Pakistan Journal of Advances in Medicine and Medical Research (PJAMMR)
ISSN: (Online) 2957-5893
Website: https://www.pjammr.com/index.php/pjammr/homepage

Open Access
Volume 4, Issue 1, 2025

Original Article

Evaluating The Prognostic Value of Variceal Bleeding Using Child-Pugh Stratification in The Outcome of Chronic Liver Disease: Rebleeding and Mortality.

Muhammad Ashraf[1], Jahanzeb[2], Syed Akhter Muhammad[3],Abdul Malik[4], Hakim[5], Asma Qadeer[6]

1. Postgraduate Resident (FCPS), Department of General Medicine, Sandeman Provincial Hospital, Bolan Medical College, Quetta, Balochistan, Pakistan.
2. Professor, Department of Medicine (FCPS), Sandeman Provincial Hospital, Bolan Medical College, Quetta, Balochistan, Pakistan.
3. Assistant Professor, Department of Gastroenterology (FCPS), Sandeman Provincial Hospital, Bolan Medical College, Quetta, Balochistan, Pakistan.
4. Assistant Professor, Department of Medicine (FCPS), Sandeman Provincial Hospital, Bolan Medical College, Quetta, Balochistan, Pakistan.
5. Postgraduate Resident (FCPS), Department of General Medicine, Sandeman Provincial Hospital, Bolan Medical College, Quetta, Balochistan, Pakistan.
6. Postgraduate Resident (FCPS), Department of General Medicine, Sandeman Provincial Hospital, Bolan Medical College, Quetta, Balochistan, Pakistan.

Keywords: Chronic liver disease; Variceal bleeding; Child-Pugh classification; Rebleeding; Mortality; Portal hypertension.

Article History
Received: 22-08-2025
Revised: 18-10-2025
Accepted: 22-11-2025
Published: 10-01-2026

Corresponding Author: Muhammad Ashraf

Department of General Medicine, Sandeman Provincial Hospital, Bolan Medical College, Quetta, Balochistan, Pakistan.

Email: kehark556@gmail.com

ORCID: 0000-0002-8272-758

DOI: 10.69837/pjammr.v4i1.114

How to Cite This Article: **Ashraf M, Jahanzeb, Muhammad SA, Malik A, Hakim, Qadeer A.** Evaluating the Prognostic Value of Variceal Bleeding Using Child-Pugh Stratification in the Outcome of Chronic Liver Disease: Rebleeding and Mortality. **Pak J Adv Med Med Res. 2025;4(1):39-43.**

ABSTRACT

Background: Variceal bleeding is a life-threatening complication of chronic liver disease (CLD) that has a high frequency of recurrent bleeding and mortality. Child-Pugh classification is a widely used scoring system for evaluating hepatic dysfunction and may be useful for predicting outcomes after acute variceal hemorrhage.

Objective: To evaluate the prognostic value of Child-Pugh classification in predicting recurrent variceal bleeding and mortality among patients with chronic liver disease presenting with acute variceal bleeding.

Methodology: This cross-sectional study was conducted in the Department of General Medicine, Sandeman Provincial Hospital, Bolan Medical College, Quetta, Balochistan, Pakistan, from March to August 2025. A total of 126 consecutive patients with chronic liver disease presenting with acute variceal bleeding were included using consecutive non-probability sampling. Patients were classified into Child-Pugh Classes A, B, or C based on clinical and laboratory findings at admission. Standard medical and endoscopic management was provided to all patients. Data were analyzed using SPSS version 27.0, and a p-value <0.05 was considered statistically significant.

Results: Among 126 patients, 32 (25.4%) were classified as Child-Pugh Class A, 51 (40.5%) as Class B, and 43 (34.1%) as Class C. Rebleeding within six weeks occurred in 2 (6.3%), 14 (27.5%), and 24 (55.8%) patients in Child-Pugh Classes A, B, and C, respectively ($p < 0.001$). In-hospital mortality increased from 1 (3.1%) in Class A to 6 (11.8%) in Class B and 16 (37.2%) in Class C ($p < 0.001$). Multivariable logistic regression identified Child-Pugh Class C as an independent predictor of recurrent bleeding (adjusted OR 6.58; 95% CI 2.41–17.94; $p < 0.001$) and mortality (adjusted OR 8.74; 95% CI 2.35–32.49; $p = 0.001$).

Conclusion: Child-Pugh stratification is a reliable prognostic tool for identifying patients at increased risk of recurrent variceal bleeding and mortality. It is potentially beneficial for early risk stratification, treatment choices, and patient outcomes when used routinely.

.

INTRODUCTION

Chronic liver disease (CLD) is a significant public health problem with a high burden of morbidity, mortality, and health care costs globally. It includes a range of progressive liver diseases associated with long-term (chronic) inflammation, fibrosis, and cirrhosis, leading to liver failure. Liver diseases are a major cause of death around the world, and cirrhosis is one of the ten leading causes of death internationally, according to the World Health Organization. Chronic hepatitis B virus (HBV) and hepatitis C virus (HCV) infections, late diagnosis, limited access to anti-viral therapy, and lack of awareness about preventive measures all contribute to the high burden of CLD in developing countries, including Pakistan. Liver disease progresses to portal hypertension, which is a significant pathological pathway, leading to several life-threatening complications [1,2]. Gastroesophageal variceal bleeding is one of the most serious medical emergencies that can be seen in clinical practice among the other complications of portal hypertension. Around 50-60% of those with cirrhosis develop oesophageal varices during the course of their disease, and nearly one-third of these patients have a single episode of acute variceal hemorrhage. Acute variceal bleeding has still been linked to high morbidity/mortality despite remarkable improvement in drug treatment, endoscopy, intensive care treatment, and prevention modalities. The likelihood of early rebleeding after the first bleeding event is still high, especially within the first six weeks after the initial bleed, and should be assessed promptly and managed appropriately to increase the survival of patients [3,4]. The prognosis after variceal bleeding will relate to several factors: extent of liver dysfunction, the severity of portal hypertension, the presence of ascites, the presence of hepatic encephalopathy, renal impairment, coagulopathy and response to initial treatment. Hepatic functional reserve is one such factor and plays an important role in short- and long-term outcomes. Thus, the appropriate quantification of liver disease severity is essential for predicting clinical outcomes and guiding therapeutic decisions [5]. One of the most widely accepted prognostic scoring systems for assessing the severity of chronic liver disease is the Child-Pugh classification. The score was originally developed to identify operative mortality in patients undergoing surgery for portal hypertension, but is now a standard clinical tool to evaluate liver function. It includes five clinical and biochemical factors: serum bilirubin, serum albumin, prothrombin time/ international normalized ratio (INR), ascites, and hepatic encephalopathy. Patients are classified into Child-Pugh Classes A, B, or C, corresponding to mild, moderate, and severe hepatic dysfunction, respectively, based on the total score. Several studies have shown that the higher the Child-Pugh classification, the greater the complication rate, the longer the hospital stay, the higher the recurrence rate, and the lower the survival rate [6,7]. While various prognostic models, such as the Model for End-Stage Liver Disease (MELD) score, have been developed, the Child-Pugh classification continues to be used for its simplicity, clinical utility, and proven prognostic value. The early recognition of patients with a high risk of recurrent hemorrhage and mortality allows for the close observation of these individuals, the optimization of their pharmacological management, early endoscopic intervention, and the consideration of advanced therapies such as transjugular intrahepatic portosystemic shunting (TIPS) or liver transplantation. This risk stratification becomes especially crucial in healthcare environments with limited resources, where efficient resource allocation is crucial [8,9]. Although the Child-Pugh system is widely used to assess acute variceal bleeding, available regional data on its usefulness in predicting rebleeding and mortality are limited. Variations in disease etiology, health care access, and treatment practices can affect patient outcomes in various populations.

Study Objective

To assess the ability of Child-Pugh classification in the prediction of rebleeding and mortality in patients with chronic liver disease who presented with acute variceal bleeding.

Materials and Methods

Study Design and Setting.

This cross-sectional study was conducted in the Department of General Medicine at Sandeman Provincial Hospital/Bolan Medical College, Quetta, from March to August 2025, following Institutional Review Board approval.

Participants

A total of 126 adult patients with chronic liver disease presenting with acute upper gastrointestinal bleeding secondary to esophageal or gastric varices were included using consecutive non-probability sampling. The diagnosis of chronic liver disease was established based on clinical findings, laboratory investigations, ultrasonography, and upper gastrointestinal endoscopy. Child-Pugh classification was determined at admission using standard clinical and biochemical parameters. All patients received standard medical and endoscopic treatment according to institutional protocols.

Sample Size Calculation

The sample size was calculated using the WHO Sample Size Calculator assuming a 95% confidence level, 8% margin of error, and an anticipated prevalence of 50%, yielding a minimum required sample size of 126 participants. Consecutive eligible patients were enrolled until the required sample size was achieved.

Inclusion Criteria

- Adults aged 18 years and older.
- On clinical, laboratory, and imaging evaluation, chronic liver disease was diagnosed.

- Acute esophageal/gastric variceal bleeding with upper GI endoscopy confirmation.
- Written informed consent was obtained from patients for inclusion in the study.

Exclusion Criteria

- Patients with non-variceal upper gastrointestinal bleeding.
- Previous transjugular intrahepatic portosystemic shunt (TIPS) or liver transplantation.
- Liver cancer or other serious cancers.
- Severe cardiopulmonary disease or chronic kidney disease in need of dialysis.
- Inadequate clinical records or lost to follow-up.

Diagnostic and Management Strategy.

Upper gastrointestinal endoscopy was performed within 24 hours of admission and confirmed the acute variceal bleeding. Standard management (hemodynamic resuscitation, vasoactive agents, prophylactic antibiotics, and endoscopic variceal ligation/sclerotherapy as needed) was given to all patients.

Statistical Analysis

Data were entered and analyzed in IBM SPSS Statistics version 27.0. All continuous variables were shown as mean ± SD and all categorical variables were expressed as frequencies and percentages. One-way ANOVA and Chi-square tests were used as appropriate to make comparisons between Child-Pugh classes. Independent predictors of rebleeding and mortality were identified by multivariable logistic regression. A p-value <0.05 was considered statistically significant.

Results

A total of 126 patients with chronic liver disease presenting with acute variceal bleeding were included in the study. There were 86 (68.3%) males and 40 (31.7%) females, with a mean age of 51.9 ± 11.4 years. According to Child-Pugh stratification, 32 (25.4%) patients were classified as Class A, 51 (40.5%) as Class B, and 43 (34.1%) as Class C. Rebleeding within six weeks occurred in 2 (6.3%) patients in Child-Pugh Class A, 14 (27.5%) in Class B, and 24 (55.8%) in Class C ($p < 0.001$). In-hospital mortality was observed in 1 (3.1%) patient in Class A, 6 (11.8%) in Class B, and 16 (37.2%) in Class C ($p < 0.001$). The mean duration of hospital stay increased significantly with worsening Child-Pugh class, from 4.9 ± 1.8 days in Class A to 6.8 ± 2.3 days in Class B and 9.4 ± 3.1 days in Class C ($p < 0.001$). Multivariable logistic regression demonstrated that Child-Pugh Class C was independently associated with recurrent bleeding (adjusted OR, 6.58; 95% CI, 2.41–17.94; $p < 0.001$) and mortality (adjusted OR, 8.74; 95% CI, 2.35–32.49; $p = 0.001$).

Table 1. Baseline Demographic and Clinical Characteristics of the Study Participants According to Child-Pugh Class (n = 126)

Variable	Child-Pugh A (n=32)	Child-Pugh B (n=51)	Child-Pugh C (n=43)	p-value
Age (years), Mean ± SD	45.8 ± 10.4	51.7 ± 11.2	56.9 ± 10.8	<0.001
Male, n (%)	22 (68.8)	35 (68.6)	29 (67.4)	0.987
Female, n (%)	10 (31.2)	16 (31.4)	14 (32.6)	
HBV-related CLD, n (%)	12 (37.5)	18 (35.3)	15 (34.9)	0.956
HCV-related CLD, n (%)	15 (46.9)	24 (47.1)	20 (46.5)	
Other causes, n (%)	5 (15.6)	9 (17.6)	8 (18.6)	
Ascites, n (%)	8 (25.0)	28 (54.9)	39 (90.7)	<0.001
Hepatic encephalopathy, n (%)	2 (6.3)	11 (21.6)	24 (55.8)	<0.001
INR, Mean ± SD	1.28 ± 0.18	1.59 ± 0.24	2.02 ± 0.36	<0.001
Serum Albumin (g/dL), Mean ± SD	3.7 ± 0.4	3.1 ± 0.5	2.6 ± 0.4	<0.001
Total Bilirubin (mg/dL), Mean ± SD	1.8 ± 0.7	3.2 ± 1.1	5.6 ± 2.0	<0.001

Baseline demographic and clinical characteristics of patients presenting with acute variceal bleeding according to Child-Pugh classification. Continuous variables are presented as mean ± standard deviation (SD), whereas categorical variables are presented as frequencies and percentages. P-values were calculated using one-way ANOVA for continuous variables and the Chi-square test for categorical variables.

Table 2. Clinical Outcomes According to Child-Pugh Classification

Outcome	Child-Pugh A (n=32)	Child-Pugh B (n=51)	Child-Pugh C (n=43)	p-value
Rebleeding within 6 weeks, n (%)	2 (6.3%)	14 (27.5%)	24 (55.8%)	<0.001
In-hospital mortality, n (%)	1 (3.1)	6 (11.8)	16 (37.2)	<0.001
Length of hospital stay (days), Mean ± SD	4.9 ± 1.8	6.8 ± 2.3	9.4 ± 3.1	<0.001
ICU admission, n (%)	2 (6.3)	10 (19.6)	18 (41.9)	<0.001
Blood transfusion ≥3 units, n (%)	5 (15.6)	18 (35.3)	27 (62.8)	<0.001

Comparison of major clinical outcomes among Child-Pugh classes. Patients with Child-Pugh Class C experienced significantly higher rates of recurrent variceal bleeding, mortality, ICU admission, blood transfusion requirements, and prolonged

hospitalization.

Table 3. Multivariable Logistic Regression Analysis for Predictors of Rebleeding

Variable	Adjusted OR	95% CI	p-value
Child-Pugh Class B vs A	2.74	1.09–6.89	0.031
Child-Pugh Class C vs A	6.58	2.41–17.94	<0.001
Age (>55 years)	1.54	0.78–3.05	0.208
Male gender	1.12	0.53–2.39	0.761
Ascites	2.18	1.02–4.66	0.044
Hepatic encephalopathy	2.71	1.21–6.05	0.015
INR (>1.8)	2.36	1.08–5.17	0.032

Multivariable logistic regression identifying independent predictors of recurrent variceal bleeding. Child-Pugh Class C demonstrated the strongest association with rebleeding after adjustment for potential confounding variables.

Table 4. Multivariable Logistic Regression Analysis for Predictors of Mortality

Variable	Adjusted OR	95% CI	p-value
Child-Pugh Class B vs A	2.61	0.79–8.58	0.116
Child-Pugh Class C vs A	8.74	2.35–32.49	0.001
Rebleeding	3.52	1.34–9.22	0.011
Hepatic encephalopathy	3.85	1.42–10.41	0.008
INR (>1.8)	2.94	1.09–7.89	0.033
Serum Albumin (<2.8 g/dL)	2.47	1.01–6.05	0.047
Age (>55 years)	1.72	0.68–4.31	0.252

Multivariable logistic regression analysis showing predictors of in-hospital mortality. Advanced liver dysfunction (Child-Pugh Class C), recurrent bleeding, hepatic encephalopathy, elevated INR, and hypoalbuminemia were independent predictors of mortality.

Discussion

The present cross-sectional study evaluated the association between Child-Pugh classification and clinical outcomes among patients with chronic liver disease presenting with acute variceal bleeding. The findings demonstrated a progressive increase in recurrent bleeding, prolonged hospital stay, and mortality with worsening Child-Pugh class. The clinical outcome of Child-Pugh Class C was significantly worse than Class A and B, thus supporting the notion that an advanced hepatic dysfunction is one of the strongest determinants of poor outcome after acute variceal hemorrhage. The results agree with other studies that found Child-Pugh classification to be a useful and easily applied tool for predicting the prognosis in cirrhotics with portal hypertension [10]. The mean age of the study population was 51.9 ± 11.4 years, and 68.3% of the participants were male. This demographic profile is comparable to that reported in recent studies from South Asia and other developing countries, where chronic hepatitis B and hepatitis C remain the predominant causes of cirrhosis and portal hypertension. Similar age distribution and male predominance have been reported among patients presenting with acute variceal bleeding, reflecting the epidemiology of chronic liver disease in these regions [11,12]. Recurrent variceal bleeding was observed in approximately one-third of patients, with the highest frequency among those classified as Child-Pugh Class C. The risk of recurrent bleeding increased significantly with worsening hepatic dysfunction, emphasizing the close relationship between impaired liver function, portal hypertension, and recurrent hemorrhage. Similar findings have been reported in previous studies, where advanced Child-Pugh class independently predicted recurrent bleeding despite standard pharmacological and endoscopic therapy [14,15]. There was also a significant difference in mortality for each Child-Pugh class, with the highest mortality in the Child-Pugh Class C group. This discovery is consistent with current findings indicating that the severity of hepatic dysfunction remains one of the strongest predictors of early survival after acute variceal bleeding. Current international recommendations emphasize the importance of early identification of high-risk patients, enabling early intensive care, early use of vasoactive therapy, early endoscopy, consideration of pre-emptive transjugular intrahepatic portosystemic shunt (TIPS), and evaluation of liver transplantation if indicated [15,17]. A multivariable logistic regression analysis also showed that Child-Pugh Class C was an independent predictor of recurrent bleeding and mortality following the adjustment for other clinical variables. Newer prognostic models have been proposed, including MELD, MELD-Na, and ALBI. Still, the Child-Pugh classification remains widely used due to its ease of use, bedside applicability, and established prognostic performance. Child-Pugh classification has been validated in several recent studies compared with other systems, particularly in resource-limited healthcare settings, where a quick bedside assessment of risk is crucial [16,17]. Patients in Child-Pugh Class C also had much longer hospital stays compared with patients in Classes A and B, suggesting more complications, higher levels of healthcare resource utilization, and higher disease severity. Comparable findings have been reported in recent multicenter studies showing that for those who develop cirrhosis, advanced cirrhosis is associated with longer hospital stays, higher transfusion needs, intensive care unit admission, and higher health care costs. These observations support the existing guidelines that recommend early risk stratification and intensive treatment of those patients with advanced liver disease who present with acute variceal bleeding [15,17,18]. This study provides important local evidence supporting the prognostic utility of Child-Pugh classification among Pakistani patients with chronic liver disease presenting with acute variceal bleeding. Future multicenter prospective studies with

larger sample sizes comparing the Child-Pugh classification with newer prognostic models, including MELD, MELD-Na, and ALBI scores, are warranted to optimize risk prediction further and improve clinical outcomes in patients with acute variceal hemorrhage [16-19].

Limitations

This study was conducted at a single tertiary-care center with a relatively small sample size, which may limit the generalizability of the findings. In addition, the cross-sectional design precluded assessment of long-term clinical outcomes. Larger multicenter studies with extended follow-up are recommended to validate these findings.

Conclusion

The Child-Pugh classification is a practical and reliable prognostic tool for predicting rebleeding and mortality among patients with chronic liver disease presenting with acute variceal bleeding. Higher Child-Pugh classes were significantly associated with worse clinical outcomes, supporting the routine use of this simple bedside scoring system for early risk stratification and individualized clinical management. Further multicenter studies are recommended to validate these findings in larger and more diverse patient populations.

Ethical Approval

Ethical approval for this cross-sectional study was obtained from the Institutional Review Board (IRB) of Sandeman Provincial Hospital/Bolan Medical College, Quetta **(Approval No. IRB/SPH-BMC/2025/1233; dated 02/03/2025).**

Disclaimer: Nil

Conflict of Interest: Nil

Funding Disclosure: Nil

Authors' Contributions (ICMJE-Compliant)

Muhammad Ashraf: Conceptualization, study design, patient recruitment, data collection, data analysis, interpretation of results, manuscript drafting, and final approval of the manuscript.

Jahanzeb: Study supervision, methodology, critical revision of the manuscript for important intellectual content, and final approval.

Syed Akhter Muhammad: Clinical management, data interpretation, manuscript review, and final approval.

Abdul Malik: Data collection, statistical interpretation, manuscript drafting, and final approval.

Hakim: Patient recruitment, data curation, data verification, manuscript review, and final approval.

Asma Qadeer: Literature review, data validation, manuscript editing, and final approval.

All authors approved the final manuscript and agree to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

References

1. Yang L, Sun R, Wei N, Chen H. Systematic review and meta-analysis of risk scores in prediction for the clinical outcomes in patients with acute variceal bleeding. Ann Med. 2021;53(1):1806-1815. doi:10.1080/07853890.2021.1990394.
2. Khan F, Tripathi D. Role of early transjugular intrahepatic portosystemic stent-shunt in acute variceal bleeding: An update of the evidence and future directions. World J Gastroenterol. 2021;27(44):7612-7624. doi:10.3748/wjg.v27.i44.7612.
3. Cazacu SM, Alexandru DO, Popescu AV, Popa P, Rogoveanu I, Iovanescu VF. Is there a role for the neutrophil-to-lymphocyte ratio for rebleeding and mortality risk prediction in acute variceal bleeding? A comparative 5-year retrospective study. Diseases. 2025;13(8):265. doi:10.3390/diseases13080265.
4. Ji K, Li X, Zhu H, Zhao S, Zhan P, Shi Y, et al. A creatinine-based model for predicting recurrent bleeding after modified percutaneous transhepatic variceal embolization in patients with cirrhosis. J Interv Med. 2022;5(2):95-102. doi:10.1016/j.jimed.2022.03.007.
5. Cazacu SM, Alexandru DO, Statie RC, Iordache S, Ungureanu BS, Iovănescu VF, et al. The accuracy of pre-endoscopic scores for mortality prediction in patients with upper gastrointestinal bleeding and no endoscopy performed. Diagnostics (Basel). 2023;13(6):1188. doi:10.3390/diagnostics13061188.
6. Liu Y, Chang H, Zeng Y, Li J, Li Y, Chen Y, et al. Influence of subcutaneous adipose tissue index on prognosis in cirrhotic patients following endoscopic therapy: A retrospective cohort study. Lipids Health Dis. 2024;23(1):7. doi:10.1186/s12944-023-01996-9.
7. Shi Y, Shen W, Xu G, Wang X, Ning B. Hepatic venous pressure gradient and rebleeding risk of patients with nonalcoholic steatohepatitis cirrhosis after variceal bleeding. Front Med (Lausanne). 2023;10:1224506. doi:10.3389/fmed.2023.1224506.
8. Luo S, Wu K, Zhou X. Timing of endoscopy in patients with acute variceal bleeding in cirrhosis: An updated systematic review and meta-analysis. BMC Gastroenterol. 2025;25(1):488. doi:10.1186/s12876-025-04088-3.
9. Jung K, Moon W. Role of endoscopy in acute gastrointestinal bleeding in real clinical practice: An evidence-based review. World J Gastrointest Endosc. 2019;11(2):68-83. doi:10.4253/wjge.v11.i2.68.
10. Barbu LA, Cercelaru L, Vîlcea ID, Şurlin V, Mogoantă SS, Ţenea Cojan TS, et al. Variceal upper gastrointestinal bleeding: A retrospective cohort of 98 cases, historical comparison, and updated management algorithm. Life (Basel). 2025;15(10):1626. doi:10.3390/life15101626.
11. Guinazu C, Fernández Muñoz A, Maldonado MD, De La Cruz JA, Herrera D, Arruarana VS, et al. Assessing the predictive factors for bleeding in esophageal variceal disease: A systematic review. Cureus. 2023;15(11):e48954. doi:10.7759/cureus.48954.
12. Zanetto A, Shalaby S, Feltracco P, Gambato M, Germani G, Russo FP, et al. Recent advances in the management of acute variceal hemorrhage. J Clin Med. 2021;10(17):3818. doi:10.3390/jcm10173818.
13. Rajesh S, George T, Philips CA, Ahamed R, Kumbar S, Mohan N, et al. Transjugular intrahepatic portosystemic shunt in cirrhosis: An exhaustive critical update. World J Gastroenterol. 2020;26(37):5561-5596. doi:10.3748/wjg.v26.i37.5561.
14. Triantos C, Kalafateli M, Assimakopoulos SF, Karaivazoglou K, Mantaka A, Aggeletopoulou I, et al. Endotoxin translocation and gut barrier dysfunction are related to variceal bleeding in patients with liver cirrhosis. Front Med (Lausanne). 2022;9:836306. doi:10.3389/fmed.2022.836306.
15. Mohammadyari F, Aflak A, ZareDini M, Irandoost R, Ghaffari S, Gharib A, et al. Risk stratification and scoring systems in upper and lower gastrointestinal bleeding: Review of performance and limitations in the emergency department. Front Med (Lausanne). 2025;12:1564015. doi:10.3389/fmed.2025.1564015.
16. Zhu Z, Jiang H. External validation of Chronic Liver Failure-Consortium Acute Decompensation score in the risk stratification of cirrhotic patients hospitalized with acute variceal bleeding. Eur J Gastroenterol Hepatol. 2023;35(3):302-312. doi:10.1097/MEG.0000000000002487.
17. Boregowda U, Umapathy C, Halim N, Desai M, Nanjappa A, Arekapudi S, et al. Update on the management of gastrointestinal varices. World J Gastrointest Pharmacol Ther. 2019;10(1):1-21. doi:10.4292/wjgpt.v10.i1.1.
18. Dewi PISL, Pamungkas KMN, Dewi NLPY, Dewi NNGK, Sindhughosa DA, Mariadi IK. Evaluating the clinical endpoint of antibiotic prophylaxis for cirrhosis patients complicated with upper gastrointestinal bleeding: An updated systematic review and meta-analysis. Acta Med Philipp. 2025;59(8):77-86. doi:10.47895/amp.vi0.10174.
19. Hofer BS, Simbrunner B, Bauer DJM, Paternostro R, Schwabl P, Scheiner B, et al. Acute hemodynamic response to propranolol predicts bleeding and nonbleeding decompensation in patients with cirrhosis. Hepatol Commun. 2022;6(9):2569-2580. doi:10.1002/hep4.2021.