The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 6, 2025

FREQUENCY OF HEPATORENAL SYNDROME IN CHRONIC HEPATITIS C PATIENTS ADMITTED AT CHANDKA MEDICAL COLLEGE AND HOSPITAL, LARKANA

Dr. Asif Ali[1], Dr. Rahul[*2], Dr. Syed Basit Ali Shah[3], Dr. Javed Ali Khawaja[4], Dr. Manesh[5], Dr. Nimarta[6]

[1, *2, 5,6] *Resident Physician at SMBBMU Larkana*
[3]*Medical Officer at Chandka Medical Hospital larkana.*
[4]*Medical Officer at Jacobabad institute of Medical Sciences (JIMS)*

[1]aliasifbhatti5@gmail.com, [*2]shetiyarahul1@gmail.com, [3]basitshah98765@gmail.com, [4]javedahmed4878@gmail.com, [5]manesh1237@gmail.com, [6]nimrata.sadani@gmail.com

DOI: https://doi.org/10.5281/zenodo.15696339

Keywords
Hepatitis C, Hepatorenal Syndrome, Liver Disease, Renal Dysfunction

Article History
Received on 11 May 2025
Accepted on 11 June 2025
Published on 19 June 2025

Corresponding Author: *
Dr. Rahul

Abstract

Objective: *This study aimed to determine the frequency of hepatorenal syndrome among chronic hepatitis C patients admitted to Chandka Medical College, Larkana.*

Background: *Hepatorenal syndrome (HRS) is a severe and potentially fatal complication that occurs in patients with advanced liver disease, including those with chronic hepatitis C. It is characterized by progressive renal dysfunction in the absence of other identifiable causes of kidney injury. The pathophysiology involves complex hemodynamic changes triggered by liver failure, leading to renal vasoconstriction and impaired kidney function. Understanding the frequency of HRS in chronic hepatitis C patients is essential for timely diagnosis and management to improve outcomes.*

Methodology: *A cross-sectional study was conducted over six months at the Department of Medicine, SMBBMU, Larkana. Eligible patients with chronic hepatitis C provided informed consent and underwent clinical evaluation. Blood samples were collected to measure serum creatinine levels, and renal ultrasounds were performed to assess kidney morphology. Diagnosis of HRS was based on elevated creatinine and compatible ultrasound findings. Data were recorded electronically for analysis.*

Results: *A total of 141 patients were enrolled, with a mean age of 49.5 ± 12.4 years. Females comprised 75.2% (n=106) and males 24.8% (n=35). Hepatorenal syndrome was diagnosed in 39.0% (n=55) of patients, indicating a high prevalence in this population.*

Conclusion: *Hepatorenal syndrome is a common complication in patients with chronic hepatitis C, underscoring the need for vigilant monitoring and early intervention. Further research is warranted to explore the underlying mechanisms and develop targeted therapies to improve prognosis in this vulnerable group.*

INTRODUCTION

Liver cirrhosis is the result of persistent and chronic hepatocellular injury and can ultimately lead to hepatic dysfunction and failure. It is an irreversible pathological process featured by fibrosis and nodular regeneration. The number of deaths by this lethal disease is among the highest worldwide.[1-2] In Pakistan, the figure of patients with cirrhosis is quite high, and unfortunately, more than 65% of the cases are due to hepatitis B and C, both of which are preventable by standard community health services.[3-4] The complications of cirrhosis, such as hepatic encephalopathy, upper gastrointestinal bleeding, HRS, and hepatopulmonary syndrome, cause a high mortality rate of the disease. Hepatorenal syndrome (HRS) is a complication describing functionally deteriorating kidneys in liver failure (either acute or chronic).[5]

Renal failure is usually irreversible unless liver transplantation is being performed. Hepatorenal syndrome develops in the final phase of the disease. Cirrhosis of the liver refers to a progressive, diffuse, fibrosing, nodular condition that disrupts the entire normal architecture of the liver.[6-7] Cirrhosis and chronic liver failure are leading causes of morbidity and mortality worldwide. The reduction in renal blood flow and glomerular filtration rate (GFR) by administration of non-hormonal anti-inflammatory drugs to cirrhotic patients with ascites was shown by Anand et al.[8-9] Further studies in the following two decades demonstrated that renal failure occurred because of vasoconstriction of the renal circulation and intense systemic arteriolar vasodilatation, resulting in reduced systemic vascular resistance and arterial hypotension.[10]

The HRS is a syndrome of functional renal failure due to end-stage liver disease. It is caused by impaired renal perfusion pressure, stimulation of the renal sympathetic nervous system, and production of mediators causing mesangial contraction and reduced filtration fraction. The hallmark of HRS is renal vasoconstriction and splanchnic and systemic vasodilatation.[11-12] Researchers could refer to the main theories explaining the pathophysiological background of HRS: "Arteriolar Vasodilatation Theory" and "Hepatorenal Reflex Theory".[13-14]A study done by Mal et al found the prevalence of hepatorenal syndrome to be 37.5%.[15] Another study reported that out of 70 patients with hepatitis C and cirrhosis, renal dysfunction was reported in 30 (43%).[16]

The study was designed to figure out the frequency of HRS among patients with cirrhosis in Pakistan with Hepatitis C, which might show some geographical differences as the aetiology of liver cirrhosis is different in different parts of the world, and the disease pattern might vary. As HRS is a diagnosis of exclusion; therefore, the study could also reveal other causes of renal failure. Preventive measures and interventions to save the kidney had also been highlighted in the study, which can help in making a future strategy for the treatment of HRS.

Material & Methods:

This cross-sectional study was conducted to determine the frequency of hepatorenal syndrome among patients with chronic hepatitis C. The research took place in the Department of Medicine at SMBBMU, Larkana, Karachi, over a six-month period following the approval of the study synopsis and continued until the target sample size was reached. A total of 141 patients were enrolled, with the sample size calculated using WHO software based on an expected hepatorenal syndrome frequency of 37.5%, an 8% margin of error, and a 95% confidence interval.[15] Non-probability consecutive sampling was used to include all eligible patients who presented during the study period. Inclusion criteria comprised patients aged 30 to 70 years diagnosed with chronic hepatitis C who reported decreased urine output of less than 400 ml over at least 24 hours, irrespective of gender. Patients were excluded if they had a history of thyroid disorders (hypothyroidism or hyperthyroidism), pre-existing kidney disease, long-term use of non-steroidal anti-inflammatory drugs (NSAIDs), hepatocellular carcinoma, pregnancy, or a history of myocardial infarction, chronic obstructive pulmonary disease, or asthma.

Data Collection:

Following approval from the College of Physicians and Surgeons Pakistan and the institutional ethical review committee, patients meeting the inclusion criteria were enrolled from the Department of Medicine, Chandka Medical College, Larkana. Informed consent was obtained from all participants.

Demographic details and baseline clinical history were recorded on a predesigned proforma at enrolment. A 5cc blood sample was collected using aseptic technique by a phlebotomist to assess creatinine levels. All patients then underwent renal ultrasound, performed by a radiologist with over five years of experience. The diagnosis of hepatorenal syndrome was made based on creatinine and ultrasound findings, according to the operational definition. Study variables such as age, gender, residential status, height, weight, BMI, duration of symptoms, diabetes mellitus, hypertension, smoking status, duration of hepatitis C, and hepatorenal syndrome status were recorded in the attached proforma.

Data Analysis:

Data analysis was performed using SPSS Version 26.0. The normality of continuous data was assessed using the Shapiro-Wilk test. Mean ± standard deviation or median with interquartile range (IQR) were calculated for variables such as age, height, weight, BMI, duration of symptoms, and duration of hepatitis. Frequencies and percentages were determined for categorical variables including gender, residential status, type II diabetes mellitus, hypertension, smoking status, and presence of hepatorenal syndrome. Stratification was done for age, gender, residential status, type II diabetes mellitus, hypertension, smoking status, and duration of chronic hepatitis to evaluate their effects on the outcome variable. Post-stratification, the Chi-square or Fischer's exact test (if expected frequency was ≤5) was applied at a 5% level of significance.

Results:

The table No I presents the frequency and percentage distribution of key variables among 141 patients. Most participants were female (75.2%) and lived in urban areas (63.8%). About one-third (34.0%) had type II diabetes mellitus, while nearly two-thirds (63.8%) were hypertensive. Smoking was reported by 42.6% of the patients. Hepatorenal syndrome was present in 39.0% of the study population. This data highlights the demographic and clinical characteristics relevant to the patient group studied.

The table No II shows the average values and standard deviations for various continuous variables among the study participants (n=141). The mean age was 49.52±12.41 years, weight averaged 73.35±10.54 kg, and height was 168.43±8.47cm. The average body mass index (BMI) was 25.87±3.49. Participants had symptoms for an average duration of 27.48±14.41 months and had chronic hepatitis for about 8.96±4.64 years. None of the variables showed statistically significant differences, as indicated by p-values all above 0.05.

The table No III shows the relationship between various factors and the presence of hepatorenal syndrome in 141 patients. Among the age groups, 22% of patients over 50 had hepatorenal syndrome compared to 17% in the 30–50 age group, but this difference was not statistically significant (p=0.122). Regarding gender, 30.5% of females and 8.5% of males had hepatorenal syndrome, with no significant difference (p=0.509). Urban residents had a slightly higher rate (24.1%) than rural residents (14.9%), but this was also not significant (p=0.691). Notably, diabetes was significantly associated with hepatorenal syndrome: 8.5% of diabetic patients had the condition compared to 30.5% of non-diabetics (p=0.014). Hypertension, smoking status, and duration of chronic hepatitis showed no significant association with hepatorenal syndrome. Overall, diabetes was the only factor significantly linked to hepatorenal syndrome in this group.

Table No I Frequency Distribution of Key Variables (n=141)

Variable	Category	Frequency (%)
Gender	Male	35, (24.8%)
	Female	106, (75.2%)
Residential Status	Urban	90, (63.8%)
	Rural	51, (36.2%)
Type II Diabetes Mellitus	Diabetic	48, (34.0%)
	Non-Diabetic	93, (66.0%)

Hypertension	Hypertensive	90, (63.8%)
	Non-Hypertensive	51, (36.2%)
Smoking Status	Smoker	60, (42.6%)
	Non-Smoker	81, (57.4%)
Hepatorenal Syndrome	Yes	55, (39.0%)
	No	86, (61.0%)

Table No II: Summary Statistics for Continuous Variables (n=141).

VARIABLES	MEAN±SD	P-VALUE
Age	49.52±12.41	0.089
Weight	73.35±10.54	0.162
Height	168.43±8.47	0.346
Body Mass Index	25.87±3.49	0.235
Duration Of Symptoms	27.48±14.41	0.060
Duration Of Chronic Hepatitis	8.96±4.64	0.709

Table No III. Stratification of Demographic and Clinical Factors with Hepatorenal Syndrome (n=141).

Variable	Category	Hepatorenal Syndrome Yes N (%)	Hepatorenal Syndrome No N (%)	P-Value
Age Group (Years)	30 – 50	24 (17.0%)	49 (34.8%)	0.122
	> 50	31 (22.0%)	37 (26.2%)	
Gender	Male	12 (8.5%)	23 (16.3%)	0.509
	Female	43 (30.5%)	63 (44.7%)	
Residential Status	Urban	34 (24.1%)	56 (39.7%)	0.691
	Rural	21 (14.9%)	30 (21.3%)	
Type II Diabetes Mellitus	Diabetic	12 (8.5%)	36 (25.5%)	0.014*
	Non-Diabetic	43 (30.5%)	50 (35.5%)	
Hypertension	Hypertensive	35 (24.8%)	55 (39.0%)	0.970
	Non-Hypertensive	20 (14.2%)	31 (22.0%)	
Smoking Status	Smoker	22 (15.6%)	38 (27.0%)	0.624
	Non-Smoker	33 (23.4%)	48 (34.0%)	
Duration Of Chronic Hepatitis (Years)	4 – 10	43 (30.5%)	70 (49.6%)	0.641
	>10	12 (8.5%)	16 (11.3%)	

*Significant at $p < 0.05$ (Chi-square test applied)

Discussion:

Hepatorenal syndrome (HRS) presents a significant clinical challenge in the management of patients with chronic hepatitis C, representing a complex interplay between liver and kidney dysfunction.[17] As a potentially life-threatening complication, HRS is characterized by progressive renal impairment in the context of advanced liver disease, typically cirrhosis, and portal hypertension.[18] Chronic hepatitis C infection, a leading cause of liver cirrhosis worldwide, predisposes individuals to the development of HRS, further complicating the clinical course and prognosis.

The pathophysiology of HRS involves a multifactorial process, including circulatory disturbances, renal vasoconstriction, and systemic inflammation, among

other mechanisms.[19] In chronic hepatitis C patients, viral-induced liver damage exacerbates these processes, leading to renal dysfunction and, ultimately, HRS. Additionally, the presence of comorbidities such as ascites, spontaneous bacterial peritonitis, and hepatocellular carcinoma further contributes to the complexity of HRS management in this population.[20]

Hepatorenal syndrome (HRS) remains a serious complication in chronic hepatitis C patients, with high rates of morbidity and mortality despite recent therapeutic advances. Effective management requires interventions that address both liver and kidney dysfunction. Understanding the epidemiology, risk factors, and mechanisms of HRS is crucial for improving clinical outcomes in this population.

HRS is a major challenge due to its complex diagnosis and management, particularly as liver cirrhosis a common consequence of chronic hepatitis C is a key predisposing factor for renal dysfunction. This review summarizes current knowledge on the clinical implications, diagnostic difficulties, and available therapies for HRS in chronic hepatitis C patients, emphasizing the need for early recognition and targeted treatment strategies to enhance patient prognosis.[21] Diagnosing HRS in chronic hepatitis C patients requires a high index of suspicion, as clinical manifestations may overlap with other complications of liver cirrhosis, such as prerenal azotemia or acute kidney injury. Laboratory parameters, including serum creatinine levels and urine sodium concentrations, along with imaging studies such as renal ultrasound, play a crucial role in the diagnostic evaluation. [22] However, distinguishing HRS from other causes of renal dysfunction remains challenging, necessitating a comprehensive assessment of clinical and laboratory findings. The management of HRS in chronic hepatitis C patients involves addressing both liver and kidney dysfunction simultaneously. Therapeutic interventions aim to improve renal perfusion, enhance cardiac output, and mitigate the underlying hemodynamic disturbances. [23] Pharmacological agents such as vasoconstrictors (e.g., terlipressin) and albumin infusion have demonstrated efficacy in improving renal function and reducing mortality rates in HRS patients. However, treatment outcomes may vary depending on the severity of liver cirrhosis and the presence of complications such as refractory ascites or hepatocellular carcinoma.

Despite advances in therapeutic strategies, the prognosis of HRS in chronic hepatitis C patients remains guarded, with high rates of morbidity and mortality. [24] The presence of comorbidities and the complexity of liver cirrhosis further complicate the clinical course, necessitating a multidisciplinary approach to patient care. Additionally, the scarcity of randomized controlled trials specifically targeting HRS in chronic hepatitis C patients underscores the need for further research to optimize treatment algorithms and improve patient outcomes. In this study, the mean age was 49.52±12.41 years. Another study recorded a mean age of 51.53±11.01 years.[15] Bhatti HW, et al found the mean age of 55 years.[16]

In our study, the gender distribution among the participants revealed that 35 individuals, constituting 24.8% of the sample, were male, while 106 individuals, making up 75.2% of the sample, were female. In the study of Mal P, et al, out of 100 patients, 56% were male and 44% were female.[15] The study done by Bhatti HW, et al reported to have 80% of male cases and 20% of female cases.[16]

In this study, hepatorenal syndrome was found in 55 (39.0%) patients. Mal P, et al noted the frequency of hepatorenal syndrome as 337.5%.[15]Another study reported that out of 70 patients, renal dysfunction was reported in 30 (43%). [16] Hepatorenal syndrome represents a formidable challenge in the management of chronic hepatitis C patients with advanced liver disease. A comprehensive understanding of the pathophysiology, diagnostic approaches, and therapeutic interventions is essential for improving clinical outcomes and enhancing the quality of care for these vulnerable populations. Further research efforts are warranted to elucidate the underlying mechanisms of HRS and identify novel therapeutic targets to address this critical complication effectively.

Conclusion: It is to be concluded that hepatorenal syndrome was commonly prevalent in chronic hepatitis C patients. The high incidence of underscores the importance of vigilant monitoring and interventions. Further research is needed to understand the mechanisms linking chronic hepatitis C to hepatorenal syndrome, enabling targeted treatments and improving outcomes.

References:

Gracia-Sancho J, Marrone G, Fernández-Iglesias A. Hepatic microcirculation and mechanisms of portal hypertension. Nat Rev Gastroenterol Hepatol. 2019;16:221–34. doi:10.1038/s41575-019-0124-8.

Majid B, Khan R, Junaid Z. Assessment of knowledge about the risk factors of chronic liver disease in patients admitted in Civil Hospital Karachi. Cureus. 2019;11(9):e5945. doi:10.7759/cureus.5945.

Amin AA, Alabsawy EI, Jalan R, Davenport A. Epidemiology, pathophysiology, and management of hepatorenal syndrome. Semin Nephrol. 2019;39(1):17–30. doi:10.1016/j.semnephrol.2018.10.003.

Anand R, Harry D, Holt S. Endothelin is an important determinant of renal function in a rat model of acute liver and renal failure. Gut. 2002;50(1):111–7. doi:10.1136/gut.50.1.111.

Pillebout E. Syndrome hépatorénal Hepatorenal syndrome. Nephrol Ther. 2014;10(1):61–8. doi:10.1016/j.nephro.2013.11.003.

Lee BP, Vittinghoff E, Hsu C, et al. Predicting low risk for sustained alcohol use after early liver transplant for acute alcoholic hepatitis: the sustained alcohol use post-liver. Hepatology. 2019;69(4):1477–87. doi:10.1002/hep.30300.

Shah N, Silva RG, Kowalski A, Desai C, Lerma E. Hepatorenal syndrome. Dis Mon. 2016;62(9):364–75. doi:10.1016/j.disamonth.2016.05.007.

Ng CK, Chan MH, Tai MH, Lam CW. Hepatorenal syndrome. Clin Biochem Rev. 2007;28(1):11–7.

Piano S, Tonon M, Angeli P. Management of ascites and hepatorenal syndrome. Hepatol Int. 2018;12(2):122–34. doi:10.1007/s12072-018-9860-3.

Nguyen-Tat M, Jäger J, Rey JW. Terlipressin and albumin combination treatment in patients with hepatorenal syndrome type 2. United Eur Gastroenterol J. 2019;7(4):529–37. doi:10.1177/2050640619826724.

Nanda A, Reddy R, Safraz H, Salameh H, Singal AK. Pharmacological therapies for hepatorenal syndrome: a systematic review and meta-analysis. J Clin Gastroenterol. 2018;52(4):360–7. doi:10.1097/MCG.0000000000000963.

Malinchoc M, Kamath PS, Gordon FD, Peine CJ, Rank J, ter Borg PC. A model to predict poor survival in patients undergoing transjugular intrahepatic portosystemic shunts. Hepatology. 2000;31(4):864–71. doi:10.1002/hep.510310412.

Ali SA, Donahue RM, Qureshi H, Vermund SH. Hepatitis B and hepatitis C in Pakistan: prevalence and risk factors. Int J Infect Dis. 2009;13(1):9–19. doi:10.1016/j.ijid.2008.06.019.

Seetlani NK, Memon AR, Iftikhar F, Ali A, Fazel PA. Hepatorenal syndrome in patients with cirrhosis of the liver according to 2007 International Ascites Club Criteria. J Ayub Med Coll Abbottabad. 2016;28(3):578–81.

Mal P, Altaf J, Ansari MR. Determine the frequency of hepatorenal syndrome in patients with cirrhosis associated with hepatitis C. Int Clin Pathol J. 2017;4(4):104–9. doi:10.15406/icpjl.2017.04.00172.

Bhatti HW, Tahir U, Chaudhary NA, Bhatti S, Hafeez M, Rizvi ZA. Factors associated with renal dysfunction in hepatitis C-related cirrhosis and its correlation with Child-Pugh score. BMJ Open Gastroenterol. 2019;6(1):e000292. doi:10.1136/bmjgast-2018-000292.

Gines P, Arroyo V. Is there still a need for albumin infusions to treat patients with liver disease? Gut. 2000;46(5):588–90. doi:10.1136/gut.46.5.588.

Lin SM, Lee CS, Kao PF. Low-dose dopamine infusion in cirrhosis with refractory ascites. Int J Clin Pract. 1998;52(8):533–6. doi:10.1046/j.1368-5031.1998.00217.x.

Carcoana OV, Hines RL. Is renal dose dopamine protective or therapeutic? Crit Care Clin. 1996;12(3):677–85. doi:10.1016/s0749-0704(05)70122-1.

Gülberg V, Bilzer M, Gerbes AL. Long-term therapy and retreatment of hepatorenal syndrome type 1 with ornipressin and dopamine. Hepatology. 1999;30(4):870–5. doi:10.1002/hep.510300418.

Kenny-Walsh E. Clinical outcomes after hepatitis C infection from contaminated anti-D immune globulin. Irish Hepatology Research Group. N Engl J Med. 1999;340(16):1228–33. doi:10.1056/NEJM199904153401603.

Guy J, Peters MG. Liver disease in women: the influence of gender on epidemiology, natural history, and patient outcomes. Gastroenterol Hepatol. 2013;9(10):633–9.

Kim IH, Kisseleva T, Brenner DA. Aging and liver disease. Curr Opin Gastroenterol. 2015;31(3):184–91. doi:10.1097/MOG.0000000000000167.

Siregar GA, Gurning M. Renal dysfunction in liver cirrhosis and its correlation with Child-Pugh score and MELD score. IOP Conf Ser Earth Environ Sci. 2018;125:012061. doi:10.1088/1755-1315/125/1/012061.