

Performance of New Thresholds of the Glasgow Blatchford Score in Managing Patients With Upper Gastrointestinal Bleeding

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- BACKGROUND & AIMS:** Upper gastrointestinal hemorrhage (UGIH) is a common cause of hospital admission. The Glasgow Blatchford score (GBS) is an accurate determinant of patients' risk for hospital-based intervention or death. Patients with a GBS of 0 are at low risk for poor outcome and could be managed as outpatients. Some investigators therefore have proposed extending the definition of low-risk patients by using a higher GBS cut-off value, possibly with an age adjustment. We compared 3 thresholds of the GBS and 2 age-adjusted modifications to identify the optimal cut-off value or modification.
- METHODS:** We performed an observational study of 2305 consecutive patients presenting with UGIH at 4 centers (Scotland, England, Denmark, and New Zealand). The performance of each threshold and modification was evaluated based on sensitivity and specificity analyses, the proportion of low-risk patients identified, and outcomes of patients classified as low risk.
- RESULTS:** There were differences in age ($P = .0001$), need for intervention ($P < .0001$), mortality ($P < .015$), and GBS ($P = .0001$) among sites. All systems identified low-risk patients with high levels of sensitivity ($>97\%$). The GBS at cut-off values of ≤ 1 and ≤ 2 , and both modifications, identified low-risk patients with higher levels of specificity (40%–49%) than the GBS with a cut-off value of 0 (22% specificity; $P < .001$). The GBS at a cut-off value of ≤ 2 had the highest specificity, but 3% of patients classified as low-risk patients had adverse outcomes. All GBS cut-off values, and score modifications, had low levels of specificity when tested in New Zealand (2.5%–11%).
- CONCLUSIONS:** A GBS cut-off value of ≤ 1 and both GBS modifications identify almost twice as many low-risk patients with UGIH as a GBS at a cut-off value of 0. Implementing a protocol for outpatient management, based on one of these scores, could reduce hospital admissions by 15% to 20%.

Keywords: Outpatient; Management; Gastrointestinal Bleeding; Prognosis; UGIH.

Upper gastrointestinal hemorrhage (UGIH) remains a common cause of admission to the hospital in most countries. Several risk-scoring systems have been developed for the assessment of patients presenting with this condition.^{1–7} The Glasgow Blatchford score (GBS) has been shown to be accurate in identifying patients' risk of requiring hospital-based intervention (blood transfusion, endoscopic treatment, or surgery), or death.^{2,8–11} Several studies have found that patients with a GBS of 0 have very low risk ($<1\%$) of these outcomes.^{2,8–10,12–14} When using a cut-off value of 0, the GBS

is capable of identifying 5% to 22% of patients with UGIH who are at low risk of requiring hospital-based intervention or death, and who potentially can be managed as outpatients.^{8,10,12,14} Utilization of the GBS

Abbreviations used in this paper: amGBS, age-modified Glasgow Blatchford score; GBS, Glasgow Blatchford score; PPI, proton pump inhibitor; UGIH, upper gastrointestinal hemorrhage.

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with a cut-off value of 0 in the emergency department has been shown to safely reduce admissions among low-risk patients with this condition.⁸ Some investigators have suggested that the proportion of identified low-risk patients could be increased by using a higher GBS cut-off value,^{9,12,13} or modifying the GBS with an adjustment for age.^{10,15} However, using a higher cut-off value or adjusted GBS also may lead to reduced sensitivity, resulting in an increased risk of misclassification of patients who actually require intervention, or die.

The aim of this study was to compare 3 thresholds of GBS and 2 score modifications to identify the optimal cut-off value or modification using an international multicenter analysis. We also examined if the performance of the GBS depended on the location of the patient cohort.

Methods

Data Collection

Data were collected prospectively from consecutive patients presenting with UGIH for 24 months at both the Royal Cornwall Hospital (Truro, England) and the Odense University Hospital (Odense, Denmark), prospectively for 18 months at Glasgow Royal Infirmary (Glasgow, Scotland), and retrospectively for 58 months at Dunedin Hospital (Dunedin, New Zealand). UGIH was defined as a history of hematemesis, coffee-ground vomit, or melena. Patients experiencing UGIH while already inpatients for another reason were excluded.

Data were collected by junior doctors (non-specialists), medical students, or research nurses, depending on the site. Patient characteristics; GBS; endoscopic findings (if performed); interventions in the form of blood transfusion, endoscopic treatment, surgery, or arterial embolization; and mortality were recorded at all sites. All admitted patients were followed up until discharge, but all patients who were not admitted for any reason were followed up for a minimum of 30 days to assess outcome.

Some of the data from Glasgow, Truro, and Odense have been reported in earlier studies.^{8,10,16} The local hospitals recognized this as a service evaluation, rather than research, because no randomization or allocation to an intervention was performed, therefore ethical approval was unnecessary. The study was conducted according to the Declaration of Helsinki.¹⁷ Our report follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Evaluated Scoring Systems

The GBS was calculated according to the criteria stated in the original article (Table 1).² The ability of the GBS to predict low risk of need for intervention or death was evaluated at the following cut-off values: 0, ≤ 1 , and ≤ 2 . Two previously reported modifications of the GBS

Table 1. The Glasgow Blatchford Score

	Assigned score
Blood urea level, <i>mmol/L</i>	
6.5–7.9	2
8.0–9.9	3
10.0–24.9	4
≥ 25.0	6
Hemoglobin level for men, <i>g/L</i>	
120–129	1
100–119	3
< 100	6
Hemoglobin level for women, <i>g/L</i>	
100–119	1
< 100	6
Systolic blood pressure, <i>mm Hg</i>	
100–109	1
90–99	2
< 90	3
Other markers	
Pulse ≥ 100 /min	1
Presentation with melena	1
Presentation with syncope	2
Hepatic disease ^a	2
Cardiac failure ^b	2

^aKnown history, or clinical and laboratory evidence, of chronic or acute liver disease.

^bKnown history, or clinical and echocardiographic evidence, of cardiac failure.

also were examined: first, an age-modified version defining low risk as follows: GBS ≤ 2 and age < 70 years¹⁵ (amGBS1); and, second, an age-modified version defining low risk as follows: GBS ≤ 2 when age between 60 and 69 years was assigned 1 extra point and age ≥ 70 years was assigned 3 points¹⁰ (amGBS2).

Definition of Hemostatic Intervention

Hemostatic intervention was defined as endoscopic therapy, surgery, or interventional radiology performed during the index hospital stay.

Definition of Low-Risk Patients

Low-risk status was defined as patients who did not need a blood transfusion or hemostatic intervention, and did not die during the index admission.

Treatment of Patients

The general treatment of patients followed the national guidelines of the British Society of Gastroenterology Endoscopy Committee¹⁸ (Glasgow, Truro), the Danish Society of Gastroenterology and Hepatology¹⁹ (Odense), and local guidelines (all centers). Patients were admitted to the Departments of Gastroenterology (Glasgow, Truro, Dunedin), or a specialized gastrointestinal bleeding unit (Odense). Critically ill patients were transferred to intensive care units based on clinical judgment and local resources. The majority of patients were endoscoped

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