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Use of Risk Scoring System in Upper Gastrointestinal Haemorrhage: A Critical Review

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Abstract:

Upper gastrointestinal bleeding (UGIB) represents a substantial clinical and economic burden with significant mortality and morbidity. Validated prognostic scales are used to stratify patients into low and high risk, on the basis of clinical, laboratory, and endoscopic criteria. Early identification of high-risk patients allows appropriate intervention, which minimizes morbidity and mortality.

Background:

Acute upper gastrointestinal bleeding is the commonest emergency managed by gastroenterologists. It represents a substantial clinical and economic burden, with reported incidence ranging from 48 to 160 cases per 100 000 adults per year (1) and mortality generally from 10% to 14%. (2) The incidence being highest in areas of the lowest socioeconomic status. Most deaths occur in elderly patients who have significant comorbidity and the majorities are inevitable, despite improvements in medical and surgical expertise. Mortality is reported to be lower in specialist units (3) and this is probably not related to technical developments but because of adherence to protocols and guidelines.

Although a proportion of patients presenting with UGIH require transfusion, endoscopic or surgical intervention and a small minority die, the majority do not require intervention and remain well. Similar to other common medical conditions including chest pain, deep venous thrombosis and chest infection, risk-scoring systems for UGIH have been developed.

Scoring systems in clinical practice

Current risk-stratification systems for patients with acute upper-gastrointestinal bleeding discriminate between patients at high or low risks of dying or rebleeding.

Many scoring systems have been developed to direct appropriate patient management of upper GI bleeding, predict the risk of rebleeding or death in patients with upper gastrointestinal bleeding and enable cost effective use of resources. The most widely used score is the Rockall score (Table 1). This was developed by Rockall et al in 1996 (4). The Rockall score was designed to predict mortality used the data from an audit in four English Health regions, but Rockall et al suggested that it could also be used for the prediction of re-bleeding (5).

The Rockall score is a prognostic score based on the patient's age, presence of shock, coexisting illness, diagnosis, and stigmata of hemorrhage. Therefore, before the Rockall score can be calculated, the endoscopy must first be performed. Patients with a score of 2 or below are at low risk of rebleeding and

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death. Although one validation study found the prediction of risk of rebleeding to be unsatisfactory with the Rockall score, another large retrospective study found the score useful in influencing the management of patients based on their severity of illness..(6) (7) An abbreviated ‘admission’ Rockall score (excluding the two endoscopic criteria) has been used in some centres, but this has never been fully validated.

Table 1: The Rockall Score

Component score	0	1	2	3
Age (years)	<60	60–79	≥80	–
Shock				
Pulse (bpm)	<100	≥100	–	–
Systolic BP (mmHg)	≥100	≥100	<100	–
Co-morbidity	None	–	IHD, cardiac failure, other major co-morbidity	Renal or liver failure, disseminated malignancy
Diagnosis	MW or no lesion and no stigmata	All other diagnoses	Malignant lesions of UGIT	–
Stigmata of haemorrhage	No stigmata or dark spot on ulcer	–	Blood in UGIT, adherent clot, visible/spurting vessel	–

UGIT, upper gastrointestinal tract; BP, blood pressure; IHD, ischaemic heart disease

Although most risk scoring systems for this disorder incorporate endoscopic findings, the Glasgow-Blatchford bleeding score (GBS) is based on simple clinical and laboratory variables; a score of 0 identifies low-risk patients who might be suitable for outpatient management..

The Glasgow-Blatchford score ([Table 2](#)) was developed in 2000 (6) to predict a patient’s risk of requiring intervention or death It can be calculated by tallying up the points for each of the following criteria: systolic blood pressure, blood urea nitrogen, hemoglobin, and the presence of tachycardia, melena, syncope, liver, or cardiac diseases. High scores carry a graver prognosis and require intervention, as compared with lower scores. One advantage of this score is that it can be calculated when the patient presents to the physician. Unlike the Rockall score, both endoscopy and the diagnosis are not required for the Glasgow-Blatchford score. The Glasgow-Blatchford score has been used successfully to stratify patients into different risk groups. Those with low scores can be managed outpatient, whereas those with higher scores are admitted and treated in hospital. The GBS has recently been shown to

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identify 16 – 22% of patients as being ‘low risk’ (GBS $\frac{1}{4}$ 0;) who could be safely managed as outpatients.(8)

Table 2: Glasgow Blatchford score (GBS)

Admission risk marker	Score value
Blood urea (mmol/L)	
6.5–8	2
8–10	3
10–25	4
>25	6
Hb (g/L) for men	
120–130	1
100–120	3
<100	6
Hb (g/L) for women	
100–120	1
<100	6
Systolic blood pressure (mmHg)	
100–109	1
90–99	2
<90	3
Pulse \geq 100/minute	1
History/co-morbidities	
Presentation with melaena	1
Presentation with syncope	2
Hepatic disease*	2
Cardiac failure [†]	2

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*Known history of or clinical/laboratory evidence of chronic or acute liver disease

†Known history of or clinical/echocardiographic evidence of cardiac failure

In addition to the GBS, other non-endoscopic scores have been developed including the Cambridge score (9) and an American score based on an artificial neural network (ANN).(10)

The Cambridge score requires 14 clinical and laboratory variables and identifies only 6% low-risk patients who may be suitable for outpatient management. Partly for these reasons it has not been externally validated or widely adopted. The ANN score requires 20 variables in addition to computer software for analysis, which makes it less attractive to busy clinicians.

A summary of the main scores is shown in Table 3

Table 3: Summary of main risk scoring systems for UGIH

Score (ref.)	Endoscopy required?	No. of variables	Suitable for unselected UGIH patients?	Validated for early patient discharge?
Rockall ⁴	Yes	6	Yes	Yes
Admission' Rockall ⁴	No	4	Yes	Yes
Glasgow Blatchford ⁵	No	5	Yes	Yes
Cambridge ⁸	No	14	Yes	No
ANN ⁹	No	20	No	No

Recommendations from the SIGN guideline, the international consensus guideline and the UK national audit include early risk assessment of patients presenting with UGIH.(10) (12) The 2008 SIGN guideline suggested the use of the admission Rockall score, but was published before several recent papers directly comparing the GBS and admission Rockall scores, while the 2010 international guidelines recognized the recent favorable comparisons for the GBS.

A recent national UK audit of 6750 patients with UGIH has revealed that only 52% hospitals had an out-of-hours endoscopy service and only 50% patients received endoscopy within 24 hours of presentation.(13)Therefore many lower risk patients may stay in hospital longer than necessary, when outpatient management may be appropriate

No study has been able to demonstrate that early endoscopy leads to a reduction in mortality. Nevertheless the BSG guidelines along with others emphasise the importance of endoscopy within 24 h of presentation particularly for high risk patient (14) (15)

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While several scores are useful in identifying low-risk patients who may be suitable for early discharge, they appear less helpful in differentiating medium and higher risk patients who may require emergency endoscopy or high dependency/intensive care management. However the sensitivity of these scores is probably more important than the specificity, as the clinician does not want to mistakenly label a higher risk patient as 'low-risk' and possibly discharge them early.

GBS is equivalent to both the full and admission Rockall scores in predicting death and superior to both in predicting need for blood transfusion. The GBS is similar to the full Rockall score and superior to the admission Rockall score in predicting need for endoscopic therapy or surgery.(16)

A recent data from London also showed The GBS but not the pre-endoscopy Rockall score identifies patients with upper gastrointestinal bleeding who may be suitable for outpatient management, therefore potentially allowing for more efficient use of hospital resources. (17)

A recent study from Hong Kong have shown that The Blatchford score is more useful for predicting low-risk patients who do not need therapeutic endoscopy and who may be suitable for outpatient management. A threshold of 0 for low risk should be used. The Rockall score is not helpful in predicting the presence of low-risk lesions.(18). However the proportion of patients fulfilling the GBS low-risk criteria in this Chinese study was lower than the published UK figures, which may be due to differences in patient populations and health-care delivery

One study assessed the three main endoscopy-based scores and found that the full Rockall was superior to the Cedars Sinai and Baylor scores, particularly for lower risk patients. In this study, all scores were better at predicting mortality than re-bleeding, (19)

A publication from USA suggested that An GBS of 1 or less exhibit a low chance of having lesions that benefit from therapeutic endoscopy and have a low risk of rebleeding (5%) and mortality (0.5%) SO IT HAS a 100% negative predictive value for re-bleeding or death, or need for intervention, respectively.(20)

Recent recommendations from a consensus panel in Asia (21) suggest using the GBS to triage patients for more-intensive therapy. Other studies have suggested the complete Rockall score is more accurate.

The key point is that the selection of a specific scoring system is less important than using some method to predict which patients need early endoscopy and vigorous therapy. Both the GBS and pre-endoscopy Rockall scores can achieve this goal. All three systems are based on clinical measures that reflect the volume of bleeding and the hemodynamic status of the patient. The complete Rockall score has the advantages of adding the presence of endoscopic stigmata, which are the best predictors of rebleeding, and allowing simultaneous endoscopic therapy that can reduce that risk for rebleeding. A low score and decision for outpatient therapy do not obviate the need for outpatient endoscopy at the earliest possible time

Conclusion:

There is a growing body of evidence and consensus opinion to recommend the early use of risk stratification scores for patients presenting with UGIH.

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Whilst a score for optimal sensitivity and specificity could be calculated, in practice the clinician will err towards sensitivity at the cost of specificity. Therefore, the scores are best used to identify low risk patients for non-admission or early discharge. As previously reported by our group, a GBS score of zero had 100% sensitivity for intervention or death, but there were interventions and a death amongst those with an admission Rockall score of zero.

The GBS appears superior to the admission Rockall score for early non-endoscopic risk assessment and identifies low-risk patients in whom admission can be safely avoided. All scores seem to perform less well among patients at higher risk. Further studies are required to compare scoring systems in different populations and further clarify their role in clinical practice.

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