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# Comparison of non-endoscopic scores for the prediction of outcomes in patients of upper gastrointestinal bleed in an emergency of a tertiary care referral hospital: a prospective cohort study

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**ABSTRACT – Background** – Traditionally peptic ulcer disease was the most common cause of upper gastrointestinal (UGI) bleed but with the changing epidemiology; other etiologies of UGI bleed are emerging. Many scores have been described for predicting outcomes and the need for intervention in UGI bleed but prospective comparison among them is scarce. **Objective** – This study was planned to determine the etiological pattern of UGI bleed and to compare Glasgow Blatchford score, Pre-Endoscopy Rockall score, AIMS65, and Modified Early Warning Score (MEWS) as predictors of outcome. **Methods** – In this prospective cohort study 268 patients of UGI bleed were enrolled and followed up for 8 weeks. Glasgow Blatchford score, Endoscopy Rockall score, AIMS65, and MEWS were calculated for each patient, and the area under the receiver operating characteristic (AUC-ROC) curve for each score was compared. **Results** – The most common etiology for UGI bleed were gastroesophageal varices 150 (63.55%) followed by peptic ulcer disease 29 (12.28%) and mucosal erosive disease 27 (11.44%). Total 38 (15.26%) patients had re-bleed and 71 (28.5%) patients died. Overall, 126 (47%) patients required blood component transfusion, 25 (9.3%) patients required mechanical ventilation and 2 (0.74%) patients required surgical intervention. Glasgow Blatchford score was the best in predicting the need for transfusion (cut off – 10, AUC-ROC= 0.678). Whereas AIMS65 with a score of ≥2 was best in predicting re-bleed (AUC-ROC=0.626) and mortality (AUC-ROC=0.725). **Conclusion** – Gastrointestinal bleed was most commonly of variceal origin at our tertiary referral center in Northern India. AIMS65 was the best & simplest score with a score of ≥2 for predicting re-bleed and mortality.

**Keywords** – Upper gastrointestinal bleed; rebleed; mortality; Glasgow Blatchford score; pre- endoscopy Rockall score; AIMS65; Modified Early Warning Score.

## INTRODUCTION

Upper gastrointestinal (UGI) bleed is a common presentation in a medical emergency. UGI bleed is anatomically defined as any gastrointestinal (GI) bleed originating proximal to the ligament of Treitz[1].

Patients generally present with hematemesis or melena. Incidence and etiology vary from region to region and the level of the health care center, ranging from 48–160 cases per 100,000 adults per year[2]. India has a huge burden of UGI bleed with nearly 4.6% of hospital admissions due to UGI bleed[3]. The etiology of UGI bleed is generally divided into variceal and non-variceal in origin[4]. Non-variceal bleed includes peptic ulcer disease (PUD), erosive disease, esophagitis, Mallory Weiss tears, vascular malformation, and malignancies. Variceal bleed is generally due to esophageal varices but rarely can be due to gastric and even ectopic varices in the duodenum[5]. Most available data suggests PUD as the most common cause of UGI bleed in western countries and variceal bleed constitutes only a minor fraction[4]. Few studies have shown an increasing incidence of variceal bleed in recent times[6,7]. This rising trend may be due to increased alcohol consumption, the rise of chronic viral hepatitis B and C and non-alcoholic fatty liver disease (NAFLD) and non-alcoholic steatohepatitis (NASH) cases around the globe. The clinical severity of UGI bleed may vary from being insignificant to fatal. Mortality from UGI bleed varies from 2 to 26 % whereas 10–30% have re-bleed[2,8,9]. Many scoring systems have been used to identify high-risk and low-risk patients to predict outcomes and the need for intervention. The scoring systems which are widely used are Glasgow Blatchford Score (GBS), Pre-Endoscopy Rockall score (PRS), AIMS65, and Modified Early Warning Score (MEWS), formulated by using basic clinical data, blood investigations, and endoscopic parameters[10-12]. The higher score predicts the need for intensive care and intervention. But the utility of these scoring systems as a predictor of outcome is still controversial.

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## METHODS

Study design and study site: this prospective cohort study was conducted at the Postgraduate Institute of medical education and research (PGIMER), a tertiary care center in Chandigarh, Northern India. The study was conducted from December 2017 to December 2018 with the collaboration of the Department of Internal medicine, gastroenterology, and hepatology, after prior approval from the institutional Ethics Committee.

Screening and enrollment: the patients presenting with a history of UGI bleed at the emergency medical outpatients department were screened for enrollment in the study as per inclusion and exclusion criteria after getting informed consent.

### Inclusion and exclusion criteria

Irrespective of gender and with age of ≥18 years, all patients with UGI bleed were included in the study.

Patients with a lower GI bleed and not willing to give consent were excluded from the study.

### Management protocol

Patient presenting with hematemesis, melena or hematochezia were considered as having UGI bleed. A detailed history and clinical characteristics were noted down to rule out other causes such as hemoptysis or lower GI bleed. The study was community-based however the study population consisted more of referral patients than primary presentation as ours is a referral center. Once recruited, a blood sample was drawn for assessing baseline hemogram, coagulation profile, electrolytes, renal function, and liver functions. Ultrasonogram (USG) of the abdomen or Fibroscan was performed when required. Data was collected for each patient in a predesigned proforma. All patients were risk stratified by using the GBS, PRS, AIMS65 and MEWS. All patients were managed using standard emergency protocols. For the management-airway, breathing and circulation were given initial priority. A crystalloid infusion was given as and when required. Blood transfusion was given to maintain the target Hb of 7–9 g/dL or with signs of hemodynamic instability despite fluid resuscitation. All patients were subjected to UGI endoscopy within 12–24 hrs of presentation. All patients with non-variceal UGI bleed received endoscopic therapy according to the European Society of Gastrointestinal Endoscopy (ESGE) guideline 2015, which included the use of dual modalities (injection and mechanical) when feasible. Re-bleed was defined as significant UGI bleed anytime post endoscopy leading to repeat endoscopy, hemodynamic instability, a significant drop in hemoglobin (Hb), or requiring blood transfusions during the follow-up period. In case of a re-bleed, another attempt on endoscopic hemostasis was taken and in cases of failure, surgical intervention was advised. The patients were observed during the hospital course and were followed up to 8 weeks via phone call or OPD basis.

### Outcome assessment

The outcomes were assessed as etiology of UGI bleed, the incidence of re-bleed, need for surgical intervention, blood transfusion, mechanical ventilation, duration of hospital stays (>3 days was taken as a prolonged hospital stay), and mortality within 8 weeks. GBS, PRS, AIMS65, and MEWS were calculated for each patient, and the area under the receiver operating characteristic (AUC-ROC) curve for each score was compared. [Risk factors of each score given in supplementary TABLE 1–4].

**TABLE 1.** Baseline clinical profile of patients.

| Clinical feature (n=268) | Frequency (percentage) |
|---|---|
| Gender | |
| Male | 222 (82.8%) |
| Female | 46 (17.2%) |
| Age group in years | |
| 18–44 | 92 (34.33%) |
| 45–60 | 131 (48.88%) |
| >60 | 45 (16.79%) |
| Presentation | |
| Hematemesis | 127 (47.38%) |
| Melena | 80 (29.85%) |
| Hematemesis and melena | 61 (22.76%) |
| Associated symptoms | |
| Abdominal pain | 103 (38.4%) |
| Syncope | 81 (30.2%) |
| Respiratory difficulty | 50 (18.7%) |
| Altered sensorium | 53 (19.77%) |
| Bleeding from other sites | 13 (4.9%) |
| Comorbidity and risk factor | |
| Chronic liver disease | 172 (64.2%) |
| Diabetes mellitus | 38 (14.2%) |
| Hypertension | 32 (11.9%) |
| Chronic hepatitis C or anti-HCV positive | 19 (7.1%) |
| Long-term NSAID intake | 9 (3.4%) |
| Antiplatelet intake | 9 (3.4%) |
| Cardiovascular disease | 8 (3.0%) |
| Malignancy | 6 (2.2%) |
| Chronic renal disease | 5 (1.9%) |
| Chronic hepatitis B | 3 (1.1%) |
| Cerebrovascular disease | 3 (1.1%) |
| Chronic respiratory illness | 3 (1.1%) |
| HIV positive status | 2 (0.7%) |
| Anticoagulant intake | 1 (0.4%) |
| Clinical findings | |
| Tachycardia (pulse rate ≥100) | 147 (54.85%) |
| Hypotension (systolic BP ≤90) | 88 (32.8%) |
| Hypoxia (SpO2 ≤90) | 28 (10.4%) |
| Pallor | 202 (75.4%) |
| Icterus | 82 (30.6%) |
| Pedal edema | 95 (35.4%) |

NSAID: nonsteroidal anti-inflammatory drug.

**TABLE 2.** Endoscopic etiological distribution and frequency of therapeutic procedures done in study patients.

| Parameter | Frequency (percentage) | Parameter | Frequency (percentage) |
|---|---|---|---|
| Etiology – endoscopic diagnosis | (n=236) | Therapeutic procedure | (n=236) |
| Variceal bleeding (including gastroesophageal and esophageal variceal bleeds) | 150 (63.55%) | Endo-variceal ligation | 115 (48.72%) |
| Peptic ulcer disease, including esophageal, duodenal and gastric ulcer | 29 (12.28%) | Glue injection | 13 (5.50%) |
| Mucosal erosive disease, including esophagitis, gastritis, and duodenitis | 27 (11.44%) | Adrenaline injection | 7 (2.96%) |
| Mallory-Weiss tear | 6 (2.54%) | Hemostatic clip | 4 (1.69%) |
| Gastric antral vascular ectasia | 2 (0.84%) | Multimodal therapy | 7 (2.96%) |
| Diverticulum | 2 (0.84%) | None | 90 (38.13%) |
| Malignancy | 1 (0.42%) | | |
| Arteriovenous malformation | 1 (0.42%) | | |
| Esophageal Web | 1 (0.42%) | | |
| Corrosive ingestion | 1 (0.42%) | | |
| Normal UGI endoscopy | 16 (6.77%) | | |

UGI: upper gastrointestinal.

**TABLE 3.** Table showing AUROC curve, cut off value and sensitivity of all scores at the cut off value for predicting outcomes.

| Parameters | Score(S) | Area | 95%CI | | Cut off values | Sensitivity | Specificity |
|---|---|---|---|---|---|---|---|
| | | | Lower Bound | Upper Bound | | | |
| 8–week mortality | GBS | **0.670** | 0.597 | 0.744 | >10 | 77.5% | 48.3% |
| | PRS | **0.605** | 0.530 | 0.681 | >2 | 90.1% | 26% |
| | AIMS65 | **0.725** | 0.656 | 0.794 | >1 | 80.3% | 53.9% |
| | MEWS | 0.593 | 0.512 | 0.675 | >2 | 62.0% | 51.1% |
| Rebleeding | GBS | 0.552 | 0.462 | 0.642 | – | – | – |
| | PRS | 0.517 | 0.418 | 0.616 | – | – | – |
| | AIMS65 | **0.626** | 0.546 | 0.707 | >1 | 78.9% | 48.3% |
| | MEWS | 0.530 | 0.435 | 0.626 | – | – | – |
| >3 days of hospital stay | GBS | 0.553 | 0.448 | 0.659 | – | – | – |
| | PRS | 0.482 | 0.378 | 0.585 | – | – | – |
| | AIMS65 | 0.579 | 0.460 | 0.697 | – | – | – |
| | MEWS | 0.466 | 0.367 | 0.565 | – | – | – |
| Need for blood component transfusion | GBS | **0.678** | 0.612 | 0.743 | >9 | 80.7% | 46.9% |
| | PRS | 0.597 | 0.526 | 0.667 | – | – | – |
| | AIMS65 | **0.643** | 0.574 | 0.711 | >1 | 68.1% | 55.4% |
| | MEWS | 0.532 | 0.460 | 0.604 | – | – | – |
| Need for mechanical ventilation | GBS | **0.746** | 0.656 | 0.837 | >11 | 86.4% | 51.1% |
| | PRS | **0.658** | 0.551 | 0.765 | >3 | 72.7% | 46.7% |
| | AIMS65 | **0.738** | 0.624 | 0.853 | >1 | 81.8% | 46.7% |
| | MEWS | **0.748** | 0.643 | 0.852 | >2 | 86.4% | 50.7% |
| Need for surgical intervention | GBS | **0.681** | 0.589 | 0.773 | >12 | 100% | 59.5% |
| | PRS | 0.451 | 0.061 | 0.842 | – | – | – |
| | AIMS65 | **0.914** | 0.810 | 1.000 | >2 | 100% | 75.5% |
| | MEWS | **0.753** | 0.677 | 0.829 | >3 | 100% | 68.4% |

GBS: Glasgow Blatchford Score; PRS: Pre- Endoscopy Rockall score; MEWS: Modified Early Warning Score; CI: confidence interval. AUC: >0.6 – **significant marked in bold**.

**TABLE** 4. Table showing comparison of AUROC cut off value and sensitivity of all scores at the cut off value for predicting outcomes in variceal and non-variceal bleed patients.

| Parameters | Scores | Variceal bleed | | | Non-variceal bleed | | |
|---|---|---|---|---|---|---|---|
| | | Area | 95%CI | | Area | 95%CI | |
| | | | Lower bound | Upper bound | | Lower bound | Upper bound |
| Blood transfusion | GBS | **0.611** | 0.517 | 0.706 | **0.759** | 0.657 | 0.861 |
| | PRS | **0.615** | 0.521 | 0.708 | 0.527 | 0.397 | 0.657 |
| | AIMS65 | **0.602** | 0.508 | 0.697 | **0.645** | 0.523 | 0.767 |
| | MEWS | 0.472 | 0.374 | 0.569 | 0.569 | 0.440 | 0.697 |
| Need for mechanical ventilation | GBS | **0.716** | 0.498 | 0.935 | **0.619** | 0.506 | 0.731 |
| | PRS | **0.687** | 0.484 | 0.889 | **0.644** | 0.492 | 0.796 |
| | AIMS65 | **0.817** | 0.640 | 0.995 | 0.465 | 0.029 | 0.901 |
| | MEWS | **0.817** | 0.667 | 0.967 | 0.596 | 0.276 | 0.916 |
| Rebleed | GBS | 0.528 | 0.412 | 0.645 | **0.677** | 0.509 | 0.845 |
| | PRS | 0.478 | 0.349 | 0.607 | 0.590 | 0.417 | 0.763 |
| | AIMS65 | **0.618** | 0.510 | 0.726 | **0.742** | 0.615 | 0.870 |
| | MEWS | 0.536 | 0.417 | 0.654 | 0.588 | 0.384 | 0.792 |
| Death | GBS | **0.631** | 0.513 | 0.748 | **0.639** | 0.492 | 0.787 |
| | PRS | 0.589 | 0.475 | 0.704 | **0.626** | 0.487 | 0.765 |
| | AIMS65 | **0.704** | 0.606 | 0.801 | **0.659** | 0.502 | 0.815 |
| | MEWS | 0.578 | 0.459 | 0.697 | 0.505 | 0.354 | 0.656 |
| >3 days of hospital admission | GBS | 0.434 | 0.198 | 0.670 | 0.524 | 0.360 | 0.687 |
| | PRS | 0.373 | 0.154 | 0.592 | 0.391 | 0.119 | 0.663 |
| | AIMS65 | 0.519 | 0.302 | 0.736 | 0.271 | 0.059 | 0.484 |
| | MEWS | 0.593 | 0.357 | 0.829 | 0.365 | 0.111 | 0.620 |

CI: confidence interval. AUC: >0.6 – **significant marked in bold**.

### Statistical analysis

The data was analyzed using SPSS (22.0) after compilation of data in a spreadsheet. Descriptive data distribution was presented with the mean and standard deviation. Categorical data were presented as proportions. Nominal variables were evaluated using either Pearson's $x^2$-test or Fisher's exact test. All the correlations between continuous variables were assessed using Pearson's correlation coefficient and chi-square test to look for significant differences. The difference in the distribution of variables between variceal and nonvariceal bleed subgroups was done using multivariate regression analysis. The *P*-value of less than 0.05 was taken as statistically significant (95%CI). The area under the receiver operating characteristic (AUC-ROC) curve was calculated for the GBS, PRS, AIMS65, and MEWS and the predictive accuracy of each scoring system was measured. Pairwise AUC-ROC comparisons were performed between combinations of two different scoring systems using the nonparametric approach developed by DeLong et al.[13]. The AUC-ROC curve of >0.6 was taken as acceptable and the higher the AUC-ROC curve the better is the predictor of outcome.

## RESULTS

The clinical and demographic data was recorded of total 268 patients (TABLE 1). The mean age of the patients enrolled in the study was 48.49±13.23 years. The maximum number of patients was in the age group 45–60 years and males constituted 82.83% of the patients. The most common comorbid condition was chronic liver disease (CLD) seen in 64.17% of patients followed by diabetes mellitus (14.2%) and hypertension (11.9%). Alcohol (79.06%) was the most common etiology for CLD. The most common presentation was hematemesis (47.38%) followed by melena (29.85%), while 22.76% presented with both (hematemesis and melena). The most common clinical finding was pallor (75.4%) followed by tachycardia (54.85%) (TABLE 1).

### Etiology and endoscopic findings

Out of 268 patients, only 236 could undergo endoscopy for definitive therapy and etiology of UGI bleed due to poor clinical condition or not giving consent for endoscopy. (FIGURE 1) The most common cause of UGI bleed was due to variceal pathology

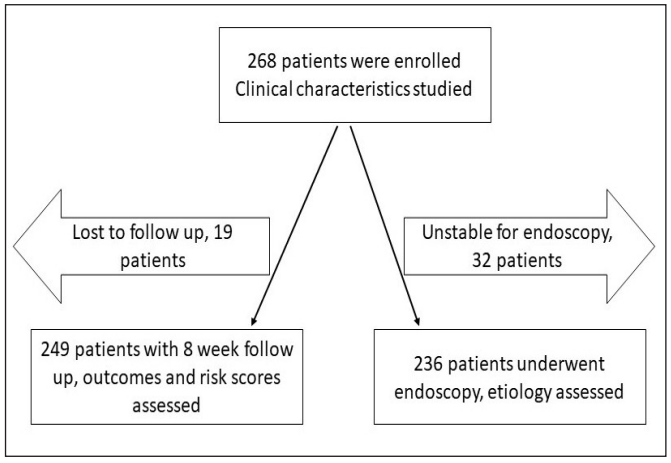


**FIGURE 1.** Flowchart explaining patient distribution while recording results.

seen in 150 (63.55%) patients followed by PUD (12.28%) and mucosal erosive disease (11.44%). Endoscopic interventions were required in 146 (61.86%) of 236 patients who underwent endoscopy. Endoscopic variceal ligation (EVL) was the most common intervention (48.72%) done followed by Glue injection (5.50%) in patients having fundal varices. Multimodal therapy (adrenaline instillation followed by hemostatic clips) was needed in 2.96% of patients (TABLE 2).

### Outcomes

Out of 268 patients, 249 patients completed follow-up. Rebleed occurred in 38 (15.26%) cases out of which 28 cases were of variceal etiology. Out of 249 patients, 126 (50.60%) patients required blood component transfusion and 25 (10.04%) patients required mechanical ventilation and 2 (0.80%) patients required surgical intervention for control of bleed. The mean duration of hospital stay was 3.0±1 day with 35 (14.05%) patients having a hospital stay of >3 days. Out of 249 patients, overall mortality was 71 (28.51%) patients, out of which, 33 (46.5%) patients had variceal bleed, 15 (21.1%) patients had non-variceal bleed and 23 (32.4%) could not undergo endoscopy to establish the etiology of UGI bleed.

### Pre endoscopy scores as a predictor of outcome

Pre-endoscopy Scores (GBS, AIMS65, MEWS & PRS) were calculated for 249 patients who completed follow up. These scores were calculated at initial presentation (TABLE 3). AIMS65 was the best in predicting re-bleed with cut-off value of ≥2 which achieved sensitivity and specificity of 79% and 48% respectively. None of the scores were predictive for duration of hospital stay. GBS and AIMS65 were predictive for the need for blood component transfusion while PRS and MEWS had insignificant AUC-ROC curves. For the need for mechanical ventilation; MEWS, AIMS65 and GBS had good predictive ability. The AUC-ROC for AIMS65, MEWS, and GBS were significant for the need for surgical intervention and was found to be 0.914, 0.753 and 0.681 respectively. For predicting mortality AUC-ROC for AIMS65, GBS, and PRS was significant. Further, we separately compared the AUC-ROC curves for each outcome in variceal and non-variceal patients. AIMS65 was better in both groups in predicting re-bleed and mortality as compared to PRS (TABLE 4).

## DISCUSSION

With the changing epidemiology, the most common etiology for UGI bleed was variceal bleed replacing the PUD in our study. This was consistent with the recent studies done across Northern India where variceal etiology appeared as the predominant etiology[8,14,15]. Studies in Nepal also suggested variceal bleeding to be the predominant cause of UGI bleed followed by peptic ulcer disease[7,16]. Etiological spectrum and clinical data were compared with regional studies across India and results were similar to the studies done in tertiary care centers in Northern, Southern and Western India, whereas peptic ulcer disease was more commonly seen in Eastern India[3,8,14,15,17,18].

Various studies in the South Asian regions have shown a higher incidence of variceal bleed in males as compared to females which were consistent with our study where 66.83% of males had variceal bleed whereas non-variceal etiologies were predominant (52.5%) in the female population[7,8,19]. This could be due to higher alcohol consumption in males and increased incidence of CLD. As expected, variceal bleed was the commonest etiology of UGI bleed in CLD patients, however, it was also important to look for nonvariceal causes. We found that 10.96% of our CLD patients had a nonvariceal bleed. It is important because mortality is higher in patients having CLD with non-variceal bleed than patients without CLD[20]. Endoscopic band ligation was the most common therapeutic procedure done due to esophageal varices being the commonest cause of UGI bleed.

The need for mechanical ventilation occurred in 9.3% of patients which was lower than the previous study[21]. Our study showed mortality (28.51%) on the higher side when compared with other similar studies (2.6–33.5%) done across the world[7,17,19,22,23]. This could be attributed to a higher number of variceal bleeds in our study population as compared to the Western population and because of CLD related complications. Re-bleed was seen in 15.26% of patients which was comparable to the Western as well as the Indian studies[8,22,23].

Risk stratification is an important strategy for the management of patients with UGI bleed regarding in-patient or out-patient care, the need for intervention and early discharge[24,25]. As the epidemiology of UGI bleed varies from region to region**,** a well-validated scoring system needs to be in place for a regional set up. Commonly used validated scoring systems for predicting patient outcomes are GBS, AIMS65, PRS and MEWS[10,21,26,27].

In our study population, AIMS65 was the best in predicting mortality as seen in the previous studies[21,26]. The cut-off value was ≥2, whereas it was ≥3 in other studies[21,26]. GBS and PRS had higher cut-off of ≥14 and ≥3 respectively in studies by Nagaraja et al. and Bozkurt et al. respectively as in comparison to our study having a cut-off of 11[10,28]. AIMS65 was the only predictor for rebleed with a score of ≥2 whereas Robertson et al. kept a cut-off of ≥3. For GBS as a predictor of rebleed, there is conflicting data with a cut-off from 1–13[29,30]. Bozkurt et al. demonstrated the utility of PRS at a cut-off value of four. However, PRS was not effective in our study for predicting rebleed and mortality but gained significance when analyzed separately for the non-variceal population for predicting mortality. Another study from our center showed that PRS works better in non-variceal bleed in predicting outcomes and is similar to our findings[16]. In another large retrospective study done only in variceal bleed patients, AIMS65 was shown to have predictive ability (AUROC >0.8) in predicting mortality but not rebleed[31]. In our

study population, none of the scores were predictive of prolonged hospital stay of >3 days which was similar to another study[21]. GBS was the best in predicting the need for blood transfusion as seen by Robertson et al. and Goncalves et al.[21,27]. The cut-off score for the need for blood transfusion was found ≥10 which was consistent with Robertson et al.[21]. AIMS65 with a cut-off of two was also predictive of the need for blood transfusion in our study, which was similar to Robertson et al.[21]. MEWS was the best in predicting the need for Mechanical Ventilation with a cut-off value of ≥3. To the best of our knowledge, this was the first study comparing MEWS with the need for mechanical ventilation. GBS and AIMS65 were also fairly predictive for need intensive care unit admission with cut off at 12 and 2 respectively. AIMS65 followed by MEWS were predictive for the need for surgical intervention at a cutoff score of ≥3 and ≥4 respectively whereas Goncalves et al. have reported GBS as the only score predictive for surgical intervention[27]. However, patients undergoing surgical intervention were very few (only two); hence predictive ability may not be clinically acceptable.

A single score could not predict all outcomes. AIMS65 emerged as a simple score that was able to predict interventions such as the requirement of blood transfusion and surgery along with outcome variables of rebleed and mortality. AIMS65 with a cut-off of 2–3 can be routinely used in emergency for the need of intensive management (TABLE 5).

This study was conducted in a tertiary care institute in Northern India which caters to a diverse population from Jammu and Kashmir, Punjab, Haryana, Uttarakhand, Uttar Pradesh, Rajasthan, and Bihar. The sample population is small and might not have been representative of the whole Indian population. A multicenter multiregional study with a larger sample should be conducted for a better evaluation of the complete epidemiology of UGI bleed in our nation.

## CONCLUSION

With changing epidemiology, variceal etiology for UGI bleed has become the predominant diagnosis replacing peptic ulcer disease in Northern India and many other Southeastern Asian regions. Rebleed and mortality were more commonly seen in variceal bleed patients as compared to non-variceal bleed patients. Pre-endoscopy Rockall score was not effective in predicting outcomes in variceal bleed patients. AIMS65 was the best & simplest score for predicting mortality and re-bleed in UGI bleed patients.

**TABLE 5.** Table showing the best score for predicting each outcome according to AUROC and their respective cutoffs from the curve.

| Outcome | Score best predictor | Auroc | Sensitivity/ specificity | Cut off | Range |
|---|---|---|---|---|---|
| Need for blood component transfusion | GBS | 0.678 | 80.7/46.9 | ≥10 | 0–23 |
| Need for mechanical ventilation | MEWS | 0.748 | 86.4/50.7 | ≥3 | 0–14 |
| Need for surgical intervention | AIMS65 | 0.914 | 100/25.5 | ≥3 | 0–5 |
| Rebleed | AIMS65 | 0.626 | 78.9/21.1 | ≥2 | 0–5 |
| Mortality | AIMS65 | 0.725 | 80.3/53.9 | ≥2 | 0–5 |
| >3 days hospital stay | None | | | | |

GBS: Glasgow Blatchford Score; MEWS: Modified Early Warning Score.

## Authors' contribution

Sachan A, Dhibar DP and Sharma V: were involved in the drafting of the manuscript. Prakash A: helped with the statistical analysis. Taneja S and Bhalla A: reviewed the manuscript.

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**RESUMO – Contexto** – Tradicionalmente, a doença úlcera péptica era a causa mais comum de sangramento digestivo alto, mas com a mudança da epidemiologia, outras etiologias do sangramento do trato digestivo alto estão emergindo. Muitas pontuações têm sido descritas para prever resultados e a necessidade de intervenção na hemorragia gastrointestinal superior, mas a comparação prospectiva entre elas é escassa. **Objetivo** – Este estudo foi planeado para determinar o padrão etiológico de pacientes com hemorragia digestiva alta e comparar os escores de Glasgow Blatchford, o Rockall pré-endoscopia, o AIMS65 e o Early Warning modificado (MEWS) como preditores do resultado. **Métodos** – Neste estudo prospetivo de coorte, 268 pacientes com sangramento digestivo alto foram acompanhados durante 8 semanas. Os escores Glasgow Blatchford, Rockall pré-endoscopia, AIMS65 e MEWS foram calculados para cada paciente, e a área sob a curva (AUC-ROC) para cada pontuação foi comparada. **Resultados** – A etiologia mais comum para a hemorragia gastrointestinal alta foi varizes gastroesofágicas 150 (63,55%), seguida de úlcera péptica 29 (12,28%) e de doença erosiva de mucosa 27 (11,44%). No total, 38 (15,26%) doentes voltaram a sangrar e 71 (28,5%) doentes morreram. No total, 126 (47%) doentes necessitaram de transfusão de componentes sanguíneos, 25 (9,3%) necessitaram de ventilação mecânica e 2 (0,74%) destes doentes necessitaram de intervenção cirúrgica. O escore de Glasgow Blatchford foi o melhor na previsão da necessidade de transfusão (corte – 10, AUC-ROC =0,678). Enquanto o AIMS65 com uma pontuação de ≥2 foi o melhor na previsão de ressangramento (AUC-ROC =0,626) e mortalidade (AUC-ROC =0,725). **Conclusão** – O sangramento gastrointestinal alto mais comum é de origem varicosa em centro de referência terciária. O AIMS65 é o melhor escore simples, com uma pontuação de ≥2 para prever o ressangramento e a mortalidade.

**Palavras-chave** – Sangramento digestivo alto; ressangramento; mortalidade; escore de Glasgow Blatchford, escore Rockall pré-endoscopia; AIMS65; *Modified Early Warning Score*.

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