

Validity Of Rockall Scoring System In Determining In-Hospital Rebleeding Among Cirrhotic Patients With Acute Esophageal/Gastric Variceal Hemorrhage Using Endoscopy As Gold Standard

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Abstract

The rate of rebleeding of esophageal varices remains high after cessation of acute esophageal variceal hemorrhage. Rockall scoring system primarily developed for patients with non variceal source of bleeding. **Objective:** To determine the validity of Rockall scoring system in determining in-hospital re-bleeding among cirrhotic patients with acute esophageal/gastric variceal haemorrhage using endoscopy as gold standard. The study was conducted in Allied hospital and Liver Centre Allied/DHQ Hospitals, Faisalabad. **Study Period:** Study was carried out from 28-06-2010 to 27-12-2010. **Patients and Methods:** Total 176 cases were include in this study. The subjects were scored using Rockall scoring system and placed under

observation for re-bleed in 10 days. **Results:** The mean age of patients was 50.99 ± 12.47 years. Out of 87 positive cases on Rockall score, 82 cases were true positive. Out of 89 cases, that were negative, 81 were true negative. Sensitivity, Specificity and diagnostic accuracy of Rockall score was found to be 91.1%, 94.1% and 92.6%, respectively. Positive predictive value (PPV) of Rockall score was 94.2% and negative predictive values (NPV) was 90.0%. **Conclusion:** The risk scoring system developed by Rockall and coworkers is a clinically useful scoring system among cirrhotic patients with acute esophageal/gastric variceal haemorrhage. **Key Words:** Esophageal varices, Cirrhosis, Rockall scoring system, Bleeding.

INTRODUCTION

Cirrhosis of liver mostly caused by chronic viral hepatitis is one of the common clinical conditions leading to morbidity and mortality in our population. Approximately 50% to 60% of patients with cirrhosis have esophageal varices, and around 30% of patients with varices develop serious bleeding from the varices within 2 years of diagnosis¹. Despite substantial improvements in the early diagnosis and treatment of variceal hemorrhage, variceal bleeding has a very high early mortality rate of up to 30% and up to 47%-74% of patients will have recurrent bleeding^{2,3}. The reported mortality from first episode of variceal bleeding in western studies ranges from 17% to 57%, as compared to 5-10% mortality reported in our population⁴. Pharmacological therapy, endoscopic intervention and other modalities like balloon tamponade, and radiological and surgical treatment for difficult cases

are used to stop variceal bleed and to prevent recurrence⁵. Although overall survival has improved in recent years, mortality is still closely related to control of hemorrhage or early re-bleeding, which occurs in as many as 40% of patients within first 5 days after initial bleeding episode⁶. Thus the main goal of management is to identify patients at high risk for an adverse outcome on the basis of clinical, laboratory, and endoscopic variables. Scoring system based on these variables is needed to identify patients who are at risk of re-bleed^{7,8}. Rockall scoring system primarily developed for patients with non variceal source of bleeding and later on applied to variceal bleeding, is found to be effective for predicting re-bleeding and death. The scoring system is based on three clinical variables (age, shock and co-morbidity) and two endoscopic variables (diagnosis and major stigmata of

recent hemorrhage, each characterized and scored with 0-3 points, to give maximum score of 11 points as shown in table⁷ A total score of < 2 predicts a low risk of re-bleeding and mortality. High score (> 8) predicts high risk of re-bleeding and mortality.⁸ Endoscopy is the gold standard for evaluation of esophageal/gastric varices¹¹. The aim of this study was to evaluate the usefulness of Rockall scoring system for stratification of patients with esophageal/gastric varices into high and low risk categories for re-bleed during their hospital stay so that it could also be used to select low risk patients for early discharge and outpatient management.

MATERIAL AND METHODS

Study Design

Cross Sectional Validation Study

Setting

Medical Units and Liver Centre Allied/DHQ Hospitals, Faisalabad

Duration of Study

Study was carried out over a period of six months from 28-06-2010 to 27-12-2010.

Sample Size

Sample size was 176 cases

Sensitivity and specificity of Rockall score for the detection of rebleed i.e. 91% 9 and 41.1 [9].

Prevalence of Rebleed: 47% [2, 3]

Desired Precision: 6%

Confidence Level: 95%

Sampling Technique

Non-probability/ consecutive Sampling sample selection

Sample Selection

INCLUSION CRITERIA

1. Age: Patients above the age of 18 years
2. Gender: Either (Male and female)
3. Cirrhotic patients presenting with upper GI bleeding as per operational definition confirmed by endoscopy to have esophageal/gastric variceal source of bleeding.

EXCLUSION CRITERIA

1. Cirrhotic patients with non-variceal upper GI bleed on endoscopy.
2. Patients with bleeding disorders that are confirmed by history, clinical examination and low platelet counts, deranged PT and APTT.

DATA COLLECTION

Approval for conduct of study was taken from hospital ethical committee. The indoor patients with variceal bleed those fulfilling the inclusion criteria were recruited for the study. Patients were treated with pharmacologic therapy i.e. oteriotide, terlipressin and blood transfusions if needed. Patients were treated with band ligation and/or injection sclerotherapy as needed. Informed consent was taken from the patients. In case, patient is not capable of giving an informed consent, consent was taken from attending guardian. The subjects were scored using Rockall scoring system by the investigator and placed under observation for re-bleed for 10 days. In case of re-bleed the subjects were treated with pharmacologic therapy i.e. oteriotide, terlipressin, blood transfusions and band ligation and/or injection sclerotherapy as needed. Endoscopy was done at the earliest after resuscitation and haemodynamic stability achieved (within 24 hours) by a consultant endoscopist of our concerned unit. All information was recorded before the discharge of patients using a structured questionnaire (proforma attached).

DATA ANALYSIS

Data was entered and analyzed using SPSS 10.0. Descriptive statistic was calculated for all variables. Quantitative variables of the study like age was expressed as Mean±SD. The sex, findings of ultrasonography and endoscopy findings, rebleed Rockall score were qualitative variables and presented as frequency and percentage. Validity was assessed by calculating sensitivity, specificity, positive and negative predictive values using 2 X 2 tables.

| | Positive | Negative | |
|----------|--------------------|--------------------|---------------------------|
| Positive | True Positive (a) | False Positive (b) | Positive predictive value |
| Negative | False Negative (c) | True Negative (d) | Negative predictive value |
| | ↓ Sensitivity | ↓ Specificity | |

$$\text{Sensitivity} = a / a + c \times 100$$

$$\text{Specificity} = d / b + d \times 100$$

$$\text{Positive Predictive Value} = a / a + b \times 100$$

$$\text{Negative Predictive Value} = d / c + d \times 100$$

RESULTS

A sample of 176 patients was collected from Medical Units and Liver Centre Allied/DHQ Hospitals, Faisalabad, during the study period of six months. The mean age of patients was 50.99±12.47 years. 43 patients (24.4%) were in age range of 20-40 years, 105 patients (59.7%) were between age range of 41-60 years, 26 patients (14.8%) were 61-80 years while 2 patients (1.1%) were more than 80 years old (Table-1). Distribution of sex shows, 100 patients (56.9%) were male while remaining 76 patients (43.1%) were female (Table-2). Out of 87 positive cases on Rockall score, 82 cases were true positive. Out of 89 cases, that were negative, 81 were true negative (Table-3). Sensitivity, Specificity and diagnostic accuracy of Rockall score was found to be 91.1%, 94.1% and 92.6%, respectively (Table-4). Positive predictive value (PPV) of Rockall score was 94.2% and negative predictive values (NPV) was 90.0% (Table-5).

Table-1
Distribution of cases by age

| Age (Year) | Number | Percentage |
|----------------|--------------------|---------------|
| 20-40 | 43 | 24.4 |
| 41-60 | 105 | 59.7 |
| 61-80 | 26 | 14.8 |
| > 80 | 02 | 1.1 |
| Total | 176 | 100.00 |
| Mean±SD | 50.99±12.47 | |

Table-2
Distribution of cases by sex

| Sex | Number | Percentage |
|--------------|------------|---------------|
| Male | 100 | 56.9 |
| Female | 76 | 43.1 |
| Total | 176 | 100.00 |

Table-3
Comparison of Rockall score vs Endoscopy
n = 100

| Rockall score | Endoscopy (Gold Standard) | | Total |
|-----------------|------------------------------|----------|-------|
| | Positive | Negative | |
| Positive | 82 (TP) | 5 (FP) | 87 |
| Negative | 08 (FN) | 81 (TN) | 89 |
| Total | 90 | 86 | 176 |

Key:

TP = True positive
 FP = False positive
 FN = False negative
 TN = True negative

Table-4
Sensitivity, Specificity and diagnostic accuracy of Rockall score

| | |
|-----------------------|--|
| Sensitivity rate = | $\frac{\text{True Positive}}{\text{True Positive} + \text{False Negative}} \times 100 =$ |
| | $\frac{82}{82 + 8} \times 100 = 91.1\%$ |
| Specificity rate = | $\frac{\text{True Negative}}{\text{True Negative} + \text{False Positive}} \times 100 =$ |
| | $\frac{81}{81 + 5} \times 100 = 94.1\%$ |
| Diagnostic Accuracy = | $\frac{\text{True Positive} + \text{True Negative}}{\text{True Positive} + \text{True Negative} + \text{False Positive} + \text{False Negative}} \times 100 =$ |
| | $\frac{82 + 81}{82 + 81 + 5 + 8} \times 100 = 92.6\%$ |

Table-6
Positive predictive value and negative predictive value of Rockall score

| | |
|-----------------------|--|
| Predictive value of = | $\frac{\text{True Positive}}{\text{True Positive} + \text{False Positive}} \times 100 =$ |
| Positive test | $\frac{82}{82 + 5} \times 100 = 94.2\%$ |
| Predictive value of = | $\frac{\text{True Negative}}{\text{True Negative} + \text{False Negative}} \times 100 =$ |
| Negative test | $\frac{81}{81} \times 100 = 90.0\%$ |

DISCUSSION

The upper gastrointestinal haemorrhage remains a significant cause of hospital admission, with mortality rates up to 14%. In order to standardise and improve care, various scoring systems (e.g. Rockall, Blatchford and Baylor) have been developed to identify those individuals at high risk of requiring treatment (transfusion, endoscopic or surgical intervention) or of re-bleeding or death. There is also increasing interest in the utilisation of scoring systems to identify individuals at low risk of complications, as these may

be discharged early, possibly with outpatient endoscopy. Most scoring systems are developed to predict outcomes in non-variceal bleeding¹⁰. The Rockall coring system was developed from an analysis of data obtained from a large audit of patients who presented with upper-GI bleeding because of a wide range of causes, and only a minority of patients received endoscopic therapy. The current analysis was designed to determine in-hospital re-bleeding among cirrhotic patients with acute esophageal/gastric variceal haemorrhage using endoscopy as gold standard.

CONCLUSION

The risk scoring system developed by Rockall and coworkers is a clinically useful scoring system among cirrhotic patients with acute esophageal/gastric variceal haemorrhage. Rockall scoring system has good predictive and discriminative value for in-hospital rebleeding.

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