

Predictive Value of Risk Scoring Systems in Predicting Clinical Outcomes and Intervention in Patients with Nonvariceal Upper Gastro-Intestinal Bleeding

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Abstract

The international consensus recommend risk scoring systems for the prediction of various clinical outcomes in patients with gastro-intestinal bleeding for successful prognosis and treatment. The objective of this study was to assess the predictive accuracy of three risk scoring systems in Moroccan patients with acute non variceal upper gastrointestinal bleeding (NVUGIB).

From January, 2020 till December 2021, patients with NVUGIB from an university hospital center were retrospectively enrolled. The Glasgow-Blatchford score (GBS), Rockall score (RS), and AIM65 (albumin, INR, mental status, systolic blood pressure and age > 65) were calculated. Their performance was assessed by calculating the area under the receiver-operating characteristic curve.

A total 219 patients had NVUGIB. The areas under the curve (AUC) of the GBS, RS, and AIM65 for predicting the need for blood transfusion were 0.77, 0.69, and 0.61. The AUC for predicting mortality were 0.66, 0.80, and 0.76. AUC score was not statistically significant for predicting rebleeding.

GBS, RS, and AIM65 were precise scores for assessing the need for blood transfusion, endoscopic therapy, mortality, and surgery during NVUGIB.

Keywords: Nonvariceal Upper Gastrointestinal Bleeding; AIMS65 Score; Rockall Score; Glasgow-Blatchford Score; Accuracy; Risk Assessment

Introduction

Nonvariceal upper gastrointestinal bleeding (NVUGIB) remains a common medical emergency in gastroenterology with significant mortality of 5 - 10% [1]. The early use of risk stratification scores is recommended for clinical decisions, follow up and treatment selection in patients with NVUGIB [2]. Several risk assessment scores have been developed, the most widely used in clinical practice are the Glasgow-Blatchford (GBS), the Rockall score (RS) and AIMS65 [3].

These scoring systems are useful to identify patients who are at high risk of mortality or rebleeding and predict the need of blood transfusion and endoscopic hemostasis. They are simple to calculate using laboratory variables routinely available in the emergency clinical situation. Variceal upper gastrointestinal bleeding (VUGIB) and NVUGIB have different natural history and mortality rate. Therefore, risk scoring systems may have different performance in predicting clinical outcomes between both groups [4].

Several studies validated the performance of scoring systems in patients with upper gastro-intestinal bleeding (UGIB) worldwide, but more data is required from Morocco.

Aim of the Study

We aimed to determine the prognostic value for each Scoring System in predicting the need for blood transfusion, endoscopic treatment, surgery requirement, short-term mortality, and re-bleeding among Moroccan population with NVUGIB.

Methods

This was a retrospective descriptive and analytical study conducted between January 2020 to December 2021. We included patients who presented to the gastroenterology department medical center of the university hospital center, Casablanca, Morocco with UGIB based on the presence of hematemesis or melena or both. All patients underwent upper endoscopy. Patients who refused endoscopic examination were excluded from this study.

Management of UGIB was based on the Consensus for Clinical Practice Guidelines for the Endoscopic diagnosis and management of nonvariceal upper gastrointestinal hemorrhage (NVUGIH) from European Society of Gastrointestinal Endoscopy (ESGE).

Baseline characteristics including age, gender, presenting symptoms, co-morbidities, history of nonsteroidal anti-inflammatory drugs (NSAIDs) anticoagulant usage, hemodynamic status, laboratory parameters, endoscopic findings, re-bleeding, and mortality were recorded. Patients with variceal bleeding were excluded. GB, RS and AIM65 were calculated for all patients. Components of each scoring system were described in table 1.

Rockall score		Glasgow-Blatchford score		AIMS65 score	
Component	Point	Component	Point	Component	Point
Age (yr)		BUN (mg/dL)		Albumin < 3.0 mg/dL	1
≥ 60	0	18.2–22.4	2	PT INR > 1.5	1
51–59	1	22.4–28.0	3	Altered mental status	1
40–50	2	28.0–70.0	4	SBP < 90 mmHg	1
< 40		≥ 70.0	6	Age > 65 yr	1
Endoscopic shock	0	Hb, men (g/dL)			
Systolic BP > 100/min, SBP > 100 mmHg	1	12.0–13.0	1		
Systolic BP < 100 mmHg	2	10.0–12.0	3		
Major comorbidity		<10.0	6		
Endoscopic diagnosis		Hb, women (g/dL)			
Forrest-Weiss tear or no lesion and no stigmata	0	10.0–12.0	1		
Forrest II or other diagnosis	1	< 10.0	6		
Forrest III or malignancy	2	SBP (mmHg)			
Severity of bleeding		100–109	1		
Forrest I or stigmata or dark spot on ulcer	0	90–99	2		
Blood in the GI tract, adherent clot, visible or spurting vessel	2	< 90	3		
		Other clinical parameter			
		Heart rate ≥ 100/min	1		
		Melena	1		
		Syncope	1		
		Liver disease	2		
		Cardiac failure	2		

N, blood urea nitrogen; PT INR, prothrombin time international normalized ratio; SBP, systolic blood pressure; Hb, hemoglobin; CHF, congestive heart failure; IHD, ischemic heart disease; GI, gastrointestinal.

Table 1: Components of the scoring system.

Outcomes were in-hospital mortality, rebleeding, blood transfusion requirement and endoscopic, or surgical intervention.

Rebleeding was defined as the presentation of fresh hematemesis and/or melena or decreased hemoglobin concentration by more than 2 g/dL after successful initial treatment.

The indications for blood transfusion were hemoglobin levels falling to < 7 g/dL in average patients or < 8 g/dL in patients with a high risk of heart disease.

The accuracy of the scores in predicting patient’s outcomes was assessed by the receiver operating characteristic curve (ROC) and the area under the curve (AUC) with 95% confidence intervals. The cut-off value of each scoring system is determined by the ROC curve with the most specificity and sensitivity. A P-value < 0.05 was considered to be statistically significant.

Results

A total of 219 patients presented with NVUGIB were enrolled. The mean age was 54 (15 - 101) years and 67,1% were men. All patients received intravenous proton pump inhibitor and underwent upper endoscopy.

Among the studied patients, blood transfusion was indicated in 60,7% with a median transfusion requirement of 2 units. 14% required endoscopic therapy and 3 (1,7%) patients underwent surgery to control bleeding. Endoscopic therapies included injection of epinephrine, or application of endoscopic clips or both. Rebleeding occurred in 4 patients (1,8%). The in-hospital mortality rate was 3,6%. The median risk scores were as follows: GBS: 2 (range 0 - 6); RS: 4 (range 0 - 11) and AIMS65: 7 (range 0 - 20).

On ROC analyses, the AIM65, GBS, and RS were accurate in predicting the need for transfusion AUC 0,928, p < 0,001; AUC = 0,881 p < 0,001; AUC = 0,850; p < 0,001; respectively (Figure 1).

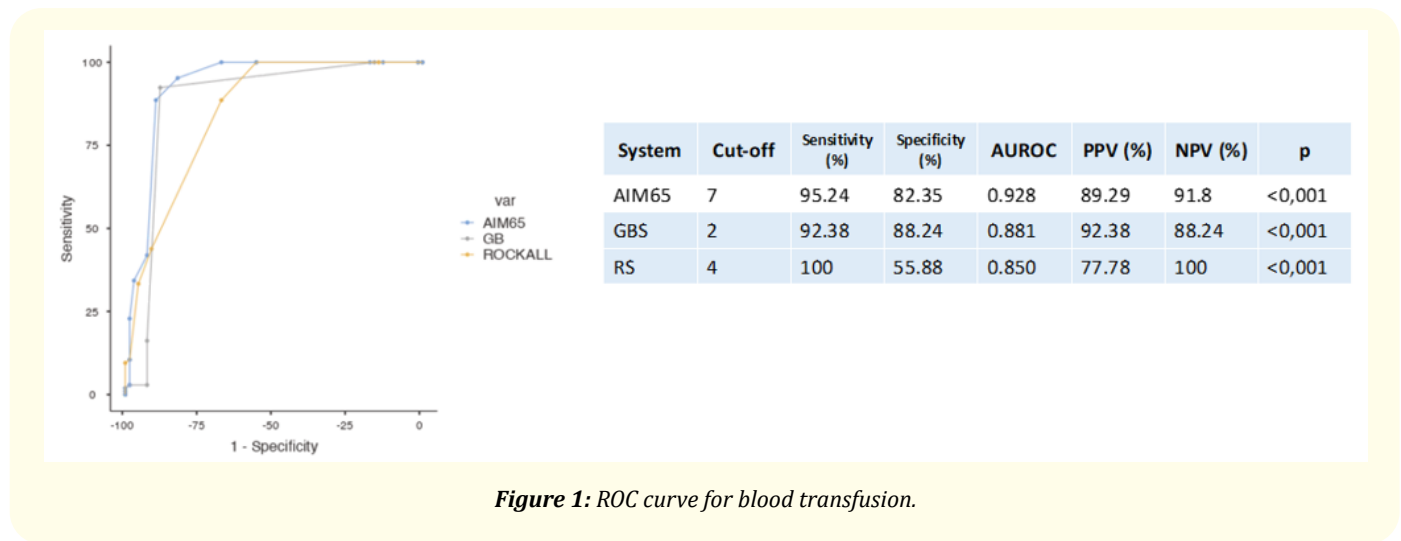
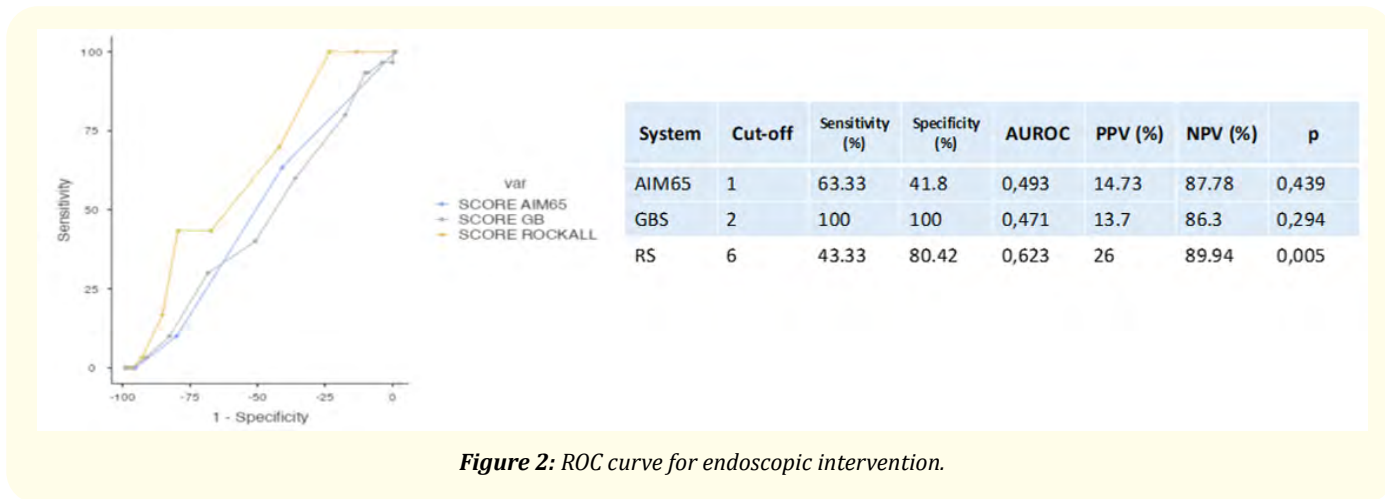


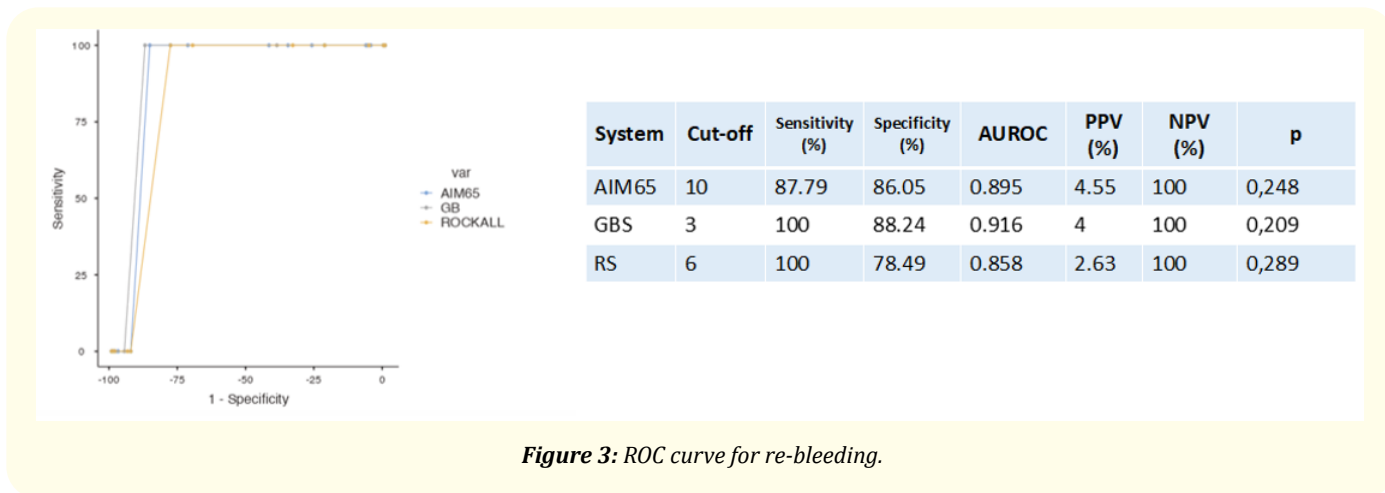
Figure 1: ROC curve for blood transfusion.

For prediction of the need for endoscopic therapy, the AIM65 (AUC = 0,342, p = 0,03) was superior to RS (AUC = 0,310; p = 0,005) and GBS (AUC = 0,519, p = 0,209) (Figure 2).



The performance of the GBS (AUC = 1, p < 0,001) was similar to both RS (AUC = 1, p = 0,036) and AIM65 (AUC = 1, p < 0,001) in predicting surgery.

All three scores were unable to predict rebleeding (GB: AUC = 0,916, p = 0,209; RS: AUC = 0,858, p = 0,289; AIM65: AUC = 0,895, p = 0,248) (Figure 3).



GBS showed the best discriminative ability in predicting mortality with an AUC of 0,988, (p < 0,001). AIM65 also showed good performance with an AUC of 0.850 (p = 0.012). RS had no discriminative ability in this outcome AUC = 0.687 (p = 0.201) (Figure 4).

Discussion

NVUGB represents more than 70% of acute upper gastrointestinal bleeding, with gastric ulcers or duodenal ulcers being the commonest [5].

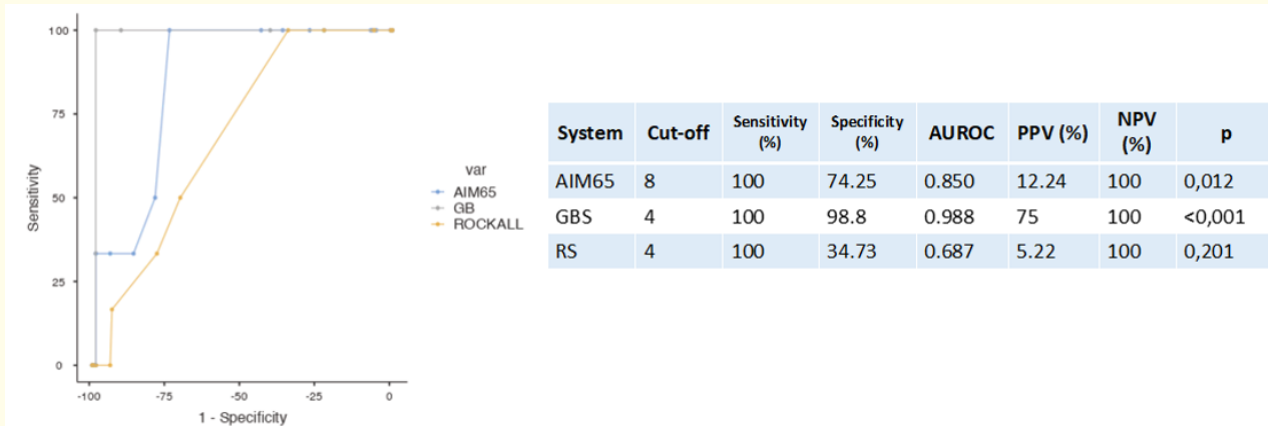


Figure 4: ROC curve for in-hospital mortality.

Despite the use of proton-pump inhibitors and *Helicobacter pylori* eradication therapy, the prevalence of NVUGIB is still increasing with a mortality rate reported to be approximately 5 - 10% [1] due to population aging and the use of anti-platelet drugs [5]. Recent guidelines have suggested use of risk scores to standardize clinical management decisions and identify patients at higher risk in order to ensure successful and accurate treatment.

In this study, we evaluated whether GBS, RS and AIM65 are effective in predicting mortality in NVUGIB patients and their utility in predicting rebleeding, transfusion, endoscopic intervention, or surgery.

Although the three score were useful for predicting the transfusion requirement, the AIM65 was superior to other scores. Hyett, *et al.* found that GBS was better in predicting the need and the number of packed red blood cell transfusions [6].

In our study, AIMS65, GBS, and RS showed similar performance in predicting the need of surgery however, the need for endoscopic intervention was better predicted by AIM65. These findings are in agreement with a Korean study involving 523 patients with NVUIB showed that AIMS65 score was useful for predicting endoscopic intervention [7]. That was consistent with the results of the present study.

As our study Stanley, *et al.* showed that the accuracy of GBS score is superior to that of AIMS65 and RS in predicting in-hospital mortality with a similar AUROC to ours [1]. In a study on the utility of GBS and AIMS65 conducted in the United States and involving 165 patients with NVUGIB aged ≥ 65 years, GBS was superior to AIMS65 in predicting mortality [5].

In contrast, A recent single center retrospective study from Australia of 424 patients with upper gastrointestinal bleeding reported that AIMS65 is more useful for predicting mortality than the GBS and RS scores with an AUROC of 0.80 vs. 0.76 ($p = 0.03$) and 0.74 ($p = 0.001$) respectively [3].

A further study by Yake, *et al.* found AIMS65 to be equivalent to GBS in predicting in-hospital mortality [8].

This study has some limitations. First, it was a single center retrospective study. Second, Patients who did not undergo esophago-gastric duodenoscopy were excluded in this study, which may affect the results.

Further multicenter prospective studies will be required to evaluate the usefulness and predictability of the scoring system for assessing the prognosis of NVUGIB.

Conclusion

In the present study, the scores were useful for predicting several clinical outcomes, except rebleeding. The AIM65 and GB performed well in predicting the need for transfusion and mortality, while RS is particularly helpful in the assessment of endoscopic therapy requirement.

Our data suggest that developing a new scoring system may be necessary, because no single scoring system seem to be superior to others in predicting all clinical outcomes.

Authors' Contributions

The authors read and approved the final manuscript.

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This study received no financial support.

Availability of Data and Materials

The datasets used and analyzed in the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors have no conflicts of interest to declare.

Bibliography

1. Stanley AJ, et al. "Comparison of risk scoring systems for patients presenting with upper gastrointestinal bleeding: international multicentre prospective study". *British Medical Journal* 356 (2017): i6432.
2. Kim MS, et al. "AIMS65 scoring system is comparable to Glasgow-Blatchford score or Rockall score for prediction of clinical outcomes for non-variceal upper gastrointestinal bleeding". *BMC Gastroenterology* 19.1 (2019): 136.
3. Robertson M, et al. "Risk stratification in acute upper GI bleeding: comparison of the AIMS65 score with the Glasgow-Blatchford and Rockall scoring systems". *Gastrointestinal Endoscopy* 83.6 (2016): 1151-1160.
4. Thanapirom K, et al. "Prospective comparison of three risk scoring systems in non-variceal and variceal upper gastrointestinal bleeding". *Journal of Gastroenterology and Hepatology* 31.4 (2016): 761-767.
5. Kim MS, et al. "Validation of a new risk score system for non-variceal upper gastrointestinal bleeding". *BMC Gastroenterology* 20.1 (2020): 193.
6. Hyett BH, et al. "The AIMS65 score compared with the Glasgow-Blatchford score in predicting outcomes in upper GI bleeding". *Gastrointestinal Endoscopy* 77.4 (2013): 551-557.
7. Park SM, et al. "Comparison of AIMS65 score and other scoring Systems for Predicting Clinical Outcomes in Koreans with nonvariceal upper gastrointestinal bleeding". *Gut Liver* 10.4 (2016): 526-531.

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