Prevalence of hepatorenal syndrome in patients with hepatic cirrhosis at a university hospital in Colombia

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DOI: https://doi.org/10.36104/amc.2025.3167

Abstract

Introduction: hepatorenal syndrome (HRS) is a functional kidney failure with no significant histological abnormalities that occurs in patients with advanced liver disease. The objective of this study was to determine the prevalence of HRS in patients with hepatic cirrhosis treated at a university hospital in Colombia.

Method: this was a retrospective, descriptive, cross-sectional study. Patients over the age of 18 with hepatic cirrhosis treated at Hospital Universitario San Rafael de Tunja between January 1, 2016, and December 31, 2021, were included. Those with incomplete medical charts were excluded. Data collection was done by the investigators.

Results: the prevalence of HRS was 5.2%. Patients' ages ranged from 28 to 89 years, and they were predominantly male (77.5%). The most frequent complications were coagulopathies, ascites and hepatic encephalopathy. A total of 12.8% required intensive care unit admission, 38.7% were classified as Child-Pugh C, and the mortality rate was 34.6%.

Conclusions: hepatorenal syndrome is considered a pathological process that causes kidney damage in patients with hepatic cirrhosis, with high morbidity and mortality. This study found a low prevalence compared to other national and international studies, indicating that early diagnosis and prompt treatment are needed to control complications and reduce mortality. **(Acta Med Colomb 2025; 50. DOI: https://doi.org/10.36104/amc.2025.3167).**

Keywords: *kidney disease, cirrhosis, kidney failure, hepatorenal syndrome, creatinine, prevalence.*

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Received 17/IV/2024 Accepted: 14/V/2025

Introduction

Hepatorenal syndrome (HRS) is a functional kidney failure with no significant histological changes in people with severe liver disease (1). It is characterized by decreased renal perfusion caused by reduced effective circulatory volume and vasoactive system activation (2).

Despite its clinical relevance, little is known about the prevalence of HRS in patients hospitalized with hepatic cirrhosis in this country. This lack of information makes it difficult to implement timely prevention and treatment strategies, limits the ability of healthcare professionals to make clinical decisions that fit the local reality, and hinders the design of appropriate comprehensive care strategies. With this context, there is a need to determine the prevalence of HRS in patients with hepatic cirrhosis treated at a university hospital in Colombia.

Portal hypertension triggers a series of events that initially cause vasodilation of the splanchnic circulation to maintain optimal blood pressure, which increases cardiac output and activates vasoconstrictive mechanisms. However, this process is insufficient to guarantee adequate blood flow to the target organs, thus contributing to their injury (3).

There are two types of this syndrome: HRS-acute kidney injury (AKI), formerly known as type 1, characterized by a rapid and progressive loss of renal function, along with acute kidney failure, characterized by creatinine elevation to more than 1.5 mg/dL within one week. The second type is HRS-chronic kidney disease (CKD), previously known as type 2, which does not have a rapidly progressive course and is associated with chronic kidney failure and refractory ascites (2, 4).

Acute kidney injury occurs in 25 to 50% of patients with hepatic cirrhosis after a decompensation episode, facilitated by hypovolemia and vasoconstriction which promote kidney injury. The mortality rate in cirrhotic patients hospitalized for AKI is 2-31%, while the one-year life expectancy in this population is 40-70% (5, 6).

Hepatorenal syndrome is a potentially reversible syndrome. These patients should be considered candidates for

liver transplantation as soon as possible, to improve kidney function and increase survival. Treatment options are also available, like albumin combined with terlipressin, used as transition therapy toward liver transplantation. Likewise, biomarker measurement is recommended for early prediction of HRS, including hemoglobin, total bilirubin and creatinine (7).

The objective of this study was to determine the prevalence of HRS in patients with hepatic cirrhosis treated at a Colombian university hospital.

Method

Type of study: this was a cross-sectional, retrospective, descriptive study.

Population and selection criteria: the target population included all patients over the age of 18 treated at Hospital Universitario San Rafael de Tunja for hepatic cirrhosis of any etiology between January 1, 2016, and December 31, 2021. Those with incomplete medical charts were excluded.

Data collection and analysis: the investigators were responsible for data collection. They initially identified the list of patients using the following International Classification of Diseases (ICD-10) codes: K70.3 (alcoholic hepatitis), K70.4 (alcoholic cirrhosis of liver), K70.9 (alcoholic liver disease, unspecified), K74.0 (hepatic fibrosis), K74.3 (primary biliary cirrhosis), K74.4 (secondary biliary cirrhosis), K74.5 (biliary cirrhosis, unspecified), K74.6 (other and unspecified cirrhosis of liver), K72.1 (chronic hepatic failure) and K76.7 (hepatorenal syndrome). After this, they used an instrument designed on Google Forms to collect the respective variables from the clinical charts. The diagnosis of HRS was directed by the international guidelines (7–9).

The database was recorded in Excel version 2013 and analyzed using the SPSS version 22 statistical package. The univariate analysis was done using descriptive statistics, determining absolute and relative frequencies for the qualitative variables. Measures of central tendency (mean, median) and dispersion (standard deviation and interquartile range) were calculated for the quantitative variables.

Ethical considerations: Based on Resolution 8430 of 1993, this was considered a no risk study. Permission for the chart review was obtained from the ethics and research committee at Hospital Universitario San Rafael de Tunja (minute meetings number 053 of 2021).

Results

A total of 386 unique patients were found using any of the ICD-10 codes related to hepatic cirrhosis and/or hepatorenal syndrome (K70.3, K70.4, K70.9, K74.0, K74.3, K74.4, K74.5, K74.6, K72.1 and K76.7) in the hospital´s medical records system. However, 97 patients were excluded due to incomplete clinical data, according to the previously established inclusion criteria. Therefore, the final analysis was done with a sample of 289 patients.

Prevalence of hepatorenal syndrome

The prevalence of hepatorenal syndrome was 5.2% (**Figure 1**).

Sociodemographic description

The minimum age of the overall population was 28 years, and the maximum age was 89 years. Most were males, accounting for 77.51%, with 4% having HRS (**Table 1**).

Comorbidities and complications

The most frequent complications were hepatic encephalopathy and coagulopathy, followed by ascites (**Table 2**).

Prognosis

Altogether, 12.8% of the overall population required a hospital stay in the intensive care unit, 0.35% of whom had HRS. The mortality rate in patients with HRS was 4.5% (**Table 3**).

Discussion

Hepatorenal syndrome is a kidney dysfunction that occurs in the context of hepatic cirrhosis and portal hypertension, leading to a hyperdynamic state, diminished effective blood flow and extreme renal vasoconstriction, resulting in a reduced glomerular filtration rate. This condition is associated with greater morbidity and mortality (10-12).

There are few studies in Colombia on HRS's clinical information and prevalence. Our study showed a lower global prevalence than reported in the literature. Rey M et al. (13) reported that 23.9% of 117 patients with cirrhosis were diagnosed with HRS, with ascites present in more than 80% of the cases. Other studies, like the one by Hasan et al., also reported higher figures, with a global prevalence in hospitalized patients and concomitant ascites ranging from 10 to 19% (14,15). Our results, with lower figures, could be explained by intrinsic factors in the study population or possible underdiagnosis, due to the presence of other diseases that cause kidney failure.

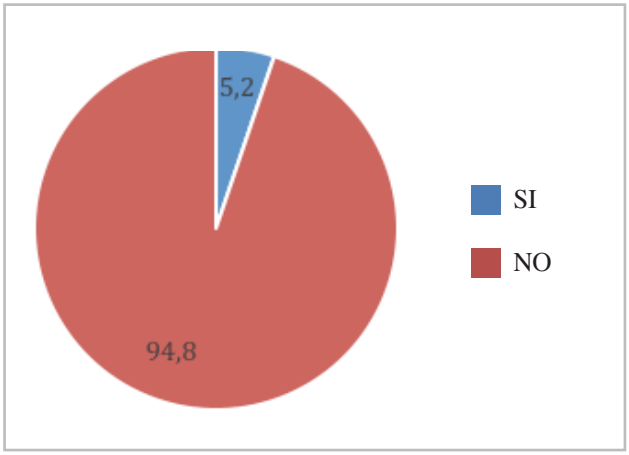

Figure 1. *Prevalence of hepatorenal syndrome. (Source*: **Authors´ own**).

Table 1. *Sociodemographic description.*

Variables		Hepatorenal syndrome			
		No (n: 274)	%	Yes (n:15)	%
Sex	Female	62	21.45	3	1.04
	Male	212	73.36	12	4.15
Type of health insurance	Contributive	37	12.80	0	0.00
	Subsidized	237	82.01	15	5.19
Etiology	Alcoholic	232	80.28	12	4.15
	Autoimmune	12	4.15	0	0.00
	Primary biliary	10	3.46	0	0.00
	Secondary biliary	1	0.35	0	0.00
	Non-alcoholic fatty liver	4	1.38	1	0.35
	Medications	1	0.35	0	0.00
	Cancer	2	0.69	0	0.00
	Idiopathic	5	1.73	2	0.69
	Porphyria	1	0.35	0	0.00
	Hemochromatosis	4	1.38	0	0.00
	Viral	2	0.69	0	0.00
Schooling	None	6	2.08	0	0.00
	Not available	187	64.71	9	3.11
	Primary	59	20.42	6	2.08
	Secondary	13	4.50	0	0.00
	University	9	3.11	0	0.00

As far as the sociodemographic characteristics, there was a higher prevalence in males, slightly higher than reported in studies like those by Salerno and Martin-Llahicon, whose figures range from 70 to 76.7% (14,16). As far as etiology, the most frequent cause of cirrhosis in patients with HRS was alcoholic (80%), followed by idiopathic (13.33%) and non-alcoholic fatty liver (6.66%). These findings could be explained by the high prevalence of alcohol consumption in the study population, as Boyacá is one of the departments with the highest reported consumption (17).

The main complications associated with HRS were coagulopathy (93.33%), hepatic encephalopathy (86.66%) and ascites (80%), the latter in concordance with the syndrome´s pathophysiology (18,19). The coagulopathy and hepatic encephalopathy can be explained by the advanced stage of the disease, evidenced by the fact that 80% of the patients with HRS were classified as Child-Pugh C (20).

The most frequent comorbidity was hypertension, found in 26.66% of the patients, in line with its high prevalence in the general population of cirrhotic patients (27.67%). This figure is considerably high when compared to the national prevalence of hypertension in people under the age of 60, reported by García-Peña to be 3.95% (21).

Hepatorenal syndrome has a negative prognosis, with an average survival of less than two weeks for type 1, and 6-12 months for type 2, depending on the severity (22). In our study, the mortality rate of patients with HRS was 86.66%, accounting for 14.94% of all recorded deaths, a figure higher than the one reported by Carvalho y col. (23), who found an inpatient mortality of 52.7% in cirrhotic patients with ascites and kidney injury. Furthermore, only 6.6% of the patients were admitted to the intensive care unit, which is explained by their unstable condition and poor prognosis on hospital admission.

This study›s main limitation was the small sample size, which was due to the low prevalence of the disease. However, the findings could be reproduced, expanding the sample size. Another limitation is the retrospective nature of the study, which entails a risk of information bias, although this was controlled through objective data measurement.

Conclusion

In this study, HRS had a lower prevalence than what has been reported in previous studies, which could be attributed to both inherent characteristics of the study population as well as possible diagnostic underreporting. It was more frequent in male patients and those with alcoholic cirrhosis, which reflects local alcohol-related epidemiological patterns.

The main complications were coagulopathy, hepatic encephalopathy and ascites, which indicates an advanced

Table 2. *Comorbidities and complications.*

Variables No (n: 274)		Hepatorenal syndrome			
		%	Sí (n:15)	%	
Coagulopathy	No	73	25.26	1	0.35
	Yes	201	69.55	14	4.84
Ascites	No	128	44.29	3	1.04
	Yes	146	50.52	12	4.15
Hepatic encephalopathy	No	156	53.98	2	0.69
	Yes	118	40.83	13	4.50
Peritonitis secondary to ascites	No	259	89.62	13	4.50
	Yes	15	5.19	2	0.69
Esophageal varices	No	163	56.40	7	2.42
	Yes	111	38.41	8	2.77
Gastrointestinal bleeding	No	154	53.29	10	3.46
	Yes	120	41.52	5	1.73
Hypertension	No	198	68.51	11	3.81
	Yes	76	26.30	4	1.38
Diabetes	No	243	84.08	13	4.50
	Yes	31	10.73	2	0.69
Rheumatoid arthritis	No	265	91.70	15	5.19
	Yes	9	3.11	0	0.00
Cholelithiasis	No	234	80.97	11	3.81
	Yes	40	13.84	4	1.38
Gastric ulcers	No	192	66.44	13	4.50
	Yes	82	28.37	2	0.69

Table 3. *Prognosis.*

Variables No (n: 274)		Hepatorenal syndrome			
		%	Yes (n:15)	%	
ICU	No	238	82.35	14	4.84
	Yes	36	12.46	1	0.35
Child-Pugh Score	Class A	47	16.26	0	0.00
	Class B	89	30.80	2	0.69
	Class C	100	34.60	12	4.15
	Not available	38	13.15	1	0.35
Mortality	Before 48 h	34	11.76	2	0.69
	After 48 h	53	18.34	11	3.81
	No	187	64.71	2	0.69

degree of hepatic decompensation at diagnosis. Hypertension was the most common comorbidity, in line with what has been described in the general population with cirrhosis.

The mortality rate was considerably high, possibly related to the advanced clinical condition on admission and limited access to intensive care units. These findings underscore the need to strengthen strategies for early diagnosis and prompt treatment of HRS, as well as improve access to specialized care, to reduce its clinical impact.

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