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Upper Gastrointestinal Bleeding in Patients with Alcohol-Related Liver Cirrhosis in Boyacá (Colombia)

Alexander Germán Ponce Esparza[1], Fabián Andrés Sánchez Castillo[1], Mariana Rada Rada[2], Juliana Noguera Fonseca[3], Laura Daniela Pinzón Rodríguez[4], Tania Julieth Ávila Espitia[5]

ABSTRACT

Introduction: Alcohol-related liver cirrhosis (ARLC) is a chronic, diffuse, and irreversible liver disease characterized by fibrosis and the formation of regenerative nodules, with potentially fatal complications such as upper gastrointestinal bleeding (UGIB). **Objective:** To determine the prevalence of upper gastrointestinal bleeding in patients with ARLC treated in a second-level hospital in Boyacá (Colombia) during 2021. **Materials:** A descriptive, retrospective cross-sectional study of all patients diagnosed with uncomplicated ARLC (without UGIB) and complicated ARLC (with UGIB). The variables analyzed included sociodemographic characteristics, pathological, pharmacological, and toxicological history, clinical manifestations, and paraclinical tests. **Results:** The majority of patients were male (81.1%), with an average age of 57 years. The prevalence of UGIB was 39.62%. The predominant residence was rural (66.04%), and the most frequent comorbidities were hypertension (41.51%), heart failure (13.21%), COPD (11.32%), and type 2 diabetes (7.55%). The most significant paraclinical findings were anemia (49.06%), hyponatremia (45.28%), prolonged INR (58.49%), prolonged PT (62.26%), hyperbilirubinemia (62.26%), elevated AST (77.36%), and hypoalbuminemia (64.15%). In patients with UGIB, these findings were also prevalent, along with leukocytosis (58.33%). **Conclusion:** The prevalence of UGIB was 39.62%, with most patients being males aged 45 to 64, from rural areas, with a history of hypertension, heart failure, COPD, and type 2 diabetes. None were managed with propranolol, and clinical manifestations included hematemesis, melena, and hyporexia. The patients had a high MELD score ($\bar{x}$=14.1), low levels of hemoglobin, sodium, and albumin, elevated total bilirubin, AST, and leukocyte levels, with prolonged INR and PT.

Keywords: liver cirrhosis; upper gastrointestinal bleeding; liver; associated factors; epidemiology.

[1] Hospital Regional de Moniquirá (Moniquirá, Colombia).

[2] Hospital San José, Fundación Universitaria de Ciencias de la Salud (FUCS) (Bogotá, Colombia).

[3] Compensar EPS (Bogotá, Colombia); Universidad de Boyacá (Tunja, Colombia).

[4] Resident Physician, Universidad Juan N Corpas (Bogotá, Colombia).

[5] Resident Physician, Universidad Pedagógica y Tecnológica de Colombia (Tunja, Colombia).

Corresponding Author: Juliana Noguera Fonseca. Email Address: noguerafonsecaj@gmail.com

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Hemorragia de vías digestivas altas analizadas en pacientes con cirrosis hepática alcohólica en Boyacá (Colombia)

RESUMEN

Introducción: La cirrosis hepática alcohólica (CHA) presenta una alteración crónica, difusa e irreversible del hígado, caracterizada por fibrosis y formación de nódulos de regeneración, cuyas complicaciones pueden ser mortales, como la hemorragia de vías digestivas altas (HVDA).

Objetivo: Determinar la prevalencia de hemorragia de vías digestivas altas en pacientes con CHA atendidos en un hospital de segundo nivel del departamento de Boyacá (Colombia), durante 2021.

Materiales: Estudio descriptivo, retrospectivo de corte transversal del total de pacientes con diagnóstico de CHA no complicada (sin HVDA) y complicada (con HVDA). Las variables analizadas fueron sociodemográficas, antecedentes patológicos, farmacológicos, toxicológicos, manifestaciones clínicas y exámenes paraclínicos.

Resultados: La mayoría de pacientes pertenecía al sexo masculino (81,1 %), con una edad promedio de 57 años. La prevalencia de HVDA fue del 39.62 %, la residencia que predomino fue rural 66.04 % y las comorbilidades más frecuentes fueron hipertensión arterial (41,51 %), falla cardiaca (13,21 %), EPOC (11,32 %) y DM2 (7,55 %). Los hallazgos paraclínicos más relevantes fueron anemia (49,06 %), hiponatremia (45,28 %), INR prolongado (58,49 %), PT prolongado (62,26 %), hiperbilirrubinemia (62,26 %), elevación de AST (77,36 %), hipoalbuminemia (64.15 %), y en el contexto de HVDA también predominaron estas variables incluida la leucocitosis (58,33 %).

Conclusión: La prevalencia de HVDA fue del 39,62 %, la mayoría hombres de 45 a 64 años, de área rural, con antecedente de HTA, falla cardiaca, EPOC y DM2, sin manejo con propranolol, con manifestaciones de hematemesis, melenas e hiporexia, puntaje MELD alto ($\bar{x}$=14.1), niveles bajos de hemoglobina, sodio y albúmina, niveles elevados de bilirrubina total, AST y leucocitos, con INR y PT prolongados.

Palabras clave: cirrosis hepática; hemorragia de vías digestivas altas; hígado; factores asociados; epidemiología.

Hemorragia de vias digestivas altas analisadas em pacientes com cirrose hepática alcoólica em Boyacá (Colômbia)

RESUMO

Introdução: A cirrose hepática alcoólica (CHA) apresenta uma alteração crônica, difusa e irreversível do fígado, caracterizada por fibrose e formação de nódulos de regeneração, cujas complicações podem ser mortais, como a hemorragia de vias digestivas altas (HVDA).

Objetivo: Determinar a prevalência de hemorragia de vias digestivas altas em pacientes com CHA atendidos em um hospital de segundo nível do departamento de Boyacá (Colômbia) durante 2021.

Materiais: Estudo descritivo, retrospectivo de corte transversal do total de pacientes com diagnostico de CHA não complicada (sem HVDA) e complicada com (com HVDA). As variáveis analisadas foram sociodemográficas, antecedentes patológicos, farmacológicos, toxicológicos, manifestações clinicas e exames paraclínicos.

Resultados: A maioria dos pacientes pertencia ao sexo masculino (81,1%), com uma idade média de 57 anos. A prevalência da HVDA foi de 39,62%, a residência predominante foi rural (66,04%) e as comorbidades mais frequentes foram hipertensão arterial (41,51%), insuficiência cardíaca (13,21%), DPOC (11,32%) e DM2 (7,55%). Os achados paraclínicos mais relevantes foram anemia (49,06%), hiponatremia (45,28%), INR prolongado (58,49%), PT prolongado (62,26%), hiperbilirrubinemia (62,26%), elevação de AST (77,36%), hipoalbuminemia (64,15%) e, no contexto de HVDA, essas variáveis também predominavam, incluindo leucocitose (58,33%).

Conclusão: A prevalência de HVDA foi de 39,62%, a maioria homens de 45 a 64 anos, de área rural, com antecedentes de hipertensão arterial, insuficiência cardíaca, DPOC e DM2, sem manejo com propranolol, com manifestações de hematêmese, melena e hiporexia, escore MELD alto (X=14,1), níveis baixos de hemoglobina, sódio e albumina, níveis elevados de bilirrubina total, AST e leucócitos, com INR e PT prolongados.

Palavras-chave: cirrose hepática; hemorragia de vias digestivas altas; fígado; fatores associados; epidemiologia.

INTRODUCTION

Globally, alcohol consumption is a well-known risk factor for premature death, morbidity, and disability, accounting for 5.9% of deaths and the loss of 139 million disability-adjusted life years (1–3). Alcohol-related liver cirrhosis (ARLC) is defined as a disorder related to excessive alcohol consumption that typically leads to chronic, diffuse, and irreversible damage to the liver. It is characterized by fibrosis and the formation of regenerative nodules that alter the vascular architecture and liver function (2,4–15).

Among the complications of ARLC are upper gastrointestinal bleeding (UGIB) and hepatic encephalopathy, which tend to occur in the late stages of the disease. UGIB is the most common complication, primarily caused by the presence and rupture of esophageal and gastric varices. The main clinical manifestations include hematemesis or melena, which can lead to acute peripheral circulatory failure in a short period (2,9,16–20). Alcohol-related liver disease is considered a major public health concern due to its high global prevalence and the significant costs associated with delayed or untimely detection in the population. It is believed to have the worst prognosis compared to liver cirrhosis of other etiologies (1,8,12,16,21–23).

The annual number of ARLC cases and its resulting complications negatively impacts the health of the Colombian population, a trend that continues to rise. This is largely due to limited access to healthcare, as well as socio-environmental, cultural, economic, educational, genetic, and behavioral factors. The national rate of alcohol-related liver disease is 10.7 per 100,000 inhabitants, with the highest rates in both sexes reported in the departments of Santander (27.1), Risaralda (19.9), and Boyacá (15.0) (1,5,14).

The objective of this study was to determine the prevalence of UGIB in patients with ARLC treated at a second-level hospital in Boyacá (Colombia) during 2021. The study population is located in the Suárez river basin, which includes municipalities from the lower Ricaurte area, such as Moniquirá, Chitaraque, San José de Pare, Santana, and Togüí; the upper Ricaurte area, and others like San Benito, Puente Nacional, and Vélez (6). Conducting this study in a second-level healthcare facility is of significant importance due to the high patient flow from various municipalities, allowing for the collection of data and understanding the dynamics of this pathology. This, in turn, can contribute to the implementation of health promotion strategies, disease prevention, and the management of its complications (7).

METHODOLOGY

Study Design and Population

This was a descriptive, retrospective, cross-sectional study. The data collection center was a second-level hospital in Boyacá. Medical records from patients aged 18 years and older with uncomplicated ARLC (without UGIB) and complicated ARLC (with UGIB), who were treated between January 1 and December 31, 2021, in the emergency and inpatient services, were analyzed, to find patients meeting the criteria for investigation.

Data Collection

Eighty-five medical records were reviewed, and the following inclusion criteria were applied: subjects between 18 and 95 years of age, adults with diagnosed ARLC identified according to the 10th edition of the International Classification of Diseases (ICD-10) as follows: cirrhosis, cirrhotic (K74.6), and alcohol-related cirrhosis (K70.3). Patients with ARLC and UGIB were defined as those having the following diagnoses: esophageal varices with hemorrhage (I850), esophageal varices without hemorrhage (I859), and gastrointestinal hemorrhage (K92.2). Exclusion criteria included patients with incorrect ICD-10 coding that did not match the described pathologies, or incomplete medical records. Thirty-two cases were excluded due to incorrect ICD-10 coding or incomplete records, leaving 53 patients that met the study's characteristics for evaluation.

Sociodemographic variables were collected, such as age, sex, origin, healthcare affiliation status, as well as pathological, pharmacological, and toxicological history. Clinical data collected included abdominal pain, hyporexia, nausea, hematemesis, and melena; paraclinical data collected included complete blood count, coagulation tests, electrolytes, liver function, renal function, and diagnostic imaging such as ultrasound and computed tomography. Length of hospital stay was also recorded, and the Child-Pugh classification and Model for End-Stage Liver Disease (MELD) score, both predictor models for cirrhosis patients, were calculated.

Statistical Analysis

The database was recorded in MS Excel® version 2013 and analyzed using SPSS version 26. Central tendency measures were used for quantitative variables, and frequency measures were used for qualitative variables. A univariate analysis was conducted on the selected population using descriptive statistics to determine absolute and relative frequencies of categorical variables. In this research design, selection biases were controlled by including all patients diagnosed with cirrhosis during the study period, based on ICD-10 diagnoses, with clear inclusion and exclusion

criteria established for differentiation. However, underdiagnosis and fewer hospital admissions may have occurred due to the COVID-19 pandemic. Other biases, such as information bias, were managed by using the content and data from medical records in the second-level hospital. Nevertheless, the data were recorded in the context of daily clinical practice rather than in a research setting, which could introduce a margin of error.

Ethical Considerations

The design of this cross-sectional descriptive study adheres to international and national ethical research standards, notably the Nuremberg Code, the Declaration of Helsinki, and Resolution 8430 of 1993 from the Colombian Ministry of Health, which governs health research. In accordance with these regulations, the present study is classified as low-risk (24). The study was approved by the institution's Scientific Research Ethics Committee.

RESULTS

A total of 53 medical records of patients diagnosed with cirrhosis, both with and without UGIB, were evaluated during the established timeframe from a second-level hospital. The sociodemographic characteristics and personal history of the studied population were analyzed (Table 1).

Table 1. Sociodemographic Characteristics and Medical History of Patients with Alcohol-Related Liver Cirrhosis in 2021

Characteristics	Total (n = 53)	With UGIB (n = 21)	Without UGIB (n = 32)
Sex (n [%])			
Men	43 (81.1)	18 (41.86)	25 (58.14)
Women	10 (18.87)	7 (70.00)	3 (30.00)
Age in completed years ($\bar{x}$)	57	62	54
Municipality (n [%])			
Moniquirá	16 (30.19)	4 (25.00)	12 (75.00)
Togüí	7 (13.21)	2 (28.57)	5 (71.43)
Santana	10 (18.87)	6 (60.00)	4 (40.00)
Chitaraque	11 (20.75)	5 (45.45)	6 (54.55)
San José de Pare	2 (3.77)	0 (0.00)	2 (100.00)
Barbosa	4 (7.55)	1 (25.00)	3 (75.00)
Others	3 (5.66)	3 (100.00)	0 (0.00)
Area of Occurrence (n [%])			
Rural	35 (66.04)	16 (45.71)	19 (54.29)
Urban	18 (33.96)	5 (27.78)	13 (72.22)
Type of Healthcare Coverage (n [%])			
Subsidized	47 (88.68)	17 (36.17)	30 (63.83)
Contribution- based	6 (11.32)	4 (66.67)	2 (33.33)
Special regime	0 (0.00)	0 (0.00)	0 (0.00)
Linked	0 (0.00)	0 (0.00)	0 (0.00)
Private	0 (0.00)	0 (0.00)	0 (0.00)
Education Level (n [%])			
None	5 (9.43)	5 (100.00)	0 (0.00)
Primary	32 (60.38)	12 (37.50)	20 (62.50)
Secondary	16 (30.19)	4 (25.00)	12 (75.00)
University	0 (0.00)	0 (0.00)	0 (0.00)

Characteristics	Total (n = 53)	With UGIB (n = 21)	Without UGIB (n = 32)
Associated Chronic Disease (n [%])			
Yes	38 (71.70)	13 (34.21)	25 (65.79)
No	15 (28.30)	8 (53.33)	7 (46.67)
Comorbidities (n [%])			
Arterial hypertension	22 (41.51)	6 (27.27)	16 (72.73)
Type 2 diabetes mellitus	4 (7.55)	1 (25.00)	3 (75.00)
Obesity	1 (1.89)	1 (100)	0 (0.00)
Heart failure	7 (13.21)	2 (28.57)	5 (71.43)
COPD	6 (11.32)	2 (33.33)	4 (66.67)
Kidney disease	2 (3.77)	1 (50.00)	1 (50.00)
Neoplasia	1 (1.89)	0 (0.00)	1 (100.00)
Alcohol-related cirrhosis only	16 (30.19)	9 (56.25)	7 (56.25)

Characteristics	Total (n = 53)	With UGIB (n = 21)	Without UGIB (n = 32)
Toxicological History (n [%])			
Alcohol only	46 (86.79)	18 (39.13)	28 (60.87)
Smoking	2 (3.77)	1 (50.00)	1 (50.00)
Wood smoke	5 (9.43)	2 (40.00)	3 (60.00)
PAS	0 (0.00)	0 (0.00)	0 (0.00)
Use of 5 or More Medications (n [%])			
Yes	4 (7.55)	2 (50.00)	2 (50.00)
No	49 (92.45)	19 (38.78)	30 (61.22)
Use of Propranolol (n [%])			
Yes	14 (26.42)	4 (28.57)	10 (71.43)
No	39 (73.58)	17 (43.59)	22 (56.41)

x̄: mean; n: number; %: percentage; COPD: chronic obstructive pulmonary disease

The variable of sex was associated with different age groups to identify the most prevalent ages for patients with uncomplicated ARLC and those complicated by UGIB (Table 2).

Table 2. Age Groups by Sex for Patients with Alcohol-Related Liver Cirrhosis in 2021

Age in Completed Years	Total Men	Men with UGIB	Men without UGIB	Total Women	Women with UGIB	Women without UGIB
18–24 (n [%])	1 (2.33)	1 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
25–44 (n [%])	6 (13.95)	1 (16.67)	5 (83.33)	0 (0.00)	0 (0.00)	0 (0.00)
45–64 (n [%])	27 (62.79)	9 (33.33)	18 (66.67)	7 (70.00)	1 (14.29)	6 (85.71)
65–74 (n [%])	5 (11.63)	3 (60.00)	2 (40.00)	2 (20.00)	1 (50.00)	1 (50.00)
≥75 (n [%])	4 (9.30)	4 (100.00)	0 (0.00)	1 (10.00)	1 (100.00)	0 (0.00)
Total (n [%])	43 (81.13)	18 (41.86)	25 (58.14)	10 (18.87)	3 (30.00)	7 (70.00)

n: number; %: percentage

Paraclinical reports, imaging studies performed, and the management provided to the patients are shown in Table 3.

Table 3. Clinical, Paraclinical, Imaging, and Management Characteristics of Patients with Alcohol-Related Liver Cirrhosis in 2021

	Total (n = 53)	With UGIB (n = 21)	Without UGIB (n = 32)
Clinical Manifestations (n [%])			
Abdominal pain	14 (26.42)	5 (35.71)	9 (64.29)
Hyporexia	22 (41.51)	8 (36.36)	14 (63.64)
Nausea	9 (16.98)	3 (33.33)	6 (66.67)
Hematemesis	17 (32.08)	15 (88.24)	2 (11.76)
Melena	11 (20.75)	9 (81.82)	2 (18.18)
Asthenia	17 (32.08)	6 (35.29)	11 (64.71)
Syncope	3 (5.66)	3 (100.00)	0 (0.00)
Pale mucocutaneous membranes	5 (9.43)	4 (80.00)	1 (20.00)
Ascites	7 (13.21)	2 (28.57)	5 (71.43)
Seizure	4 (7.55)	2 (50.00)	2 (50.00)
Altered consciousness	10 (18.87)	3 (30.00)	7 (70.00)
Jaundice	7 (13.21)	0 (0.00)	7 (100.00)
Others	7 (13.21)	1 (14.29)	6 (85.71)
Leukocytes (n [%])			
< 10,000 × 10^3/µl	41 (77.36)	14 (34.15)	27 (41.67)
≥ 10,000 × 10^3/µl	12 (22.64)	7 (58.33)	5 (41.67)
Hemoglobin (n [%])			
< 12 g/dL	26 (49.06)	17 (65.38)	9 (34.62)
12–17 mg/dL	24 (45.28)	4 (16.67)	20 (83.33)
> 17 mg/dL	3 (5.66)	0 (0.00)	3 (100.00)
Platelets (n [%])			
< 150,000 ×10^3/µl	24 (45.28)	8 (33.33)	16 (66.67)
150-450,000 × 10^3/µl	23 (43.40)	9 (39.13)	14 (60.87)
> 450,000 ×10^3/µl	6 (43.40)	4 (66.67)	2 (33.33)
Sodium (n [%])			
< 135 mEq/L	24 (45.28)	11 (45.83)	13 (54.17)
135–145 mEq/L	25 (47.17)	7 (28.00)	18 (72.00)
> 145 mEq/L	4 (7.55)	3 (75.00)	1 (25.00)
Potassium (n [%])			
< 3.5 mEq/L	14 (26.42)	8 (57.14)	6 (42.86)
3.5–5 mEq/L	30 (56.60)	7 (23.33)	23 (76.67)
> 5 mEq/L	9 (16.98)	6 (66.67)	3 (33.33)
Creatinine (n [%])			
< 1.2 mg/dL	38 (71.70)	15 (39.47)	23 (60.53)
≥ 1.2 mg/dL	15 (71.70)	6 (40.00)	9 (60.00)
INR (n [%])			
< 1.3	22 (41.51)	8 (36.36)	14 (63.64)
≥ 1.3	31 (58.49)	13 (41.94)	18 (58.06)
Prothrombin Time (n [%])			
< 16 seconds	20 (37.74	7 (35.00)	13 (65.00)
≥ 16 seconds	33 (62.26)	14 (42.42)	19 (57.58)
Total Bilirubin (n [%])			
< 1.2 mg/dL	20 (37.74)	10 (50.00)	10 (50.00)
≥ 1.2 mg/dL	33 (62.26)	11 (33.33)	22 (66.67)
AST/TGO (n [%])			
< 30 U/L	12 (22.64)	9 (75.00)	3 (25.00)
≥ 30 U/L	41 (77.36)	12 (29.27)	29 (70.73)
Albumin (n [%])			
< 3.5 g/dL	34 (64.15)	12 (35.29)	22 (64.71)
≥ 3.5 g/dL	19 (35.85)	9 (47.37)	10 (52.63)
Child-Pugh Classification			
A (n [%])	19 (35.85)	10 (47.62)	9 (28.13)
B (n [%])	30 (56.60)	10 (47.62)	20 (62.50)
C (n [%])	4 (7.55)	1 (4.76)	3 (9.38)

	Total (n = 53)	With UGIB (n = 21)	Without UGIB (n = 32)
Imaging Studies (n [%])			
Ultrasound	36 (67.92)	6 (16.67)	30 (83.33)
Endoscopy	19 (35.85)	16 (84.21)	3 (15.79)
Computed tomography	3 (5.66)	2 (66.67)	1 (33.33)
Treatment (n [%])			
Endoscopic	13 (24.53)	12 (92.31)	1 (7.69)
Non-endoscopic	40 (75.47)	9 (22.50)	31 (77.50)

INR, international normalized ratio; AST, aspartate aminotransferase/TGO, glutamic oxaloacetic transaminase

Subsequently, comparative variables were established between subjects with uncomplicated ARLC and those complicated by UGIB, calculating the average or medians (Table 4).

Table 4. Comparative Variables in Patients with Alcohol-Related Liver Cirrhosis in 2021

	With UGIB	Without UGIB
Length of stay (days), M_e	3	2.5
MELD score, $\bar{x}$	14.1	13.9
MELD ≥ 18 points, n (%)	4 (19.05)	7 (21.88)
Leukocytes ($\times 10^3/\mu l$), M_e	8,000	6,350
INR, M_e	1.4	1.33
PT (seconds), M_e	19	17.1
Creatinine (mg/dL), M_e	0.92	0.81
Albumin (g/dl), $\bar{x}$	3.1	3.4

MELD: Model for End-Stage Liver Disease; INR: international normalized ratio; PT: prothrombin time; AST: aspartate aminotransferase; Me: median; $\bar{x}$: mean; n: number; %: percentage

DISCUSSION

Liver cirrhosis is one of the most common pathologies and has a high mortality rate, accounting for approximately one million deaths annually worldwide, with a higher incidence in men than women (2,18,25–30). UGIB secondary to esophageal and gastric varices is one of the most frequent complications and causes more than 40% of cirrhosis-related mortality. For this reason, it is crucial to analyze the characteristics of this condition, which are of great clinical importance in implementing timely interventions (31–37).

In this study, subjects with ARLC had a prevalence of UGIB of 39.62% (n = 21) compared to 60.38% (n = 32) without this complication. Most cases were male (81.1%; n = 43), of which 41.86% (n = 18) had UGIB, while 18.87% (n = 10) were female, with 70% (n = 7) presenting UGIB.

The average age of the studied population was 57 years, a result similar to that of Rangel-Orozco and colleagues (38), where 71.8% were men and 22.8% were women, with an average age of 52 years. In our study, both uncomplicated cirrhosis and UGIB occurred primarily in the 45–64 age group for both men and women. However, this may vary depending on the region or country studied. This is consistent with several studies, such as that of Prieto-Ortiz and colleagues (22), which identified that cirrhosis peaks in incidence

between 40 and 50 years, predominantly in men, or the study by Candas Santos and colleagues (15), which reported that the predominant sex in patients with alcohol-related cirrhosis was male, particularly in the 45–54 age group.

Another frequently observed characteristic was the presence of comorbidities in 71.70% of cases (n = 38). The most prevalent of these were hypertension (41.51%), heart failure (13.21%), chronic obstructive pulmonary disease (11.32%), and type 2 diabetes *mellitus* (7.55%), with UGIB prevalence rates of 27.27%, 28.57%, 33.33%, and 25%, respectively. This aligns with studies by Lu and colleagues (11) and Zhang and colleagues (2), which demonstrated that one of the main factors associated with gastrointestinal bleeding in patients with liver cirrhosis was hypertension. Additionally, according to Candas Santos and colleagues (15), the most common pathological histories were hypertension, type 2 diabetes, and others such as bronchial asthma, ischemic heart disease, and heart failure.

Of the population, 73.58% (n = 39) did not take propranolol, and of these, 43.59% (n = 17) developed UGIB, compared to 28.57% (n = 4) of those who were on propranolol and also developed UGIB. This is similar to the findings of Martínez Lorenzo and colleagues (13), which showed that the use of propranolol in patients with ARLC helped prevent this complication, given the proven efficacy of the medication in reducing and preventing the risk of first bleeding in 40%–50% of cases.

It was found that 58.33% of patients with leukocytosis and 65.38% of those with anemia developed UGIB. Cirrhotic patients exhibited hyponatremia (45.28%), prolonged INR (58.49%), prolonged prothrombin time (62.26%), hyperbilirubinemia (62.26%), elevated aspartate aminotransferase (AST) (77.36%), and hypoalbuminemia (64.15%). These variables were also prevalent in the context of cirrhosis complicated by UGIB. This is consistent with the study by Mandal and colleagues (39), which showed that cirrhotic patients with a worse prognosis were those with anemia, hyperbilirubinemia, elevated AST, and hypoalbuminemia, as well as the findings of Fayad and colleagues (40), which highlighted patients with hyponatremia and prolonged INR. Furthermore, Shin and colleagues (41) found that cirrhotic patients with upper gastrointestinal bleeding had anemia, leukocytosis, hypoalbuminemia, hyperbilirubinemia, elevated AST, prolonged INR, and hyponatremia, all of which worsened the prognosis. These findings are consistent with those of our study.

Regarding the Child-Pugh classification, it was observed that most patients were classified as Child-Pugh B, and of these, 47.62% developed UGIB. This is similar to a study conducted by

Buganza-Torio and Montano-Loza (42), where the majority of patients were Child-Pugh B, in contrast to the study by Mandal and colleagues (39), where most patients were classified as Child-Pugh C.

The MELD score is a system used to measure the severity of chronic liver disease and the likelihood of survival while awaiting a liver transplant. In this study, the average score was higher in cirrhotic patients with UGIB compared to those without the complication (14.1 vs. 13.9 points). A similar study by Zubieta-Rodríguez and colleagues (43) also found higher MELD scores in patients with complicated ARLC. The average serum albumin level was lower in patients with UGIB (3.1 vs. 3.4 g/dL). The medians for variables such as length of hospital stay (3 vs. 2.5 days), leukocytes (8,000 vs. $6{,}350 \times 10^3/\mu l$), INR (1.4 vs. 1.33), prothrombin time (19 vs. 17.1 seconds), and creatinine (0.92 vs. 0.81 mg/dL) were higher in patients with UGIB.

It should be considered that low hemoglobin and albumin levels can be corrected through red blood cell transfusion or albumin replacement. Timely correction of these abnormalities prevents hemodynamic instability and improves the overall health outcomes of patients. Additionally, it has been reported that leukocytosis and neutrophilia are associated with higher infection rates, multi-organ failure, and lower survival rates in cirrhotic patients. Proinflammatory cytokines influence the progression to acute-on-chronic liver failure by promoting multi-organ failure through progressive vasodilation. Therefore, an increase in white blood cell count without evidence of infection may be related to this clinical context, due to the higher presence of proinflammatory cytokines (41). However, further research is needed to identify the mechanism responsible for elevated white blood cells in the context of cirrhosis with UGIB. In this study, most cirrhotic patients with UGIB were diagnosed through esophagogastroduodenoscopy and received endoscopic treatment for the complication, aimed at achieving effective control of acute bleeding and preventing early recurrence and death (17,34,35,44).

Some limitations of the study arise from its retrospective design, and selection bias cannot be entirely ruled out. Although all medical records of patients diagnosed with cirrhosis during this period were selected and inclusion and exclusion criteria were applied, underdiagnosis and a lower number of admissions due to the COVID-19 pandemic cannot be excluded. Furthermore, the sample size was small, which does not represent the entire population of interest. Regarding information bias, the content and data from hospital medical records were used; however, patient data were recorded during routine clinical practice, not in a research context, which may introduce a margin of error. Such limitations can be overcome with a prospective study.

This research is highly relevant as the region has one of the highest rates of alcohol-related liver disease in the country, where studies, in addition to being scarce, lack sufficient epidemiological data that delve into one of the main etiologies of cirrhosis, which is alcohol-related cirrhosis.

CONCLUSION

The prevalence of UGIB in patients with ARLC was 39.62%, predominantly in males, especially between the ages of 45 and 64, from rural areas, with a history of hypertension, heart failure, chronic obstructive pulmonary disease, and type 2 diabetes *mellitus*, and without propranolol treatment. The main clinical manifestations were hematemesis, melena, and hyporexia. They presented a high MELD score ($\bar{x}$ = 14.1 points), low hemoglobin, sodium, and albumin levels, along with elevated total bilirubin, AST, and white blood cell counts, with prolonged INR and prothrombin time. These findings provide useful information for decision-making in hospitalized cirrhotic patients, both uncomplicated and those with UGIB. Moreover, it enables individual and collective interventions aimed at prevention, early diagnosis, and avoiding the development of complications.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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