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Original Research Article

Triaging patients with upper gastrointestinal bleeding: the utility of Glasgow-Blatchford score

Namita Mohanty, Arjun Nataraj Kannan*

Department of General Medicine, MKCG Medical College, Berhampur, Ganjam, Odisha, India

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***Correspondence:**
Dr. Arjun Nataraj Kannan,
E-mail: arjun090@gmail.com

ABSTRACT

Background: Glasgow-Blatchford bleeding score (GBS), was developed to predict the need for hospital-based intervention (transfusion, endoscopic therapy or surgery) or death following upper gastrointestinal bleeding. Study evaluated the Glasgow Blatchford score's (GBS) ability to identify high risk patients who needed blood transfusion in patients with UGI haemorrhage.
Methods: A total of 270 cases admitted with upper gastrointestinal bleeding in the Medical ICU/Wards of MKCG Medical College were put on Blatchford scoring system and classified as those requiring (high risk = GBS >1) and not requiring blood transfusion (low risk) based on the score assigned on admission and a correlation between initial scoring and requirement of blood transfusion was done.
Results: Units of blood transfusion required, the GBS and duration of hospital stay were significantly lower among the low risk group, all with p value <0.001. No blood transfusion was required in patients with GBS <3. There was significant correlation between GB score and requirement of blood transfusion (p <0.001) and duration of hospital stay (p <0.001). GBS had 100% sensitivity, negative predictive value and positive likelihood ratio, when a cut off of > 16 was used in predicting mortality.
Conclusions: Patients presenting with Upper GI bleeding can be triaged in casualty with Glasgow Blatchford scoring. Patients with a low score of less than or equal to 3 can be safely discharged and reviewed on follow up thereby reducing admission, allowing more efficient use of hospital resources.

Keywords: Blood transfusion, Mortality, Outdoor management

INTRODUCTION

Upper gastrointestinal bleeding (UGIB) is that originating proximal to the ligament of Treitz; in practice from the oesophagus, stomach and duodenum.[1-4] The severity of the disorder varies from mild symptoms, such as coffee-ground vomiting without haemodynamic compromise to severe exsanguination.[5] However, most patients do not need emergency endoscopic intervention or blood transfusion.[6]

The approach to UGIB consists of maintenance of hemodynamic stability and determination of the amount and localization of bleeding.[7] The prognosis of gastrointestinal (GI) bleeding is variable, from mild to life-threatening bleeding.[8] As in all life-threatening conditions in an emergency department, physical examination, diagnostic procedures, and therapeutic efforts should be simultaneously initiated, and patients should be resuscitated and stabilized in UGIB.[9]

In order to stratify patients according to the risk of the complications, such as rebleeding or death, and to predict the need of clinical intervention, several risk scores have been proposed and their use consistently recommended by international guidelines.[10] The use of risk scoring systems in early assessment of patients suffering from UGIB may be useful to distinguish high-risk patients, who may need clinical intervention and hospitalization, from low risk patients with a lower chance of developing complications, in which management as outpatients can be considered.[10] The Glasgow Blatchford score (GBS). The GBS, which is based on clinical and laboratorial parameters, has been studied to predict the need of clinical intervention. A score of 0 identifies low-risk patients who might be suitable for outpatient management.[11] The GBS enables assessment of risk based on clinical variables alone without the use of endoscopic findings. Its purpose is to aid in identification of patients requiring intervention, such as blood transfusion, or endoscopic or surgical intervention to control UGIB.[5]

The GBS has also been shown to be superior to the clinical Rockall score in identifying patients with suspected UGIB who have a low likelihood of an adverse clinical outcome (blood transfusion, endoscopic therapy, interventional radiology, surgery or 30 day mortality) and can be considered for early discharge.[8,11-13]

There are very few Indian studies that uses scoring system to risk stratify patients presenting with Upper GI bleeding. Hence this study was aimed at defining whether applying the GBS score to Indian patients presenting at an Emergency Department with UGI bleeding may predict the requirement of blood transfusion, duration of hospital stay and mortality. A GBS cut off of <1 to define low risk group based on previous data like the study done by Mustafa et al.

METHODS

This was a prospective observational study conducted in Department of General Medicine, MKCG Medical College, Berhampur, Odisha for a period of 1 year (February 2017 to January 2018)

A total of 356 cases admitted with UGIB in the Medical Intensive Care Unit/Wards of MKCG Medical College, Berhampur who met the inclusion criteria were selected on a consecutive basis. 86 patients self-discharged themselves and were excluded from the study. Patients were put on GB scoring system (Table 1) and prognosticated after getting a written informed consent.

Patients were classified as those requiring (high risk) and not requiring blood transfusion (low risk) based on the score assigned on admission and a correlation between initial scoring and requirement of blood transfusion was done. High risk means a GB score of greater than 1.

Table 1: Glasgow Blatchford score.

Admission risk markers	Score
Blood urea (mmol/l)	
6.5-8	2
8-10	3
10-25	4
>25	6
Hemoglobin (Hb) for men (g/dl)	
12-13	1
10-12	3
<10	6
Hb for women (g/dl)	
10-12	1
<10	6
Systolic Blood Pressure (SBP) (mmHg)	
100-109	1
90-99	2
<90	3
Other markers	
Pulse > 100/min	1
Presentation with melaena	1
Presentation with syncope	2
Hepatic disease[a]	2
Cardiac disease[b]	2
[a] Known history of or clinical/laboratory evidence of chronic or acute liver disease [b] Known history of or clinical/echocardiographic evidence of cardiac failure	

Inclusion criteria

- More than 18 years of age
- Experiencing either hematemesis (NG bloody aspirate), melena or both as confirmed by hospital staff.

Exclusion criteria

- Patients admitted with lower GI bleed
- Patients declining to undergo blood transfusion.

Statistical analysis

Detailed clinical history, complete clinical examination, relevant investigations including Upper GI endoscopy was performed for each patient. Statistical analysis was carried out for 270 patients. They were categorized according to - Age, gender, Glasgow Blatchford score and units of blood transfused or not. Scores derived from the Blatchford system on admission to hospital were correlated with the requirement of blood and regressed to find the relationship between the two. Additional observations of duration of hospital stay and in-hospital mortality/outcome during the present admission were also correlated with the initial scoring. Predictive power of GBS for mortality and blood transfusion requirement was calculated as areas under receiver-operator characteristic

(ROC) curves at the 95% confidence interval. To compare parameters in low and high-risk groups, the Mann Whitney U-test was used. All tests were two tailed and a p-value of <0.05 was deemed significant. Data analysis was done using Microsoft Excel and SPSS.

RESULTS

The final study population was 270 patients, which consisted of 40 low risk patients (mean age 35: males 28, females 12) and 230 high-risk patients (mean age 44.4: males 173, females 57) (Table 2).

There was statistically significant difference in pulse rate (mean low risk, 88 vs mean high risk, 103), systolic BP (mean low risk, 124.8 vs mean high risk, 99.9), hemoglobin (mean low risk, 12.8 vs mean high risk, 8.3) and blood urea (mean low risk, 30.6 vs mean high risk, 40) between the two groups, (p <0.001). The mean duration of hospital stay in low risk group was 3.4 compared to 5.3 in the high-risk group (p <0.001) (Table 2).

Table 2: Patient demographics.

Variable (Mean)	Low risk (40)	High risk (230)	p-value
Age	35.03	44.4	< 0.001
Gender M: F	28:12	201:69	-
Hematemesis	40	230	
Malena	0	62	
Syncope	0	15	
Pulse	88	103	< 0.001
Systolic BP (mmHg)	124.8	99.9	< 0.001
Hemoglobin (g/L)	12.5	8.3	< 0.001
Urea (mg/dl)	30.6	40	< 0.001
Days in Hospital	3.4	5.3	< 0.001

No patient with a GB score of <3 required blood transfusion. There was statistically significant positive correlation between GB score and requirement of blood transfusion, (r - 0.820 and p <0.001). There was no adverse outcome (mortality) in any patients with GB score <16 (Table 3).

Table 3: Correlation of GB score with blood transfusion.

GB Score	Patients who required blood transfusion (%)
0-3	0
4-9	63.9
10-15	81.4
≥16	100

Spearman correlation, r = 0.820 (p <0.001).

Most of the patients (27 cases) had normal UGI Endoscopic study, 8 had gastritis, 4 had esophagitis and 1 patient had a vascular lesion like Gastric Antral Vascular Ectasia (GAVE) or Dieulafoy lesion. No one from the high-risk group had normal endoscopic study or gastritis or esophagitis. Most common findings in high risk group were esophageal varices (98 cases) and duodenal ulcer (70). Other findings included gastric ulcer (42 cases), vascular lesion (14 cases) and gastric carcinoma (6 cases) (Table 4).

Table 4: Endoscopic findings.

Endoscopic finding	Low risk (40)	High risk (230)
Normal	27	0
Gastritis	8	0
Esophagitis	4	0
Vascular lesion	1	14
Esophageal varices	0	98
Duodenal ulcer	0	70
Gastric ulcer	0	42
Gastric carcinoma	0	6

Receiver-operator characteristic (ROC) curves at the 95% confidence interval were plotted to find out the performance of GB score in predicting blood transfusion (Area under Curve (AUC) - 0.994) and adverse outcome/death (AUC - 0.999) (Figure 1).

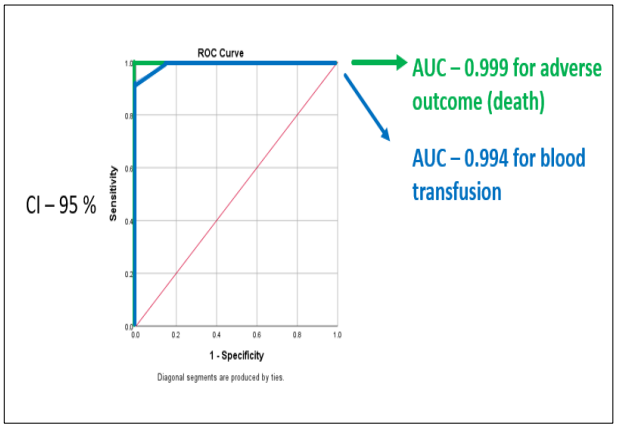

Figure 1: ROC curve for the performance of GB score.

Sensitivity, specificity, positive predictive value, negative predictive value and overall accuracy of GB score in predicting blood transfusion and death were calculated and summarized in and (Table 6).

From the ROC curve it was found that GB score had a sensitivity of 100 % for predicting blood transfusion and adverse outcome upto scores of 3 and 16 respectively. (Table 5 and Table 6) The overall accuracy of GB score in predicting blood transfusion requirement and death was 94.81 % and 99.62 % respectively (Table 6).

Table 6: Predictive power of GBS for blood transfusion and adverse outcome (death).

	Blood transfusion (GBS cut off > 3)	Adverse outcome (Death) (GBS cut off ≥ 16)
Sensitivity	100 %	100%
Specificity	82.92 %	99.59%
Positive predictive value	93.07 %	96.55%
Negative predictive value	100 %	100%
Accuracy	94.81 %	99.62%

DISCUSSION

Many risk stratification tools are used in clinical practice, especially for critically ill patients. In patients with GI tract bleeding, the severity of an upper GI bleed influences the urgency of upper endoscopy, the need for blood transfusion, and the need to consult specialists to control GI tract bleeding.[14-17] In recent years, several practice guidelines and risk scores, combining clinical and endoscopic parameters, have been developed with the aim of assisting physicians in the early stages of decision making.[15,18-21] Such a prediction may help physicians decide about hospital admission or discharge, the level of assistance that admitted patients' need, and the type of treatment to be adopted.

The ideal risk stratification score for UGIB should be simple and easily applied at the bedside. GB score was preferred as it could be easily calculated using clinical and lab parameters and doesn't need endoscopy.

The mean and standard deviation for the age of the low risk and high-risk groups were 35.03±8.75 years and 44.44±12.53 years respectively. In low risk group median age (35) was lower than high risk group (median age 49). In the study done by R. Srirajaskanthan et al, median age in the low risk group was 39 and it was 70 in the high risk group.[5] Similar findings (median low risk 35 and median high risk 69) were also reported in the study by Marc Girardin et al.[22] This may be because older patients have higher GBS due to associated comorbidities.

Study had more males than females in both low risk and high-risk groups (70% and 75.2% respectively). Studies done by R. Srirajaskanthan et al, I-Chuan Chen et al, Marc Girardin et al, and Mustafa et al, also had a male predominant study population.[5,12,22,23]

None of the patients in the low risk group presented with symptoms of malena or syncope while 62 (22.9%) and 15(5.6%) patients in high risk group had malena and syncope respectively. In the study done by Marc Girardin et al, there were no low risk patients with symptoms of malena or syncope and there were 73 % and 7 % patients in high risk group who had malena and syncope respectively.[22]

Most of the patients among the low risk group had normal endoscopic study (27 patients, 67.5 %) or Gastritis (20%). Among the high-risk group, common endoscopic diagnosis were esophageal varices (98 patients, 42.6 %), Duodenal ulcer (30.5%), Gastric ulcer (18.3%), Vascular lesion (6%) and Carcinoma stomach (2.6%).R. Srirajaskanthan et al, also reported similar findings i.e. low risk group mostly had normal (29.6%) or gastritis (40.7%) on endoscopy, while high risk group had Varices (18%), Gastric or duodenal ulcer (45.8%) and malignancy (5.5%).[5] Similar endoscopic findings were also found in the study by Marc Girardin et al.[22] Cirrhotic patients have a baseline GBS of at least two. Therefore, using GBS will always classify them as high-risk. So, it may be better to use specialized scores like MELD or Child-Pugh score to assess these patients.

In this study, no patient who was classified as low risk required blood transfusion and 188 patients (81.7%) who were classified as high-risk required at least 1 unit of blood transfusion (p value<0.001). Studies done by Marc Girardin et al, R. Srirajaskanthanet al, both of which used a GBS cut off of 0 and <2, respectively to define low risk groups also had similar outcomes.[22,5] In the study done by Mustafa et al, which used GBS <1 to define low risk group, only 1 patient (0.5%) in the low risk group required blood transfusion and 118 patients (35%) in the high-risk group needed blood transfusion (p <0.001).[23]

Moreover, no patient with GBS <3 required blood transfusions. Study done by Juan G Martı´nez-Cara et al, also concluded that patients with GBS <3 didn't require any blood transfusion.[24]

Receiver Operating Characteristic (ROC) curve was plotted to find out the performance of GB score in predicting requirement of blood transfusion. The area under the Curve is 0.994 (CI 95%) indicating that the GB score is able to distinguish patients who required blood transfusion with high accuracy up to score 3. The GB Score had 100% sensitivity and negative predictive value for predicting blood transfusion. Its specificity was 82.92% with positive predictive value of 93.07%. Overall accuracy of the test was 94.81%.

Among the low risk group, all patients were discharged within 3 to 4 days. In high risk group, majority (68.3%) patients were admitted for 5 to 9 days. Mean duration of hospital stay (low risk - 3.4 vs high risk = 5.3) was significantly lower among the low risk group with p value < 0.001. This was also same in the studies done by Marc Girardin et al, and R. Srirajaskanthan et al.[5,22]

There was significant correlation between GB score and requirement of blood transfusion (p <0.001 and Correlation coefficient - 0.820) and duration of hospital

stay (p <0.001 and Correlation coefficient - 0.820). The first study on GBS by Blatchford O et al also showed similar correlation between GBS and requirement of transfusion and duration of hospital stay.[8]

The Receiver Operating Characteristic (ROC) curve was plotted to find out the performance of GB score in predicting adverse outcome (death).The area under the curve is 0.999 (95% CI) indicating that the GB score is able to distinguish patients with adverse outcome (death) with high accuracy.

The GB score has high sensitivity and specificity till value of 16, after which there is a steep decline. The GB Score had 100% sensitivity and negative predictive value for predicting adverse outcome (death). Its specificity was 99.59% with positive predictive value of 96.55%. Overall accuracy of the test for predicting adverse outcome (death) was 99.62%. Study done by Nagaraja B. S et al, found that a GBS >13 accurately predicts mortality.[25]

Optimal GBS cut-off

Since no patients with GBS <3 in this study required blood transfusion nor had any adverse outcome, the question that needs to be addressed is: Whether the low risk cut off of GBS can be increased to <3 and manage these patients on outdoor basis?

Increasing the GBS cut-off to define "low risk" has been suggested in several studies. By increasing the score threshold, a larger proportion of low-risk patients could be identified, and admission potentially avoided. Recent data from studies done by R. Srirajaskanthan et al, Masaoka T et al, Le Jeune IR et al, and Schiefer M et al, showed that GBS <2 identifies low risk group without any adverse outcomes.[5,26-28]

However, other studies have suggested that by increasing the cut-off, patients' risk of poor outcome may rise unacceptably. In Laursen's large multicenter study, 3% of patients with a score of ≤2 suffered an adverse outcome.[29] So, before increasing the GBS cut off to define low risk patients, further multicenter trials need to be undertaken.

Limitations of the study was that it was a single center study done in the only referral center in Southern Odisha which could explain the high proportion of high-risk group in this study. There was no scope for emergency endoscopy in the hospital. Moreover, there is considerable delay in arranging blood transfusion which could have prolonged the duration of hospital stay in high risk patients.

CONCLUSION

The value of risk scores in predicting the outcomes in acute UGIB has been proven far beyond any skepticism. The Glasgow Blatchford Score is a useful means of identifying high-risk patients with upper gastrointestinal bleeding in casualty. Patients with a low score of less than or equal to 3 could be safely discharged and reviewed on follow up thereby reducing admission and more efficient use of hospital resources. High score helps in predicting the requirement of blood transfusion and adverse outcome of patients.

Further prospective multicenter studies are required to validate whether GBS <3 are safe for outdoor management of patients which will reduce financial burden of patients and hospitals, especially in countries like India.

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REFERENCES

1. Network SI. Management of acute upper and lower gastrointestinal bleeding. SIGN Guideline 105. SIGN. 2008:1-40.
2. Biecker E, Heller J, Schmitz V, Lammert F, Sauerbruch T. Diagnosis and management of upper gastrointestinal bleeding. Dtsch Arztebl Int. 2008 Feb;105(5):85-94.
3. Jain V, Agarwal P N, Singh R, Mishra A, Chugh A, Meena M. Management of Upper Gastrointestinal Bleed. MAMC J Med Sci. 2015;1:69-79.
4. Kim J. Management and prevention of upper GI bleeding. Gastroenterology Nutr Series. PSAP-VII; 2012:7-26.
5. Srirajaskanthan R, Conn R, Bulwer C, Irving P. The Glasgow Blatchford scoring system enables accurate risk stratification of patients with upper gastrointestinal haemorrhage. Inter J Clini Pract. 2010 Jun;64(7):868-74.
6. Atkinson RJ, Hurlstone DP. Usefulness of prognostic indices inupper gastrointestinal bleeding. Best Pract Res Clin Gastroenterol. 2008;22:233-42.
7. Bozkurt S, Köse A, Arslan ED, Erdoğan S, Üçbilek E, Çevik İ, et al. Validity of modified early warning, Glasgow Blatchford, and pre-endoscopic Rockall scores in predicting prognosis of patients presenting to emergency department with upper gastrointestinal bleeding. Scandinavian J Trauma, Resuscitation Emer Med. 2015 Dec;23(1):109.
8. Blatchford O, Murray WR, Blatchford M. A risk score to predict need for treatment for upper gastrointestinal haemorrhage. Lancet. 2000 Oct 14;356(9238):1318-21.
9. Lim JK, Ahmed A. Endoscopic approach to the treatment of gastrointestinal bleeding. Tech Vasc Interv Radiol. 2004 Sep; 7(3):123-9.
10. Monteiro S, Gonçalves TC, Magalhães J, Cotter J. Upper gastrointestinal bleeding risk scores: Who, when and why?. World J Gastrointestinal Pathophysiol. 2016 Feb 15;7(1):86.

11. Stanley AJ, Ashley D, Dalton HR, Mowat C, Gaya DR, Thompson E, et al. Outpatient management of patients with low-risk upper-gastrointestinal haemorrhage: multicentre validation and prospective evaluation. Lancet. 2009 Jan 3;373(9657):42-7.
12. Chen IC, Hung MS, Chiu TF, Chen JC, Hsiao CT. Risk scoring systems to predict need for clinical intervention for patients with nonvariceal upper gastrointestinal tract bleeding. Am J Emerg Med. 2007 Sep;25(7):774-9.
13. Pang SH, Ching JY, Lau JY, Sung JJ, Graham DY, Chan FK. Comparing the Blatchford and pre-endoscopic Rockall score in predicting the need for endoscopic therapy in patients with upper GI hemorrhage. Gastrointes Endo. 2010 Jun 1;71(7):1134-40.
14. Forrest JH, Finlayson ND, Shearman DJ. Endoscopy in gastrointestinal bleeding. Lancet. 1974 Aug 17;304(7877):394-7.
15. Laine L, Peterson WL. Bleeding peptic ulcer. N Engl J Med. 1994 Sep 15;331(11):717-27.
16. Peterson WL, Barnett CC, Smith HJ, Allen MH, Corbett DB. Routine early endoscopy in upper-gastrointestinal-tract bleeding: a randomized, controlled trial. N Engl J Med. 1981 Apr 16;304(16):925-9.
17. Sacks HS, Chalmers TC, Blum AL, Berrier J, Pagano D. Endoscopic hemostasis: an effective therapy for bleeding peptic ulcers. JAMA. 1990 Jul 25;264(4):494-9.
18. Longstreth GF, Feitelberg SP. Outpatient care of selected patients with acute non-variceal upper gastrointestinal haemorrhage. Lancet. 1995 Jan 14;345(8942):108-11.
19. Rockall TA, Logan RF, Devlin HB, Northfield TC. Risk assessment after acute upper gastrointestinal haemorrhage. Gut. 1996 Mar 1;38(3):316-21.
20. Saeed ZA, Winchester CB, Michaletz PA, Woods KL, Graham DY, A scoring system to predict rebleeding after endoscopic therapy of nonvariceal upper gastrointestinal hemorrhage, with a comparison of heat probe and ethanol injection, Am J Gastroenterol. 1993 Nov;88(11):1842-9.
21. Hay JA, Lyubashevsky E, Elashoff J, Maldonado L, Weingarten SR, Ellrodt AG, Upper gastrointestinal hemorrhage clinical--guideline determining the optimal hospital length of stay. Am J Med. 1996 Mar;100(3):313-22.
22. Girardin M, Bertolini D, Ditisheim S, Frossard JL, Giostra E, Goossens N, et al. Use of Glasgow-Blatchford bleeding score reduces hospital stay duration and costs for patients with low-risk upper GI bleeding. Endo Inter Open. 2014;2(02):E74-9.
23. Mustafa Z, Cameron A, Clark E, Stanley AJ. Outpatient management of low-riskpatients with upper gastrointestinal bleeding: can we safely extend the Glasgow Blatchford Score in clinical practice? Eur J Gastroenterol Hepatol. 2015 May;27(5):512-5.
24. Martínez-Cara JG, Jiménez-Rosales R, Úbeda-Muñoz M, de Hierro ML, de Teresa J, Redondo-Cerezo E. 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. United Euro Gastroenterol J. 2016 Jun;4(3):371-9.
25. Nagaraja BS, Vinay K, Akhila Rao K, Umesh KJ, Prashant BC. Comparison of prediction of outcomes in upper GI bleed using nonendoscopic scoring systems Int J Adv Med. 2018 Aug;5(4):838-4.
26. Masaoka T, Suzuki H, Hori S, Aikawa N, Hibi T. Blatchford scoring system is a useful scoring system for detecting patients with upper gastrointestinal bleeding who do not need endoscopic intervention. J Gastroenterol Hepatol. 2007 Sep;22(9):1404-8.
27. Le IJ, Gordon AL, Farrugia D, Manwani R, Guha IN, James MW. Safe discharge of patients with low-risk upper gastrointestinal bleeding (UGIB): can the use of Glasgow-Blatchford Bleeding Score be extended?. Acute Med. 2011;10(4):176-81.
28. Schiefer M, Aquarius M, Leffers P, Stassen P, van Deursen C, Oostenbrug L, et al. Predictive validity of the Glasgow Blatchford Bleeding Score in an unselected emergency department population in continental Europe. Euro J Gastroenterol Hepatol. 2012 Apr 1;24(4):382-7.
29. Laursen SB, Dalton HR, Murray IA, et al. Performance of new thresholds of the Glasgow Blatchford score in managing patients with upper gastrointestinal bleeding. Clin Gastroenterol Hepatol. 2015;13(1):115-21.

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