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EFFECTIVENESS OF BLATCHFORD AND ROCKALL SCORING SYSTEMS TO PREDICT OUTCOME OF IMMEDIATE MEDICAL INTERVENTION IN PATIENTS WITH UPPER GASTROINTESTINAL BLEEDING REFERRED TO EMERGENCY DEPARTMENT

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ABSTRACT

Background & Aim: The identification of high-risk patients with acute upper gastrointestinal bleeding (UGIB) is a real challenge facing emergency physicians in terms of the need for emergency endoscopy and urgent medical interventions. In this regard, the use of Rockall and Blatchford score systems can be helpful in meeting this challenge. As a result, this study was conducted to investigate the effectiveness of Blatchford and Rockall risk scoring systems in prediction of urgent medical intervention outcome in patients with upper gastrointestinal bleeding, referring to Shahid Beheshti hospital of Qom.
Methods & Materials:: In this analytical retrospective study, a checklist derived from the Blatchford and Rockall risk scoring systems was used to collect data from medical records of 194 non-trauma UGIB patients, aged over 18 years old, visiting the Emergency Department of Shahid Beheshti Hospital between 2012-2015. The research samples were selected using the convenience sampling method. In the current study, the significance level was considered to be 0.05. In addition, the effectiveness of the Blatchford and Rockall risk scoring systems in predicting the urgent medical intervention outcome was investigated in SPSS and MEDCAL.
Result: This study showed a significant relationship between the actual interventions administered to patients with UGIB in Shahid Beheshti Hospital and interventions predicted by the Blatchford risk scoring system (p=0.000, kappa=0.294). Moreover, a significant relationship was observed between the actual hospitalization unit in Shaid Beheshti Hospital with hospitalization unit predicted by the Rockall risk scoring system (p=0.000, kappa=0.182). On the other hand, no significant relationship was observed between the Blatchford risk scoring system and the age of participants (p=0.011). In contrast, a significant relationship was observed between the age of participants and the Rockall risk scoring system (p<0.00001).
Conclusion: This study showed that the Blatchford risk scoring system can be used in the Emergency Department of Shahid Beheshti Hospital of Qom as a clinical guideline to determine the type of medical interventions (urgent or non-urgent). It also showed that the Rockall system can be used as a clinical guideline to determine the required level of medical interventions for a certain patient.

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Introduction

The acute UGIB is a common life-threatening problem, which accounts for approximately 85% of all gastrointestinal bleeding cases [1]. The annual incidence of UGIB is 50-172 per 100,000 populations with mortality rate of 2-15% and recurrence rate of 10-30% [2]. Despite recent advances in endoscopy and pharmaceutical methods, the prevalence of UGIB

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has presented an upward trend, which can be attributed to population aging, comorbidities including cardiovascular and kidney diseases, and increased consumption of such drugs as aspirin and nonsteroidal anti-inflammatory medicines [3]. Upper gastrointestinal bleeding is a bleeding occurs above the ligament of Treitz [4]. The clinical presentations of UGIB are hematemesis, melena, and hematochezia [5]. It is a common emergency disease associated with a high mortality and medical care costs. As a result, patients with UGIB are important from two regards:

i. Proper management and treatment of the disease with high rate of prevalence and mortality
ii. Management of hospital beds, specifically in the emergency department, to allocate them to patients who most need emergency hospitalization rather than outpatients

Due to following reasons, an integrated and effective clinical guideline is essential for these patients:

iii. To address the high prevalence of UGIB, which causes high rates of bed occupancy and referral between hospitals and cities
iv. To resolve disagreements on management and treatment procedures, e.g. determining the proper time for administration of emergency endoscopy, blood transfusion, and other types of treatments
v. To increase the level of satisfaction and longevity of patients
vi. To improve quality of life of patients [6]

Among these effective clinical guidelines are the Rockall and Blatchford risk scoring systems, which can be helpful in identifying patients at risk and applying suitable medical practices. The application of these systems for classification of patients in high- and low-risk of [bleeding] recurrence and mortality allows physicians to diagnose low-risk patients for outpatient treatment [2, 7].

Clinical assessment of patients can be very helpful in classifying them in the high- and low-risk groups. In this way, the proper time for administration of endoscopy and discharge, and determination of the risk of severe bleeding and mortality can be determined in high-risk patients, who need more significant level of healthcare (e.g. hospitalization in ICU) [9]. After risk assessment of patients based on these two systems, treatment measures in terms of healthcare level (outpatient, ICU, etc.) and intervention type (urgent and nonurgent) should be taken [3]. Among these measures is the bolus administration of a proton pump inhibitors (8 and 80 mg/h PPI), that has a significant role in stabilization of the clot caused by peptic ulcer. PPI can be helpful in postponing the need for endoscopy by reducing the risk level of an ulcer. When an early endoscopy is not possible or the endoscopist is not adequately experienced, these scoring systems can be used as cost-effective alternatives [13, 14]. The early endoscopy (within 24 hours of symptom onset) is recommended for non-varicose bleeding. In general, the very early endoscopy (within 12 hours of symptom onset) does not seem more effective than the early endoscopy (within 12-24 hours of symptom onset) in reducing severity of recurrent bleeding, the need for surgery, or mortality rate in such patients [13, 14]. The endoscopic methods are applicable only for high-risk lesions, such as active spurting bleeding, active oozing bleeding, vessel exposure, and red or black adherent clots [13].

Many studies have approved the effectiveness of these two systems, as an effective predictor, in patients with non-varicose UGIB. They have also reported the superiority of the Rockall system over the Blatchford system in determining the rate of mortality [5, 15, 16, 17, 18]. There are other risk scoring systems, such as AIMS65-MELD-MEWS [1, 6, and 20]. A study compared the effectiveness of Rockall, Blatchford, and MELD systems and observed better performance of MELD than the two other system in prediction of mortality in cirrhosis patients with unstable upper gastrointestinal bleeding [19]. Another study reported higher sensitivity of AIMS65 than the Blatchford system in identification of low-risk patients presenting to the emergency room [6].

Finally, due to low level of knowledge and scant studies into the current conditions in Iran, this study aimed at investigating patients hospitalized in the Shahid Beheshti Hospital in the past with diagnosis of UGIB. To this end, the effectiveness of the Rockall and Blatchford scoring systems was tested in determining the need for outpatient treatment, emergency endoscopy, mortality rate, and recurrence rate. In addition, the effectiveness of them as a reasonable and accessible clinical guideline for outcome prediction was assessed.

Methodology

This analytical-retrospective study was conducted to investigate the effectiveness of Blatchford and Rockall risk scoring systems in prediction of urgent medical intervention outcome in patients with upper gastrointestinal bleeding visiting Shahid Beheshti University of Qom between 2012-2015. The statistical population included non-trauma patients with UGIB visiting the Emergency Department of Shahid Beheshti Hospital between 2012-2015.

The samples size was considered equal to 194, based on previous studies, areas under the Blatchford curve (0.67) and Rockall curve (0.76), the first-order error (α=0.05), and power of the study (β=0.95). The scoring was conducted based on the symptoms in both scoring systems (the minimum area under curves of both systems was considered to be AUC=0.06).

This study was conducted using the convenience sampling and checklist developed based on the Blatchford and Rockall systems, as well as data in triage form and history records of non-trauma UGIB patients, aged over 18 years old, referring to the Emergency Department of Shahid Beheshti Hospital between 2012-2015.

The researcher used the checklist derived from the Blatchforn and Rockall system to collect data from medical records of 194 patients. The subjects had complaint of UGIB (hematemesis, melena, and hematochezia). It is worth noting that the

validity and reliability of these two systems were approved by Pang et al. (2010) in their study, entitled comparison of Blatchford and Rockall scoring systems in determining the need for emergency endoscopy in patients with upper gastrointestinal bleeding [9, 21].

In the Blatchford scoring system, a patient is scored between 0-23. This system has been designed based on clinical data (systolic blood pressure, pulse rate, melena, syncope, liver disease, and previous disease), as well as laboratory data (BUN and Hb). Although this system is mainly used to predict the need for clinical interventions, recent studies have highlighted its effectiveness in predicting the risk of morality [9, 10].

Blatchford Scoring System [11]						
Variable	Score					
	1	2	3	4	5	6
BUN(mg/dl)		18-22.4	22.4-28	28-70		>70
Hb(male)	12-13		10-12			<10
Hb(female)	10-12					<10
SBP	100-109	90-99	<90			
Other variables	PR> 100 Melena	Syncope Kidney disease Heart disease				

According to criteria in above table, patients are categorized in three groups:

A. Score = 0: Low risk patients can be followed up by outpatient treatment without endoscopic intervention.
B. Score < 0: Patients should be hospitalized and received treatment interventions. However, patients scored lower than 5 do not need urgent and serious intervention.
C. Score > 5: High-risk patients in need of urgent intervention. Many studies have considered patients scored higher than 2 in need of treatment intervention [8, 10].

The pre-endoscopy Rockall scoring system is in the range between 0-7, based on clinical data: age, shock status (severity of bleeding, blood pressure, and pulse rate), and comorbidity [11].

Pre-endoscopy Rockall scoring system				
Variable	Score			
	0	1	2	3
Age	Less than 60	60-79	<80	
Shock status	No shock	PR>100 SBP>100	SBP<100	
Comorbidity		No comorbidity	Heart failure Ischemic heart disease	Liver disorder Kidney disorder Malignancy

According to criteria in above table, patients are categorized in three groups:

A. Patients scored 0 are placed in the low-risk group in terms of bleeding recurrence. The rate of mortality and bleeding recurrence in this group is 0.2%. The low-risk bleeding patients receive outpatient treatment and are discharged early.
B. Patients scored between 1-2 are categorized with moderate bleeding. The rates of bleeding recurrence and mortality in this group are 2.4 and 5.6, respectively.
C. Patients scored higher than 2 are categorized with severe bleeding. The rate of mortality in this group is in the range of 5-50%. As a result, patients scored higher than 5 should be hospitalized in the intensive care units [12].

The checklist data including age, vital signs (PR, SBP), comorbidity (heart disease, ischemic heart disease, kidney disease, and malignancy), hemoglobin (based on the gender), and BUN was extracted from triage form, medical history gained by the emergency physician, and common test results routinely administered in the emergency department. The Rockall and Blatchford scores were first obtained based on the data derived from medical records of each patient, using the checklist. Then, the need for emergency endoscopy and hospitalization in the ICU was determined. Results were compared to the actual emergency and gastrointestinal measures taken. Data correlation in these two instruments was measured using the Pearson, ICC, and kappa tests. To determine the relationship of qualitative variables with outcome, the chi-square test was used after determining the cutoff point. To determine the cutoff point, sensitivity and specificity, and predictive value, data was analyzed in SPSS and Medcal. The significance level in the current study was considered to be 0.05.

Findings

There were 194 patient in this study, out of which 42.4% were men and 57.2% were women. The mean age of the subjects was 55.36 years old with average Blatchford and Rockall scores of 8,65 and 1.91, respectively. Moreover, the mean rates of PR, SBP, HB, and BUN were 95.67, 114.82, 10.43, and 35.16, respectively.

The frequency of underlying disease among 194 research subjects were as follows: ischemic heart disease (n=49), cirrhosis (n=10), malignancy (n=2), ischemic heart disease and kidney disease at the same time (n=1). In addition, 49 patients had BP <100 and PR > 100. The shock status was null in the remaining patients. Among 194 patients with UGIB, 71 individuals received packed cells, 36 patients received packed cells and emergency endoscopy, 3 patients received emergency endoscopy without packed cells, and 84 patients were treated without any urgent intervention. Moreover, 10 patients received outpatient treatment, 171 patients were treated in the unit, and 10 patients were hospitalized in ICU.

The Blatchford scores of 194 patients with UGIB symptoms were obtained. Based on the results, 155 patients needed urgent medical interventions.

Findings suggested a significant relationship between actual medical interventions administered to patients visiting the emergency department and the Blatchford scores (kappa= 0.294 and p<0.00001). In the current study, patients with mean scores of 11.6 and 4.77 received urgent and non-urgent medical interventions, respectively (Table 1).

Table 1. Consistency between two qualitative variables, namely actual interventions conducted in hospital and intervention predicted by Blatchford

Intervention predicted by Blatchford			Total
	Urgent	Non-urgent	
Urgent intervention administered by hospital	101	9	110
Percentage	66.2	23.1	56.7
Non-urgent intervention administered by hospital	54	30	84
	34.8	76.9	43.3
Total	155	39	194

A significant relationship was also observed between the actual hospitalization unit and hospitalization unit predicted by the Rockall scoring system, kappa=0.182 (Table 2).

In addition, patients scored 0, 2.15, and 5.39 on average on the Rockall system should be given emergency outpatient treatment, hospitalized in the ward, and hospitalized in ICU, respectively. Patients admitted to outpatient treatment unit, specialized unit, and ICU, according to the triage system of the hospital, obtained Rockall scores of 0.1, 1,89, and 42, respectively.

Table 2. Comparison of two qualitative variables, namely actual hospitalization unit in hospital and hospitalization unit predicted by Rockall

	Actual hospitalization unit in hospital			Total
	Emergency	Hospitalization unit	ICU	
Hospitalization unit predicted by Rockall (outpatient)	9	1	0	10
Percentage	16.1	0.9	0	5.2
Hospitalization unit predicted by Rockall (specialized unit)	47	109	18	174
Percentage	83.9	94.8	78.3	89.7
Hospitalization unit predicted by Rockall (ICU)	0	5	5	10
Percentage	0	4.3	21.7	5.2
Total	56	115	23	194

In this study, no significant correlation was observed between the Blatchford scoring system and age (p=0.11); whereas, a relationship was observed between the Rockall scoring system and age (p<0.00001).

Discussion

As a result, this study was conducted to investigate the effectiveness of Blatchford and Rockall risk scoring systems in prediction of immediate medical intervention outcome in patients with upper gastrointestinal bleeding, referring Shahid Beheshti hospital of Qom. Results showed a significant relationship between the actual interventions administered in the hospital and Blatchford scores (kappa=0.294, p<0.00001). Patients who received urgent and non-urgent medical interventions in the hospital had the Blatchford scores of 111.6 and 4.77, respectively. Moreover, patients with the mean Blatchford scores of 10.32 and 2.02 should receive urgent and non-urgent medical treatments, respectively. Previous studies also reported similar findings. In a study conducted by Ganji et al. for the Clinical Practice Guideline Development and Standardization Office, the Blatchford and Rockall scores of all patients with UGIB were obtained at admission and then the treatment decisions were made based on their scores. In that, patients with the Blatchford score of 0 did not require hospitalization and were discharged after receiving outpatient treatment. Patients scored higher than 0 were hospitalized and received endoscopy treatment. After the endoscopy, those with Rockall scores less than 3, which indicates low risk of bleeding recurrence, got early discharge. Bozcurt (2015) in a prospective study investigated the validity of the Blatchford, Rockall, and modified early warning (MEW) in predicting the prognosis in patients with UGIB. They found that patient with the Blatcford scores higher than 5 required urgent medical intervention. Moreover, patients scored 12 and 13 on the Blatchford scoring system were hospitalized in ICU.

This study also showed a significant correlation between the actual hospitalization unit with hospitalization unit predicted by the Rockall scoring system (kappa = 0.182). In addition, patients scored 0, 2.15, and 5.39 on average, based on the Rockall system, should be given outpatient treatment, hospitalized in specialized unit, and hospitalized in ICU, respectively. Patients admitted to outpatient treatment unit, specialized unit, and ICU, according to the triage system of the hospital, obtained Rockall scores of 0.1, 1.89, and 42, respectively. Previous studies also showed similar findings. For example, Nezam-Abadi et al. performed a study, entitled triage in patients with UGIB, and found that patients with Rockall score of 0 received outpatient treatment, patients scored 1 and 2 had slight bleeding with mortality rate between 2.4% and 5.6%, patients scored higher than 2 had severe bleeding, and patients scored higher than 5 had mortality rate of 50% and required ICU hospitalization. Yang et al. (2015) reported the superiority of the full RS over PresRS scoring system in identifying patients in need of ICU hospitalization. This study did not found any significant correlation between the Blatchford scoring system and age (p=0.11). In contrast, a significant relationship was observed between the Rockall system and age (p<0.00001). Moreover, no significant correlation was observed between the gender and the Rockall and Blatchford scoring systems (p=0.19 and p=0.12).

Conclusion

The currents study showed a relationship between the interventions predicted by the Blatchford system and actual interventions administered in the hospital for patients with UGIB. In addition, a correlation was observed between the hospitalization unit predicted by the Rockall system and actual hospitalization unit in the hospital decided based on its triage system. As a result, these two scoring systems can be used as clinical guidelines in triage system of Shahid Beheshti Hospital

to determine the need for immediate medical interventions. It is recommended to conduct further studies into other scoring systems for determining the priority of treatments in patients with and without varicose bleeding.

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