

# PREVALENCE OF HEPATORENAL SYNDROME IN LIVER CIRRHOSIS PATIENTS DUE TO CHRONIC HEPATITIS B AND C: A CROSS-SECTIONAL STUDY

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## Abstract

**Aim:** To determine the prevalence of Hepatorenal syndrome in liver cirrhosis patients due to chronic hepatitis B and C. **Study design:** A cross-sectional study. **Place and Duration:** Bilawal medical college hospital Kotri between the duration of December 2019 to December 2020. **Methodology:** Overall 100 patients with liver cirrhosis (with complete history, examination and investigations like HBSA, Anti HCV) irrespective of sex and race were included in this study. Liver cirrhosis was diagnosed by clinical and laboratory criteria which include: decreased liver span, splenomegaly, ascites, raised prothrombin time, low serum albumin, low ascitic fluid albumin, SAAG ratio of more than 1:1. The patients who have creatinine 2mg/dl or more were further analysed for Hepatorenal syndrome. **Results:** This study showed that renal dysfunction was very common among patients with cirrhosis and ascites. Hepatorenal syndrome was the major cause of kidney dysfunction. Other causes of renal impairment included spontaneous bacterial peritonitis (SBP) primary renal disease with a history of prolonged analgesia and hypovolemia. Out of 100 patients, only 33 of patients had altered renal function. Out of 33 patients, only 2 patients had got normal serum creatinine after getting normal saline infusion after withdrawal of diuretics. Nine patients had decreased serum creatinine below 1.5mg/dl after receiving appropriate antibiotics for infection. Eight patients had primary renal disease as indicated by altered urine D/R and/or U/S of kidneys. Two patients had a history of taking prolonged NSAIDs or nephrotoxic drugs. Overall only Twelve patients had Hepatorenal syndrome (HRS). **Conclusion:** Hepatorenal syndrome should only be identified when all other potential causes of renal impairment have been ruled out. It is an illness of exclusion. Patients with cirrhosis and ascites frequently have a medical complication known as Hepatorenal syndrome (HRS). Based on the

data gathered for this investigation, HRS was found to be the most frequent cause of renal impairment in these patients, followed by hypovolemia, primary renal disease, analgesic nephropathy, spontaneous bacterial peritonitis, and other reasons.

**Keywords:** Hepatorenal syndrome, hepatitis B, hepatitis C, Ascites, liver cirrhosis

## INTRODUCTION

In Pakistan, liver cirrhosis is the most common reason for morbidity and hospital admission. <sup>1</sup> Viral hepatitis B and C are Pakistan's most frequent causes of liver cirrhosis. The documented complication of liver cirrhosis is Hepatorenal syndrome. Pakistan has a higher incidence of hepatitis C. One of the numerous potential causes of acute kidney injury in people with acute or chronic liver disease is Hepatorenal syndrome. <sup>2</sup>

The most common causes of portal hypertension in affected people are cirrhosis, severe alcoholic hepatitis, or (less frequently) metastatic tumour, however fulminant hepatic failure can occur for any reason. <sup>3</sup> Hepatorenal syndrome is the culmination of a series of decreases in renal perfusion brought on by progressively more severe hepatic damage. <sup>4</sup> According to the updated criteria of the International Ascitic Club, Hepatorenal syndrome is diagnosed and has a dismal prognosis. <sup>5</sup>

The most serious variety, type 1 Hepatorenal syndrome, is characterized by a minimum twofold rise in blood creatinine (indicating a 50% reduction in creatinine clearance) to a level of more than 2.5 mg/dL (221 micromole/L) in less than two weeks duration. Some patients with type 1 Hepatorenal syndrome had a urine production of less than 400 to 500 mL per day at the time of diagnosis. <sup>6</sup>

Kidney function impairment that is less severe than that seen with type 1 disease is referred to as type 2 Hepatorenal syndrome. Ascites that are diuretic-resistant are the main clinical symptom in people with type 2 Hepatorenal syndrome. <sup>7</sup>

Since HRS lacks any distinctive symptoms, the diagnosis is made by ruling out other forms of renal failure. The below lists the criteria required to diagnose HRS. <sup>8</sup> These criteria differ significantly from those that were previously defined in that they: a. Because creatinine clearance is more complicated than basic serum creatinine for regular uses and does not improve the accuracy of renal function estimation in individuals with cirrhosis, it has been eliminated.

b. Renal failure is now regarded as HRS when there is a continuous bacterial infection but no sign of septic shock. This indicates that HRS treatment might begin before full recovery from the infection; additionally, albumin rather than saline should be used to expand plasma. The panellists agreed that albumin induces an expansion that is bigger and more prolonged than saline; c. minor diagnostic criteria have been deleted since they are not necessary.

The current study is planned to determine the prevalence of Hepatorenal syndrome in liver cirrhosis patients due to chronic hepatitis B and C

## **METHODOLOGY**

This cross-sectional study was carried out in wards medical 1 and 2 at Bilawal medical college hospital Kotri between the duration of December 2019 to December 2020. The participants in this study were all patients with liver cirrhosis and ascites associated with either hepatitis B or C or both, aged between 15 and 60 years, admitted to the medical wards of the Bilawal Medical College in Jamshoro or Kotri. Clinical and laboratory criteria, such as decreased liver span, splenomegaly, ascites, elevated prothrombin time, low serum albumin, low ascitic fluid albumin, and a SAAG ratio greater than 1, were used to confirm the diagnosis of liver cirrhosis.

When patients were comatose, formal consent was obtained from their caregivers. All patients that were recruited were evaluated. These individuals had tests for haemoglobin, liver function, urea, creatinine, electrolytes, and abdominal ultrasonography. Patients with creatinine levels of 2 mg/dl or higher had the ensuing investigations and procedures to test for the presence of Hepatorenal syndrome.

All users who were taking diuretics stopped taking them. In order to rule out hypovolemia as the source of renal failure, each patient received 1.5 liters of normal saline intravenously. To rule out primary renal illness in these patients, a 24-hour urine protein excretion test was performed. To rule out spontaneous bacterial peritonitis in these patients, ascitic fluid analyses were performed. To rule out obstructive uropathy and renal parenchymal abnormalities, ultrasounds of the kidney, ureter, and bladder were performed. HRS was diagnosed by using the updated criteria put forth by the international ascites club.

## **RESULTS**

One patient was positive for both hepatitis B and C out of 100 patients, of which 51 were males (51%) and 49 were females (49%) and 35 were HbsAg and 66 were anti-HCV positive. Blood CP, urea, creatinine, liver function test, serum albumin, prothrombin time, SAAG ratio, as well as the liver size and portal vein diameter were measured as part of the baseline parameters that were recorded.

A total of 33 individuals, or 33% of the total 100 patients, exhibited kidney dysfunction as evidenced by serum creatinine levels of 2meq/l or above. Thirteen participants were female and twenty were male. When 1.5 liters of normal saline was given and their diuretics were stopped, 2 patients (6.06 percent) whose serum creatinine was falling below 1.6 were classified as having renal failure caused by hypovolemia. Both of these patients were male.

The diagnosis of renal failure related to primary renal disease was made in 8 patients (24.24%) who had RBC in their urine greater than 50/hpf, urinary proteins greater than 150mg in 24 hours, and ultrasound evidence of renal parenchymal abnormalities. In this group, there were 1 female patient and 7 male patients. (As shown in Table 1)

A total of 02 patients were identified as having renal impairment secondary to analgesic nephropathy according to their extensive histories of analgesic usage, renal parenchymal abnormalities on ultrasonography, and RBC in urine greater than 50/hpf. In this group, there were two female patients.

A total of 09 patients (27.27%) with renal failure had spontaneous bacterial peritonitis identified as having a WBC count of more than 250/cmm in ascites fluid or infection anywhere in the body. In this group, there were five male patients and four female patients. A total of 12 individuals had Hepatorenal syndrome or 36.4% of those with renal impairment and 12% of those with ascites. Of these, 6 patients were male and 6 patients were female. Out of 12, three patients (25%) had positive surface HbsAg, while nine patients (9%) had positive anti-HCV results. Patients with Hepatorenal syndrome had an average creatinine level of 3.42 mg/dl.

**Table 1: Causes of hepatitis and complications study participants (n = 100)**

<b>Gender</b>	
Male	51
Female	49
<b>Cause of Hepatitis</b>	
Hepatitis B	35
Hepatitis C	66
Both hepatitis B and C	01
<b>Complications</b>	
Hepatorenal syndrome	12
Renal impairment	33
Spontaneous bacterial peritonitis	09

## DISCUSSION

Patients with extensive chronic liver disease experience renal failure known as Hepatorenal syndrome (IRS). Cirrhosis is the end result of hepatocellular damage, which causes both fibrosis and nodular regeneration throughout the liver. At least 10% of people with cirrhosis and ascites are predicted to acquire HRS throughout the course of their illness.<sup>9</sup>

In this study hypovolemia is a prevalent example of renal impairment in individuals with chronic liver disease. It is a dangerous and irreversible condition and one of the major causes of death globally. Random bacterial peritonitis is a prevalent cause of HRS. A total of 12% of the patients in this research experienced HRS despite receiving sufficient infection therapy.

A similar kind of investigation was carried out by Givens A. Escorsell A and colleagues to determine the incidence, risk factors, and other characteristics. A total of 234 non-azotemia patients with cirrhosis and ascites were recruited. They found that the chances of HRS occurring were 18% after one year and 38% after five years.<sup>10</sup> The annual incidence of patients with ascites and cirrhosis has been calculated at 8%, according to

Arroyo V in his study <sup>11</sup> there is disagreement on the frequency of HRS, according to Richard Moreau. <sup>12</sup>

Less than 1% of patients with ascites had HRS, according to a large study done in North America that included 3860 patients. A total of 234 non-azotemia patients with ascites, revealed that the likelihood of developing HRS was 20% at 1 year of follow-up. These results appear to be inconsistent, but the cause is unknown. The prevalence of HRS in patients with chronic liver disease and ascites was investigated. There were 240 patients enrolled. Of those, 148 (61.7% of them men) and 92 (38.3% of them women). <sup>13</sup>

According to a study, there were 76 patients overall (31.6%) who had impaired renal function, which was determined by an elevated blood creatinine level. Overall 11 of the patients had primary renal disease, according to the diagnosis. Six individuals were found to have renal dysfunction caused by analgesic nephropathy, and in seventeen cases, spontaneous bacterial peritonitis was the cause of renal dysfunction. Dehydration or volume depletion affected six patients. Patients with chronic liver disease and ascites had a 15% prevalence of HRS. <sup>14</sup>

In 2006, a study examined the predictive markers for patients with cirrhosis and kidney dysfunction using MELD scoring (Model for End-stage liver disease). <sup>15</sup> In roughly 40% of patients, the HRS was present. <sup>16</sup> Another study observed that the HRS was present in 47.4% of cirrhotic individuals with ascites who also had decreased renal function. <sup>17</sup>

However, our analysis demonstrates that 36.4% of cirrhotic patients with ascites and impaired renal function had HRS. According to Michael Schepke's study, renal parenchymal disease, which accounts for around 23% of renal impairment in cirrhotic individuals, is the second most prevalent cause of renal impairment. A total of 14.4% of cirrhotic patients with ascites, according to Dr. Raj Kumar, had a primary renal illness.

While this study demonstrates that patients with cirrhosis and ascites who have impaired renal function overall have a primary renal disease rate of 24.24%. According to another study, renal disease owing to medication occurs in cirrhotic individuals with ascites at a rate of roughly 19%. In that study, 7.6% of cirrhotic patients have altered renal function as a result of medication. While our research indicates that in cirrhotic patients with ascites and abnormal serum creatinine, the overall patient percentage with kidney disease subsequent medications is 6.06%. According to Michael Schepke et al, 15% of cirrhotic patients with ascites brought on by prerenal failure and infection also had an aberrant renal function. According to Dr Raj Kumar et al, 22.3% of patients had elevated serum creatinine due to spontaneous bacterial peritonitis (SBP) or infection.

According to the current study, 27.27% of patients experienced infections (either SBP-related or other types of infections throughout the body), and 6.06% of patients had dehydration due to impaired renal function, ascites, and cirrhosis.

In a local study, there were 105 (53.6%) male patients and 91 (46.4%) female patients out of a total of 196 patients. Based on the diagnostic criteria, Hepatorenal syndrome was determined to be present in 39 cases. A total of 39 patients were treated, of which 22

(56.4%) were female and 17 (43.6%) were male. The average age of those suffering from Hepatorenal syndrome was 55.64 years. The Hepatorenal syndrome was seen in 19.9% of individuals with liver cirrhosis.<sup>18</sup> In another study a blood creatinine level of 1.5 mEq/L or above was used to diagnose renal impairment in 76 patients, or 31.6% of the total population.<sup>19</sup> Results of a study showed that all of the participants had ascites and were all diagnosed with chronic liver disease. The reasons of renal failure were determined for all of the patients, and Hepatorenal syndrome and other potential causes were investigated. A total of 148 men [61.7%] and 92 women [38.3%] out of the 240 patients recruited in the study.<sup>20</sup>

## **RECOMMENDATIONS**

In order to protect volume status and renal function, it is advised that patients who have developed spontaneous bacterial peritonitis and show signs of renal impairment be managed in a setting that allows for optimal monitoring. They should also start receiving intravenous albumin 1.5g/kg per day. Other precipitating factors, such as high doses of diuretics and large-volume paracentesis without plasma volume expansion, are also advised to be avoided. Additionally, with these patients, bacterial infection and gastrointestinal bleeding should be actively managed.

## **CONCLUSION**

Patients with cirrhosis and ascites frequently experience the consequence condition known as Hepatorenal syndrome (HRS). According to the data gathered for this investigation, spontaneous bacterial peritonitis, primary renal disease, analgesic nephropathy, and hypovolemia were the next most common causes of renal impairment in these individuals after HRS.

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### **Permission**

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### **Conflict**

No conflict of interest

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