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WJGS mainly publishes articles reporting research results and findings obtained in the field of gastrointestinal surgery and covering a wide range of topics including biliary tract surgical procedures, biliopancreatic diversion, colectomy, esophagectomy, esophagostomy, pancreas transplantation, and pancreatectomy, *etc*.

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ORIGINAL ARTICLE

Retrospective Study

Predictive utility of the Rockall scoring system in patients suffering from acute nonvariceal upper gastrointestinal hemorrhage

De-Ping Han, Cai-Qian Gou, Xin-Mian Ren

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Abstract

BACKGROUND

Acute non-variceal upper gastrointestinal bleeding (ANVUGIB) represents a significant clinical challenge due to its unpredictability and potentially severe outcomes. The Rockall risk score has emerged as a critical tool for prognostic assessment in patients with ANVUGIB, aiding in the prediction of rebleeding and mortality. However, its applicability and accuracy in the Chinese population remain understudied.

AIM

To assess the prognostic value of the Rockall risk score in a Chinese cohort of patients with ANVUGIB.

METHODS

A retrospective analysis of 168 ANVUGIB patients' medical records was conducted. The study employed statistical tests, including the *t*-test, χ^2 test, spearman correlation, and receiver operating characteristic (ROC) analysis, to assess the relationship between the Rockall score and clinical outcomes, specifically focusing on rebleeding events within 3 months post-assessment.

RESULTS

Significant associations were found between the Rockall score and various clinical outcomes. High Rockall scores were significantly associated with rebleeding events (r = 0.735, R^2 = 0.541, P < 0.001) and strongly positively correlated with adverse outcomes. Low hemoglobin levels (t = 2.843, P = 0.005), high international normalized ratio (t = 3.710, P < 0.001), active bleeding during endoscopy (χ^2 = 7.950, P = 0.005), large ulcer size (t = 6.348, P < 0.001), and requiring blood transfusion (χ^2 = 6.381, P = 0.012) were all significantly associated with rebleeding events. Furthermore, differences in treatment and management strategies were identified between patients with and without rebleeding events. ROC analysis indicated the excellent discriminative power (sensitivity: 0.914; specificity: 0.816;

area under the curve: 0.933; Youden index: 0.730) of the Rockall score in predicting rebleeding events within 3 months.

CONCLUSION

This study provides valuable insights into the prognostic value of the Rockall risk score for ANVUGIB in the Chinese population. The results underscore the potential of the Rockall score as an effective tool for risk stratification and prognostication, with implications for guiding risk-appropriate management strategies and optimizing care for patients with ANVUGIB.

Key Words: Acute non-variceal upper gastrointestinal bleeding; Rockall risk score; Clinical outcomes; Risk stratification; Prognosis

Core Tip: This retrospective clinical study aimed to assess the prognostic value of the Rockall risk score in a Chinese cohort of patients with acute non-variceal upper gastrointestinal bleeding (ANVUGIB). The conclusion of this study provides valuable insights into the prognostic value of the Rockall risk score for ANVUGIB in the Chinese population. The results underscore the potential of the Rockall score as an effective tool for risk stratification and prognostication, with implications for guiding risk-appropriate management strategies and optimizing care for patients with ANVUGIB.

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INTRODUCTION

Acute non-variceal upper gastrointestinal bleeding (ANVUGIB) refers to nonvariceal gastrointestinal bleeding occurring above the suspensory ligament of the duodenum[1-3]. Its common causes include peptic ulcer disease, gastrointestinal tumors, and acute gastric mucosal lesions, which make it a prevalent medical emergency in internal medicine[4,5]. The mortality rate of upper gastrointestinal bleeding (UGIB) ranges from 2% to 10%, which is associated with substantial treatment costs. In recent years, the application of proton pump inhibitors (PPIs) and the advancement of techniques, such as gastrointestinal endoscopy, have improved the treatment outcomes of UGIB[6,7]. However, no significant decline has been observed in the incidence and mortality rates[8]. Therefore, early identification of high-risk bleeding and poor prognosis is particularly important.

The timely assessment of ANVUGIB severity and the accurate prognostication of patient outcomes are crucial to guide clinical management and optimize patient care[9-11]. In this context, risk stratification tools, such as the Rockall risk score, have been developed to aid in UGIB evaluation[12-14]. The Rockall score incorporates clinical and endoscopic parameters to stratify patients into different risk categories and allow for risk-appropriate management strategies[7,15,16]. This system has been extensively utilized in clinical practice, and numerous studies have investigated its application in adult populations with UGIB in various geographical locations[10,17,18]. However, these studies have produced conflicting findings on the correlation degree between the score and certain morbidity and mortality outcomes[2,19-21].

Nurses play a crucial role in the care and management of patients with ANVUGIB. They often serve as frontline healthcare providers responsible for patient assessment, monitoring, and support during diagnostic and therapeutic interventions. Given the potential severity and clinical complexity of ANVUGIB, nurses are essential in the prompt recognition of deteriorating clinical conditions, early intervention for potential hemorrhage, and ongoing patient education and support. Moreover, they are pivotal in the coordination of care among multidisciplinary teams, including facilitating timely endoscopic procedures, administering medications, and monitoring patients' response to treatment. To date, no study has validated the Rockall score for ANVUGIB in China. Therefore, this retrospective clinical research aims to evaluate the prognostic value of the Rockall risk score in a Chinese cohort of patients presenting with acute ANVUGIB. Understanding the prognostic value of risk stratification tools, such as the Rockall risk score, in ANVUGIB is of paramount importance to nursing practice. The findings provide nurses with valuable insights into the early identification of high-risk bleeding and poor prognosis, thereby aiding in the delivery of timely and tailored nursing care to patients with ANVUGIB and contributing to improved clinical outcomes and patient experience. By assessing clinical outcomes and risk stratification based on the Rockall score, this study is expected to provide valuable insights into the utility of the Rockall score in risk assessment and clinical decision-making for Chinese patients with ANVUGIB.

MATERIALS AND METHODS

Study design

This study adopted a retrospective clinical design. Data from the medical records of patients with ANVUGIB were utilized to evaluate the prognostic value of the Rockall risk score.

Participant selection

This study comprised a cohort of 104 patients diagnosed with ANVUGIB who presented to our hospital between December 2020 and December 2022. Patients were divided into without rebleeding (n = 87) and rebleeding (n = 81) groups according to the occurrence of rebleeding events within 3 months after the Rockall risk score assessment. This study was approved by the Ethics Committee of Chengyang District People's Hospital. Given its retrospective nature, this research solely utilized de-identified patient data. Thus, informed consent was waived because of the lack of potential for harm or influence on patient care.

The inclusion criteria were as follows: Aged 18-70 years and confirmed diagnosis with ANVUCGIB based on clinical symptoms, endoscopic findings, or other relevant diagnostic criteria as *per* the established medical guidelines and institutional practices[22-25].

The exclusion criteria were as follows: (1) Variceal bleeding, which refers to gastrointestinal bleeding from enlarged veins in the esophagus, stomach, or duodenum; (2) Incomplete or insufficient documentation of clinical data, including incomplete Rockall risk score components, missing laboratory parameters, or incomplete endoscopic findings; (3) Known gastrointestinal conditions that could substantially influence the interpretation of the Rockall risk score and clinical outcomes, such as inflammatory bowel disease, malignancies, or severe coagulopathies; and (4) Concurrent severe illnesses or conditions that could independently impact prognosis or confound the interpretation of rebleeding events, such as advanced organ failure or life-threatening systemic conditions.

Rockall risk score

The Rockall scoring system is a widely utilized clinical tool for predicting the risk of rebleeding and mortality. Scores of ≥ 5 indicate high risk, 3-4 represent moderate risk, and 0-2 indicate low risk. Patients with documented Rockall risk scores were included in this study. The Rockall score was calculated based on clinical and endoscopic parameters[16,26].

Clinical data

Patients whose comprehensive clinical data, including demographic information, endoscopic findings, and treatment details, were available in their medical records were included in this study.

Laboratory parameters

For blood testing, 5 mL of fasting blood sample was collected from the antecubital vein in the morning and measured using the Beckman DxH800 hematology analyzer.

Statistical analysis

Various statistical tests, such as t-test and χ^2 test, were performed to assess the relationship between Rockall score and clinical outcomes, including rebleeding events. Statistical analysis was conducted using SPSS 29.0 software (SPSS Inc, Chicago, IL, United States). Categorical data were presented as n (%) and analyzed by χ^2 test. The normality of continuous variables was assessed using the Shapiro-Wilk method. Continuous variables following a normal distribution were expressed as (± SD) and analyzed using a corrected variance t-test. A two-tailed $P < 0.05$ was considered statistically significant.

Spearman correlation and receiver operating characteristic (ROC) analyses were performed. The authors discussed any statistical adjustments or corrections made for potential confounding variables.

RESULTS

Patient characteristics

This study included 168 patients with ANVUGIB, of which 87 were in the without rebleeding group and 81 were in the rebleeding group (Table 1). The mean age of patients was 52.84 years (SD = 8.15) in the without rebleeding group and 54.15 years (SD = 7.48) in the rebleeding group. The difference in age between the two groups was not statistically significant (t = 1.087, P = 0.279). In terms of gender distribution, the without rebleeding group had 25 males and 30 females, and the rebleeding group had 30 males and 19 females (χ^2 = 0.310, P = 0.577). The prevalence of smoking, drinking, hypertension, diabetes and hyperlipidemia was not significantly different between the two groups (P > 0.05). For comorbidities, a trend toward a high prevalence of renal failure (t = 3.005, P = 0.083) and pneumonia (t = 1.984, P = 0.159) was observed in the rebleeding group. No significant difference in the prevalence of septicemia (χ^2 = 0, P = 1.000) and the use of nonsteroidal anti-inflammatory drugs (χ^2 = 2.095, P = 0.148), or anticoagulants (χ^2 = 2.188, P = 0.139) was found between the two groups.

Table 1 Patient characteristics, *n* (%)

Parameter	Without rebleeding group (*n* = 87)	Rebleeding group (*n* = 81)	t/χ^2	*P* value
Age (years)	52.84 ± 8.15	54.15 ± 7.48	1.087	0.279
Gender (M/F)	35 (40.23)/52 (59.77)	37 (45.68)/44 (54.32)	0.310	0.577
BMI (kg/m^2)	23.39 ± 1.31	23.65 ± 1.23	1.283	0.201
Smoking history (Yes/No)	11 (12.64)/76 (87.36)	10 (12.35)/71 (87.65)	0.000	1.000
Alcohol history (Yes/No)	20 (22.99)/67 (77.01)	19 (23.46)/62 (76.54)	0.000	1.000
Hypertension (Yes/No)	9 (10.34)/78 (89.66)	9 (11.11)/72 (88.89)	0.000	1.000
Diabetes (Yes/No)	7 (8.05)/80 (91.95)	6 (7.41)/75 (92.59)	0.000	1.000
Hyperlipidemia (Yes/No)	8 (9.2)/79 (90.8)	7 (8.64)/74 (91.36)	0.000	1.000
Renal failure (Yes/No)	8 (9.2)/79 (90.8)	16 (19.75)/65 (80.25)	3.005	0.083
Pneumonia (Yes/No)	6 (6.9)/81 (93.1)	12 (14.81)/69 (85.19)	1.984	0.159
Septicemia (Yes/No)	14 (16.09)/73 (83.91)	14 (17.28)/67 (82.72)	0.000	1.000
NSAID use (Yes/No)	43 (49.43)/44 (50.57)	50 (61.73%)/31 (38.27)	2.095	0.148
Anticoagulant use (Yes/No)	29 (33.33)/58 (66.67)	37 (45.68)/44 (54.32)	2.188	0.139

M: Male; F: Female; BMI: Body mass index; NSAID: Nonsteroidal anti-inflammatory drug.

Rockall score

Comparison of medication use revealed significant differences in the Rockall score (t = 13.984, P < 0.001) between the two groups (Figure 1). The without rebleeding group had a mean score of 2.8 (SD = 1.5), and the rebleeding group had a mean score of 6.03 (SD = 1.5). This finding indicates a clear association between high Rockall scores and rebleeding events in patients with ANVUGIB.

Laboratory parameters

Comparison of laboratory parameters revealed significant differences in hemoglobin levels (t = 2.843, P = 0.005) between the two groups (Table 2). The rebleeding group had a mean of 113.95 g/L (SD = 11.44), and the rebleeding group had a mean of 109.14 g/L (SD = 10.48). In addition, the international normalized ratio (INR) was significantly higher in the rebleeding group (mean score of 1.48, SD = 0.29) than in the without rebleeding group (mean score of 1.34, SD = 0.18, t = 3.710, P < 0.001). No significant differences in platelet count (t = 1.344, P = 0.181) and albumin levels (t = 1.168, P = 0.244) were observed between the two groups. These findings suggest that low hemoglobin levels and high INR values are associated with rebleeding events in patients with ANVUGIB.

Endoscopic findings

Comparison of endoscopic findings revealed significant differences in active bleeding (Table 3) between the without rebleeding (37 cases) and with rebleeding (53 cases) groups (χ^2 = 7.950, P = 0.005), indicating a clear association between active bleeding during endoscopy and rebleeding events. In addition, the average ulcer size was significantly larger in the rebleeding group (mean size of 1.8 cm, SD = 0.65) than in the without rebleeding group (mean size of 1.19 cm, SD = 0.58) (t = 6.438, P < 0.001). The number of ulcers also showed significant difference between the two groups, with a higher proportion of patients in the rebleeding group having more than two ulcers (χ^2 = 5.512, P = 0.019). However, no significant difference in ulcer location (χ^2 = 0.515, P = 0.473) was found between the two groups. These findings suggest that active bleeding during endoscopy, large ulcer size, and a high number of ulcers are associated with rebleeding events in patients with ANVUGIB.

Treatment and management

Comparison of treatment and management strategies revealed significant differences between the two groups (Table 4). Endoscopic therapy was significantly more common in the without rebleeding group (60 patients) than in the rebleeding group (30 patients) (χ^2 = 15.933, P < 0.001). Moreover, blood transfusion was significantly more frequent in the rebleeding group (6 patients) than in the without rebleeding group (39 patients) (χ^2 = 6.381, P = 0.012). Although the prevalence of PPI therapy was higher in the without rebleeding group compared with that in the rebleeding group, the difference was not statistically significant (χ^2 = 0.255, P = 0.613). These findings suggest that endoscopic therapy and blood transfusion are associated with rebleeding events in patients with ANVUGIB.

Spearman correlation analysis

Spearman correlation analysis revealed several significant relationships in patients with ANVUGIB (Table 5). The Rockall score exhibited a strong positive correlation with rebleeding events (r = 0.735, R^2 = 0.541, P < 0.001), indicating its pre-

Table 2 Laboratory parameters, *n* (%)

Parameter	Without rebleeding group (*n* = 87)	Rebleeding group (*n* = 81)	*t* value	*P* value
Hemoglobin (g/L)	113.95 ± 11.44	109.14 ± 10.48	2.843	0.005
Platelet count (× 10^4/microliter)	24.48 ± 8.15	22.97 ± 6.37	1.344	0.181
INR	1.34 ± 0.18	1.48 ± 0.29	3.710	< 0.001
Albumin (g/dL)	3.91 ± 0.59	3.79 ± 0.67	1.168	0.244

INR: International normalized ratio.

Table 3 Endoscopic findings, *n* (%)

Parameter	Without rebleeding group (*n* = 87)	Rebleeding group (*n* = 81)	t/χ^2	*P* value
Active bleeding (Yes/No)	37 (42.53)/50 (57.47)	53 (65.43)/28 (34.57)	7.950	0.005
Average ulcer size (cm)	1.19 ± 0.58	1.8 ± 0.65	6.348	< 0.001
Number of ulcers (≤ 2/> 2)	49 (56.32)/38 (43.68)	30 (37.04)/51 (62.96)	5.512	0.019
Ulcer location (gastric/duodenal)	35 (40.23)/52 (59.77)	38 (46.91)/43 (53.09)	0.515	0.473

Table 4 Treatment and management, *n* (%)

Parameter	Without rebleeding group (*n* = 87)	Rebleeding group (*n* = 81)	χ^2	*P* value
PPI therapy (Yes/No)	85 (97.7)/2 (2.3)	77 (95.06)/4 (4.94)	0.255	0.613
Endoscopic therapy (Yes/No)	60 (68.97)/27 (31.03)	30 (37.04)/51 (62.96)	15.933	< 0.001
Blood transfusion (Yes/No)	39 (44.83)/48 (55.17)	53 (65.43)/28 (34.57)	6.381	0.012

PPI: Proton pump inhibitor.

Table 5 Spearman correlation analysis

	r value	R^2 value	*P* value
Rockall score	0.735	0.541	< 0.001
Hemoglobin (g/L)	-0.215	0.046	0.005
INR	0.281	0.079	< 0.001
Average ulcer size (cm)	0.443	0.197	< 0.001
Renal failure (Yes/No)	0.151	0.023	0.051
Active bleeding (Yes/No)	0.229	0.053	0.003
Number of ulcers (≤ 2/>2)	-0.193	0.037	0.012
Endoscopic therapy (Yes/No)	-0.32	0.102	< 0.001
Blood transfusion (Yes/No)	0.207	0.043	0.007

INR: International normalized ratio.

dictive value for adverse outcomes. The average ulcer size showed a moderate positive correlation with rebleeding (r = 0.443, R^2 = 0.197, P < 0.001). Factors such as hemoglobin levels (r = -0.215, R^2 = 0.046, P = 0.005), INR (r = 0.281, R^2 = 0.079, P < 0.001), active bleeding during endoscopy (r = 0.229, R^2 = 0.053, P = 0.003), and need for blood transfusion (r = 0.207, R^2 = 0.043, P = 0.007) also showed significant associations with rebleeding events. Furthermore, the use of endoscopic therapy exhibited a strong negative correlation with rebleeding (r = -0.32, R^2 = 0.102, P < 0.001), suggesting its potential impact on reducing rebleeding risk. These findings underscore the importance of these parameters in risk assessment and patient management strategies for ANVUGIB.

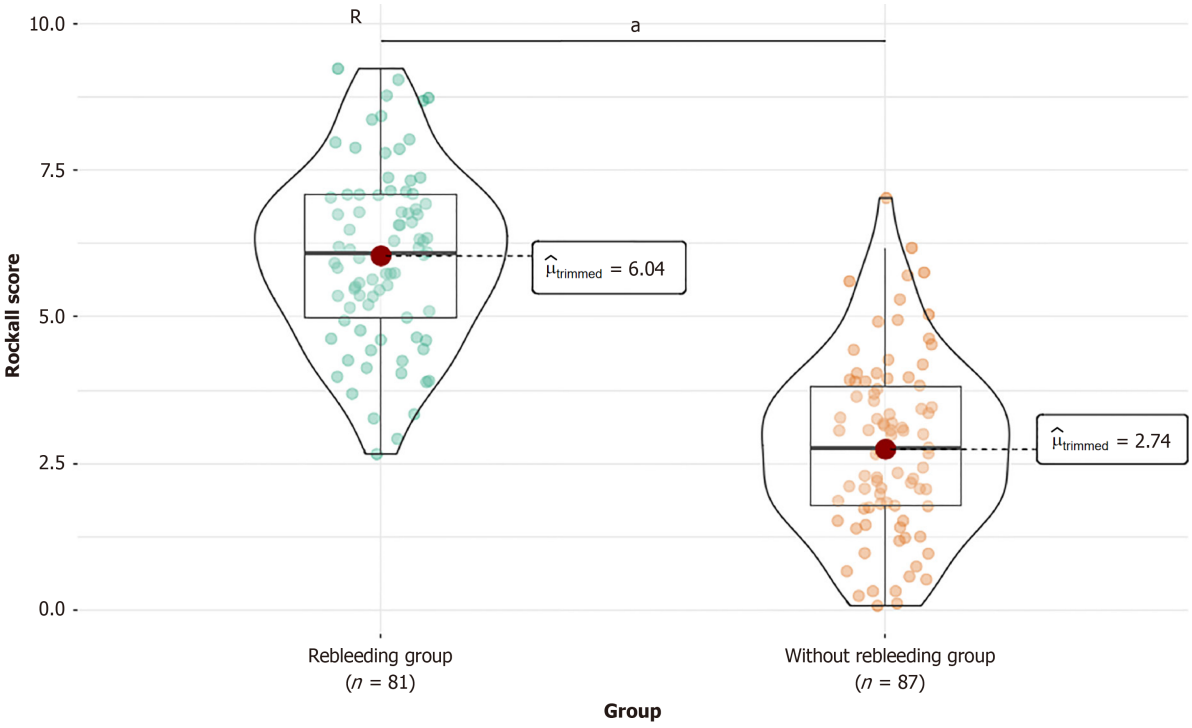

Figure 1 Rockall score of the two groups. [a]*P* < 0.05.

Logistic regression analysis

Multivariate logistic regression analysis (Table 6) revealed that the Rockall score was a significant independent predictor of outcomes in patients with ANVUGIB, with an odds ratio (OR) of 1.134 [95% confidence interval (CI): 1.106-1.164, *P* < 0.001]. Although significant in the univariate analysis (OR: 0.96, 95%CI: 0.932-0.988, *P* = 0.007), the hemoglobin level did not retain its significance in the multivariate model (OR: 0.998, 95%CI: 0.994-1.002, *P* = 0.317). The INR (OR: 1.142, 95%CI: 0.926-1.409, *P* = 0.214) and impact of blood transfusion necessity (OR: 1.055, 95%CI: 0.955-1.166, *P* = 0.29) also lost their significance in the multivariate analysis. Meanwhile, the average ulcer size (OR: 1.156, 95%CI: 1.069-1.25, *P* < 0.001) and presence of active bleeding at the time of endoscopy (OR: 1.117, 95%CI: 1.007-1.24, *P* = 0.036) retained their significance. The number of ulcers (OR: 0.91, 95%CI: 0.824-1.006, *P* = 0.065) and application of endoscopic therapy (OR: 0.908, 95%CI: 0.817-1.01, *P* = 0.075) did not reach statistical significance in the multivariate analysis. These results highlight the Rockall score, average ulcer size, and active bleeding as crucial prognostic indicators in this clinical setting.

ROC analysis of using Rockall score to predict rebleeding events within 3 months

ROC analysis (Table 7) demonstrated the high predictive utility of the Rockall score for rebleeding events within 3 months in patients with ANVUGIB (Figure 2). The sensitivity was 0.914, and the specificity was 0.816, with an area under the curve (AUC) of 0.933, indicating excellent discriminative power. The calculated Youden index of 0.730 underscores the strong overall performance of the Rockall score in predicting rebleeding events, further supporting its clinical relevance in risk assessment for this patient population.

DISCUSSION

ANVUGIB is a critical medical emergency with significant morbidity and mortality rates[2,15,16]. The timely assessment of its severity and accurate prognostication of patient outcomes are crucial for guiding clinical management and optimizing patient care[16]. Risk stratification tools, such as the Rockall risk score, have been proposed to aid in ANVUGIB evaluation[27,28]. This retrospective clinical study aimed to evaluate the prognostic value of the Rockall risk score in a Chinese cohort of patients presenting with acute ANVUGIB, providing valuable insights into its utility in risk assessment and clinical decision-making for this population.

The findings provide important insights into the prognostic value of the Rockall risk score for ANVUGIB. The study population consisted of 168 patients with ANVUGIB, offering a substantial sample size for evaluating the performance of the Rockall score in this patient population. Results revealed significant associations between the Rockall score and various clinical outcomes including rebleeding events, laboratory parameters, endoscopic findings, and treatment strategies. These findings provide valuable information regarding the predictive capacity of the Rockall score and its potential role in guiding risk-appropriate management strategies for patients with ANVUGIB in the Chinese population.

One of the key findings of this study is the significant association between high Rockall scores and rebleeding events in patients with ANVUGIB. Comparison of Rockall scores between the without rebleeding and rebleeding groups de-

Table 6 Receiver operating characteristic analysis

	Sensitivities	Specificities	AUC	Youden index
Rockall score	0.914	0.816	0.933	0.730
Hemoglobin (g/L)	0.519	0.736	0.641	0.255
INR	0.494	0.874	0.668	0.368
Average ulcer size (cm)	0.864	0.552	0.752	0.416
Active bleeding (Yes/No)	0.654	0.575	0.615	0.229
Number of ulcers (≤ 2/>2)	0.63	0.563	0.596	0.193
Endoscopic therapy (Yes/No)	0.63	0.69	0.66	0.32
Blood transfusion (Yes/No)	0.654	0.552	0.603	0.206

INR: International normalized ratio; AUC: Area under the curve.

Table 7 Logistic regression

Factor	Univariate regression				Multivariate regression			
	OR	95%CI	β	*P* value	OR	95%CI	β	*P* value
Rockall score	3.891	2.729-6.057	1.359	< 0.001	1.134	1.106-1.164	0.126	0
Hemoglobin (g/L)	0.96	0.932-0.988	-0.04	0.007	0.998	0.994-1.002	-0.002	0.317
INR	11.647	3.092-48.723	2.455	< 0.001	1.142	0.926-1.409	0.133	0.214
Average ulcer size (cm)	5.013	2.826-9.577	1.612	< 0.001	1.156	1.069-1.25	0.145	0
Active bleeding (Yes/No)	2.558	1.378-4.822	0.939	0.003	1.117	1.007-1.24	0.111	0.036
Number of ulcers (≤ 2/>2)	0.456	0.244-0.843	-0.785	0.013	0.91	0.824-1.006	-0.094	0.065
Endoscopic therapy (Yes/No)	0.265	0.138-0.497	-1.329	< 0.001	0.908	0.817-1.01	-0.096	0.075
Blood transfusion (Yes/No)	2.33	1.257-4.382	0.846	0.008	1.055	0.955-1.166	0.054	0.29

INR: International normalized ratio; OR: Odds ratio; CI: Confidence interval.

monstrated a substantial difference, with a mean score of 2.4 in the without rebleeding group and 6.8 in the rebleeding group. This marked difference underscores the prognostic value of the Rockall score in predicting rebleeding events in patients with ANVUGIB. Furthermore, Spearman correlation analysis revealed a strong positive correlation between the Rockall score and rebleeding events, further emphasizing the predictive utility of this score in assessing adverse outcomes in this patient population. The high sensitivity, specificity, and AUC demonstrated in the ROC analysis further support the strong overall performance of the Rockall score in predicting rebleeding events within 3 months. These findings highlight the potential of the Rockall score as an effective tool for risk stratification and prognostication in the management of ANVUGIB, consistent with previous research that emphasized the utility of this score in predicting adverse outcomes for patients with UGIB[29].

In addition to rebleeding events, the study identified significant associations between the Rockall score and various laboratory parameters, endoscopic findings, and treatment strategies. Low hemoglobin levels and high INR were found to be associated with rebleeding events, indicating the potential use of these parameters as prognostic indicators in patients with ANVUGIB. Furthermore, active bleeding during endoscopy, large ulcer size, and a high number of ulcers were significantly associated with rebleeding events, emphasizing their importance in risk assessment and clinical decision-making. These findings are consistent with previous literature highlighting the role of endoscopic parameters in risk stratification and prognostication for patients with UGIB[26,30,31]. Moreover, this study identified significant differences in treatment and management strategies between patients with and without rebleeding events, with implications for risk-appropriate therapeutic interventions in patients with ANVUGIB.

This study contributes to the ongoing discourse regarding the use of risk stratification tools in ANVUGIB management. Although the Rockall score has been extensively utilized in clinical practice for risk assessment in patients with UGIB, its application for ANVUGIB, particularly in the Chinese population, is rarely researched. The findings offer valuable insights into the performance of the Rockall score in predicting adverse outcomes in patients with ANVUGIB, thus filling a significant gap in literature. By demonstrating the significant associations of the Rockall score with rebleeding events, laboratory parameters, endoscopic findings, and treatment strategies, this study provides a comprehensive evaluation of the prognostic value of this score in the Chinese perspective and thereby enhances our understanding of its clinical utility

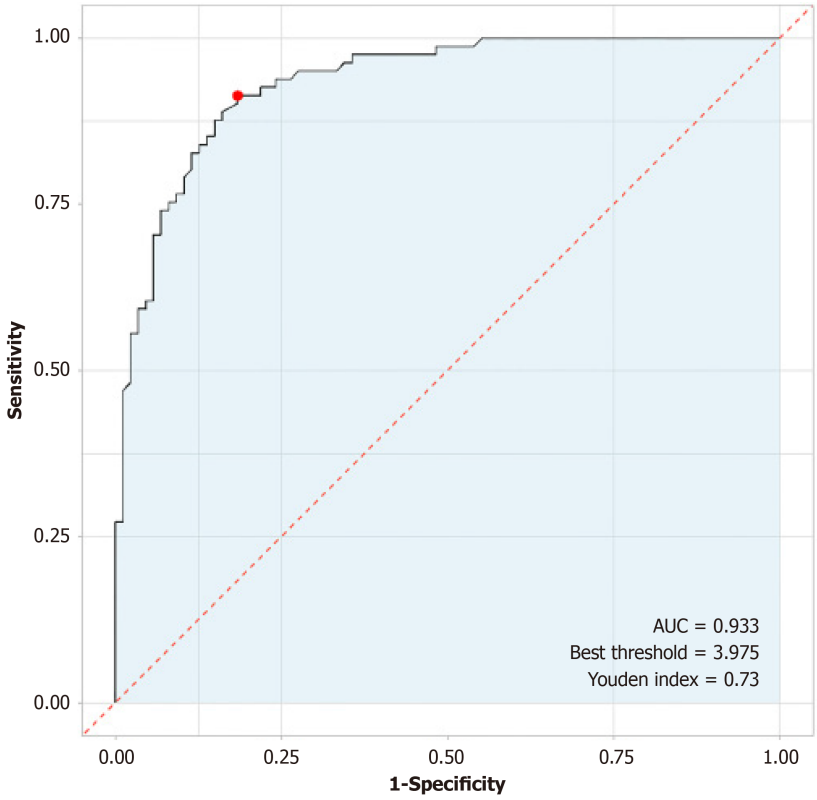

Figure 2 Receiver operating characteristic analysis of using the Rockall score to predict rebleeding events within 3 months. AUC: Area under the curve.

in this patient population.

The use of the Rockall risk score as a prognostic tool can guide nurses in identifying patients at high risk of rebleeding events, thereby prompting vigilant monitoring, timely intervention, and close collaboration with the healthcare team to optimize patient outcomes. Furthermore, the identified significant associations of laboratory parameters, endoscopic findings, and treatment strategies with rebleeding events provide nurses with valuable clinical indicators to consider in the assessment and care planning for patients with ANVUGIB. This knowledge can aid nursing practices in terms of individualizing patient care, facilitating shared decision-making, and enabling timely interventions, such as advocating for endoscopic therapy or coordinating blood transfusion as part of comprehensive patient care. As such, the integration of the study findings into nursing practices can enhance the quality of care provided to patients with ANVUGIB and ultimately contribute to improved patient outcomes and experiences.

Despite the compelling findings of this study, several limitations should be acknowledged. First, its retrospective design may have introduced inherent biases related to data collection and patient selection. In addition, its single-center nature may limit the generalizability of the findings to other patient populations in different clinical settings. The absence of a validation cohort and the retrospective nature of the data analysis may limit the robustness of the findings and their applicability to prospective clinical practice. Future prospective studies involving large, multicenter cohorts are warranted to validate these findings and further elucidate the prognostic value of the Rockall score in Chinese patients with ANVUGIB.

CONCLUSION

This retrospective clinical study provides valuable insights into the prognostic value of the Rockall risk score in Chinese patients with ANVUGIB. The Rockall score was found to be significantly associated with rebleeding events, laboratory parameters, endoscopic findings, and treatment strategies, highlighting its potential as an effective tool for risk stratification and prognostication in this patient population. The findings contribute to the growing body of evidence surrounding risk assessment and clinical decision-making for patients with ANVUGIB, emphasizing the potential of the Rockall score to guide risk-appropriate management strategies and optimize patient care in the Chinese context. Despite this study's limitations, its findings underscore the significance of risk stratification tools in ANVUGIB management and provide a foundation for further research in this critical area of clinical practice.

FOOTNOTES

Author contributions: Han DP designed the experiments, conducted clinical data collection, statistical analysis, wrote the original manuscript and revised the paper; Gou CQ and Ren XM performed postoperative follow-up and recorded the data; All authors read and approved the final manuscript.

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