ACCURACY OF ROCKALL SCORE FOR IN HOSPITAL RE-BLEEDING AMONG CIRRHOTIC PATIENTS WITH VARICEAL BLEED

Samina Ali Asgher,[1] Muhammad Khurram Saleem,[2] Amina Hussain[3]

Abstract

Objective: To assess the diagnostic accuracy of Rockall scoring system for predicting in-hospital re-bleeding in cirrhotic patients presenting with variceal bleed.

Material and Methods: This descriptive case series study was conducted at Department of Medicine Combined Military Hospital Lahore from December 2013 to May 2014. We included patients with liver cirrhosis who presented with upper GI bleeding and showed varices as the cause of bleeding on endoscopy. Clinical and endoscopic features were noted to calculate Rockall score. Patients with score of ≤ 2 and ≥ 8 were included. After treating with appropriate pharmacological and endoscopic therapy, patients were followed for re-bleeding for 10 days. Diagnostic accuracy was assessed by calculating sensitivity, specificity, positive and negative predictive values using 2×2 tables.

Results: In the study, 175 patients were included. Mean age was 51.5 ± 1.22 years. Male to female ratio was 1.5 to 1. Out of 175 patients, 157 patients (89.7%) were of low risk group (score ≤ 2) while 18 patients (10.3%) were in high risk group (score ≥ 8). In low risk group, re-bleeding occurred only in 2 patients (1.2%) while in high risk group, re-bleeding occurred in 14 patients (78%). Rockall score was found to have good diagnostic accuracy with sensitivity of 87.5%, specificity of 97.48%, positive predictive value of 77.8% and negative predictive value of 98.7%.

Conclusion: In cases of variceal bleed, frequency of re-bleed is less in patients who are in low risk category with lower Rockall score and high in high risk patients with higher rockall score. The Rockall score has a good diagnostic accuracy in prediction of re-bleed in variceal bleeding.

Key Words: Upper Gastrointestinal (GI) Bleed, Rockall Score, Re-bleed in varices.

Asgher S.A.[1]
Assistant Professor of Medicine
CMH LHR Medical College, Combined Military Hospital, Lahore

Saleem M.K.[2]
Assistant Professor of Medicine
CMH LHR Medical College, Combined Military Hospital, Lahore

Hussain A.[3]
Associate Professor of Medicine
SIMS / Services Hospital, Lahore

Introduction

Cirrhosis of liver occurs as result of persistent and chronic hepatocellular damage ultimately leading to impaired hepatic function and failure. The number of deaths by this lethal disease is quite high after malignancy and trauma.[1] In Pakistan, the figure of patients with cirrhosis is quite high and unfortunately more

than 65% of the cases are due to chronic hepatitis B and C, both of which are preventable by standard community health services.[2]

Upper GI bleed in cirrhotic patients is a very common emergency worldwide and in Pakistan. Gastroesophageal varices are one of the major causes of upper GI bleeding in our population. These varices develop in 50% to 60% of cirrhotic patients and approximately 30% of them are known to experience an episode of variceal bleed within 2 years of diagnosis of the varices.[3]

The mortality rate within two weeks after an acute bleeding episode is 30% and recurrent hemorrhage occurs in 70% within 1 year (half within 6 weeks) and the mortality rate is 60% at 2 years.[4] The deaths caused by variceal bleeding in western studies ranges from 17% to 57% as compared to 5 – 10% mortality reported in our population.[5] The difference in mortality is due to different etiology of cirrhosis in our part of world as we have very few cases of alcoholic cirrhosis as compared to the western population.[6]

Pharmacologic therapy and endoscopic intervenetion are main treatment modalities used to stop variceal bleed and to prevent re-bleeding episodes.[4] Although survival of patients has improved in recent years,[7] mortality is still closely related to control of hemorrhage or early re-bleeding, which can occur in around 40% of patients within first 5 days after initial bleeding episode.[8]

The main goal of management is to identify patients at a high risk for re-bleeding and mortality on the basis of clinical, laboratory and endoscopic variables. A scoring system based on these variables is needed to identify patients at risk of re-bleed. Various scoring systems (e.g. Rockall, Blatchford and Baylor) have been developed to identify those individuals at high risk of re-bleeding or death.[9]

Rockall scoring system was primarily developed for patients with bleeding due to non variceal causes .Later on it was applied to variceal bleeding and was found to be effective for predicting re-bleeding and death.[10] The scoring system represents a simplified summary of the results of a logistic regression analysis and includes three clinical variables (age, shock, and co-morbidity)and two endoscopic variables(diagnosis and major stigmata of recent hemorrhage, each scored with 0 – 3 points, to give maximum score of 11 points as shown in Table I.A total score of 2 or less predicts a low risk of re-bleeding and mortality.[11]

The aim of our study was to assess the accuracy of Rockall scoring system for stratifying in hospital patients with esophageal varices into high and low risk categories for re-bleed so that it can also be used to select low risk patients for early discharge and outpatient management.

Materials and Methods

This descriptive case series was conducted in Medicine department Combined Military Hospital Lahore. Sample size of 175 patients was calculated with 8% margin of error, 95% level of confidence taking expected percentage of variceal bleed in cirrhotic patients and sensitivity and specificity of Rockall score for the prediction of re-bleed i.e. 91% and 40.8%.Non probability purposive sampling was used and the study lasted for six months.

Table 1: Rockall Score.[10,11]

Variable	Score 0	Score 1	Score 2	Score 3
Age	< 60	60 – 79	>80	
Shock	No shock	Pulse > 100 SBP > 100	SBP<100	
Co-morbidity	No major		CCF,IHD	Renal failure, Hepatic failure, Malignancy
Diagnosis	Mallory Weiss	All other diagnoses	GI Malignancy	
Evidence of bleeding	None		Blood, Adherent clot, Spurting vessel	

Operational Definitions

Score Risk

High Risk: a score ≥ 8 indicates a very high risk of re-bleeding.

Low Risk: a score ≤ 2 indicates very low risk of re-bleeding.

Re-bleeding

Re-bleeding was defined as a new episode of bleeding during hospitalization within 10 days manifesting as hematemesis, melena or hemodynamic instability after the initial bleeding was stopped.

True Positive

Cases with a Rockall score of ≥ 8 with re-bleed confirmed on endoscopy were true positive cases.

True Negative

Cases with Rockall score of ≤ 2 without re-bleed were true negative cases.

False Positive

Cases with a Rockall score of ≥ 8 without re-bleed were false positive cases.

False Negative

Cases with Rockall score of ≤ 2 with re-bleed were false negative cases.

Sample Selection

Inclusion Criteria

1. Age 20 – 85 years.
2. Either Sex.
3. All cirrhotic patients (due to chronic viral hepatitis) presenting with upper GI bleeding confirmed and evaluated by endoscopy to have variceal source of bleeding.

Exclusion Criteria

1. Cirrhotic patients in whom the cause of upper GI bleed on endoscopy was non variceal.
2. Patients with documented bleeding disorders
3. Patients having Rockall score in between 3-7 were excluded.

Data Collection Procedure

One hundred and seventy five (175) patients with variceal bleed fulfilling the inclusion criteria were included in this study. Patients were treated with pharmacologic therapy i.e. Octereotide, Terlipressin and blood transfusions (if needed). Patients were treated with band ligation and / or injection Sclero-therapy as per needed. Patients were scored using Rockall scoring system and those having sore of ≤ 2 and ≥ 8 were kept under observation for re-bleed for 10 days. In case of re-bleed, patients were managed accordingly. All data were collected using a structured Performa.

Data Analysis

Data were entered and analyzed using SPSS 18.0 version. The sex, findings of endoscopy, re-bleeds and Rockall score were the qualitative variables and were presented as percentage. Diagnostic accuracy was assessed by calculating sensitivity, specificity, positive and negative predictive values using 2 × 2 tables (Table 2).

Table 2:

Test Result	Diseased	Not Diseased
Test Positive	True Positives (A)	False Positives (B)
Test Negative	False Negatives(C)	True Negatives (D)

Results

In this study, 175 patients were enrolled in which 106 patients (60.6%) were males while 69 patients (39.4%) were females. Their mean age was 51.5 years with SD of 1.22. Out of these 175 patients, 114 patients (65.1%) had both hematemesis and melena, 27 (15.4%) had hematemesis only, 30 (17.1) had melena only while 4 patients (2.3%) presented with hematemesis and fresh per rectal bleeding.

The viral cause of cirrhosis was determined in all 175 patients. Chronic hepatitis C was responsible for cirrhosis in 115 patients (65.71%), 40 patients (22.85%) had chronic hepatitis B related cirrhosis while 20 patients (11.42%) had both viral markers.

Upper GI endoscopy was performed in all patients. Esophageal varices were source of bleeding in 156 patients (89.1%), gastric varices were present in 7 patients (4.0%) and both esophageal and gastric varices

were noted in 12 patients (6.9%). Therapeutic intervention was carried out as indicated depending on source of bleeding.

Observing the patients after initial control of bleeding revealed uneventful recovery and discharge in 159 patients (90.9%). Sixteen (16) patients (9.1%) had re-bleeding after the control of initial bleeding. Of these 16 patients, 5 patients had re-bleeding on 2nd day of control of initial bleeding episode,6 patients on 3rd day,3 patients on 4th day and 1 patient each on 5th and 7th day. Amongst these patients bleeding was successfully controlled by vasoactive and repeat endoscopic measures in all patients.

Rockall sore was calculated. Out of 175 patients, 157 patients (89.7%) were of low risk group (score ≤ 2) while 18 patients (10.3%) were in high risk group (score ≥ 8).

In low risk group, re-bleeding occurred only in 2 patients (1.2%). Remaining 155 patients (98.7%) had uneventful recovery and were discharged.

In high risk group, re-bleeding occurred in 14 patients (78%) while 4 patients (22%) had uneventful recovery.

It is pertinent to note lower re-bleeding rate (1.2%) in low risk group having score ≤ 2 and higher re-bleeding rate (78%) in high risk group having score ≥ 8.

Analysis of Rockall scoring system showed a good diagnostic accuracy for the risk groups included. Sensitivity of Rockall scoring system calculated is 87.5%, specificity is 97.48%, positive predictive value of Rockall score is 77.8% and negative predictive value is 98.7%.

This result shows that Rockall score is less sensitive and more specific for prediction of re-bleed in variceal bleed.

Discussion

Upper gastrointestinal bleed is one of the very common emergencies throughout the world. Of these, variceal bleeding is the commonest cause in cirrhotic patients. Although with modern treatment variceal bleeding has been successfully controlled, still re-bleed and mortality is a common issue in these patients.

A need of dividing patients into low risk and high risk cases for re-bleed is there so that monitoring should be done in high and intermediate risk cases for re-bleed and intimate strategy for control of it should be made. On the other hand, low risk cases can safely be discharged early.

Several scoring systems have been made to predict re-bleed and mortality in patients of upper GI bleed. These were primarily developed and are being used for non variceal bleed mainly. Rockall scoring system was also developed primarily for non variceal bleed in 1996.[10]

It was later validated by multiple large trials and was found to be useful in predicting re-bleeding and mortality. Veenburg et al,[12] found it to be good for pre-

Table 4: Relation of Rockall Score and in Hospital Re-bleeding.

		In Hospital Re-bleeding within 10 Days		Total
		Yes	No	
Rockall Score	Rockall Score 8 or More	14 (A)	4 (B)	18
		87.5%	2.5%	10.3%
	Rockall Score 2 or Less	2 (C)	155 (D)	157
		12.5%	97.5%	89.7%
Total		16	159	175
		100.0%	100.0%	100.0%

Sensitivity = A / A + C * 100 = 14/ 16 * 100 = 87.5%
Specificity = D / B+ D * 100 = 155 / 159 * 100 = 97.48%
Positive predictive value = A / A + B * 100 = 14 / 18 * 100 = 77.8%
Negative predictive value = D / C + D* 100 = 155 / 157 * 100 = 98.7%

dicting mortality but not good for prediction of re-bleed. Similar conclusion was drawn by Church et al,[13] and Bessa et al.[8]

Rockall scoring system is being increasingly used in patients with cirrhosis and upper GI bleed Study of Sander et al,[14] was first to conclude that Rockall score can be used to predict re-bleed in patients with portal hypertensive bleed (P value < 0.0005). Lee et al,[15] compared Rockall score with Model for End Liver Disease (MELD) score and Child Pugh (CP) score in patients with variceal bleed and found it to be better for predicting mortality. In a study conducted by Thomas et al,[16] sensitivity and specificity of Rockall score for low risk score (≤ 2) were 93% and 40.8% respectively and for high risk score (≥ 8) were 91% and 41.1% respectively.

In a local study by Sarwar et al,[3] Rockall score showed very good predictive value for re-bleeding and mortality. Comparison of Rockall score was done with CP and MELD scores and it showed better diagnostic accuracy of Rockall for prediction of rebleed. Area under the receiver operating characteristic (AUROC) curve for predicting re-bleeding in this study was 0.49 for MELD score, 0.52 for CP score and 0.803 for Rockall score.[17] In a similar study conducted by Lyles et al,[18] AUROC curve was 0.70 (95% confidence interval, 0.64 – 0.76 and the comparison of the University of Texas Southwestern model to the Rockall model revealed P < 0.0001). A study conducted by Chandra[19] et al, also showed similar results where AUROC curve was 0.72.

In our study, low risk groups having score of ≤ 2 showed a very low percentage of re-bleeding (1.2%) within 10 days of observation and the high risk group having score of ≥ 8 showed a high percentage of re-bleeding (78%). This shows that prediction of re-bleeding with Rockall score correlates well with actual re-bleeding in variceal bleeding in current study. These results almost correlate with local study above mentioned showing a good diagnostic accuracy of Rockall score for variceal bleeding, values rather better than original Rockall score for prediction of re-bleeding in non variceal bleeding.

Overall re-bleeding in current study is much less than the primary Rockall population under study. Re-bleeding in our patients was 9.1% as compared to about 40% in western literature.[11] It is due to difference in etiology of disease resulting in different outcome. Alcoholic liver disease is responsible for 21% of cases of cirrhosis in United States.[20] Contrary to this; viral hepatitis is responsible for majority of cases with cirr-

hosis in our population with very few cases of alcoholic liver disease.[6,22] Alcoholic liver disease has aggressive natural history resulting in early development of complications and higher mortality in western population.[21]

As portal hypertension is the leading cause of upper GI bleed in our population, use of Rockall score to assess the risk status of patients being admitted with portal hypertensive bleed will enable us to focus on patients at high risk of re-bleeding at the same time, avoiding undue hospital admissions and costly vasoactive drugs in patients with low risk. Further studies on effectiveness of this score in cirrhosis with longer follow up can also help us in developing strategies for secondary prophylaxis of GI bleed.

Conclusion

Percentage of re-bleed is less in patients who were in low risk category with lower Rockall score and high in high risk i.e. patients with higher Rockall score. It can be presumed that Rockall score has a good diagnostic accuracy in prediction of re-bleed in variceal bleeding.

References

1. Mashud I, Khan H, Khattak AM. Relative frequency of Hepatitis B and C viruses in patients with Hepatic Cirrhosis at DHQ Teaching Hospital DI Khan. J Ayub Med Coll Abottabad, 2004; 16: 32-4.
2. Saab S, Nguyen S, Ibrahim A, Vierling JM, Tong MJ. Management of patients with cirrhosis in Southern California: results of a practitioner survey. J Clin Gastroenterol. 2006; 40: 156-6.
3. Sarwar S, Dilshad A, Ahmad A, Alam A, Butt AK, Tariq S, et al. Predictive value of Rockall score for re-bleeding and mortality in patients with variceal bleeding. J Coll Physicians Surg Pak. 2007; 17: 253-6.
4. Tierney LM, McPhee SJ, Papadakis MA. Current medical diagnosis and treatment. United States of America: McGraw Hill Companies, 2005; 555-6.
5. Farooqi RJ, Farooqi JI, Rehman M, Ahmad H, Ahmed F, Gul S. Outcome after injection sclerotherapy for esophageal variceal bleeding in patients with liver cirrhosis and COPD. J Posgrad Med Inst. 2005; 19: 76-80.
6. Ullah F, Khan S, Afridi AK, Rahman SU. Frequency of different causes of cirrhosis liver in local population. Gomal J Med Sci. 2012; 10: 178-81.
7. Chalasani N, Kahi C, Francois F, Pinto A, Marathe A, Bini EJ, et al. Improved patient survival after acute variceal bleeding:a multicenter cohort study. Am J Gasteroenterol. 2003; 98: 653-9.

8. Bessa X, O'Callaghan E, Balleste B, Nieto M, Seoane A, Panades A. et al. Applicability of Rockall score in patients undergoing endoscopic therapy for upper gastrointestinal. Dig Liver Dis. 2006; 38: 12-7.

9. Atkinson RJ, Hurlstone DP. Usefulness of prognostic indices in upper gastrointestinal bleeding. Best Pract Res Clin Gastroenterol. 2008; 22 (2): 233-42.

10. Barkun A, Sabbah S, Enns R; et al. RUGBE Investigators. The Canadian Registry on Nonvariceal Upper Gastrointestinal Bleeding and Endoscopy (RUGBE): endoscopic hemostasis and proton pump inhibition are associated with improved outcomes in a real – life setting. Am J Gastroenterol. 2004; 99: 1238-46.

11. Rockall TA, Logan RF, Devin HB, Northfield TC. Risk assesmtent after acute upper gastrointestinal haemorrhage. Gut. 1996; 38: 316-21.

12. Veenburg EM, Terwee CB, Snel P, Rauws EA, Bartelsman JF, Meulen JH, et al. Validation of Rockall risk scoring system in upper gastrointestinal bleeding. Gut. 1999; 44: 331—5.

13. Church NI, Dallal HJ Masson J, Mowat NA, Johnson DA, Radin E, et al. Validity of Rockall scoring system after endoscopic therapy for bleeding peptic ulcer: a prospective cohort study. gastrointstinal Endos. 2006; 63: 606-12.

14. Sanders DS, Carter MJ, Goodchap RJ, Cross SS, Gleeson DC, Lobo AJ. Prospective validation of the Rockall risk scoring system for upper GI hemorrhage in subgroups of patients with varices and peptic ulcers. Am J Gastroenterol. 2002; 97: 630--5.

15. Lee JY, Lee JH, Kim SJ, Choi DR, Kim KH, Kim YB, et al. Comparision of predictive factors related to mortality and rebleeding caused by variceal bleeding:Child Pugh score, MELD score and Rockall score. Taeban Khan Hakhoe Chi. 2002; 8: 458-64.

16. Thomas F, Jason A, Lynn P, Cynthia M, Jill C, Susan M; et al. Predicting poor outcome from acute upper gastrointestinal hemorrhage. Arch Intern. Med. 2007; 167: 1291-6.

17. Sarwar S, Khan AA, Tarique S. Comparison of MELD, Child Pugh score and Rockall score for predicting rebleeding and in-hospital mortality in patients of variceal bleeding. J Coll Physicians Surg Pak. 2008; 18: 524–525.

18. Lyles T, Elliot A, Rockey DC. A risk scoring system to predict in-hospital mortality in patients with cirrhosis presenting with upper gastrointestinal bleeding. Clin Gastroenterol. 2014; 48 (8): 712-720.

19. Chandra S, Hess EP, Agarwal D, Nestler DM, Montori VM. External validation of Glasgow – Blatchford bleeding score and the Rockall score in US setting. Am J Emer Med. 2012; 30 (5): 673-9.

20. William R. Global challenges in liver disease. Hepatology, 2006; 44: 521-6.

21. Kobayashi M, Ikeda K, Hosaka T, Sezaki H, Someya T, Akuta N, et al. Natural history of compensated cirrhosis in the Child Pugh class.a compared between 490 patients with hepatitis C and 167 with B virus infections. J Med Virol. 2006; 78: 459-65.

22. Khan P, Ahmad A, Muhammad N, khan TM, Ahmad B. Screening of 110 cirrhotic patients for hepatitis B and C at Saidu Teaching Hospital Saidu Sharif Swat.J Ayub Med Coll Abbottabad, 2009; 21: 119-21.