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Research Article

### INCIDENCE AND MORTALITY RATE OF RENAL IMPAIRMENT AFTER SPONTANEOUS BACTERIAL PERITONITIS AMONG PATIENTS SUFFERING FROM CIRRHOSIS

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**Abstract:**

**Background:** The occurrence of spontaneous bacterial peritonitis (SBP) is a significant complication among patients with cirrhosis, and has been linked to renal impairment. However, there have been no studies specifically focused on this problem.

**Objective:** To determine the incidence and mortality rate of renal impairment after SBP in cirrhotic patients.

**Methodology:** The study was carried out at the Department of Medicine at Liaquat University Hospital, Hyderabad, from January 2022 to July 2022, using a cross-sectional observational analysis. A sample of 291 cirrhotic patients was selected through non-probability consecutive sampling. SBP diagnosis was made when the ascitic fluid polymorphonuclear cell count was equal to or greater than 250 cells/mm<sup>3</sup>. Data was collected using a pre-structured, interview-based questionnaire containing inquiries about basic sociodemographic details, clinical examinations details, and particulars of laboratory investigation. The data was analyzed using SPSS v. 26.0.

**Results:** The study found that the incidence of SBP was 23.02%, with 30 episodes (45.52%) of SBP associated with renal impairment (transient in 50.82%, steady in 21.31%, and progressive in 27.87%). The mortality rate associated with progressive renal impairment was 100%, 53.85% with steady renal impairment, and 9.68% with transient renal impairment. The mortality rate in patients with renal impairment was significantly higher than in those without (44.26% vs. 8.06%).

**Conclusion:** This study highlights the common occurrence of renal impairment after SBP among cirrhotic patients, and suggests that it is a poor prognostic factor for this infection.

**Keywords:** Liver cirrhosis, incidence rate, mortality rate, renal impairment, spontaneous bacterial peritonitis.

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## INTRODUCTION:

Chronic hepatitis C virus infection affects an estimated 170 million people worldwide. An estimated 3% of the global population is infected with hepatitis C, although the prevalence ranges from 0.1 to 12%, depending on the country. This equates to approximately 170 million chronic carriers worldwide. New infections occur at a rate of 1 to 3 cases per 100,000 persons per year, although the actual incidence is probably much higher because most new infections are asymptomatic. [1, 2]

The seroprevalence of hepatitis C in different parts of Pakistan reported in last 5 years is from 2.2% to 13.5%. The highest seroprevalence of hepatitis C is reported from Lahore (13.5%), Jamshoro and Mardan (9%). Hepatitis C Infection can lead to Chronic Liver Disease and Cirrhosis and is the most frequent indication for liver transplantation. Cirrhosis is characterized by triad of parenchymal necrosis, regeneration and scarring. Cirrhosis and its disease-related complications are the 12th leading cause of mortality among adults worldwide and are responsible for nearly as many fatalities as diabetes mellitus. [3, 4]

Ascites is the accumulation of free fluid in peritoneal cavity and among the major complications of cirrhosis, along with hepatic encephalopathy and the hemorrhage caused by the rupture of the esophageal varices. Patients with cirrhosis and ascites show a higher susceptibility to bacterial infections. Spontaneous bacterial peritonitis (SBP) is the infection of the ascetic fluid that occurs in the absence of a visceral perforation and in the absence of and intra-abdominal inflammatory focus such as abscess, acute pancreatitis or cholecystitis. For diagnosis of SBP, the number of polymorphonuclear leucocytes (PMN) in the ascitic fluid obtained by paracentesis must exceed 250 cells/mm<sup>3</sup> and from bacteriological cultures only one germ must be isolated. [5, 6]

Spontaneous bacterial peritonitis (SBP) is an important clinical complication affecting patients with cirrhosis and ascites. It is associated with a poor short term and long-term prognosis, with an in-hospital mortality rate ranging from 20% to 40%, and a recurrence rate of 70% after one year. Renal impairment (RI) after SBP has been described in 25% to 38% of the reported cases. It probably occurs as a result of an accentuation of the circulatory dysfunction (common in patients with cirrhosis and ascites) induced by the infection. Recently, RI has been shown to be the best predictor of in-hospital mortality in patients with SBP. [7, 8]

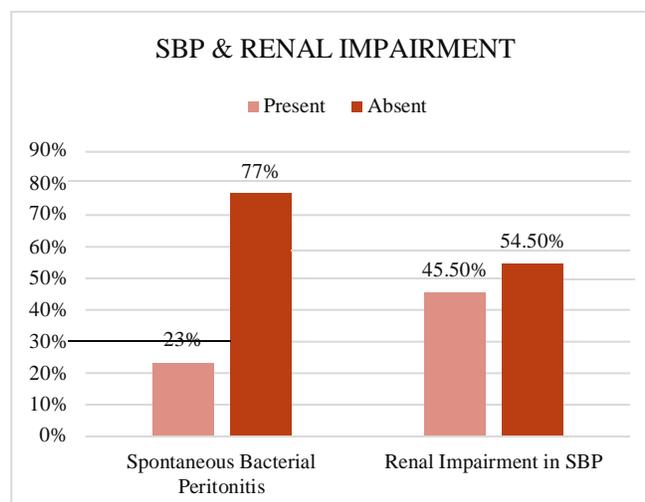
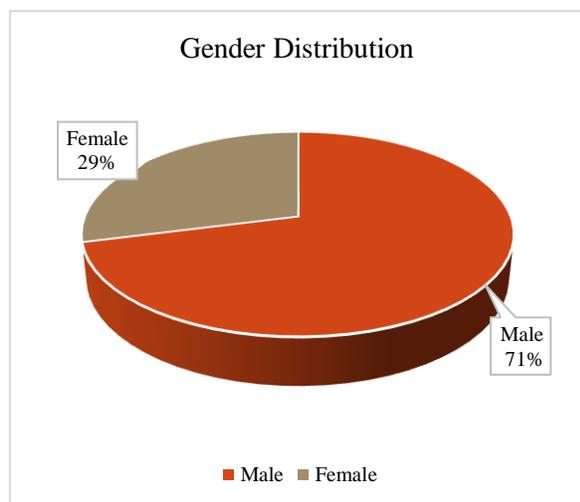
Although SBP is traditionally considered a precipitating factor of kidney failure in cirrhosis, very few studies specifically addressing this problem have been reported and that too from far corners of the globe (Spain and Brazil). Therefore, we wanted to investigate whether similar results would be observed in others areas of the world, namely Pakistan. [9, 10] The aim of the present study was to assess the incidence and prognosis of RI after SBP in cirrhotic patients.

## METHODOLOGY:

The study was carried out at the Department of Medicine at Liaquat University Hospital, Hyderabad, from January 2022 to July 2022, using a cross-sectional observational analysis. A sample of 291 cirrhotic patients was selected through non-probability consecutive sampling. SBP diagnosis was made when the ascitic fluid polymorphonuclear cell count was equal to or greater than 250 cells/mm<sup>3</sup>. Patients diagnosed with cirrhosis and who had experienced SBP included in the study while those with hepatocellular carcinoma or having bacterial or viral (other than that of SBP) were excluded from the study. Data was collected using a pre-structured, interview-based questionnaire containing inquiries about basic sociodemographic details about age, sex, and other demographic characteristics of the patients and clinical examinations details, and particulars of laboratory investigation as well as information on the severity of their cirrhosis and SBP. The severity of the cirrhosis was assessed using Child-Pugh score. The data was analyzed using SPSS v. 26.0. Frequency and percentages were used for qualitative data. Chi-square test was applied to check the significance of association between the mortality and type of renal impairment in SBP patients.

## RESULTS:

The mean age of sample stood at 51 years (SD  $\pm$ 7.5). 70.96% (207) of the subjects were males, while the remaining 29.04% (84) were females. The incidence of SBP was 23.02%. Among the 67 total cases of SBP, in 30 (45.52%) episodes, SBP was associated with RI. RI was classified as transient in 50.82%; steady in 21.31%; and progressive in 27.87%. The mortality rate associated with progressive RI was 100% (P<0.01); 53.85% with steady RI; and 9.68% with transient RI. The mortality rate in patients with or without RI was 44.26% and 8.06%, respectively.



TYPE OF R.I	PREVALENCE	MORTALITY	P-VALUE
TRANSIENT	50.82%	9.68%	> 0.05
STEADY	21.31%	53.85%	> 0.05
PROGRESSIVE	27.87%	100%	< 0.01

### DISCUSSION:

Renal impairment following spontaneous bacterial peritonitis (SBP) is a serious complication in patients with cirrhosis, and it can lead to high morbidity and mortality rates. In this discussion, we will assess the incidence and mortality rate of renal impairment following SBP in cirrhotic patients based on recent research.

The incidence of renal impairment following SBP in cirrhotic patients varies in different studies. A study by García-Saenz-de-Sicilia et al. (2021) reported an incidence of 31.5% [11], while a study by Terg et al. (2019) reported an incidence of 15.3%. [12] Another study by Wong et al. (2021) reported an incidence of 23.8%. These variations in incidence may be due to differences in study populations, diagnostic criteria, and treatment practices. [13]

The mortality rate of renal impairment following SBP in cirrhotic patients is also significant. A study by Piano et al. (2018) reported a mortality rate of 48.9%, [14] while a study by Tandon et al. (2018) reported a mortality rate of 36.8%. [15] These high mortality rates emphasize the importance of early recognition and treatment of SBP in cirrhotic patients.

The risk factors for renal impairment following SBP in cirrhotic patients have been extensively studied. A study by Piano et al. (2018) identified advanced age,

low serum albumin levels, and high serum creatinine levels as independent risk factors. [14] Similarly, a study by Wong et al. (2021) identified high MELD scores, low serum albumin levels, and hyponatremia as risk factors. [13]

The diagnosis and management of renal impairment following SBP in cirrhotic patients are crucial to prevent complications and improve outcomes. Early recognition and treatment of SBP can prevent the development of renal impairment. A study by Tandon et al. (2018) suggested that albumin infusion and antibiotic therapy may improve renal function in cirrhotic patients with SBP. [15]

No studies have addressed the development of RI after SBP in areas of Pakistan. The fact that etiology of liver disease due to lack of alcoholism and greater incidence of hepatitis infection in the country is very different from the western world, makes it important for such investigations to be conducted and results be produced. [16]

The incidence of RI observed in the present study was slightly higher than that observed in the literature, although most authors do not consider cases of transient failure as cases of RI. When our cases of transient renal failure are excluded, the incidence drops down, which is in agreement with the literature. [17]

The higher incidence of transient renal failure observed in our patients could be the result of a delay in hospitalization, which is a common fact in most developing countries. On the other hand, our study showed that RI after SBP is an important predictor of SBP prognosis also in Pakistan, particularly in cases of steady and progressive renal failure. This finding is similar to that described by others in literature. [18]

### CONCLUSION:

This study highlights the common occurrence of renal impairment after SBP among cirrhotic patients, and suggests that it is a poor prognostic factor for this infection.

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