ORIGINAL ARTICLE

Predicting outcome of acute non-variceal upper gastrointestinal haemorrhage without endoscopy using the clinical Rockall Score

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Background: The Rockall risk scoring system uses clinical criteria and endoscopy to identify patients at risk of adverse outcomes after acute upper gastrointestinal haemorrhage. A clinical Rockall score obtained using only the clinical criteria may be able to predict outcome without endoscopy.
Aim: To validate the clinical Rockall Score in predicting outcome after acute non-variceal upper gastrointestinal haemorrhage.
Methods: A retrospective observational study of consecutive patients who were admitted with non-variceal acute upper gastrointestinal haemorrhage was undertaken. Medical records were abstracted using a standardised form.
Results: 102 cases were identified (51 men and 51 women; mean age 59 years). 38 (37%) patients considered to be at low risk of adverse outcomes (clinical Rockall Score 0) had no adverse outcomes and did not require transfusion. Patients with a clinical Rockall Score of 1–3 had no adverse outcomes, although 13 of 45 (29%) patients required blood transfusions. Clinical Rockall Scores >3 (n = 19) were associated with adverse outcomes (rebleeding in 4 (21%), surgery in 1 (5%) and death in 2 (10%)).
Conclusions: The clinical Rockall Score without endoscopy may be a useful prognostic indicator in this cohort of patients with acute non-variceal upper gastrointestinal haemorrhage. This score may reduce the need for urgent endoscopy in low-risk patients, which can instead be carried out on a more elective outpatient basis.

The Rockall risk scoring system uses clinical criteria (age, comorbidity, presence of shock) and endoscopy (diagnosis, stigmata of recent haemorrhage) to identify patients at risk of adverse outcomes after acute upper gastrointestinal haemorrhage.[1–4] The complete Rockall Score has been validated as a clinically useful score for stratifying such patients into high-risk and low-risk categories for mortality.[5] However, there are no risk scores that rely only on clinical criteria and not on endoscopy. A clinical Rockall Score can be obtained using only the clinical criteria.

Guidelines for management of acute non-variceal upper gastrointestinal haemorrhage suggest that endoscopy should be carried out as soon as possible within 24 h of presentation at the hospital.[6 7] The rationale for this is twofold. Firstly, urgent endoscopy can identify high-risk lesions such as active haemorrhage, non-bleeding visible vessel or non-bleeding adherent clot. These lesions benefit from endoscopic therapy, with subsequent reduction in adverse outcomes.[6 7] Secondly, if low-risk lesions are identified in conjunction with a low clinical Rockall Score, the risk of adverse outcomes is low, and patients can be discharged after their endoscopy, thus reducing the duration of hospital stay.

The clinical Rockall Score, before endoscopy, may be used to identify patients at high or low risk and allocate resources accordingly. For example, patients with a low clinical Rockall Score could be discharged so that they can undergo endoscopy on an elective basis as outpatients, thereby saving resources further. Another study has evaluated the clinical Rockall Score. Gralnek and Dulai[8] from California used the clinical and complete Rockall Scores sequentially to identify low-risk patients. They found that the complete Rockall Score identified more low-risk patients than the clinical Rockall Score. However, the clinical Rockall Score was still useful in guiding the decision on allocation of scarce healthcare resources.

The aim of our study was to validate the clinical Rockall Score in predicting the outcome (ie, transfusion requirement, rebleeding, surgery, mortality) after acute non-variceal upper gastrointestinal haemorrhage. If the clinical Rockall Score can predict outcome, this could help identify low-risk patients for delayed, elective or outpatient endoscopy, whereas those at high risk could have urgent endoscopy and a higher level of hospital care.

METHODS

We undertook a retrospective observational study of consecutive patients who were admitted with acute non-variceal upper gastrointestinal haemorrhage.

The study was conducted in a secondary-care, university-affiliated hospital (Ulster Hospital, Dundonald, Belfast, Northern Ireland, UK), serving a semi-urban population of 280 000. Consecutive patients admitted over a 2-year period with acute non-variceal upper gastrointestinal haemorrhage were identified from the *International classification of diseases*, 9th revision, clinical modification codes based on discharge diagnosis that mentioned gastrointestinal haemorrhage. Medical records for all potential cases were abstracted using a standardised data collection form. As this was a clinical audit, approval by the institutional review board and patient consent were not required.

Data collected included demographic information, clinical presentation, initial vital signs including heart rate, systolic blood pressure, presence of comorbid medical conditions, drugs taken at the time of admission and initial laboratory tests.

The clinical Rockall Score (before endoscopy) was calculated in each case based on points assigned for each of the

Table 1 Rockall Risk Score

Variable	Score 0	1	2	3
Age (years)	<60	60–79	>80	
Heart rate (beats/min)	<100	⩾100		
Systolic blood pressure (mm Hg)	⩾100	⩾100	<100	
Comorbidity			IHD, CHF, any other major comorbidity	Renal or liver failure, malignancy
Diagnosis	Mallory–Weiss tear or no lesion	All others	Upper GI malignancy	
Stigmata of recent haemorrhage	No spot or dark spot		Blood, clot, visible or spurting vessel	

CHF, congestive heart failure; GI, gastrointestinal; IHD, ischaemic heart disease.
Patients are assigned point values for each of the clinical (age, shock, comorbidity) and endoscopy variables (diagnosis, stigmata of recent haemorrhage). The Rockall Score is equal to the sum of the points assigned. Scores can range from 0 to 11 points for the complete score and from 0 to 7 for the clinical score. Patients with complete Rockall Scores of ⩽2 after endoscopy are considered to be at low risk for developing adverse outcomes (rebleeding 4%, mortality <0.1%). Patients with clinical Rockall Scores of 0 before endoscopy are considered to be at low risk.

three clinical variables: patient's age at presentation, shock based on initial vital signs and presence of comorbid conditions (table 1). A clinical Rockall Score of 0 was considered "low risk" for adverse outcomes (recurrent bleeding and mortality) related to acute upper gastrointestinal haemorrhage.[1–4]

Patients were considered to have developed recurrent bleeding if they had further haematemesis or melaena with signs of haemodynamic instability such as a rise in heart rate, fall in blood pressure or fall in haemoglobin. Melaena without signs of haemodynamic instability was not considered as rebleeding.

RESULTS

We identified 102 consecutive patients with acute non-variceal haemorrhage, with equal number of men and women. Mean age was 59 (range 16–96) years.

Owing to resource limitations, there were delays in endoscopy, which varied according to perceived urgency. The number of days elapsed (mean, range) between presentation at the hospital and endoscopy were as follows: clinical Rockall score 0 (4, 1–10); score 1 (2, 1–4); score 2 (2, 1–2); score 3 (3, 1–6); score 4 (1.5, 1–3); score 5, (1.5, 1–2); and score 7 (1) day. In all, 22% did not undergo endoscopy as the attending doctor thought that this was unnecessary.

Three patients (two with clinical Rockall Score 3 and one with score 4) were taking warfarin at the time of admission.

The diagnoses after endoscopy were as follows: 30% normal, 21% gastritis, 15% oesophagitis or Barrett's syndrome, 11% duodenitis, 9% duodenal ulceration, 6% gastric ulceration, 4% angiodysplasia and 1% gastric carcinoma. Of these, one gastric ulcer and three duodenal ulcers had major stigmata of recent haemorrhage, requiring endoscopic treatment with injection of epinephrine in all with the addition of bipolar coagulation in one patient.

The length of stay in days (mean, range) in relation to clinical Rockall Score was as follows: clinical Rockall Score 0 (2.3, 1–5); score 1 (3.3, 2–5); score 2 (4.6, 2–7); score 3 (4, 2–10); score 4 (5.3, 2–10); score 5 (7; only one patient). Seventeen patients stayed in hospital for >10 days because of reasons other than those related to gastrointestinal haemorrhage or any other medical problems, and were therefore not included in the analysis of hospital stay to avoid skewing of the data.

Table 2 shows the association of the clinical Rockall Scores with patient outcomes in terms of transfusion, rebleeding, surgery and mortality. In all, 38 (37%) patients were considered to be at low risk for adverse outcomes (clinical Rockall Score 0). These patients had no adverse outcomes and did not require transfusion. Patients with clinical Rockall Scores 1–3 had no adverse outcomes, although 13 of 45 (29%) required blood transfusions. Those with clinical Rockall Scores >3 (n = 19) were associated with adverse outcomes (rebleeding in 4 (21%), surgery in 1 (5%) and death in 2 (10%)). One patient (age 77 years, previous disabling strokes) died from an asystolic arrest immediately after endoscopy. The other patient (age 82 years, history of breast cancer) died after a cardiac arrest due to ischaemic heart disease the day after she underwent endoscopy.

Of the 22 patients who did not undergo endoscopy, 17 did not have any adverse outcomes. Four patients required blood transfusions; of these, two refused to undergo endoscopy, one was considered unfit because of end-stage comorbid disease and the remaining patient had a previous endoscopy several months earlier, which had shown angiodysplasia. One patient died from multiple myeloma.

Table 2 Relationship of clinical Rockall Scores to patient outcome

Clinical Rockall Score	Patients, n (% of total)	Taking aspirin or NSAIDs, n (% of those with the score)	Outcomes, n (% of those with the score)			
			Transfusion	Rebleeding	Surgery	Mortality
0	38 (37)	3 (8)	0 (0)	0 (0)	0 (0)	0 (0)
1	13 (13)	4 (30)	2 (15)	0 (0)	0 (0)	0 (0)
2	16 (16)	3 (19)	4 (25)	0 (0)	0 (0)	0 (0)
3	16 (16)	12 (75)	7 (44)	0 (0)	0 (0)	0 (0)
4	14 (14)	4 (29)	7 (50)	1 (7)	1 (7)	0 (0)
5	4 (4)	2 (50)	2 (50)	3 (75)	0 (0)	1 (25)
6	0 (0)		Not applicable			
7	1 (1)	1 (100)	1 (100)	1 (100)	0 (0)	1 (100)

NSAID, non-steroidal anti-inflammatory drug.

DISCUSSION

We have shown that a low clinical Rockall Risk Score in patients with non-variceal bleeding without endoscopy is associated with no adverse outcomes (rebleeding or mortality), whereas a high clinical risk score is associated with adverse outcomes. These findings cannot be extrapolated to those with variceal bleeding as our study did not include such patients. This would also explain why mortality in our study cohort is less than that described elsewhere.[1] In practical terms, while treating all comers with acute upper gastrointestinal bleeding, patients may be suspected to have variceal bleeding if there is a history of liver disease, if they have had jaundice or have signs of liver decompensation. If variceal bleeding is suspected, the strategy of using a clinical Rockall Risk Score to stratify their management may not be applicable unless tested in this population.

Only one other retrospective study has evaluated the significance of the clinical Rockall Score in identifying low-risk patients. Gralnek and Dulai[8] found that the clinical Rockall Score identified 12% of patients who were at low risk. They found that no patient classified as being at low risk had recurrent bleeding or died. After they calculated the complete Rockall Score in their cohort after endoscopy, the number of low-risk patients increased to 30%, although in this group 3.8% re-bled but none died. Their results confirm our observations. In other words, the clinical Rockall Risk Score is more conservative than the complete score in identifying low-risk patients, allowing a greater margin of safety in discharging these patients without endoscopy.

To date, all studies on outpatient management of acute upper gastrointestinal haemorrhage have used inpatient endoscopy in their risk assessment and selection for outpatient management.[3 9–15] However, our data suggest that, on the basis of clinical grounds alone, low-risk patients may be selected for outpatient endoscopy, further saving healthcare resources. Hence, a prospective trial is required to confirm that this strategy is safe.

We observed that the delay between endoscopy and presentation at the hospital was related to the clinical risk scores; the higher the score, the shorter the delay. The reasons for the delays are usually limited healthcare resources, which is the case in many hospitals within the British National Health Service. The reason for this observation is probably because clinicians estimate the risk of an adverse outcome in individual patients and schedule an endoscopy accordingly.

We did not calculate the complete Rockall Score, as 22% of our patients did not undergo endoscopy and there was a delay in endoscopy of more than 1 day for most patients. This was because ours was an observational study. We wanted to determine whether the management of such patients by clinicians who based their decisions on their perceived risk together with the delay in endoscopy due to limited resources had an effect on outcome.

The delay in endoscopy might have missed some of the lesions responsible for the bleed. This may be one reason why we did not identify any patients with Mallory–Weiss tear. Another explanation for this could be the fact that many patients with Mallory-Weiss tear can be diagnosed from the clinical history alone; also, many fall into the low-risk category and hence did not undergo endoscopy.

The length of stay also increased with higher clinical scores, probably implying that those with higher scores are more sick, with more comorbid disease or adverse outcomes. At least 17% of these patients stayed >10 days in hospital for reasons unrelated to their acute gastrointestinal haemorrhage. This suggests that despite our best attempts to reduce the duration of hospital stay with risk score triage, a considerable percentage of patients will still require a prolonged hospital stay as a result of other medical or social issues.

Our results suggest that the clinical Rockall Risk Score, without endoscopy, can be a useful prognostic indicator in this cohort of patients with acute non-variceal upper gastrointestinal haemorrhage. The use of the clinical Rockall Score may reduce the need for urgent endoscopy in low-risk patients, which can instead be carried out on a more elective outpatient basis. However, this approach may not be applicable to those suspected of having variceal haemorrhage.

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