95)

Score	AUC	P	Cutoff	Sensitivity	Specificity	95% Confidence Interval
Re-bleeding						
GBS	0.573	0.432	12	0.727	0.583	0.389 - 0.757
RS	0.534	0.714	2	0.909	0.857	0.351 - 0.717
In-hospital death						
GBS	0.754	0.013	12	0.778	0.465	0.589 - 0.919
RS	0.744	0.016	2	0.778	0.651	0.552 - 0.936
Endoscopic intervention						
GBS	0.785	0.015	12	0.764	0.658	0.677- 0.926
RS	0.675	0.012	2	0.823	0.478	0.570-0.874
Blood transfusion requirement						
GBS	0.868	0.017	12	0.867	0.563	0.532- 0.832
RS	0.691	0.015	2	0.751	0.349	0.576- 0.810
Duration of hospitalization						
GBS	0.654	0.014	12	0.710	0.394	0.530 - 0.777
RS	0.657	0.012	2	0.952	0.697	- 0.778

$P \leq 0.05$ statistically significant.

As regard to clinical outcomes, Table 4 revealed that 65.3% of patients under study stay in hospital for more than 2 days and more than three quarters (78.9%, 75.8%) of patients needed blood transfusion and had undergone gastrointestinal endoscopic intervention respectively after admission. While 11.6% of patients were re-bleed and 9.5% of them were died during their current hospital stay. Concerning risk stratification of patients, it was found that 26.3% of patients were classified as low risk group according to GBS versus 17.8% based on RS, while 73.7% of patients were at high risk group with GBS versus 82.2% according to RS.

Table 5 presents the comparison of GBS and pre-endoscopic RS with AUC curves for the prediction of re-bleeding (GBS 0.573 and RS 0.534), $p > 0.05$. A Glasgow Blatchford score cutoff point of 12 was the optimum threshold to predict re-bleeding (sensitivity 0.727, specificity 0.583) compared to the RS of 2 as the optimum threshold to predict re-bleeding (sensitivity 0.909, specificity 0.857).

As regard to the prediction of in-hospital death, Table 5 showed that the AUC value was 0.754 for GBS and 0.744 for RS with statistical significance ability to predict death ($p < 0.05$ for both tools). A Glasgow Blatchford score cutoff point of 12 was the optimum threshold to predict in-hospital mortality (sensitivity 0.778, specificity 0.465) compared to the RS of 2 as the optimum threshold to predict re-bleeding (sensitivity 0.778, specificity 0.651).

Concerning prediction of endoscopic intervention, Table 5 revealed that the AUC value was 0.785 for GBS and 0.675 for RS with statistical significant prediction ability ($p < 0.05$). A Glasgow Blatchford score cutoff point of 12 was the optimum threshold to predict need for endoscopic intervention (sensitivity 0.764, specificity 0.658) compared to the RS of 2 as the optimum threshold to predict need for endoscopic intervention (sensitivity 0.823, specificity 0.478).

In relation to prediction of need for blood transfusion, the results revealed that the AUC value was 0.868 for GBS and 0.691 for RS, $p < 0.05$. A Glasgow Blatchford score cutoff point of 12 was the optimum threshold to

predict need for blood transfusion (sensitivity 0.867, specificity 0.563) compared to the RS of 2 as the optimum threshold to predict blood transfusion requirement (sensitivity 0.751, specificity 0.349).

Regarding the prediction of length of stay in hospital, the results revealed that the AUC value was 0.654 for GBS and 0.657 for RS (both tools performed well, $p < 0.05$). A Glasgow Blatchford score cutoff point of 12 was the optimum threshold to predict duration of hospitalization (sensitivity 0.710, specificity 0.394) compared to the RS of 2 as the optimum threshold to predict length of stay in hospital (sensitivity 0.952, specificity 0.697).

4. Discussion

Gastrointestinal bleeding remains a significant health problem that requires careful assessment to avoid high economic burden on hospitals. Initial management of upper GI bleeding involves resuscitation, followed by endoscopy. The definitive management is indicated by the overall risk of re-bleeding and morbidity. It is necessary to identify those who will not require hospital-based clinical interventions. Successful identification of such low risk patients may help reduce unnecessary admissions and health care cost [15].

Several studies have been conducted to validate the risk scoring systems of UGIB and reported different results due to variation in geographical region and health care system and management of UGIB which affects the accuracy of risk scores [16]. Therefore, this study was conducted to compare the accuracy of pre-endoscopic risk scoring systems (GBS and RS) in predicting clinical outcomes for patients with upper gastrointestinal bleeding during hospitalization.

Regarding demographic characteristics, the current study revealed that the mean of age of the studied patients was 58.27 years that ranged from 18-84 years. This may be due to advances in health care management that results in increasing age and life expectancy of general population

and led to increasing rate of peptic ulcer and variceal bleeding as a cause of UGIB in that age. This result is in accordance with Chang et al., [17] who reported that the studied patients' average age was 61.1 ± 16.5 years in their study that titled "Prospective comparison of the AIMS65 score, Glasgow-Blatchford Score, and Rockall Score for predicting clinical outcomes in patients with variceal and nonvariceal upper gastrointestinal bleeding". But the result is contradicted with Tsui et al., [18] who mentioned that the median age was 68 years and ranged from 53-82 years which is slightly higher than results of this study.

The present study showed that nearly two thirds of the studied patients were males and one third was females. This matches the results of Lu et al., and Farag et al., [19], [20] who stated that more than three quarters of the studied patients who had UGIB were males and one quarter of them were females.

As regard to endoscopic findings of the studied patients, the current study showed that two fifths of patients had varices and more than one third of them had peptic ulcer as revealed by the upper endoscopy. This results may be due to the high incidence and prevalence of epidemic virus C and liver cirrhosis in Egypt several years ago which confirmed by the results of this study that revealed that two fifths of patients had hepatic diseases, and esophageal varices is considered one of its major complications.

The increase number of patients who had peptic ulcer in this study may be due to that nearly half of patients under study were over 60 years who usually acquire chronic diseases and consume low dose aspirin and NSAIDs as a medical therapy of heart, brain, degenerative joint disease and osteoarthropathies diseases. This result is contradicted with Custovic, et al., [21] who showed that the most common cause of upper gastrointestinal haemorrhage was peptic ulcer that verified in 62.4% of patients. Esophageal varices were verified in 15.6% of patients in their study entitled "Comparison of Glasgow-Blatchford score and Rockall score in patients with upper gastrointestinal bleeding". While this result is comparable with Hafez et al., [22] who illustrated that the esophageal varices are the most common cause of upper GIT bleeding that representing in two fifths of patients followed by gastritis, gastric ulcer and adenocarcinoma.

The findings of the current study showed that few of patients had gastrointestinal malignancy, Mallory-Weiss tear, gastro-duodenal erosion and only 3.2% of patients had gastritis as causes of acute UGIB. These results go in the same line with Custovic, et al., [21] who revealed that gastric cancer was found in less than 5% of patients. Erosive gastritis and gastroesophageal reflux disease (GERD) were verified in 7.2% and 2.5% of patients respectively and Mallory-Weiss in 5.1%. In addition, Weledji, [15] found that Gastro-esophageal cancer represents less than 5% of the studied patients and Mallory-Weiss tear represent 5% in a study that titled "Acute upper gastrointestinal bleeding: A review surgery in practice".

The outcomes that are traced in this study revealed that more than two thirds of the studied patients stayed in hospital for more than 2 days. This result may be due to that approximately three quarters of patients were classified as high-risk group either by GBS or pre-endoscopic RS,

so that they stay in hospital for more than two days. In addition, two thirds of patients in the present study had co-morbid diseases (two fifths of them had hepatic disease, one quarter had heart failure and few of them had malignancy). These results are compatible with Lu et al., [19] and Shafaghi et al., [23] who stated that the mean hospitalization duration was 9.48 ± 8.4 and 6.30 ± 3.99 days respectively.

Regarding blood transfusion, it was illustrated that more than three quarters of the studied patients needed blood transfusion during their hospitalization. This may be due to that more than three quarters of patients had hemoglobin level less than 10 mg/dl. This result is incompatible with Shahrami et al., [24] who found that 41.5% of cases needed blood transfusion in their study that titled "Full and modified Glasgow-Blatchford bleeding score in predicting the outcomes of patients with acute upper gastrointestinal bleeding; a diagnostic accuracy study". Also, the result of the present study is agreed with Fouad and Shabaan, [25] who reported that three fifths (60.8%) of patients received blood because they had hemoglobin level less than 8 mg/dl.

As regard to endoscopic intervention, this study reported that all patients received gastrointestinal endoscopy procedure after admission, confirming the diagnosis of upper gastrointestinal hemorrhage. But more than three quarters of patients under study underwent endoscopic intervention in form of sclerotherapy, band ligation and adrenaline injection as a way to manage and stop the source of bleeding. This finding go in the same line with Martínez-Cara et al., [26] who stated that endoscopy was performed in all of the studied cases, within a maximum of 8 hours after admission, while 40.8% of patients received endoscopic therapy such as adrenaline and a sclerosing agent (polidocanol) injection, argon plasma coagulation, hemostatic clipping, variceal banding, balloon tamponade, cyanoacrylate glue injection, and haemostatic powder application in their study that titled "Comparison of AIMS65, Glasgow-Blatchford score, and Rockall score in a European series of patients with upper gastrointestinal bleeding: performance when predicting in-hospital and delayed mortality".

In relation to re-bleeding, the results showed that few (11.6%) of patients were re-bleeding after endoscopy. This may be due to that patients are consuming anticoagulants and NSAIDs. This result is agreed with the results of Kim et al., [27] who found that 12.7% of the studied patients developed re-bleeding in their study entitled "AIMS65 scoring system is comparable to Glasgow-Blatchford score or Rockall score for prediction of clinical outcomes for non-variceal upper gastrointestinal bleeding".

Concerning mortality rate, it was found that 9.5% of the studied patients were died during their current hospital stay. This may be due to advanced age, presence of multiple co morbid diseases such as anemia, Covid 19, malignancy, anemia, systemic lupus and stroke. This result is similar to Tang et al., [28] who stated that among the 395 patients included during the study period; the total 30-day mortality rate was 10.4% (41/395) in their study titled "Scoring systems used to predict mortality in patients with acute upper gastrointestinal bleeding in the emergency department".

The results of this study reported that cutoff point of ≥ 2 for pre-endoscopic RS and cutoff point of ≥ 12 for GBS were able to identify patients at high risk for death. All patients who are died in this study during hospitalization have RS more than or equal 2 and GBS of more than or equal 12 with AUC value was 0.744 and 0.754 respectively with no statistically significance difference between two scales. The results of this study support the use of both tools in predicting mortality of patients with UGIB who are at high risk for adverse outcomes in order to allow early and rapid intervention to decrease mortality and morbidity rate. The mortality rates of high-risk patients with GBS ≥ 12 points could be reduced if these patients underwent early endoscopic examination. Therefore, endoscopic examination should be performed as soon as possible in patients with a GBS ≥ 12 points.

This result is contradicted with Fouad and Shabaan, [25] who stated that ROC analysis showed that GBS was better than RS when predicting in-hospital mortality (AUC 0.88 versus 0.83). While Saffouri et al, [29] reported that pre-endoscopic RS was superior to GBS in predicting 30- days mortality of presentation with symptoms of UGIB (AUC 0.795 versus 0.692) at cutoff point ≥ 4 for RS and ≥ 5 for GBS. In addition, Lu et al, [19] mentioned that the predictive ability of RS was better than GBS with AUC value 0.842 (95% CI: 0.827-0.855) and 0.622 (95% CI: 0.603-0.640) respectively.

Regarding to re-bleeding, the study revealed that GBS and RS had similar predictive value for re-bleeding with no statistically significance difference between both tools (AUC 0.573 and 0.534 respectively), p value > 0.05 . This may be due to that the GBS mainly designed to predict the need for in-hospital clinical interventions rather than predicting re-bleeding, so it had less predictive ability for re-bleeding, in addition that all patients who are re-bleeding were categorized by both tools as a high risk group at cutoff point ≥ 12 and ≥ 2 for GBS and PRS respectively, or may be due to shortening the follow-up period to be in hospital only and may be if it increased, may lead to a different result.

This result is in contrast with Lu et al, [19] who found that the pre-endoscopic RS predicting re-bleeding better than the GBS (AUC 0.658 and 0.528 respectively, $P < 0.01$). But the results go in the same line with Shafaghi et al, [23] who revealed that the GBS and PRS had predictive accuracy of 0.48 and 0.51 respectively with no statistically significance difference between them. Another study conducted by Kalkan et al, [30] show that patients with high pre-endoscopic Rockall score are in greater risk of re-bleeding which support the result of the present study.

The area under the curve (AUC) for predicting the need for endoscopic intervention showed that GBS was slightly better than RS (AUC 0.785 and 0.675 respectively). This result was similar to that of Balaban et al., [31] which titled "Predictors for in-hospital mortality and need for clinical intervention in upper GI bleeding" and showed that Rockall and Blatchford models are good predictors for screening more critically ill patients with weaker outcome. The findings of the present study also supported by Fouad and Shabaan, [25] who stated that the AUC

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

Concerning prediction of need for blood transfusion, the results reported that GBS is superior than RS (AUC 0.868 versus 0.691 respectively), p value > 0.05 . This results is agreed with that of Custovic, et al., [21] who showed that the GBS had a higher accuracy in detecting patients who needed transfusion units and was superior to the RS (AUC 0.810 vs.0.675). Moreover, Mokhtare et al., [32] confirmed that GBS was more accurate than RS in terms of detecting transfusion need (AUC, 0.757 versus 0.528; $P=0.001$).

In relation to predictive accuracy of length of hospital stay, the results of this study found that the AUC value for GBS and PRS was 0.654 and 0.657 respectively. It also noticed that most of patients who stay more than two days in hospital are classified as a high risk group by both tools. This may explain the usefulness of both tools to classify patients into high and low risk group which in turn able to reduce the number of patients' admission to the hospital and eliminate the unnecessary utilization of expensive resources needed for management of patients. This results are agreed with that of Shafaghi et al, [23] who illustrated that the mean of hospital length of stay was higher in high risk group comparing to low risk group in Glasgow Blatchford (6.30 ± 3.99 Vs 5.51 ± 3.87 $p = 0.02$) and Full Rockall (5.88 ± 3.88 Vs 7.04 ± 4.56 , $P = 0.04$).

The results of this study didn't support the research hypothesis in that GBS was more accurate than RS in predicting outcomes of patients with UGIB, the researchers suggest that both tools can be used to improve triage of upper gastrointestinal bleeding patients, allowing those patients at low risk to be discharged in order to reduce hospital costs and patient exposure to hospitalization hazards. In addition, those who are at greatest risk for re-bleeding and mortality to be managed more intensively inside the hospital. The researchers also suggest reducing the cutoff point to be less than 12 for GBS and less than 2 for RS to safely discharge patients because there were two patients who are classified as a low risk group were re-bled and stay in hospital for more than two days because they had other co morbidities that aggravate the risk for bleeding such as anemia.

5. Conclusion

There is no statistically significance difference between pre-endoscopic Glasgow Blatchford score and Rockall Score in predicting accuracy of clinical outcomes for patients with UGIB.

6. Recommendations

The pre-endoscopic Glasgow Blatchford score and Rockall Score are considered useful tools that can be safely used to predict clinical outcomes of patients with gastrointestinal bleeding.

Both tools are able to early stratify patients before endoscopy into low risk group who might be suitable for management as outpatients and high risk group which need to be treated in a hospital setting in order to improve efficiency of care and potentially outcomes for patients.

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Declaration of Competing Interest

No conflict of interest has been declared by the authors.

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