The Importance of Rockall Scoring System for Upper Gastrointestinal Bleeding in Long-Term Follow-Up

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Abstract The aim of the study is to examine the importance of Rockall scoring system in long-term setting to estimate re-bleeding and mortality rate due to upper gastrointestinal bleeding. A total of 321 patients who had been treated for upper gastrointestinal bleeding were recruited to the study. Patients' demographic and clinical data, the amount of blood transfusion, endoscopy results, and Rockall scores were retrieved from patients' charts. The re-bleeding, morbidity, and mortality rates were noted after 3 years of follow-up with telephone. Re-bleeding rate was statistically significantly higher in Rockall 4 group compared to Rockall 0 group. Mortality rate was also statistically significantly higher in Rockall 4 group. Rockall risk scoring system is a valuable tool to predict re-bleeding and mortality rates for patients with upper gastrointestinal bleeding in long-term setting.

Keywords Rockall scoring system · Re-bleeding · Mortality · Upper gastrointestinal bleeding

Introduction

Upper gastrointestinal bleeding (UGIB) is a life-threatening condition and requires careful evaluation from the very first episode as an attempt to predict and reduce the risk of re-bleeding and death [1]. Several risk-scoring systems exist to

assess patients presenting with upper gastrointestinal hemorrhage.

The Rockall system has been shown to be an accurate and valid predictor of re-bleeding and death. Rockall scores are designed to combine information such as the patients' age, occurrence of shock assessed from systolic blood pressure records and pulse rate, presence and severity of comorbid conditions, and stigmata of hemorrhage [2, 3] (Table 1).

Results of the previous investigations and validations of the scoring system have highlighted that those with a score of ≤ 2 are associated with a very low rate of bleeding, recurrence, and death therefore can easily be managed as out-patients. This gives an opportunity to clinicians for a more appropriate management of patients based on their assessed risk of complications following the initial UGIB [4].

On the other hand, as far as we can find in the literature, no study is present to assess whether the Rockall scoring system is a predictor of ulcer-related re-bleeding among patients who have been discharged from the hospital after the first bleeding episode.

In our study, our aim was to evaluate the effectiveness of Rockall scoring system in long-term setting for the prediction of re-bleeding and mortality after an incidence of upper gastrointestinal bleeding.

Material and Method

The patients who were admitted to our clinic with UGIB between June 2009 and January 2011 were recruited into this retrospective study. The patients' demographic and clinical data including age, gender, endoscopy results, blood transfusion, Rockall scores, and mortality rate were retrieved from patients' files via the hospital information system of our institution.

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Table 1 Rockall scoring system

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

UGIT upper gastrointestinal tract, *IHD* ischemic heart disease, *MW* M-Weiss tear, *GI* gastrointestinal, *BP* blood pressure

Rockall risk scoring system was used to classify patients at admission. Patients with gastric tumors and patients who could not be reached during follow-up were excluded from the study.

Age, hemodynamics, and comorbidities are used in initial score and all parameters used for complete Rockall score (Table 1).

Patients with Rockall 0 score were discharged. Upper gastrointestinal endoscopy was performed for hemodynamically stable patients with Rockall score >0 within 12 h of admission and discharged. During endoscopy, actively bleeding ulcers were treated with sclerotherapy using 1/10 diluted adrenaline. In case of failure to achieve hemostasis, argon was used as a second line therapy to control bleeding. Emergency surgery was planned for hemodynamically unstable patients or in case of failure to control bleeding. Oral feeding was allowed 24 h after successful sclerotherapy or argon application and just after endoscopy if no intervention was applied during endoscopy. Hemodynamically stable patients who had well-tolerated oral feeding were discharged from the hospital with medical therapy for ulcer.

Repeat endoscopy was needed in case of hemodynamic instability or >1 point decrease in hemoglobin levels. The patients were followed up for another 24 h. The patients who had not been operated were followed up to 3 years for re-bleeding and related mortality. Patients were followed at 6 monthly intervals by telephone. After 3 years of follow-up, patients with recurrent bleeding and mortality were re-evaluated for outcomes. The time interval between initial bleeding and re-bleeding or death of the patients was noted.

For statistical analysis, Welch one-way ANOVA and post hoc analyses were used.

Results

Three hundred twenty-one patients were admitted in our clinic with upper gastrointestinal bleeding between June 2009 and

January 2011. Ten patients with gastric cancer, 18 patients with variceal bleeding, and 31 patients who could not be reached for follow-up were excluded from the study. The mean age of 262 patients who were recruited in the study was 55.4 years.

One hundred ninety-five (75 %) of patients were male and 67 (25 %) of them were female. Ninety-five percent of the patients were bleeding for the first time. All patients were evaluated by endoscopy.

Initial Rockall scores of the patients were as follows: 0 for 54 (20.6 %) patients, 1 for 44 (14.7 %) patients, 2 for 60 (22.9 %) patients, 3 for 50 (19 %) patients, 4 for 36 (13.7 %) patients, and 5 for 18 (6 %) patients (Table 2).

Complete Rockall scores of the patients were as follows: 0 for 50 (19 %) patients, 1 for 38 (14.5 %) patients, 2 for 59 (22.5 %) patients, 3 for 46 (17.5 %) patients, 4 for 31 (11.8 %), 5 for 18 (6 %) patients, and >5 for 20 (7.8 %) patients (Table 3).

Patients who had active bleeding underwent sclerotherapy (32 cases) or sclerotherapy + argon (six cases) treatment. Six of these patients were re-evaluated with endoscopy because of the decrease in hemoglobin levels and their bleeding ceased. Two cases in argon treatment group also had re-bleeding, and a second endoscopic intervention for sclerotherapy was necessitated to provide hemostasis. All the patients who needed a second intervention to control bleeding were discharged from

Table 2 Rockall score, patient number, gender, and age

Rockall score (initial)	Patient number	Male/female	Age
0	54	47/7 (87%/13%)	40.25
1	44	37/7 (84%/16%)	43.41
2	60	44/16 (73%/26%)	55.49
3	50	34/16 (68%/32%)	64.42
4	36	23/13 (64%/36%)	72.66
5	18	10/8 (55%/44%)	70.07
Total	262	67/195 (25%/75%)	55.38

Table 3 Patients with complete Rockall score

Rockall score (complete)	Patient number	Male/female
0	50	44/6 (88%/12%)
1	38	33/5 (86%/14%)
2	59	44/15 (74%/26%)
3	46	34/12 (64%/36%)
4	31	20/11 (64%/36%)
5	18	10/8 (55%/44%)
>5	20	11/9 (55%/45%)
Total	262	196/66 (75%/25%)

the hospital. Two of these patients had bleeding in the follow-up period.

Re-bleeding rate was 1.9 % (one patient) for the Rockall score 0; 2 % (one patient) for the Rockall score 1; 5 % (three patients) for the Rockall score 2; 16 % (eight patients) for the Rockall score 3; 22.7 % (eight patients) for the Rockall score 4, and 16.7 % (three patients) for the Rockall score 5 (Table 4). Patients with Rockall score 4 had a statistically significant re-bleeding rate compared to Rockall scores 0 and 1. Re-bleeding occurred within the first month in six patients. Seven patients had re-bleeding between 1 month and 1 year, six of them in the second year, and five of them in the third year.

Mortality rate for the groups was as follows: 0 % (0 patients) for the Rockall score 0; 4.5 % (two patients) for the Rockall score 1; 10.0 % (six patients) for the Rockall score 2; 6.0 % (three patients) for the Rockall score 3; 19.5 % (seven patients) for the Rockall score 4, and 22.2 % (four patients) for the Rockall score 5 (Table 4). Mortality rate was higher in patients with a score of 4 and 5 than the others, and the difference was statistically significant. Seven patients died in the first year, eight patients in the second year, and seven patients in the third year.

Table 4 Rockall score, re-bleeding, and mortality rate

Rockall score	Patient number	Re-bleeding	Mortality
0	54	1 (1.9%)	0 (0%)
1	44	1 (2.3%)	2 (4.5%)
2	60	3 (5%)	6 (10%)
3	50	8 (16%)	3 (6%)
4	36	8 (22.7%)	7 (19%)
5	18	3 (16.7%)	4 (22%)
Total	262	24 (9.2%)	22 (8.4%)

Patients with Rockall score 4 had a significant difference ratio than 0 and 1 for re-bleeding

Mortality ratio is higher in 4 and 5 than the others

Discussion

The management of acute UGIB has significantly progressed since the introduction of emergency endoscopy and modern endoscopic techniques for hemostasis. Peptic ulcer is the cause of acute UGIB in 20–50 % of patients [5, 6]. In most of the patients admitted to hospital, bleeding stops spontaneously without the need for any treatment besides the hemodynamic support. However, up to 20 % of patients continue to bleed or re-bleed and require further intervention. Further re-bleeding has been consistently described as the most important risk factor for mortality and affects the UGIB patients' outcome [7, 8].

Scoring systems are helpful to stratify the patients who would benefit from early surgical intervention and who need early endoscopic therapy [9]. But some of these scoring systems are not helpful for the presence of re-bleeding [2, 3]. Scoring systems are also necessary to decide which patients need aggressive early surgical intervention.

Advanced age is an obvious risk factor for death and is included in Rockall risk scoring systems for UGIB. In the present study, there is a difference between Rockall score 0, Rockall score 1, and the others. Although age was not found to be an independent risk factor for re-bleeding in the previous studies, our study revealed opposing results [8].

Dicu et al. [10] showed that Rockall score can successfully stratify patients with UGIB into high- and low-risk categories for mortality and is the most useful tool in identifying patients who need intensive care to improve their outcome. The results of the present study are similar with the previous one as patients with Rockall score 4 or 5 had significantly higher mortality and re-bleeding rates than the others.

Rockall scoring system is found to be correlated with mortality rate in the previous studies. In a study from the UK, 11 of 112 patients died, and all these patients had Rockall score 5 [11]. In our study, mortality occurred in five patients. Mortality rate was significantly higher in patients with Rockall scores 4 and 5.

Another significant superiority of the Rockall scoring system is about the need for transfusion [12]. But in our study, there are no statistical differences in groups for transfusion, and hemoglobin was not found to be an independent predictor of mortality.

Endoscopy is the cornerstone in the diagnosis and management of patients with acute UGIB, and accurate pre-endoscopic risk stratification of patients is of critical importance. The main purpose to use the Rockall score is to identify low-risk patients for hospitalization or early discharge. Therefore, our findings promote that low-risk patients could be discharged without endoscopic evaluation.

Although Rockall score predicted mortality and the complete Rockall score correlated with re-bleeding rates in 24 patients with peptic ulcers, there are limitations about variceal hemorrhage [12].

Our study reveals that the patients with Rockall 0 score can be discharged for elective evaluation, and the patients with high Rockall scores have higher risk of mortality and re-bleeding.

In conclusion, Rockall risk scoring system is valuable to predict re-bleeding and mortality rates for patients with upper gastrointestinal bleeding.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no competing interests.

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