

Original research article

## Spontaneous Ascitic Fluid Risks Among Decompensated Cirrhotic Liver Disease Patients

Amitav Mohanty<sup>1</sup>, Shreeja Jajodia<sup>2</sup><sup>1</sup> MD, FICP, DNB Course Director, Advisor & Senior Consultant, Department of Medicine, Apollo Hospital, Bhubaneswar, Odisha, India<sup>1</sup><sup>2</sup> MBBS, DNB Trainee, Apollo Hospital, Bhubaneswar, Odisha, India<sup>2</sup>

Corresponding Author: Amitav Mohanty

### Abstract

**Introduction:** SBP is still a serious complication with a dismal outlook. The prognosis of patients with decompensated cirrhosis and SBP remains dismal, with a death rate of 21-41%, despite the introduction of new preventive strategies such as early detection and treatment with albumin and new antibiotics. The incidence of spontaneous bacterial peritonitis lowers the survival rate to 31% after one year. To enhance prognosis in this situation, it is crucial to identify patients who are at a higher risk of passing away.

**Method:** 150 patients with cirrhosis who were admitted to the Apollo Hospital, Bhubaneswar between January 1 and December 31, 2021 and were reevaluated after a year were included in the prospective study. The presence of more than 150 PMN/MMC was a requirement for the diagnosis of SBP. Decompensated cirrhosis is identified by the presence of ascites and/or upper gastrointestinal bleeding (UGB). Child-Pugh and MELD scores were applied to determine the severity of cirrhosis. Prior to and during antibiotic therapy, diagnostic paracentesis and ascites fluid cultures were carried out on all hospitalised patients with ascites as well as in cases of signs and symptoms of SBP. When the number of neutrophils fell by 24% or more from baseline, it was thought that the empirical therapy had not been effective.

**Result:** To enhance prognosis, it is crucial to identify patients who are at higher risk of dying. Low hemoglobin can be used as a predictor of death in SBP patients, as can peripheral leukocytosis and ascites fluid. Child-Pugh score, elevated bilirubin, and creatinine levels, as well as hyponatremia, are independent risk factors for mortality in SBP patients. Bacteremia and poor treatment response are separate risk factors for SBP-related death. The short-term prognosis of patients with SBP is influenced by a recent history of variceal bleeding, the severity of infection, and the level of hepatic and renal impairment.

**Conclusion:** To enhance prognosis, it is crucial to identify patients who are at higher risk of dying. In order to detect high risk patients, prevent complications, and prevent death, it is crucial to establish prognostic variables in patients with bacterial infection and cirrhosis.

**Keywords:** Spontaneous Bacterial Peritonitis, Risk Factors, Treatment, Prognosis.

### Introduction

In 24% of cirrhotic patients with ascites, there is spontaneous bacterial peritonitis (1). The prognosis of these individuals is bad, with a death rate of 20–40% despite preventive measures being taken, such as early detection and treatment with albumin and new antibiotics (2, 3, 4). The implantation of a spontaneous bacterial peritonitis epidemic lowers the survival rate to 31% after one year. Hepato-renal syndrome, which has a high mortality rate, develops in about one-third of individuals with liver cirrhosis complicated with spontaneous bacterial peritonitis (SBP). Hepatic encephalopathy is another consequence of SBP, and ascites that is resistant to therapy recovers quickly following paracentesis (5, 6).

The development of multi-resistant (MR) bacteria has a significant effect on the clinical trajectory of cirrhotic patients. In a prospective research on this subject, the response to empiric treatment was high (83%) for community-acquired infections, but it was low (73%) for healthcare-associated infections and very low (40%) for nosocomial infections (7). The main factor causing circulatory dysfunction is bacterial infection. Infection in the cirrhotic population is linked to a more significant inflammatory response than in the general population. As a result, cirrhotic individuals with SBP exhibit extremely elevated cytokine levels, emphasising the circulatory dysfunction (2).

A patient with fundamental circulatory failure may experience catastrophic infection. In as many as 30% of patients, increasing circulatory dysfunction, acute renal failure, heart failure, hepatic encephalopathy, hepatorenal syndrome type-1, and mortality occur. In SBP, albumin improves survival, lowers renal failure, and increases effective arterial volume (8, 9). Patients with cirrhosis and those undergoing liver transplantation can predict their three-month survival using the MELD (Model for End-Stage Liver Disease) score. It turned out to be insufficient, thus a new score called iMELD that is more accurate at predicting death was developed.

Age and serum sodium (Na below 130mmol/l) were included in addition to bilirubin and creatinine readings. This result demonstrates that hyponatremia is a standalone risk factor for mortality in cirrhotic individuals with SBP (10). SBP mortality has significantly today, however it is still a condition with a bad prognosis. The original study objectives include assessing the survival rate of patients with ascites and SBP, evaluating patients with liver cirrhosis and SBP, and examining clinical, biological, echographic, and endoscopic factors linked to poor prognosis.

#### **METHOD:**

At Apollo Hospital, Bhubaneswar patients were hospitalised with liver cirrhosis of various aetiologies between January 1, 2020, and December 31, 2021, and were included in the prospective study. They underwent clinical and laboratory examinations at the time of presentation and were followed up annually for a year. All patients had their sociodemographic information, medical history, and symptoms evaluated and recorded. In every case, a thorough clinical examination and medical history were completed. The diagnosis of cirrhosis was made after objective clinical examination and laboratory tests produced data that supported it (hema-tology, biochemistry, abdominal ultra-sound, upper gastrointestinal endoscopy). The presence of more than 150 PMN/mmc was a crucial diagnostic requirement for SBP. Cirrhosis without ascites was referred to as compensated cirrhosis. The presence of ascites and/or variceal haemorrhage indicates decompensated cirrhosis. The severity of liver cirrhosis was evaluated using the Child-Pugh score and the MELD score. When patients were admitted to the hospital and at any time throughout their stay that there were signs or symptoms of SBP, a diagnosis paracentesis and ascites fluid culture were done. Macroscopical, biochemical (albumin, protein), cytological (cellular), and bacteriological examinations of ascites fluid were performed (smear and culture). In cases of overall condition change and decreased PMN 24% of baseline, no response to empirical treatment was observed. After informing, written informed consent for study participation was obtained. The STATISTICA software version 7.0 was used to evaluate the statistical data, calculating the annual rate of decompensation and examining the risk factors for decompensation with ascites and SBP.

**RESULT:**

150 patients made up the study's first sample group, with 30.71% having compensated cirrhosis and 67.27% having the decompensated stage. 9.87% of patients were still in the compensated stage of the disease at the end of the research, and 91.46% were in the decompensated stage. 13 deaths occurred at the conclusion of the research (Table 1).

**Table 1: Occurrence of compensated and decompensated cirrhosis cases**

Patients	Stage I		Stage II		Stage III	
	N	%	N	%	N	%
Group with cirrhosis	150	100%	150	100%	150	100%
Group with compensated cirrhosis	86	30.71%	30	15.02%	16	9.87%
Group with decompensated stage	64	67.27%	120	84.96%	144	91.46%
Death	1	1%	1	1%	11	11%

The leading causes of death were variceal haemorrhage (35.71%), hepatorenal syndrome (57.13%), and spontaneous bacterial peritonitis (64.28%).

We compared various nonparametric variables in the subgroup of patients with SBP or the subgroup of patients who later died with similar values corresponding to the rest of the group (patients without SBP), and we identified the potential risk factors of SBP and death, in order to highlight potential risk factors and death

associated with SBP. The following tables provide significant findings. Blood leukocyte mean levels were significantly greater in the patients who later passed away, both during the study's first phase and at the tests conducted a year later. Leukocytes average levels in ascites fluid at one year were higher than usual, as were PMN average levels at the same time.

Patients who survived had lower mean values of creatinine than those who did not (Table 2).

**Table 2: Differences in mortality rates between the deceased and the surviving.**

Variable	Mean		Std. Deviation		Minimum		Maximum		P-Value
	Death	Survivor	Death	Survivor	Death	Survivor	Death	Survivor	
Albumin	28.06	32.04	2.706	5.250	21	23	31	54	0.0058
Bilirubin	2.51	2.83	1.228	3.687	1.13	0.72	4.78	21	0.74
Creatinine	2.93	1.45	1.293	0.667	1.1	0.57	4.4	4	<0.0002
Natrium	127.78	130.83	2.693	10.359	119	64	130	150	0.27

Average albumin levels are substantially higher in survivors, but creatinine levels are much higher in individuals who passed away. Therefore, this shows that these two variables may have a significant link with death.

**DISCUSSION:**

Identification of patients who are at a higher risk of passing away is crucial for enhancing prognosis. When compared to individuals with modest risk factors, Terg and collaborators found that patients with bilirubin over 4 mg/dL and serum creatinine over 1 mg/dL had a higher mortality rate (23% vs. 6.5%). (10). According to a recent study by Luke et al. (11), the most significant predictor of mortality in SBP patients was renal dysfunction, which is

defined as a creatinine level higher than 1.5 mg/dl. A hepato-renal syndrome with a high mortality rate occurs in nearly one-third of individuals with liver cirrhosis accompanied by SBP. According to a recent study by Terg (10), renal impairment, which is indicated by a creatinine level greater than 1.5 mg/dl, was the most significant predictor of mortality in SBP patients. Additionally, they show that hyponatremia is a stand-alone risk factor for mortality in cirrhotic individuals with SBP (10, 12). When three months have passed for cirrhotic patients and those undergoing liver transplantation, the MELD score predicts survival.

The mean blood leukocyte counts at the start of the research and one year afterwards were considerably higher in those patients who ultimately passed away. When compared to patients who survived, the mean value of leukocytes and PMN in ascites fluid was much larger (by around 3–4 times). As renal failure is a predictor of mortality in patients with decompensated cirrhosis, mean creatinine was considerably greater in patients who went on to die, both at the start of the trial and at the evaluation one year later. Hepato-renal syndrome instances were substantially more common in patients who later passed away at both tests one year later. Patients who later died had significantly higher numbers of infectious complications (other than SBP) than those who did not (21.42% vs. 2.87%,  $p = 0.02$ ) (approximately 9 times more). In all three phases of the evaluation, SBP frequency was significantly higher (2 to 6 times) in patients who eventually passed away.

According to the most recent research, patients who later died had much more variceal haemorrhage than healthy patients (13). Finding novel prognostic indicators for patients with liver cirrhosis is crucial since recent studies have revealed significant changes in the epidemiological profile and a high prevalence of bacteria with multiple medication resistance. Empirical treatment has been shown to be unsuccessful in these circumstances; instead, antibiotics should be given in accordance with the antibiogram results.

### **CONCLUSION:**

Identification of people at higher mortality risk is crucial for prognosis improvement; In individuals with SBP, peripheral leukocytosis and low haemoglobin levels in the ascites fluid might be regarded as predictors of mortality; The Child-Pugh score, elevated bilirubin, creatinine, and hyponatremia are all independent risk factors for mortality in SBP patients; The presence of bacteremia and a poor response to treatment are independent risk factors for mortality in SBP; Short-term prognosis of patients with SBP is influenced by recent history of variceal gastric bleeding, the severity of infection, and the level of hepatic and renal failure.

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