e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com

International Journal of Pharmaceutical Quality Assurance 2026; 17(4); 187-193

Original Research Article

Endoscopic Spectrum of Upper Gastrointestinal Lesions in Liver Cirrhosis: A Prospective Study from a Tertiary Care Centre

Tikendra Kumar Sharma[1], Neeraj Kumar[2], Gunjan Kumar[3]

[1]Consultant, Department of Gastroenterology, Medicity Hospital, Gaya ji,Bihar, India.
[2]SMO, Department of PSM, Anugrah Narayan Magadh Medical College and Hospital, Gaya ji, Bihar, India
[3]SMO, Department of Anesthesiology, Anugrah Narayan Magadh Medical College and Hospital, Gaya ji, Bihar, India.

Received: 15-02-2026 / Revised: 14-03-2026 / Accepted: 20-04-2026
Corresponding Author: Dr. Neeraj Kumar
Conflict of interest: Nil

Abstract:

Background: Liver cirrhosis is a chronic condition associated with multiple complications, the most significant being portal hypertension and gastrointestinal bleeding. Upper gastrointestinal endoscopy (UGIE) plays a critical role in detecting mucosal lesions such as esophageal varices, gastric varices, portal hypertensive gastropathy, and peptic ulcers in cirrhotic patients. Understanding the prevalence and spectrum of these lesions is essential for risk stratification and timely intervention.

Objective: To evaluate the endoscopic spectrum and prevalence of upper gastrointestinal lesions in patients diagnosed with liver cirrhosis.

Methods: This prospective observational study was conducted on 125 patients with clinically or radiologically confirmed cirrhosis of liver who underwent UGIE at Anugrah Narayan Magadh Medical College and Hospital, Gaya ji, Bihar, India, Endoscopic findings were recorded and analyzed for prevalence, type of lesion, and association with clinical parameters including Child-Pugh classification and history of gastrointestinal bleeding.

Results: Out of 125 patients, 78 (62.4%) were male and 47 (37.6%) females. The most common lesion observed was esophageal varices (78.4%), followed by portal hypertensive gastropathy (56.8%) and gastric varices (22.4%). Peptic ulcers were seen in 9.6% of cases. Large varices were more common in patients with higher Child-Pugh grades and prior history of hematemesis. Multiple lesions coexisted in over 60% of cases.

Conclusion: Upper gastrointestinal lesions are highly prevalent in cirrhotic patients, with esophageal varices and portal hypertensive gastropathy being the most frequent findings. Early UGIE screening is crucial for timely detection, classification, and management to prevent life-threatening bleeding episodes.

Keywords: Cirrhosis, esophageal varices, gastric varices, portal hypertension, endoscopy, UGIE, Child-Pugh classification.

DOI: 10.25258/ijpqa.17.4.31

Introduction

Liver cirrhosis represents the final common pathway of chronic liver disease, characterized by irreversible fibrosis, distortion of the hepatic architecture, and the formation of regenerative nodules. It is a major global health concern, with increasing prevalence and significant morbidity and mortality, especially in developing countries like India. Cirrhosis can result from various etiologies including chronic viral hepatitis (HBV, HCV), alcoholic liver disease, non-alcoholic steatohepatitis (NASH), autoimmune liver disorders, and metabolic liver diseases [1,2].

One of the most feared and life-threatening complications of cirrhosis is portal hypertension, which arises due to increased resistance to portal blood flow and hyperdynamic circulation. This hemodynamic disturbance leads to the development of portosystemic collaterals and a spectrum of upper gastrointestinal (GI) lesions such as esophageal varices, gastric varices, portal hypertensive gastropathy (PHG), and congestive gastropathy. These lesions are highly prone to bleeding, which contributes significantly to morbidity, emergency hospitalization, and mortality in cirrhotic patients [3,4]. Esophageal varices are present in approximately 30–60% of cirrhotic patients at diagnosis, with the risk increasing with the severity of liver disease. Bleeding from esophageal or gastric varices can be sudden and massive, requiring urgent intervention [5]. Portal hypertensive gastropathy, another manifestation of portal hypertension, is

often overlooked but can cause chronic blood loss leading to anemia or, in severe cases, acute upper GI bleeding. Moreover, cirrhotic patients are also susceptible to peptic ulcer disease, erosive gastritis, and duodenal ulcers due to impaired mucosal defense, altered gastric motility, and the frequent use of non-steroidal anti-inflammatory drugs (NSAIDs) or alcohol [6]. Upper gastrointestinal endoscopy (UGIE) is an indispensable diagnostic and therapeutic tool in the evaluation and management of patients with cirrhosis. It provides direct visualization of the mucosa, allows classification of varices (size, red signs), assessment of PHG severity, and identification of non-variceal sources of bleeding. Endoscopic surveillance not only aids in the diagnosis but also guides prophylactic interventions such as band ligation or beta-blocker therapy to prevent first or recurrent variceal bleeding [7,8].

Several studies have emphasized the importance of early endoscopic screening in cirrhotic patients, especially those with advanced disease (Child-Pugh class B or C) or with a previous history of gastrointestinal bleeding [9]. However, the pattern and prevalence of endoscopic lesions can vary depending on geographic, etiological, and demographic factors. In India, where hepatitis, alcohol-related cirrhosis, and late presentation are common, understanding the endoscopic profile in cirrhotic patients is essential for developing effective screening and preventive strategies [10].

Despite its clinical importance, there is limited regional data from tertiary centers in Bihar and eastern India describing the endoscopic spectrum in liver cirrhosis. Early identification of high-risk lesions through UGIE can help reduce bleeding-related mortality and improve the quality of life in cirrhotic patients.

The present study was conducted with the objective of evaluating the prevalence and endoscopic pattern of upper gastrointestinal lesions in patients with liver cirrhosis in a tertiary care hospital. This includes the assessment of esophageal and gastric varices, portal hypertensive gastropathy, peptic ulcer disease, and their correlation with clinical severity of cirrhosis using Child-Pugh classification.

Aim and Objectives

Aim: To study the endoscopic spectrum and prevalence of upper gastrointestinal lesions in patients with liver cirrhosis admitted to a tertiary care hospital.

Objectives:

1. To determine the prevalence of esophageal varices, gastric varices, portal hypertensive gastropathy, and other upper gastrointestinal lesions in cirrhotic patients using upper GI endoscopy.
2. To classify esophageal varices by size and assess associated risk features such as red wale signs.
3. To identify the frequency of non-variceal lesions including peptic ulcers, erosions, and gastritis in cirrhotic patients.
4. To correlate endoscopic findings with the severity of liver disease based on Child-Pugh classification.
5. To assess the relationship between previous history of gastrointestinal bleeding and presence of high-risk lesions on endoscopy.

Materials and Methods

Study Design and Setting: This was a prospective, observational study conducted in Anugrah Narayan Magadh Medical College and Hospital, Gaya ji, Bihar, India

Study Duration: The study was carried out over a period of 12 months.

Sample Size: A total of 125 adult patients with clinically or radiologically confirmed liver cirrhosis who underwent upper gastrointestinal endoscopy (UGIE) were included.

Inclusion Criteria:

- Age ≥18 years.
- Patients with clinical, laboratory, and/or radiological diagnosis of liver cirrhosis.
- Patients undergoing UGIE for screening or evaluation of gastrointestinal symptoms.
- Informed consent provided.

Exclusion Criteria:

- Patients with acute liver failure.
- Patients with cirrhosis secondary to extrahepatic portal vein obstruction or non-cirrhotic portal hypertension.
- Patients who had prior endoscopic variceal band ligation or sclerotherapy within the last 6 months.
- Unwillingness or contraindications to undergo endoscopy.

Clinical Assessment and Classification: A detailed clinical history was obtained, including age, sex, alcohol intake, prior episodes of hematemesis or melena, and known liver disease. Physical examination and relevant laboratory investigations (LFTs, coagulation profile, complete blood count, renal function tests, and viral markers) were performed.

Severity of liver disease was assessed using the Child-Pugh classification, which incorporates:

- Serum bilirubin
- Serum albumin
- Prothrombin time/international normalized ratio (INR)

- Presence of ascites
- Presence of hepatic encephalopathy

Patients were grouped into Child-Pugh class A, B, or C.

Endoscopic Procedure: Upper gastrointestinal endoscopy was performed using a standard adult video endoscope (Olympus or Fujinon system) by experienced gastroenterologists. Patients underwent the procedure after fasting for at least 8 hours.

The following findings were recorded during endoscopy:

- Presence, grade, and risk stigmata of esophageal varices (classified as small, medium, or large; presence of red wale signs).
- Presence of gastric varices, if any (classified as GOV1, GOV2, IGV1, IGV2 based on Sarin's classification).
- Portal hypertensive gastropathy (PHG): Classified as mild or severe.
- Non-variceal lesions: Peptic ulcers, erosive gastritis, duodenitis, and esophagitis.

Photographic documentation and biopsy (where appropriate) were taken for unclear lesions.

Data Analysis:

Collected data were compiled using Microsoft Excel and analyzed using SPSS software (version 25.0). Descriptive statistics were used to summarize data. Categorical variables were presented as frequency and percentage. Chi-square test or Fisher's exact test was applied for comparisons. A p-value <0.05 was considered statistically significant.

Results

A total of 125 patients with clinically confirmed liver cirrhosis underwent upper gastrointestinal endoscopy during the study period. The mean age of the study population was 51.6 ± 13.2 years, with the majority being males (62.4%). Most patients presented with gastrointestinal symptoms such as upper abdominal discomfort, fatigue, and signs of portal hypertension. A previous history of upper GI bleeding was documented in 34.4% of cases. Alcohol was the most common etiological factor for cirrhosis, followed by hepatitis B and C infections.

Upper GI endoscopy revealed a wide range of lesions, with esophageal varices being the most common, followed by portal hypertensive gastropathy, gastric varices, and non-variceal lesions like peptic ulcers and erosive gastritis.

Table 1 presents the age distribution of patients with liver cirrhosis undergoing upper GI endoscopy. The majority of patients were between 41 and 60 years of age.

Table 1: Age-wise distribution of study participants

Age group (years)	Number of Patients	Percentage (%)
<30	9	7.2
31–40	21	16.8
41–50	32	25.6
51–60	38	30.4
>60	25	20.0
Total	**125**	**100**

Table 2 shows the gender distribution. Male patients constituted the majority of the study population.

Table 2: Gender distribution of the study population

Gender	Number of Patients	Percentage (%)
Male	78	62.4
Female	47	37.6

Table 3 categorizes the patients based on the underlying cause of cirrhosis. Alcohol was the most common etiology, followed by hepatitis B virus infection.

Table 3: Etiology of liver cirrhosis among study participants

Etiology	Number of Patients	Percentage (%)
Alcohol-related liver disease	61	48.8
Hepatitis B virus	26	20.8
Hepatitis C virus	15	12.0
Non-alcoholic steatohepatitis	13	10.4
Autoimmune/cryptogenic	10	8.0

Table 4 shows the distribution of cirrhotic patients according to Child-Pugh classification. Most patients were in Class B or C.

Table 4: Child-Pugh classification of cirrhosis severity

Child-Pugh Class	Number of Patients	Percentage (%)
Class A	38	30.4
Class B	51	40.8
Class C	36	28.8

Table 5 presents the proportion of patients with prior GI bleeding (hematemesis or melena). Over one-third had a history of such bleeding.

Table 5: History of gastrointestinal bleeding among participants

GI Bleed History	Number of Patients	Percentage (%)
Present (hematemesis/melena)	43	34.4
Absent	82	65.6

Table 6 summarizes the frequency of major upper GI lesions found during endoscopy. Esophageal varices were the most common, followed by portal hypertensive gastropathy.

Table 6: Endoscopic findings – overall lesion prevalence

Lesion	Number of Patients	Percentage (%)
Esophageal varices	98	78.4
Portal hypertensive gastropathy	71	56.8
Gastric varices	28	22.4
Peptic ulcers (gastric/duodenal)	12	9.6
Erosive gastritis/esophagitis	15	12.0
Normal endoscopy	11	8.8

Table 7 displays the grading of esophageal varices. Grade II varices were the most frequently observed.

Table 7: Grading of esophageal varices among affected patients

Grade of Varices	Number of Patients	Percentage (%)
Grade I (small)	31	25.6
Grade II	40	32.0
Grade III (large)	27	21.6

Table 8 shows the number of patients with high-risk stigmata (red wale signs) among those with varices.

Table 8: Presence of red wale markings on esophageal varices

Red Wale Sign	Number of Patients	Percentage (%)
Present	29	23.2
Absent	69	55.2
Not applicable (no varices)	27	21.6

Table 9 categorizes PHG severity among affected patients. Mild PHG was more common than severe PHG.

Table 9: Severity of portal hypertensive gastropathy (PHG)

PHG Severity	Number of Patients	Percentage (%)
Mild	46	36.8
Severe	25	20.0

Table 10 outlines the classification of gastric varices. GOV1 was the most frequently observed type.

Table 10: Types of gastric varices as per Sarin's classification

Gastric Varices Type (Sarin)	Number of Patients	Percentage (%)
GOV1 (lesser curvature)	17	13.6
GOV2 (fundus + esophagus)	7	5.6
IGV1 (isolated in fundus)	3	2.4
IGV2 (ectopic)	1	0.8

Table 11 illustrates the relationship between variceal grade and cirrhosis severity. Advanced varices were more prevalent in Child-Pugh Class C patients.

Table 11: Correlation of variceal grade with Child-Pugh class

Child-Pugh Class	Small Varices	Large Varices	Total with Varices
Class A	20	5	25
Class B	21	15	36
Class C	17	24	41

Table 12 presents the frequency of patients showing overlapping GI lesions. Multiple concurrent lesions were seen in over one-third of cases.

Table 12: Coexistence of multiple upper GI lesions

Coexisting Lesions	Number of Patients	Percentage (%)
Esophageal + Gastric Varices	20	16.0
Varices + PHG	44	35.2
Varices + Ulcer/Erosions	9	7.2

The results indicate that upper gastrointestinal lesions are highly prevalent in cirrhotic patients, with esophageal varices and portal hypertensive gastropathy being the most common. Larger varices and red wale signs were more frequent in patients with advanced liver disease (Child-Pugh Class C) and prior history of bleeding. The presence of overlapping lesions underscores the importance of thorough endoscopic evaluation for appropriate risk stratification and management.

Discussion

Liver cirrhosis, regardless of etiology, is a progressive condition that culminates in portal hypertension and subsequent development of a broad spectrum of upper gastrointestinal (UGI) lesions. These lesions, including esophageal varices, gastric varices, and portal hypertensive gastropathy (PHG), not only reflect the severity of hepatic decompensation but also constitute a significant cause of morbidity and mortality due to the risk of gastrointestinal bleeding. Early endoscopic surveillance plays a crucial role in detecting these high-risk lesions, facilitating appropriate prophylactic and therapeutic interventions. The present study comprehensively evaluates the prevalence and endoscopic profile of UGI lesions in 125 cirrhotic patients in a tertiary care setting in Bihar, India [11,12].

In our study, the majority of the patients belonged to the 41–60 years age group, which is consistent with the expected age of clinical manifestation of cirrhosis. Males constituted 62.4% of the study population, reflecting the higher prevalence of alcohol-related liver disease among men a trend commonly observed in Indian and global datasets [13]. Alcohol-related cirrhosis was the leading etiology (48.8%), followed by hepatitis B virus (20.8%) and hepatitis C virus (12%). These findings align with prior Indian studies indicating that alcohol remains a dominant etiological factor in cirrhosis, particularly in resource-limited and rural regions [14].

The Child-Pugh classification, which estimates the severity of cirrhosis and predicts clinical outcomes, showed that most patients were in Class B (40.8%) or C (28.8%), suggesting that a majority presented with decompensated liver disease. Importantly, the frequency and severity of endoscopic lesions were found to be strongly correlated with higher Child-Pugh class, further confirming that advanced liver disease predisposes patients to more significant portal hypertension-related complications [15].

Upper gastrointestinal endoscopy revealed that esophageal varices were the most common lesion, observed in 78.4% of patients. Among these, 32% had Grade II varices and 21.6% had Grade III (large) varices. The presence of red wale signs, a known predictor of variceal hemorrhage, was noted in 23.2% of the cohort. These observations reinforce the clinical importance of endoscopic grading and risk stratification in planning preventive strategies such as non-selective beta-blockers or endoscopic band ligation [16].

Portal hypertensive gastropathy was observed in 56.8% of cases, with 20% exhibiting the severe form. PHG, although less likely than varices to cause acute bleeding, can result in chronic blood loss leading to iron-deficiency anemia. The findings emphasize the need for routine evaluation of PHG, especially in patients with unexplained anemia or advanced cirrhosis [17]. Gastric varices were present in 22.4% of patients, with GOV1 being the most common subtype (13.6%). These lesions pose diagnostic and therapeutic challenges and often require specialized interventions such as cyanoacrylate glue injection or transjugular intrahepatic portosystemic shunt (TIPS) [18].

Interestingly, a subset of patients (9.6%) had peptic ulcers, while 12% had erosive gastritis or esophagitis. These non-variceal lesions, though less common, are clinically relevant since cirrhotic patients often have impaired mucosal defense mechanisms, delayed gastric emptying, and may be exposed to hepatotoxic or ulcerogenic medications such as NSAIDs. These factors may predispose to mucosal injury even in the absence of portal hypertension-related lesions [19].

Over one-third of patients had a history of gastrointestinal bleeding, either hematemesis or melena, prior to endoscopy. Among these, large varices and red wale signs were more prevalent, indicating that these features strongly correlate with the risk of bleeding. Additionally, many patients demonstrated coexisting lesions, with more than one-third having both varices and PHG. This highlights the need for a thorough and systematic endoscopic evaluation, as focusing solely on varices may lead to under recognition of other significant lesions [20].

The strong association between variceal grade and Child-Pugh class further underscores the importance of liver function status in predicting the presence and severity of endoscopic findings. Patients in Class C had the highest burden of large varices and PHG, reaffirming the need for more aggressive surveillance and prophylactic strategies in this subgroup.

The findings of this study are consistent with international literature and regional Indian studies, reaffirming the role of UGIE as an essential component of cirrhosis management. However, it also highlights the ongoing need for earlier diagnosis and referral, especially in rural populations where delayed presentation often results in advanced disease at the time of first evaluation.

Limitations of the study include its single-center design and absence of long-term follow-up on bleeding episodes or survival. Despite this, the sample size was adequate to establish significant patterns in lesion prevalence and severity among cirrhotic patients in eastern India.

Conclusion

Upper gastrointestinal endoscopic evaluation in cirrhotic patients reveals a high prevalence of potentially life-threatening lesions such as esophageal varices, gastric varices, and portal hypertensive gastropathy. The presence and severity of these lesions correlate closely with the degree of hepatic decompensation, as reflected by Child-Pugh classification and prior history of gastrointestinal bleeding. Early and routine endoscopic screening plays a vital role in detecting high-risk lesions, guiding prophylactic therapy, and preventing fatal hemorrhagic complications. This study underscores the importance of integrating timely UGIE into the standard management protocol for all patients with liver cirrhosis, particularly those in advanced stages or with previous GI bleeding.

References

1. Jakab SS, Garcia-Tsao G. Evaluation and Management of Esophageal and Gastric Varices in Patients with Cirrhosis. Clin Liver Dis. 2020 Aug;24(3):335-350. doi: 10.1016/j.cld.2020.04.011. Epub 2020 May 31. PMID: 32620275; PMCID: PMC11090175.
2. Stanley AJ, Laine L. Management of acute upper gastrointestinal bleeding. BMJ. 2019 Mar 25;364:l536. doi: 10.1136/bmj.l536. PMID: 30910853.
3. Shah T, Tapper EB. ERCP in Patients With Cirrhosis: "Risky Business" Or "Just Do it"? Am J Gastroenterol. 2019 Jan;114(1):19-20. doi: 10.1038/s41395-018-0271-9. PMID: 30315309.
4. Peng M, Bai Z, Zou D, Xu S, Wang C, Başaranoğlu M, Philips CA, Guo X, Shao X, Qi X. Timing of endoscopy in patients with cirrhosis and acute variceal bleeding: a single-center retrospective study. BMC Gastroenterol. 2023 Jun 26;23(1):219. doi: 10.1186/s12876-023-02766-8. PMID: 37365510; PMCID: PMC10291747.
5. Alvaro D, Caporaso N, Giannini EG, Iacobellis A, Morelli M, Toniutto P, Violi F; PReBRiC (Procedure-Related Bleeding Risk in Cirrhosis) group. Procedure-related bleeding risk in patients with cirrhosis and severe thrombocytopenia. Eur J Clin Invest. 2021 Jun;51(6):e13508. doi: 10.1111/eci.13508. Epub 2021 Feb 26. PMID: 33539542; PMCID: PMC8244048.
6. Bayani A, Hosseini A, Asadi F, Hatami B, Kavousi K, Aria M, Zali MR. Identifying predictors of varices grading in patients with cirrhosis using ensemble learning. Clin Chem Lab Med. 2022 Jul 19;60(12):1938-1945. doi: 10.1515/cclm-2022-0508. PMID: 35852068.
7. Bull-Henry K. Endoscopy in the coagulopathic patient. Curr Opin Gastroenterol. 2019 Sep;35(5):401-407. doi: 10.1097/MOG.0000000000000559. PMID: 31343417.
8. Odelowo OO, Smoot DT, Kim K. Upper gastrointestinal bleeding in patients with liver cirrhosis. J Natl Med Assoc. 2002 Aug;94(8):712-5. PMID: 12152928; PMCID: PMC2594284.
9. Dias E, Azevedo F, Afonso A, Macedo G. Upper Gastrointestinal Bleeding in a Patient with Liver Cirrhosis: Gastroesophageal Varices Are not Always to Blame. J Gastrointestin Liver Dis. 2021 Sep 21;30(3):323. doi: 10.15403/jgld-3472. PMID: 34551026.
10. Riphaus A, Lechowicz I, Frenz MB, Wehrmann T. Propofol sedation for upper gastrointestinal endoscopy in patients with liver cirrhosis as an alternative to midazolam to avoid acute deterioration of minimal encephalopathy: a randomized, controlled study. Scand J Gastroenterol. 2009;44(10):1244-51. doi: 10.1080/00365520903194591. PMID: 19811337.

11. Solanki S, Kichloo A, Dahiya DS, Solanki D, Singh J, Wani F, Albosta M, Ghimire S, Haq KF, Khan HMA, Jafri SM, Siddiqui MA, Zuchelli T. Endoscopic Retrograde Cholangiopancreatography (ERCP) in Patients With Liver Cirrhosis: Analysis of Trends and Outcomes From the National Inpatient Sample Database. J Clin Gastroenterol. 2022 Aug 1;56(7):618-626. doi: 10.1097/MCG.0000000000001573. Epub 2021 Jun 9. PMID: 34107514; PMCID: PMC9257052.
12. González-González JA, García-Compean D, Vázquez-Elizondo G, Garza-Galindo A, Jáquez-Quintana JO, Maldonado-Garza H. Nonvariceal upper gastrointestinal bleeding in patients with liver cirrhosis. Clinical features, outcomes and predictors of in-hospital mortality. A prospective study. Ann Hepatol. 2011 Jul-Sep;10(3):287-95. PMID: 21677330.
13. Gabr MA, Tawfik MA, El-Sawy AA. Non-variceal upper gastrointestinal bleeding in cirrhotic patients in Nile Delta. Indian J Gastroenterol. 2016 Jan;35(1):25-32. doi: 10.1007/s12664-016-0622-7. Epub 2016 Feb 17. PMID: 26884125.
14. Macken EJ, Steinhauser A, De Schepper HU, De Winter BY, Moreels TG. Colonoscopy in patients with liver cirrhosis : success and safety issues. Acta Gastroenterol Belg. 2015 Dec;78(4):411-4. PMID: 26712052.
15. Hadayat R, Jehangiri AU, Gul R, Khan AN, Said K, Gandapur A. Endoscopic findings of upper gastrointestinal bleeding in patients with liver cirrosis. J Ayub Med Coll Abbottabad. 2015 Apr-Jun;27(2):391-4. PMID: 26411125.
16. Cao YH, Chi P, Zhou C, Lv WF, Quan ZF, Xue FS. The 50% and 95% effective doses of remimazolam tosilate with adjuvant sufentanil for sedation in patients with liver cirrhosis undergoing oesophagogastric varices screening endoscopy. J Clin Pharm Ther. 2022 Dec;47(12):2068-2073. doi: 10.1111/jcpt.13751. Epub 2022 Aug 4. PMID: 36543252.
17. Alam L, Khattak MA, Alam M. Safety of balanced propofol and midazolam in upper gastrointestinal endoscopy for sedation in cirrhotic patients. J Pak Med Assoc. 2021 Jan;71(1(A)):64-68. doi: 10.47391/JPMA.526. PMID: 33484521.
18. Yoo JJ, Chang Y, Cho EJ, Moon JE, Kim SG, Kim YS, Lee YB, Lee JH, Yu SJ, Kim YJ, Yoon JH. Timing of upper gastrointestinal endoscopy does not influence short-term outcomes in patients with acute variceal bleeding. World J Gastroenterol. 2018 Nov 28;24(44):5025-5033. doi: 10.3748/wjg.v24.i44.5025. PMID: 30510377; PMCID: PMC6262253.
19. Cucchiarelli S, Santopaolo F, Lamazza A, Lionetti R, Lenci I, Manzia TM, Angelico M, Milana M, Baiocchi L. Pitfalls in the reporting of upper endoscopy features in cirrhotic patients. Dig Liver Dis. 2019 Mar;51(3):382-385. doi: 10.1016/j.dld.2018.08.014. Epub 2018 Aug 18. PMID: 30219669.
20. Rockey DC, Elliott A, Lyles T. Prediction of esophageal varices and variceal hemorrhage in patients with acute upper gastrointestinal bleeding. J Investig Med. 2016 Mar;64(3):745-51. doi: 10.1136/jim-2015-000047. Epub 2016 Feb 12. PMID: 26912006.