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Original Research Article

BLEED: a classification tool to predict outcomes in patients with upper and lower gastrointestinal hemorrhage

Suresh Huchchannavar, Girish Puttannavar*, Narayanchandra I. Hebsur

Department of General Surgery, Karnataka Institute of Medical Sciences, Hubballi, Karnataka, India

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***Correspondence:**
Dr. Girish Puttannavar,
E-mail: girishputtannavar@gmail.com

ABSTRACT

Background: Acute gastrointestinal (GI) haemorrhage is a common clinical problem with diverse manifestations. Such bleeding may range from trivial to massive and can originate from virtually any region of the GI tract, including the pancreas, liver, and biliary tree. Several risk scoring systems have also been proposed to classify patients into high and low risk groups for complications, like re-bleeding or mortality, based on multivariate analyses. Kollef and colleagues identified the BLEED criteria: (a) ongoing Bleeding, (b) Low systolic blood pressure (BP), (c) Elevated prothrombin time (PT), (d) Erratic mental status, and (e) unstable comorbid Disease as risk factors for complication of GIH at any time during hospitalization after an initial 24 hours of stabilization. The objective of this study was to predict outcome according to a risk stratification BLEED criterion, independent of endoscopic findings.
Methods: We studied all patients who presented with acute gastrointestinal bleeding to emergency department. patients with epistaxis, paranasal sinuses bleed, upper GI bleed secondary to endoscopic procedure, patients with chronic Anemia and those patients which admitted with Primary diagnosis other than UGIB were excluded. Patients meeting the BLEED criteria at their initial assessment were classified as high risk (66) and all others were categorized as low-risk (10). In-hospital complications were defined as recurrent UGIB, surgery to control the source of hemorrhage, hospital mortality, length of hospital stay and units of blood transfused.
Results: There were 76 patients, with mean age of 46.37 years, 56 patients (73.3%) were case of Upper gastrointestinal bleeding, 20 patients (26.7%) were case of lower gastrointestinal bleeding. 66 (86.84%) of patients were categorized as high-risk patients and 10(13.2%) of patients were categorized as low risk patients. 14(21.1%) of patients were admitted in ICU ,13 Patients had undergone surgery (17.10%), 1 (1.5%) of patient had Re bleeding, nine (13%) had died. Stastical analysis showed significant association between components like low SBP (P=0.008), elevated prothrombin time (P=0.04), erratic mental status(P=0.001) and in hospital complications. All nine deaths were found in high risk group.
Conclusions: BLEED criteria can be used as triage tool for stratifying the patients of acute gastrointestinal haemorrhage into high risk and low risk category without endoscopic findings and useful in predicting outcome in such patients and plan the treatment accordingly.

Keywords: Gastrointestinal haemorrhage, Risk factors

INTRODUCTION

Acute gastrointestinal haemorrhage (GIH) can be life threatening in some patients, a large proportion of patients presenting with this condition to hospital are admitted and monitored in the intensive care unit (ICU). ICU admission of these patients can contribute to significant hospital costs. However, only 19% to 28% of patients with GIH experience complications that require ICU interventions.[1-4]

For the remaining patients, their initial episode of bleeding is self-limited and they are stabilized in the emergency department (ED). Consequently, costly and often scarce ICU resources are used for stable patients. Several studies have shown that there is a great deal of variation between hospitals in the proportion of patients with GIH who are managed in the ICU versus a regular medical or surgical floor.[2-5]

It is likely that availability of resources accounts for some of this practice variation, but it remains clear that most physicians are not confident about which patients presenting with GIH can be safely managed without ICU monitoring after stabilization in the ED.

Several risk scoring systems have also been proposed to classify patients into high and low risk groups for complications, like re-bleeding or mortality, based on multivariate analyses.[7,13]

These scoring systems can be used to select low risk patients for early discharge or outpatient treatment, and to select high risk patients for intensive care treatment, which improves efficiency of current therapy.[6] Unfortunately, the performance of most of these scoring systems has never been validated in a population of new patients.[6]

Development and implementation of a reliable method to identify patients with acute GIH who are at low risk for early complications would decrease ICU admissions in most hospitals and could improve overall care to critically ill patients by appropriate allocation of resources.[6]

Several investigators have sought to define clinical variables to identify patients with GIH who are at high risk for complication during hospitalization. The most effective approaches involve endoscopic assessments in the ED.[14-18] Immediate endoscopy, however, is not feasible in the ED in most hospitals. Many other approaches are specific for acute upper or acute lower GIH but the source of the bleed is not always known prior to endoscopy.[19-23]

One of the risk stratification systems for predicting the outcome of gastrointestinal (GI) bleeding has been introduced by Kollef et al, who identified five predictors of risk for in-hospital complications and suggested they could be used to triage patients with upper and patients with lower GI hemorrhage.

The five predictors represented by the acronym "BLEED": on-going bleeding, low blood pressure, elevated prothrombin time (PT), erratic mental status, and unstable co-morbid disease. They selected variables that are readily available at the time of triage, unlike most of the other risk classification systems, relying on the findings of endoscopy, which are seldom available at the time of admission.[7,8,24,25]

METHODS

This is study was conducted on patients presenting with history of acute gastrointestinal hemorrhage to casualty at our medical college hospital Karnataka Institute of Medical Sciences, Hubballi between October 2014 to August 2016. Patients were clinically assessed after taking proper history. Patients were subjected to investigations to arrive at a proper diagnosis.

Inclusion criteria

Patients with history of hematemesis or melena who presented to casualty.

Exclusion criteria

- Patients with upper respiratory bleed and Paranasal sinuses bleed
- Bleeding due to trauma caused during endoscopic procedure
- Patients with chronic anemia.

Patients admitted for primary cause other than GI bleed by other department and referred for evaluation of Hematemesis/Melena which patient has developed during course of hospital stay.

Statistical analysis

Chi-square test, student t-test, paired t-test, are used in Statistical analysis.

RESULTS

A study on use of BLEED Criteria to predict outcome in upper and lower gastrointestinal haemorrhage was done. Total seventy-six cases of Gastro intestinal haemorhage who presented to emergency department at Karnataka Institute of Medical Sciences Hubballi and those which full filled inclusion criteria were examined.

Table 1: Clinical outcome in study group.

Clinical outcome	Frequency	Percentage
ICU	14	18.4
Ward	62	81.6
Re-bleeding	1	1.3
Mortality	9	13

In this study, out of total 76 cases maximum number of cases were >60 years i.e 18 cases (23.68%) with mean age of 46.37. There were 56 males and 20 females with male to female ratio of 2.8:1.

Etiological analysis showed esophageal varices as commonest cause for upper GI bleed cases who presented to emergency, totally there were 37 cases of Esophageal varices constituting 66.5% of total study population. Haemorrhoids were the major cause for Lower GI bleed, total seven cases constituting 35% of total study population.

Table 2: Categorization of patients based on which component of BLEED criteria is present in them.

BLEED criteria	Frequency	Percentage
Fresh bleeding	64	84.2
Low Systolic BP	19	25.0
Elevated PT	21	27.6
Erratic mental status	11	14.5
Co-morbidities	29	38.2

Hematemesis was the most common presenting complaint present in 54 patients out of which 48 were fresh blood and 6 had altered blood in vomitus. Melena was second common presenting complaint out of which 24 patient had frank bleeding per rectum and 28 had altered blood.

Table 3: Percentage of patients in high risk and low risk group.

Studies	High risk	Low risk
Kollef et al	80 of 108 patients 74.07%	28of 108 patients 25.93%
Javadsalimi et al	71 of 101 patients 70.29%	30 of 101 patients 29.71%
This study	66 of 76 patients 86.84%	10 of 76 patients 13.16%

Table 4: Percentage patients developing in hospital complications in different studies.

Studies	Development of in hospital complication
Kollef et al[2]	45 of 108 patients (41.66%)
Salimi J et al[6]	43 of 101 patients (42.57%)
This study	40 of 76 patients (52.63%)

Table 5: Association of various factors with risk status based on BLEED criteria.

Characteristics	BLEED criteria		X^2, degrees of freedom	p value#
	Low risk N (%)	High risk N (%)		
Ongoing fresh bleed				
No	10 (100)	2 (3)	61.4, 1	<0.001*
Yes	0	64 (97)		
Low SBP (<100mm of Hg)				
No	10 (100)	47 (71.2)	3.83, 1	0.05*
Yes	0	19 (28.8)		
Elevated PT				
No	10 (100)	45 (68.2)	4.39, 1	0.03*
Yes	0	21 (31.8)		
Erratic mental status				
No	10 (100)	55 (83.3)	1.94, 1	0.16
Yes	0	11 (16.7)		
Associated co-morbidities				
No	10 (100)	37 (56.1)	7.10, 1	0.008*
Yes	0	29 (43.9)		

40 Patients out of total study population consumed alcohol and 9 patients were smokers

Eleven patients in study population presented with altered level of consciousness at the time of presentation to emergency department. Nineteen patients out of total 76 patients recorded Systolic blood pressure less than 100mmhg.

On digital rectal examination eighteen patients found to have bleeding per rectum (frank blood) twenty-four patients found to have passage of altered blood through rectum. Deranged LFT was found in 12 patients, deranged RFT was found in 14 patients, elevated prothrombin time was found in 21 patients.

Endoscopy was done after initial stabilization; twenty-five patients were found to have Oesophageal varices accounting for 32.9 % of endoscopic finding followed by Gastric ulcer which was finding in six patients accounting for 7.9% of endoscopic findings.

Oesophageal varices was common endoscopic finding with Grade III oesophageal varices being most frequent finding amongst other grades of oesophageal varices.

Most of the patients were managed conservatively, five patients underwent therapeutic endoscopy and four patients needed surgical intervention which was elective and not an emergency procedure.

Table 6: Association between BLEED criteria and complications.

Features	No Complications N (%)	Complications N (%)	X^2 value, df@	Odd's ratio (95% CI)	p value#
Ongoing fresh bleed					
No	6 (16.7)	6 (15)	0.04, 1	1.1 (0.3-3.8)	0.84
Yes	30 (83.3)	34 (85)			
Low SBP (<100mm of Hg)					
No	32 (88.9)	25 (62.5)	7.03, 1	4.8 (1.4-16)	0.008*
Yes	4 (11.1)	15 (37.5)			
Elevated PT					
No	30 (83.3)	25 (62.5)	4.11, 1	3 (1-8.8)	0.04*
Yes	6 (16.7)	15 (37.5)			
Erratic mental status					
No	36 (100)	29 (72.5)	11.5, 1	NA	0.001*
Yes	0	11 (27.5)			
Associated co-morbidities					
No	25 (69.4)	22 (55)	1.67, 1	1.8 (0.7-4.7)	0.19
Yes	11 (30.6)	18 (45)			

Table 7: Association between in hospital complications and BLEED criteria.

CRITERIA	Kollef et al[2] (P value)		Javadsalimi et al[9] (P value)	This study (P value)
	Jewish hospital	Branes hospital		
B (ongoig bleeding)	<0.001	0.008	0.001	0.84
L (low SBP)	0.002	0.003	0.02	0.008
E (elevated PT)	<0.001	0.895	0.02	0.04
E (erratic mental status)	<0.001	0.379	0.007	0.001
D (associated comorbidities)	0.026	0.015	0.71	0.19

Clinical outcomes like ICU admission, re-bleeding, length of hospital stay, units of blood transfused and mortality was analysed. Fourteen patients were admitted in ICU, one patient had rebleed, average length of hospital stay was 7.5 (mean value), average units of blood transfused was1.2 (mean value) and nine patients died. Later these values compared in high risk and low risk groups (Table 1).

In this study number of patients having any of the component of BLEED criteria were analysed and it was found that sixty-four (84.2%) patients had ongoing bleeding, nineteen (25.0%) patient had low systolic BP (<100), twenty-one (27.6%) patient had elevated Prothrombin time, eleven (14.5%) patient had altered mental status, twenty-nine (38.2%) patient had associated comorbidities (Table 2). Based on these observations sixty-six patients (86.8%) in this study were categorised into high risk group and remaining ten patients (13.2%) were categorized into low risk group. In high risk group 50 of 66 patients had upper gastrointestinal haemorrhage and 16 patients had lower gastrointestinal haemorrhage. In low risk group 6 of 10 patients had upper gastrointestinal haemorrhage and 4 patients had lower gastro intestinal haemorrhage.

Forty i,e 52.65% patients developed in hospital complications like re-bleeding, ICU admission, need for surgical intervention and mortality. Analysing clinical outcome showed 14 (18.4%) high risk group patients were admitted to ICU, one (1.3%) patient had re-bleeding and 8 (11.6%) patients in high risk group died.

DISCUSSION

These findings are compared with the results of other similar studies. Where in one of the studies conducted by Salimi J et al, showed total number of high risk patients

were 71 of 101, out of which 43 patients developed in hospital complications.[6]

In another study by Kollef et al there were total 80 patients in high risk group (80/108) out of which 43 patients developed in hospital complications (Table 3).

Comparing with other studies percentage of patients in high risk group were higher in our study (86.84%) compared to Salimi J et al (70.29%) and Kollef et al (74.07%).

Also, percentage of patients developing in hospital complication were more in our study (52.63%) compared to Salimi J et al study (42.57%) and Kollef et al study (41.66%).[6] But values were comparable and nearly correlating with other studies.

Length of hospital stay in high risk group was 8.5 days and number of units of blood transfused was 1.2 (mean) both variables more in high risk group compared to low risk group.

Stastical analysis (chi square test) showed significant p value while associating BLEED criteria component like Ongoing bleeding (P =<0.001), Low SBP (P=0.05), Elevated PT (P=0.03), Co morbidities(P=0.008) with risk status. There by indicating association between these components and risk status of patient (Table 4).

This result is compared with the result of other study by Kollef et al.[2]

In this study finding pertaining to associating risk status with BLEED criteria component had correlation with finding of Kollef et al study.

In this study association between clinical outcomes like re bleeding, any surgery done, ICU admission and mortality with risk status of the patient was done. One patient of high risk group had re bleeding. Three patients underwent surgery, fourteen high risk patients were admitted in ICU and eight patients had died.

Stastical analysis was done and p value was derived which showed no significant association between risk status and in hospital complications. Comparing our study with the study conducted by Kollef et al and Salimi J et al showed similar findings except for finding significant association between mortality and risk status of patient in Salimi J et al study.[6]

Even though significant p value was not derived pertaining to association between risk status of patient and mortality in our study this might be influenced by smaller sample size All the nine patients who died belonged to high risk group in our study there by indicating failure to derive significant p doesn't rule out association between these two factors in our study.

Comparison was made between number of patients admitted in ICU, length of hospital stay and units of blood transfused and their risk status, it was found that all patients admitted to ICU were belonged to high risk group, length of hospital stay and units of blood transfused in high risk group was 8.5 days and 1.26 (mean values) respectively.

In this study, there were totally forty patients which had in hospital complications analysis was done to look for association between in hospital complications and components of BLEED criteria. Analysis showed thirty-four patients with in hospital complications had ongoing bleeding (p=0.84), 15 patients had low systolic blood pressure (P=0.008), 15 had elevated PT (P=0.04), 11 had erratic mental status (P=0.001) and 18 patients had associated comorbidities (0.19) (Table 6).

These observations showed association between complications and decreased Systolic blood pressure, elevated PT, erratic mental status with significant p value. These findings had correlation with the findings in study by Kollef et al and Salimi J et al except for ongoing bleeding which didn't had association in this study with in hospital complications but had association in study by Kollef et al and Salimi J et al study (Table 7).[6]

Association between ongoing bleeding and in hospital complication was also significant in study by Salami J et al with p value of 0.001.[6]

CONCLUSION

In this study, applied BLEED criteria for predicting outcome in cases of Acute GI haemorrhage who presented to emergency department. This study and result suggested that risk stratification using BLEED criteria applied at the time of triage can be used to predict outcome of patient hospitalized with Acute gastrointestinal haemorrhage

Such triage system could be utilized to decrease unnecessary use of ICU services and reduce medical treatment cost. Although clinical prediction tool is not meant to replace clinical judgment, these tool may be valuable in assisting clinicians in their patient management decision.

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