Biolife 5(4):585-592
AN INTERNATIONAL QUARTERLY JOURNAL OF BIOLOGY & LIFE SCIENCES
ISSN (online): 2320-4257
www.biolifejournals.com
BIOLIFE ORIGINAL ARTICLE

Comparison of Two Risk Scoring Systems for the Prediction of Outcomes in Egyptian Patients with Upper Gastrointestinal Tract Bleeding

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ABSTRACT

Background: Upper gastrointestinal bleeding (UGIB) is defined as hemorrhage that involves the mouth to the duodenum proximal to the ligament of Treitz. Upper gastrointestinal bleeding (UGIB) is a major public health problem, its prevalence being around 150 per 100,000 adults per year.
Aim of the Work: The aim of this study is to compare two scores (Blatchford score and complete Rock all score) to identify the most accurate score used in predicting unfavorable outcomes during patient hospitalization(about 1 week after upper endoscopy), the need for intervention, and the risk stratification in patients with confirmed UGIB.
Patients and Methods: This descriptive exploratory study was conducted on 500 adult Egyptian patients presented by symptoms of acute upper GI bleeding (Hematemesis and melena) in emergency department of Ain Shams University Hospitals in the period from May 2015 to April 2017. Patients underwent upper endoscopy within first day from an attack of upper GI bleeding. All patients signed a written informed consent prior to enrollment into this study. This study was approved by the Ethical Committee of Ain Shams University College of medicine.
Results: Blatchford score was superior to clinical and complete Rockall scores in both identifying the low-risk patients who are likely to have complete cure and in prediction of unfavorable outcomes, namely risk of rebleeding, need for surgical intervention and mortality, combining INR with the classic Blatchford score could augment its predictive power.
Conclusion: Risk stratification and decision to perform interventions including therapeutic endoscopy is often a subjective matter, and the threshold to intervene might differ between different physicians.
Recommendations: Blatchford score as a prognostic tool in emergency and gastroenterology departments, and have high sensitivity and specificity than RS for predicting outcomes.

Key words: risk scoring system, upper gastrointestinal tract bleeding, upper endoscopy, stratification

INTRODUCTION

Upper gastrointestinal bleeding (UGIB) can be a life threatening condition and requires careful evaluation from the very first episode as an attempt to predict and reduce the risk of re - bleeding or death.[1-2]

The incidence of UGIB is reported between 50 and 170 cases per 100000 people per year with different reported percentages of severity[3-4]. There are only a few inconsistent reports on the incidence and severity of UGIB in the emergency departments (EDs) [5]. It is known that the outcome of a patient with UGIB depends on first evaluation and resuscitation measures taken in the ED and that a clinically sensible tool to stratify the risk may safely reduce health care costs [5].

Different risk scoring systems were developed to discriminate between severe cases requiring aggressive treatment and low-risk patients with UGIB who can be managed as out-patients [6].

An improvement of the overall survival of patients with UGIB when these scores were included in medical judgment has also been reported based on the fact that a high score predicts with great probability the need for medical interventions and admission in intensive care units (ICUs) [7-8].

How to Site This Article:
Yousef T, Zaky H, Khaiyal A, El-Shafie A, El Sherbeny A (2017). Comparison of Two Risk Scoring Systems for the Prediction of Outcomes in Egyptian Patients with Upper Gastrointestinal Tract Bleeding. *Biolife*. 5(4), pp 585-592. doi: 10.5281/zenodo.7393412
Received: 5 October 2017;Accepted; 26 November 2017; Available online : 5 December 2017

Rockall score (RS) (pre-endoscopy RS), full RS (endoscopic findings included) [9], and Glasgow-Blatchford Bleeding Score (GBS) [10] can all be used for risk stratification in patients presenting with UGIB. Numerous comparative retrospective and prospective studies published so far have demonstrated differently variable accuracy and use of these scoring systems [10-11].

The Blatchford score suggests that it can be used to identify patients with acute UGIB who need clinical intervention before endoscopy. The complete Rockall score is calculated for each patient based on points assigned for each of the 3 clinical variables (patient age at presentation, shock status based on initial heart rate and systolic blood pressure, and presence of comorbid disease) plus 2 endoscopic variables (endoscopic diagnosis and stigmata of recent hemorrhage based on the initial endoscopic examination) [12,13].

The clinical Rockall score is calculated from 3 previously mentioned clinical variables without endoscopic finding.

Aim of the Work:

The aim of this study isto compare two scores (Blatchford score and complete Rockall score)to identify the most accurate score used in predicting unfavorable outcomes duringpatient hospitalization(about 1 week after upper endoscopy), the need for intervention, and the risk stratification in patients with confirmed UGIB.

PATIENTS AND METHODS

This study was conducted on 500 adult Egyptian patients presented by symptoms of acute upper GI bleeding (Hematemesis and melena) in emergency department of Ain Shams University Hospitals in the period from May 2015 to April 2017. Patients underwent upper endoscopy within first day from an attack of upper GI bleeding. All patients signed a written informed consent prior to enrollment into this study. This study was approved by the Ethical Committee of Ain Shams University College of medicine.

The study aimed to compare Blatchford score with Rockall scores (admission and complete)to identify the most accurate score used in predicting unfavorable outcomes (re-bleeding, surgical intervention and death) within the first week after hospitalization in patients with confirmed UGIB.

A descriptive exploratory design was followed to achieve the aim of the study.

Exclusion criteria:

Patients developed upper gastrointestinal bleeding while an inpatient for another reason.

Patient who treated by beta-blocker or drugs affecting heart rate.

Refuse to participate in this study..

Investigations and tools used in the study:

The following was conducted to all patients:

Full medical history as regard symptoms and signs of GI hemorrhage, co-morbidity and relevant drug history including anticoagulant.

Clinical examination: signs of bleeding (vital data: pulse, blood pressure) pallor and abdominal examination for organomegaly, abdominal masses and ascites.

Blood samples were withdrawn before any medications or blood transfusion for Laboratory assessment which include:-

1. Complete blood count & Coagulation profile: prothrombin time (PT), international normalized ratio (INR) and partial thromboplastin time (PTT) by standard lab tests.
2. Liver enzymes and liver function Tests: Aspartate aminotransferase (AST), alanine amino-transferase (ALT), total and direct serum bilirubin, total protein and serum albumin.
3. Renal Function Tests (Serum sodium, serum potassium, serum creatinine and blood urea nitrogen).

Blood &/or plasma transfusion requirements were guided by the clinician in patients with severe haemorrhage.

Proton pump inhibitors (PPIs) were not routinely given to all admitted patients before endoscopy. All patients with suspected varices received IV antibiotics and vasopressors. Vasopressors were in form of a 50-ugi.v.bolus of octreotide or terlipressin on admission, followed by an infusion of 1mg in 55 ml of normal saline at a rate of 3 ml/h. After endoscopy, administration of high dose PPIs by intravenous bolus followed by infusion to patients with high risk ulcer stigmata that required endoscopic treatment, and to other selected patients depending on clinical judgment

Upper gastrointestinal endoscopy was performed for diagnosis, recording endoscopic findings and proper management if stigmata of recent hemorrhage were seen. Esophageal varices were either injected with ethanolamine or banded, depending on the clinical setting and availability. While patients with gastric varices, endoscopic injection with histoacryl was performed. For patients with peptic ulcer disease, endoscopic injection therapy (adrenaline 1:100,000) into and around the bleeding point, thermal contact or/& clips were recommended in the presence of stigmata of recent hemorrhage.

Prospective assessment of all admissions due to either esophageal varices or peptic ulceration. Peptic ulceration defined by the individual endoscopist as any lesion seen to possess unequivocal depth. Erosions classified as any other break in the mucosa. A cherry-red spot, red whale marks and hematocystic spots were considered being equivalent to a dark spot and therefore has a score of 0. Rebleeding defined as overt fresh bleeding after initial stabilization, or a fall in blood pressure after initial stabilization or a fall in Hb of more than 2g within 24hours. These definitions are in accordance with the original National Audit (Rockall et al., 1996).

Admission Rockall score, Full Rockall score and GBS systems were calculated for each patient. Patient's age, systolic blood pressure, pulse rate and presence of comorbid diseases were recorded for Admission Rockall score. Endoscopic findings (diagnosis and stigmata of recent bleeding) were recorded as additional variables of full RS system.Pulse rate, systolic blood pressure, blood

urea nitrogen, hemoglobin, presentation of melena, hepatic disease, and cardiac failure were recorded as variables of GBS system.

Abdominal Ultrasonography for radiological criteria of portal hypertension (spleen size, portal vein diameter and ascites).

Finally, data was collected pertaining to the duration of inpatient stay, complications that occurred (Rebleeding, surgical intervention or mortality).

Statistical analysis:

To describe the studied sample, quantitative data were presented as minimum, maximum, mean and standard deviation. Qualitative data were presented as number and percentage.

Independent student t test was used to compare quantitative data between two scores. While one-way ANOVA was used when more than two scores were to be compared then Post Hoc test was used to detect the difference between individual scores. ROC curve was used to measure diagnostic validity and determine the best cut off value for some variables. P value ≤ 0.05 was considered significant and ≤ 0.001 was considered highly significant.

RESULTS

Table-1 shows the comparison between cases with and without complete cure regarding Clinical presentation, Laboratory findings and Endoscopic findings.

Table-2 shows that: Majority of cases had moderate to high grades. Blatchford+INR score is Blatchford score + INR score.

Table-4 shows that: Cases with complete cure had significant lower **scores**.

Table-5 shows that: Blatchford and INR had significant high diagnostic performance in prediction of complete cure, while Incomplete Rockall and Complete Rockall had significant moderate diagnostic performance.

Table-6 shows that: Blatchford and INR had significant high diagnostic performance in prediction of rebleeding, while Incomplete Rockall and Complete Rockall had significant moderate diagnostic performance.

Table-7 shows that: Blatchford and INR had significant high diagnostic performance in prediction of surgical intervention, while Incomplete Rockall and Complete Rockall had significant moderate diagnostic performance

Table-8 shows that: Blatchford and INR had significant high diagnostic performance in prediction of death, while Incomplete Rockall and Complete Rockall had significant moderate diagnostic performance.

DISCUSSION

Five hundred adult patients presenting with attack of upper gastrointestinal bleeding were included in our study. All patients received endoscopic evaluation within 24 hours of presentation and followed up for one week. Clinical, complete Rockall scores and Blatchford score were calculated for all cases. INR was proposed to be a prognostic indicator for unfavorable outcome in patients with UGIB and was combined with the Blatchford score in an attempt to augment its validity.

The mean calculated incomplete, complete Rockall scores, and Blatchford score were 3.1±1.8, 6.2±3.1 and 6.1±4.4.

According to our results, Blatchford score was superior to clinical and complete Rockall scores in

Table-1. Comparison between cases with and without complete cure regarding Clinical presentation, Laboratory findings and Endoscopic findings

		Complete (N=449)	Incomplete (n=51)	P
Clinical presentation				
SBP (mmhg)		101.4±10.2	94.3±9.7	^<0.001*
Hear rate (beat/minute)		85.3±9.5	94.4±7.7	^<0.001*
Melena		306 (68.2%)	35 (68.6%)	#0.660
Syncope		160 (35.6%)	30 (58.8%)	#0.026*
Shock		147 (32.7%)	32 (62.7%)	#<0.001*
Blood transfusion		10 (2.2%)	41 (80.4%)	&#<0.001*
Laboratory findings				
Hb (gm/dL)		11.6±1.2	9.8±0.4	^<0.001*
Pletelets (x10^3/mL)		172.3±83.7	87.4±30.2	^<0.001*
BUN (mg/dL)		12.2±7.9	53.6±24.5	^<0.001*
INR		1.3±0.3	2.7±1.2	^<0.001*
Endoscopic findings				
Stigmatanumber		4.1±1.5	5.0±0.7	^<0.001*
Stigmata of haemorrhage	None or dark spots	115 (25.6%)	3 (5.9%)	#0.005*
	Blood	334 (74.4%)	48 (94.1%)	
Endoscopic diagnosis	MW or no lesion	59 (13.1%)	2 (3.9%)	#<0.001*
	PU or erosive	93 (20.7%)	0 (0.0%)	
	others	297 (66.1%)	49 (96.1%)	

Table-2. Scores among the studied cases

		Mean±SD	Range
Incomplete Rockall score		3.1±1.8	0.0–6.0
Complete Rockall score		6.2±3.1	0.0–10.0
Blatchford score		6.1±4.4	0.0–17.0
Blatchford+INR score		6.7±5.0	0.0–20.0
		N	%
Complete Rockall grade	Low	96	19.2
	Moderate	253	50.6
	High	151	30.2
Blatchford grade	Low	8	1.6
	Moderate	246	49.2
	High	246	49.2

Total=500

INR scoring: (≤1.46=0, up to 1.66=1, up to 1.90=2, >1.90=3).

identifying patients who are likely to have complete cure (Area under curve 0.81, 0.77 and 0.98 respectively).

Table-3. Outcomes among the studied cases

Outcomes	N (n=500)	%
Complete cure	449	89.8
Toalrebleeding	45	9.0
Total surgical intervention	5	1.0
Total Death	9	1.8
Detailed outcomes		
Rebleeding only	40	8.0
Surgery only	0	0.0
Death only	6	1.2
Rebleeding& surgery	2	0.4
Rebleeding& surgery& death	3	0.6

Table-4. Comparison between cases with and without complete cure regarding scores

		Complete (N=449)	Incomplete (n=51)	P
Incomplete Rockall score		2.9±1.8	4.8±0.9	^<0.001*
Complete Rockall score		5.9±3.1	8.5±1.6	^<0.001*
Blatchford score		5.1±3.6	14.2±1.5	^<0.001*
Blatchford+INR		5.6±3.8	16.9±1.6	^<0.001*
Complete Rockall grade	Low	96 (21.4%)	0 (0.0%)	#<0.001*
	Moderate	232 (51.7%)	21 (41.2%)	
	High	121 (26.9%)	30 (58.8%)	
Blatchford grade	Low	8 (1.8%)	0 (0.0%)	#<0.001*
	Moderate	246 (54.8%)	0 (0.0%)	
	High	195 (43.4%)	51 (100.0%)	

^Independent t-test, #Chi square test, &Fisher's Exact test, *Significant

Table-5. Diagnostic performance of scales and INR in prediction of complete cure

Factors	AUC	SE	P	95% CI	Cutoff
Incomplete Rockall	0.815	0.023	<0.001*	0.771–0.859	≤3.0
Complete Rockall	0.773	0.029	<0.001*	0.715–0.830	≤7.0
Blatchford	0.973	0.007	<0.001*	0.960–0.986	≤12.0
INR	0.961	0.012	<0.001*	0.937–0.985	≤1.46
Blatchford-INR	0.989	0.004	<0.001*	0.981–0.997	≤12.0

AUC: Area under curve, SE: Standard error, CI: Confidence interval

Table-6. Diagnostic performance of scales and INR in prediction of rebleeding

Factors	AUC	SE	P	95% CI	Cutoff
Incomplete Rockall	0.802	0.025	<0.001*	0.754–0.850	≥4.0
Complete Rockall	0.756	0.032	<0.001*	0.693–0.819	≥8.0
Blatchford	0.970	0.007	<0.001*	0.957–0.984	≥13.0
INR	0.948	0.014	<0.001*	0.920–0.976	≥1.66
Blatchford-INR	0.984	0.005	<0.001*	0.975–0.994	≥13.0

AUC: Area under curve, SE: Standard error, CI: Confidence interval

ROC analysis of our results Blatchford score identified a maximum cutoff of 12 for identifying who are likely to have complete cure (Area under curve, sensitivity 94.9% and specificity 96.1%), whereas a score ≥ 13 is predictive of rebleeding (Area under curve, sensitivity 95.6% and specificity 93.6%) and mortality (sensitivity 100% and specificity 87.2%). A score of ≥ 15 is predictive of need for surgical intervention (Area under

curvesensitivity 100% and specificity 95.2%) by following hazards for one week.

Table-7. Diagnostic performance of scales and INR in prediction of surgical intervention

Factors	AUC	SE	P	95% CI	Cutoff
Incomplete Rockall	0.960	0.013	<0.001*	0.934–0.985	≥5.0
Complete Rockall	0.955	0.014	<0.001*	0.928–0.983	≥9.0
Blatchford	0.984	0.006	<0.001*	0.972–0.995	≥15.0
INR	0.965	0.024	<0.001*	0.000–1.000	≥1.90
Blatchford-INR	0.993	0.004	<0.001*	0.986–1.000	≥18.0

AUC: Area under curve, SE: Standard error, CI: Confidence interval

Table-8. Diagnostic performance of scales and INR in prediction of death

Factors	AUC	SE	P	95% CI	Cutoff
Incomplete Rockall	0.884	0.028	<0.001*	0.829–0.940	≥4.0
Complete Rockall	0.879	0.029	<0.001*	0.822–0.935	≥8.0
Blatchford	0.932	0.017	<0.001*	0.899–0.965	≥13.0
INR	0.961	0.017	<0.001*	0.928–0.995	≥1.90
Blatchford-INR	0.955	0.013	<0.001*	0.930–0.980	≥15.0

AUC: Area under curve, SE: Standard error, CI: Confidence interval

These results came in accordance with previous studies. An international multicentre prospective study Stanley et al.[14], recruited 3012 consecutive patients with upper gastrointestinal bleeding and followed up for 30 days. The GBS was best at predicting intervention or death compared with the complete Rockall score and complete Rockall score (AUC 0.86, 0.7 and 0.66 respectively, P<0.001). A GBS of ≤1 was the optimum threshold to predict survival without tintervention (sensitivity 98.6%, specificity 34.6%). The GBS was better at predicting endoscopic treatment than the complete Rockall scores (AUC 0.75 vs. 0.61 respectively, P<0.001). A GBS of ≥7 was the optimum threshold to predict endoscopic treatment (sensitivity 80%, specificity 57%).

Budimiret al [15] studied 225 patients with variceal bleeding, out of 2643 patients with UGIH admitted during the study period, most frequently with alcoholic cirrhosis. The GBS was superior in predicting the need for blood transfusion. The cutoff point that maximized the sum of sensitivity and specificity was 12 for GBS (sensitivity 0.75, specificity 0.68), and 3 for RS (sensitivity 0.59, specificity 0.57). Development of new risk scores with better discriminative abilities for predicting outcomes in patients with variceal bleeding is needed. Also, Hyett et al. [16] reported that the optimal cutoffs for inpatient mortality and rebleeding for the GBS were 10 and 12, respectively.

In a prospective, observational, cohort study including 336 patients who were admitted with UGIB with one month mortality. On multivariable analysis adjusting for the need for endoscopic intervention, high risk GBS patients had higher rebleeding rates. High GBS scores were associated with higher rebleeding rates following discharge and thus recommended that patients with high GBS scores (>7) should be monitored following discharge as they have a high risk of rebleeding[17].

In Mokhtare et al.[18],200 patients were enrolled in the study. The GBS was significantly higher in the patients with rebleeding than other cases (8.41±1.66 versus 5.73±3.65, P<0.001) but regarding RS, this was not significant (3.88±1.79 versus 3.85±1.53, P=0.992). GBS was significantly higher in the patients who were needing transfusion than the other cases (8.66±2.14 versus 5.44±3.59, P<0.001), while this was not significant in RS (3.91±1.67 versus 3.84±1.53, P=0.930). Regarding 1-month mortality, GBS was more accurate in terms of detecting transfusion need (AUC, 0.757 versus 0.528; P=0.001), rebleeding rate (AUC, 0.722 versus 0.520; P=0.002), and endoscopic intervention rate (AUC, 0.771 versus 0.650; P<0.001).

In the study conducted by Thanapirom et al.[19], prospective enrollment of 981 patients with UGIB. Among the three scoring systems, the GBS has the best performance for predicting the need for treatment, whereas the Rockall score had better accuracy for detecting death and rebleeding than the GBS during admission in patients presenting with non variceal upper gastrointestinal tract bleeding. A cut-off value of GBS>2 and complete RS>1is the optimal point for discriminating high-risk and low-risk patients with non-variceal UGIB for in-hospital death and re-bleeding.

In the study conducted by *Martínez-Cara et al.* [20], 309 patients with UGIB were included. Patients were followed during hospitalization and six months after discharge. On ROC analyses, GBS superior to RS when predicting the need for blood transfusions and rebleeding (AUC 0.85 vs. 0.73), although GBS showed a significantly better (p<0.03 vs.p<0.05).

Ahn and his colleagues[21] reviewed and extracted data from electronic medical record of 225 patients presenting to the emergency department with UGIB. All patients received endoscopic evaluation within 24 h. Comparing AUC, the Blatchford score was superior to complete Rockall and full Rockall score (0.86 vs. 0.67 and 0.72 respectively) in predicting interventions. When the score of 2 or less is counted as negative, sensitivity of 99% and specificity of 54% were calculated.

According to the study of *Laursen et al*[22] who evaluated the performance of five scoring systems (Blatchford, age-extended Blatchford, Rockall, the Cedars-Sinai Medical Center predictive index and Baylor Bleeding scores) in 831 patients with UGIB, GBS accurately identifies patients with UGIH most likely to need hospital-based intervention and also those best suited for outpatient care. No scoring system seems to accurately predict patients' 30-day mortality or

rebleeding. All of these scoring systems had AUROCs between 0.65 and 0.81, suggesting that the clinical gain of using these systems in predicting rebleeding is low. Both GBSs and complete RS had a high sensitivity in predicting rebleeding. Because the majority of patients (70%– 88%) were classified as positive, routine use of these systems in predicting rebleeding is indeed ineffective. However, a major limitation is the fact that the fact that20% of the patients in their study did not undergo endoscopy.

In *Kalkan et al.*[23], 335 elderly patients that had undergone emergency department, Rockall scores were superior to the Glasgow–Blatchford scores for predicting rebleeding. However, for predicting duration of hospitalization and the need for blood transfusion, the Glasgow–Blatchford score is superior to the Rockall score with 30 days mortality. Charatcharoen et al.[24] investigated the effect of age on clinical presentation and endoscopic diagnoses, and determined the outcomes after endoscopic therapy among patients aged ≥65 years (mean age 74.2 ±6.7 years)and compared them with patients aged <65 years (mean age 48.4 ±11.1 years) with acute UGIB. They found that elderly patients had different bleeding sources and clinical presentations of acute UGIB compared with young patients

The reasons for differences in cutoff values can include ethnicity, upper gastrointestinal tract bleeding etiology, period of follow up, the state of starting medical treatment before endoscopy, number of patient.

An interesting finding through the course of our study was the significant difference in the INR values between patients who progressed to complete cure and those who progressed to unfavorable outcome (1.3±0.3 vs 2.7±1.2, p<0.001). ROC analysis of the data yielded cutoff values for identifying low-risk patients who are likely to have complete cure (cutoff ≤1.46 with sensitivity 94% and specificity 96.1%) and those who are likely to have rebleeding (cutoff ≥1.66 with sensitivity 88.9% and specificity 85.3%), require surgical intervention (cutoff ≥1.9 with sensitivity 100% and specificity 85.5%) or have high risk for mortality (cutoff ≥1.9 with sensitivity 100% and specificity 85.5%). Despite the lower sensitivities and specificities for INR compared to the classic scoring systems, Rockall and Blatchford, it still has a good predictive power.

We postulated that combining INR with the classic Blatchford score could augment its predictive power. Testing our hypothesis through the collected data was done. The mean calculated combined Blatchford-INR score was 6.7±5.0. It was evident that combined Blatchford-INR score had the highest sensitivity and specificity for prediction of unfavorable outcomes in patients with UGIB. A cutoff value of ≤12.0 predicts complete cure with a sensitivity 94% and specificity 100%, whereas a cutoff of ≥13 predicts rebleeding with sensitivity 100% and specificity 92.7% and a cutoff of ≥15 predicts mortality with a sensitivity of 100% and specificity of 89.8%.

A major drawback of the Blatchford score that it is not the excellent screening tool owing to its false negative results (negative predictive value 99.5% in our study). Despite being low, it has a catastrophic impact on the risk stratification strategy.

Missing a patient with high-risk UGIB might delay appropriate care, resulting in a fatal outcome, and previous studies considered highest sensitivity rather than specificity in setting the cut-off values for the Blatchford score[21].

An important example is clear in the case, reported by Ahn et al.[21],female with advanced gastric cancer who was presented with hematemesis, Her vitals were stable with hemoglobin of 12 g/dL. Her initial Blatchford score was 0, suggesting low-risk UGIB; however, during laboratory follow-ups, hemoglobin was decreased to 9.0 g/dL in 6 h. In cases like this, early presentation after bleeding could have false-negative results because change in blood volume is not reflected in hemoglobin during the early phase of bleeding.

An important feature of the combined Blatchford-INR score is the absence of false negative results, according to our results. However, this finding requires further studies to confirm its validation.

Another drawback of the Blatchford score is its limited usefulness in directing clinical decision in the high risk patients. In less severe patients, the score of 0, 2, or less could help to select low-risk patients. But as shown in our study, the criteria in the Blatchford score are probably not relevant in severe patients like those with cancer, where only 8 (12.2%). So, despite its high sensitivity, the Blatchford score is not useful in predicting which of the patients will actually require overall treatments including endoscopic interventions once the patient has a high-risk score. Although the probability of requiring therapeutic intervention increases along with the score, this does not have influence on decision makings in the high-risk patients.

Conclusion

Risk stratification and decision to perform interventions including therapeutic endoscopyis often a subjective matter, and the threshold to intervene might differ between different physicians.

According to our results, Blatchford score was superior to clinical and complete Rockall scores in both identifying the low-risk patients who are likely to have complete cure (sensitivity 94.9% and specificity 96.1% vs sensitivity 72.4% and 72.2% and specificity 92.2% and 80.4% for clinical and complete Rockall scores respectively) and in prediction of unfavorable outcomes, namely risk of rebleeding, need for surgical intervention and mortality.

Receiver-operating curve analysis of our results identified a maximum cutoff of 12 for identifying low-risk patients who are likely to have complete cure (sensitivity 94.9% and specificity 96.1%), whereas a score ≥ 13 is predictive of rebleeding (sensitivity 95.6% and specificity 93.6%) and mortality (sensitivity 100% and specificity 87.2%). A score of ≥ 15 is predictive of need for surgical intervention (sensitivity 100% and specificity 95.2%).

We postulated that combining INR with the classic Blatchford score could augment its predictive power. Testing our hypothesis through the collected data was done. The mean calculated combined Blatchford-INR score was 6.7±5.0. It was evident that combined Blatchford-INR score had the highest sensitivity and

specificity for prediction of unfavorable outcomes in patients with UGIB. A cutoff value of ≤12.0 predicts complete cure with a sensitivity 94% and specificity 100%, whereas a cutoff of ≥13 predicts rebleeding with sensitivity 100% and specificity 92.7% and a cutoff of ≥15 predicts mortality with a sensitivity of 100% and specificity of 89.8%.

Recommendations:

Blatchford score as a prognostic tool in emergency and gastroenterology departments, and have high sensitivity and specificity than RS for predicting outcomes.

Combining INR with the classic Blatchford score could augment its predictive power. It was evident from our results that combined Blatchford-INR score had the highest sensitivity and specificity for prediction of unfavorable outcomes in patients with UGIB. A cutoff value of ≤12.0 predicts complete cure with a sensitivity 94% and specificity 100%, whereas a cutoff of ≥13 predicts rebleeding with sensitivity 100% and specificity 92.7% and a cutoff of ≥15 predicts mortality with a sensitivity of 100% and specificity of 89.8%. However, these findings require external validation through other prospective studies. We need more studies for two scores and orientation to hemoglobin and urea as two factors can changed from admission as first presentation and follow up in hospital, need to detect more factors can be added to scores.

Conflicts of Interest

Authors declare that there is no conflict of interests regarding the publication of this paper.

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