Diagnostic Value of the Glasgow-Blatchford Scoring System in Patients With Upper Gastrointestinal Bleeding

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Abstract- There are disagreements about the diagnostic value of the current risk stratification systems in patients with acute upper gastrointestinal bleeding (UGIB). The present study aimed to determine the diagnostic value of the Glasgow-Blatchford score in UGIB patients. This study was conducted on 182 patients with UGIB who underwent endoscopy in the Emergency Department of Imam Reza Hospital, Mashhad, Iran. Glasgow-Blatchford Score (GBS) of each patient was estimated by using the clinical and laboratory parameters. The relationship between Blatchford score and endoscopic findings was assessed. Additionally, the sensitivity and specificity of GBS were measured based on high- and low-risk patients. According to the results, GBS had a high sensitivity (90.9%), specificity (79%), as well as positive (76%), and negative predictive values (92.2%). However, no significant relationship was observed between the Glasgow-Blatchford score and re-bleeding. As the findings of the present study indicated, Glasgow-Blatchford was a good predictive method for the determination of the high-risk and low-risk patients with UGIB. Nevertheless, this method showed poor performance in the prediction of re-bleeding.

Introduction

One of the most common medical problems in both outpatient and emergency sections, is acute upper gastrointestinal bleeding (UGIB), which is a life-threatening condition (1,2). The incidence of UGIB is reported to be 48-160 cases per 100,000 people each year, resulting in an annual rate of 300,000 hospital stays (1,3-5). The morbidity and mortality rate due to UGIB is reported to be 11-14% (1,2) and is higher in the patients with recurrence of bleeding (about 8-26% of the cases). The mortality rate has largely remained unchanged despite the new improvement for the diagnosis and treatment of this problem (6,7,8).

Gastric and duodenal ulcers are the main causes of UGIB (9,10). In most cases of UGIB, hemorrhage stops spontaneously; however, intervention is essential in some cases (11).

There are several scoring criteria for the UGIB risk assessment. Glasgow-Blatchford bleeding scoring

(GBS) is one of these systems used for the prediction of the patients' conditions. In GBS, clinical and laboratory data are used prior to endoscopy to identify the patients requiring intervention (12,13). These data, including hemoglobin, blood urea levels, systolic blood pressure, melena, pulse rate, hepatic disease, and cardiac failure (13,14,15,16). The other scales to predict the UGIB patients' conditions are AIMS65 and Rockall. These scales need an endoscopy to determine the patients' conditions (17). Rockall scale is designed to predict death due to UGIB, while GBS is intended to predict the need for clinical interventions in the patients inflicted with UGIB. Although GBS is not designed to predict mortality, it is demonstrated that this scale can be applied to predict death and the need for blood transfusion, endoscopic interventions, and surgery (13).

To the best of our knowledge, the sensitivity and specificity of GBS have not been investigated in Iran. Regarding the importance of using new assessment systems for the separation of high risk from the low-risk

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ones and the lack of a specific criterion for distinguishing these patients from each other, the present study aimed to determine the sensitivity and specificity of GBS in the identification of the patients with UGIB. Furthermore, we assessed the need for emergency endoscopic measures among patients with UGIB and the relationship between GBS and endoscopic findings.

Materials and Methods

This cross-sectional study was conducted on upper gastrointestinal bleeding patients with a stable condition who referred to Imam Reza Hospital, Mashhad, Iran, in 2016.

The inclusion criterion was UGIB patients with a lack of contraindications, such as suspicion for perforation, acute abdominal surgery, and shock. The exclusion criteria include an unwillingness to participate in the study, incomplete data recorded, patient's death after entering the study, inaccessibility to the patients one month after entering the study.

Upper endoscopy was carried out within the first 24 hours of admission. The necessary decisions for performing endoscopy, blood transfusion, and surgery were made based on the current guidelines.

The participants were assigned into three groups; A: low-risk patients no requiring endoscopic intervention, B: high-risk patients requiring endoscopic intervention, and C: patients with variceal bleeding. The patients who need blood transfusion did not fall into any of the low-risk or high-risk groups.

The GBS criteria consist of quantitative and qualitative parameters, including blood pressure, heart rate, liver disease, cardiac failure, syncope, melena, hemoglobin level, and blood urea nitrogen (BUN). The validity and reliability (Cronbach's alpha=0.92) of this scale were examined in Martínez-Cara *et al.*, study (17).

The patients had follow-up for one month for gastrointestinal re-bleeding, and the relationship between re-bleeding and Blatchford scoring was assessed.

The quantitative data were analyzed using a t-test or its nonparametric equivalent. In addition, ANOVA was applied to investigate the relationship between variables. The sensitivity and specificity were shown by the receiver operating characteristic curve. The data were analyzed in SPSS version 13. A *P* of less than 0.05 was considered statistically significant.

Results

One hundred eighty-two patients (65% male) with UGIB with a mean age of 59.81±18.69 years have enrolled in the study. The mean ages of group A and B and C were 59.72±19.13 and 61.65±17, and 49.65±22.39 years, respectively. There is no significant difference among the age of the three groups (*P*=0.14). 58%, 76%, and 54.5% of the patients in the A, B, and C groups were male, respectively, and there was no significant difference among the three groups in terms of gender (*P*=0.052).

There was a significant difference between the size of the ulcers, the number of esophageal ulcers, and the basic condition of the ulcers in the three groups of patients (*P*<0.001). The other frequencies of endoscopic findings in the three study groups are illustrated in Table 1.

The total mean of GBS was 9.11±4.2. GBS values of A, B, and C groups were 7.05±3.76, 11.83±3.26, and 12.45±3.41, respectively. Based on the ANOVA test, there was a significant difference among the three groups in terms of the mean GBS (*P*<0.001). Furthermore, a significant difference was observed between the A and B groups in this regard (*P*<0.001). However, there was no significant difference between groups B and C regarding the mean GBS (*P*=0.85).

After one month follows- up; re-bleeding was observed in 6.75% of group B and 9.1% of group C.

In the present study, the sensitivity, specificity, as well as positive and negative predictive values of GBS were calculated using the cut-off point of 10.5. At this point, the sensitivity and specificity of GBS were 90.9 (range: 81.6-95.9) and 79(range: 69.7-86.1), respectively. In addition, the positive and negative predictive values of GBS were calculated as 76 (65.8-84.1) and 92.2 (84.1-96.5), respectively. Moreover, the area under the curve was estimated to be 76.6, as shown in Figure 1.
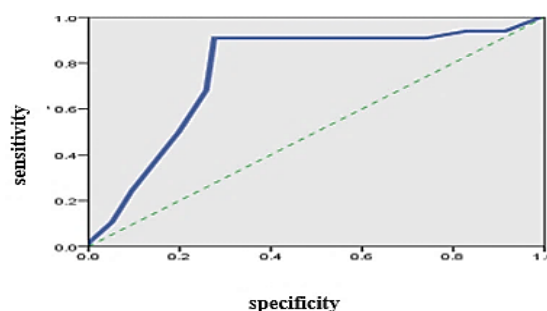
Figure 1. Receiver operating characteristic curve for the separation of the low-risk patients and those requiring endoscopic intervention

Table 1. Frequency distribution of upper endoscopic observations in patients

Variables		A: Low risk (%)	B: High risk (%)	C: Variceal veins (%)	P
Pathology of the esophagus (including varicose veins)	Yes	6.7	7.5	100	0.606
	No	94.6	92.4	0	
Gastritis	Yes	4.5	13.3	9.1	0.17
	No	95.5	86.7	90.9	
Duodenitis	Yes	3	8.6	9.1	0.34
	No	97	91.4	90.9	
Esophageal ulcers	Yes	1.5	14.3	9.1	0.02
	No	5.98	85.7	90.9	
Stomach ulcers	Yes	39.2	41.9	0	0.02
	No	60.6	58.1	100	
Duodenal ulcers	Yes	47	36.2	0	0.01*
	No	53	63.8	100	
	No	19.7	25.9	72.8	
Size of the ulcers	<10	47	52.4	27.3	<0.001*
	10-20	15.2	16.2	0	
	20-30	10.6	1.9	0	
	>30	7.6	0	0	
	No	12.1	32.4	100	
Number of esophageal ulcers	1	63.6	47.6	0	<0.001*
	1-3	21.2	17.1	0	
	>3	3	2.9	0	
	No	9.1	32.4	100	
	Clean base	0	51.4	0	
	Pigmented	0	16.2	0	
The basic condition of the ulcers	Active bleeding	25.8	0	0	<0.001*
	Non-bleeding visible vessels	36.4	0	0	
	Active bleeding	22.7	0	0	
	Clot attached	6.1	0	0	
Re-bleeding	Yes	16.7	6.7	9.1	0.24
	No	68.2	81.9	81.8	

Discussion

The most important steps for the management of patients with UGIB are resuscitation, risk classification, and endoscopy (10). There is no general agreement for the assessment of low and high-risk patients with UGIB. However, based on the National Institute for Health and Clinical Excellence (NICE), it is better to apply the GBS at the initial assessment and utilize the Rockall score after endoscopy (18). The use of GBS facilitates the management of patients who can be treated without early endoscopy (13,16). The patients with very low GBS are considered low-risk and can be safely managed as outpatients. Endoscopic therapy would not be helpful for this group and may even hurt them (13,16,19).

As the findings of the present study indicated, GBS had a high sensitivity, specificity, as well as positive and negative predictive values. Therefore, this system can be concluded as a good predicting method for the determination of low-risk patients with UGIB and high risk. However, this method showed poor performance in the prediction of re-bleeding.

Several studies have demonstrated that patients with a GBS of ≤2 do not need an urgent endoscopy (20-21). Based on a cohort study, when a score of 2 was applied as a cut-off point, the sensitivity and specificity of GBS were 99.2% and 42.9%, respectively (21). In a study conducted by Recio-Ramirez et al., the sensitivity and specificity of GBS were reported to be 100% and 46%, respectively. Therefore, this scale, with a cut-off of 2, can separate the high-risk patients from the other ones (22). In another study, the sensitivity and specificity of GBS (with a cut-off point of 7) in identifying the low-risk patients and high risk were reported to be 96% and 69%, respectively. Furthermore, the positive and negative predictive values of this scale were estimated at 74% and 95%, respectively (23).

In the current study, we assessed the predictive

power of GBS in the identification of high- and low-risk patients. The results of the study were indicative of the high sensitivity (90.9%) and specificity (79%) of this scoring system. In a study conducted by Sengupta *et al.*, a high score in GBS was associated with post-discharge re-bleeding. In the mentioned study, the patients with GBS score of higher than 7 needed immediate measurements (24). Based on our study, the sensitivity, specificity, and predictive value of GBS were high based on the cut-off point of 10. The results of the present study are different from those reported in similar studies, which can be attributed to the larger sample size of our research. The cut-off point was evaluated to obtain a higher specificity. In the present study, re-bleeding was observed in 6.75% and 9.1% of the high risk and varicose veins, respectively. Our findings revealed that GBS showed poor performance in the prediction of re-bleeding.

In our study, the group that needs blood transfusion was not fallen into high-risk criteria; so, it may be the patients with a blood transfusion to be in high-risk or low-risk groups. This form of evaluation of the patients may be the cause of reducing or increasing the sensitivity. One of the most important limitations of this study was the lack of follow-up; therefore, performing similar studies with follow-up is suggested.

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