CJEM Journal Club

Emergency department risk stratification in upper gastrointestinal bleeding

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Clinical question
What clinical features, compiled as a risk stratification tool, identify patients with upper gastrointestinal bleeding that can be safely managed and investigated in an outpatient setting?
Article chosen
Stanley AJ, Ashley D, Dalton HR. Outpatient management of patients with low-risk upper-gastrointestinal hemorrhage: multicentre validation and prospective evaluation. *Lancet* 2009;373:42-7.
Objective
To validate the Glasgow-Blatchford Bleeding Score, a risk stratification tool for upper gastrointestinal bleeding.

BACKGROUND

Upper gastrointestinal bleeding (UGIB) is a common presenting complaint to the emergency department (ED).[1] It can be caused by a wide spectrum of pathologies, some of which carry clinically significant morbidity and mortality. Deciding whether a patient warrants urgent endoscopic evaluation in the ED or can be assessed on an outpatient basis is a challenging decision to make. Referring all patients with evidence of UGIB for urgent endoscopy may be unnecessary and can prove to be costly and inefficient. A number of risk scoring systems exist to predict clinical outcomes in patients with UGIB. The most widely quoted are the Glasgow-Blatchford Bleeding Score (GBS)[2] and the clinical Rockall score,[3] both of which consider only pre-endoscopy criteria, and the full Rockall score, with additional endoscopic criteria.[4] It is unclear if any of these tools are sufficiently predictive to serve as a decision guide for emergency physicians.

POPULATION STUDIED

The population studied was adults presenting consecutively to three European hospitals with UGIB over a 12-month period for one hospital, a 6-month period for another, and a 3-month period for two others. UGIB was defined as presenting symptoms of hematemesis, coffee ground vomiting, and/or melena.

STUDY DESIGN

Phase I consisted of a prospective study of consecutive patients presenting to three European EDs with UGIB and an additional retrospective branch of the study for one of the three EDs involved (chart review). Phase II consisted of a prospective study validating the accuracy and safety of the GBS when it was incorporated into ED practice.

OUTCOMES MEASURED

The primary outcome measure was the need for clinical intervention (blood transfusion, endoscopic treatment, or surgery) or mortality as predicted by the GBS. The GBS (pre-endoscopy; Table 1) and clinical

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Table 1. GBS stratification

Variable	Score
Blood urea (mmol/L)	
6.5–7.9	2
8.0–9.9	3
10.0–25.0	4
> 25.0	6
HgB for men (g/L)	
120–129	1
100–119	3
< 100	6
HgB for women (g/L)	
100–119	1
< 100	6
Systolic blood pressure (mm Hg)	
100–109	1
90–99	2
< 90	3
Other markers	
Pulse ≥ 100/min	1
Presentation with melena	1
Presentation with syncope	2
Hepatic disease	2
Cardiac failure	2

Hgb = hemoglobin.
A Glasgow-Blatchford Bleeding Score of (GBS) 0 implies low-risk upper gastrointestinal bleeding.

Table 2. The Rockall score

Variable	Points
Age (yr)*†	
< 60	0
60–79	1
≥ 80	2
Shock*†	
Pulse > 100 beats/min	1
Systolic BP < 100 mm Hg	2
Coexisting illness*†	
Ischemic heart disease, CHF, other major illness	2
Renal failure, hepatic failure, metastatic cancer	3
Endoscopic diagnosis†	
No lesion observed, Mallory-Weiss tear	0
Peptic ulcer, erosive disease, esophagitis	1
Cancer of upper GIT	2
Endoscopic stigmata of recent hemmorhage†	
Clean base ulcer, flat pigmented spot	0
Blood in upper GIT, active bleeding, visible vessel, clot	2

BP = blood pressure; CHF = congestive heart failure; GIT = gastrointestinal tract.
*Clinical Rockall criterion;
†full Rockall criterion.
A clinical Rockall score of 0 or a complete Rockall score of 2 indicates low-risk upper gastrointestinal bleeding.

and full Rockall scores (the latter incorporates endoscopic findings; Table 2) were calculated for consecutive patients presenting with UGIB. The area under the receiver operating characteristic (ROC) curve was calculated to compare the predictive values of the GBS and the full Rockall score. Sensitivities were also calculated and compared for the GBS versus the clinical Rockall score.

CLINICAL SCORING TOOLS

The three major clinical scoring tools discussed in this study are the GBS, the clinical Rockall score, and the full Rockall score.

In the GBS system (see Table 1), a low-risk category of patients was defined by a GBS of 0 and consisted of patients meeting all of the following: absence of liver failure, syncope, cardiac disease or melena, systolic blood pressure of > 120 mm Hg, pulse < 100 beats/min, urea < 6.5 mmol/L, and hemoglobin > 130 g/L in men and > 120 g/L in women.

The clinical and full Rockall scores are compared and described in Table 2. The Rockall score includes the patient's age, status of shock, and presence of comorbid illnesses. Of note, the full Rockall score incorporates endoscopic findings (the nature and appearance of the bleeding lesions) to risk-stratify the patient.

RESULTS

In phase I of the study, 676 patients presenting consecutively for UGIB had their GBS and clinical and full Rockall scores calculated. Data were missing for the calculations of the GBS in 27 patients, the clinical Rockall score in 19, and the full Rockall score in 18. The GBS was 0 for 105 patients (16% of patients), whereas the clinical Rockall score was 0 for 184 (28% of patients). Various data were missing for 3.7% of patients (18 of 485). The median age of those with low-risk scores was considerably lower (age 41 [interquartile range 28–55] v. 64 [48–78]; $p < 0.0001$).

No deaths or subsequent interventions were reported among patients with a GBS of 0, for a

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sensitivity of 100.0% (95% CI 96.5–100.0). Patients assigned a clinical Rockall score of 0 required 44 subsequent interventions, with one death (17% of all with low-risk Rockall scores), for a sensitivity of 82.61% (95% CI 76.48–87.40).

The GBS was found to be a superior predictor of outcomes across a spectrum of scores on ROC analysis (area under the curve 0.92 [95% CI 0.90–0.94] v. 0.72 [95% CI 0.68–0.76]).

Among the 467 patients for whom endoscopic data were available, the GBS and full Rockall scores were superior to the clinical Rockall score in predicting interventions (0.90 [95% CI 0.88–0.93] v. 0.81 [95% CI 0.77–0.84] v. 0.70 [0.65–0.75]).

In the validation phase, 491 consecutive patients presented with UGIB. A GBS of 0 was noted in 123 (22%). Eighty-four (68%) were investigated as outpatients without suffering adverse events. Only 40% attended their outpatient endoscopy referral, however. None of the low-risk patients, including those who did not follow up with endoscopy, had a subsequent intervention or death up to 6 months after the initial ED presentation as best assessed by the investigators. Researchers ensured no loss to follow-up by consulting the patient and family doctors and by reviewing case notes for those who failed to present for endoscopy.

Comparing phase I and phase II of this study, the rate of admission to hospital for UGIB decreased from 96% to 71% ($p < 0.00001$), without any adverse effects.

CONCLUSION

The authors concluded that the GBS is useful in identifying patients at low risk for subsequent intervention or death secondary to UGIB. The GBS also has the potential to decrease the number of admissions to hospital, thus rendering resource use more rational.

COMMENTARY

The Rockall score is rarely used in clinical practice even though it has been validated in many settings.[5] Instead, emergency physicians more often rely on gestalt to decide between the need for observation and/or endoscopy while in the ED or safe discharge with outpatient follow-up. Emergency physicians may tend to err on the side of caution when triaging patients, however, and may choose to refer patients for urgent endoscopy even though they may be at low risk. A simple, safe, valid, and easy to apply clinical prediction rule would allow for explicit, reproducible, and measurable standards of care while optimizing outcomes.

The full Rockall score (which was found to be superior to the clinical Rockall score) requires endoscopic findings to refine the prediction of outcomes for patients presenting with UGIB. The GBS is a clinical and nonendoscopic method of assessing and identifying low-risk patients in the early phases who can be followed as outpatients rather than who require admission to the ED.

One of the limitations of this study is that only 40% of patients with a GBS of 0 attended a follow-up outpatient endoscopy; however, the study attempted to go beyond this and address patient outcomes by following up with patients and their physicians to determine the incidence of clinical intervention or death (which was 0 as it relates to UGIB). However, this does not eliminate the possibility that these patients could have carcinomas or other pathologies that presented later, that is, after this 6-month follow-up. In addition, this particular method of follow-up may have introduced a recall bias in data collection. The physicians may have failed to remember and report diagnoses accurately.

This study currently offers level II evidence[6,7] for the GBS clinical prediction rule. It has shown accuracy in at least one large prospective multicentre study including a broad spectrum of patients and clinicians. However, no traditional impact analysis was done looking at patient outcomes such as rebleeding, subsequent need for surgery, and incidence of mortality. Clinicians can use this clinical prediction rule in various settings with confidence in their accuracy but with no certainty that patient outcomes will improve.

To safely use the GBS, it needs more extensive external validity in other settings to ensure its generalizability. A modified Blatchford scale (mBRS; urea and syncope were not recorded) has been validated in a Canadian population presenting to the ED during daytime hours (during which time, endoscopy was performed).[8] However, the mBRS needs a prospective randomized study to further assess the safety of discharging patients who present after hours. The Blatchford scoring system (same as the GBS) was assessed in a small ($N = 93$) retrospective analysis in

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Japan, where the scoring system was found to accurately identify patients at low risk for gastrointestinal hemorrhage. The Blatchford scoring system was also assessed in the United States, and the full Rockall scoring system was found to be superior in identifying low-risk gastrointestinal hemorrhage patients.[9]

The GBS has yet to be evaluated in a Canadian population. The UK population has a different ethnic makeup compared to the Canadian population. Given that certain disease processes are more prevalent in specific ethnicities, applying this clinical prediction rule to a population with a uniquely different ethnic makeup would be disregarding the rules of generalizability. For example, certain populations may suffer from higher rates of alcohol-induced varices and bleeding, making the GBS a less sensitive tool.

With regard to the statistical analysis presented in this study, the specificity of this clinical prediction rule was not reported; however, the object of the study was not to aid in ruling in those patients who require an urgent scope in the ED but rather to rule out the presence of high-risk UGIB. Given the objective of the GBS, however, if patients do not have a score of 0, they will be kept for endoscopic evaluation. The specificity of this practice is unclear; however, such an approach does aid the physician in making an evidence-based decision to refer for urgent endoscopy. It is presently unclear if using the GBS clinical prediction rule compared to a clinician's gestalt is superior in sensitivity or specificity. A randomized controlled trial would, ideally, have to be conducted to most validly assess one's superiority over the other. In addition, this study did not calculate the negative predictive value of a GBS score of 0; however, the authors do refer to two studies that found a negative predictive value of 100%.[9,10]

Of note, melena is a high-risk feature, and patients with hematemesis only but no melena can have a GBS of 0. This fact likely indicates that a large number and spectrum of patients present to the ED with "hematemesis" on their history, most of which is insignificant coffee ground emesis or spitting up of blood. Of note, external studies have found that red blood hematemesis is a high-risk feature for negative outcomes.[11]

The GBS offers a high sensitivity with narrow confidence intervals, making this a useful tool to rule out high-risk UGIB.

Comparing the area under the ROC curve for the full Rockall criteria and the GBS, the latter is more reliable in assessing if patients can be seen in outpatient follow-up for the episode of UGIB. It is also easier to calculate (no endoscopic findings are required). In addition, it can potentially reduce hospital admissions; however, this depends on the proportion of the patient population that presents with a GBS of 0. This scoring system could thus allow for better allocation of resources and help alleviate ED overcrowding.

To appropriately manage patients presenting to the ED with UGIB, it is critical for physicians to risk-stratify these patients early on using validated prognostic tools and arrange for early endoscopy (within 24 hours).[12]

Competing interests: None declared.

Keywords: Glasgow-Blatchford Bleeding Score, upper gastrointestinal bleeding, upper gastrointestinal bleeding scoring

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