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Evaluation of Incidence and Outcome of Spontaneous Bacterial Peritonitis in Cirrhotic Patients with Ascites in East Indian Population

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Abstract: Background: Spontaneous bacterial peritonitis (SBP) is the most common infection of ascitic fluid that occurs in patients with cirrhotic ascites typically described in hospitalized patients. Objectives: To determine the prevalence, incidence and outcome of spontaneous bacterial peritonitis in adult patients with liver cirrhosis and ascites admitted at Narayam Medical College and Hospital, Jamuhar, Sasaram, Bihar.
Materials and methods: A study was conducted involving 60 patients with liver cirrhosis and ascites between October 2013 and April 2014. Ascitic fluid culture, the gold standard for SBP diagnosis was done, for culture positive results susceptibility testing of common antibiotics using a disc diffusion method was done. Ascitic fluid cell count and bedside dipstick test were also done. Positive ascitic fluid culture, ascitic PMNs ≥250cells/μL and positive dipstick test were diagnostic for SBP. Results: Out of 60 cases of Cirrhosis of liver, 43 (71.73%) patients were identified as cirrhotics of alcoholic etiology and 17 (28.26%) patients as cirrhotics of non- alcoholic etiology The incidence of SBP in Cirrhosis of Liver was 13 (20.65%) out of 60 patients in which 11(89.47 %) were male patients while 2 (10.25%) were female patients, showing that incidence of SBP is more in males compared to females. Out of total 13 cases of SBP, 10 (78.94%) cases were culture Positive Neutrocytic Ascites and 3 (21.05%) cases were culture Negative Neutrocytic Ascites, and out of 10 cases of culture positive neutrocytic ascites, 1 organism was isolated in 7 (73.33%) cases. Two organisms in 2 (20.00%) cases and 3 organisms in 1 (6.66%) cases indicating that incidence of monomicrobial neutrocytic ascites was highest ,seen in 7 (73.33%) cases compared to polymicrobial neutrocytic ascites ,which was least seen in 1 (6.66%) case. Out of 13 cases of SBP, death occurred in 5 (38%) cases and 8(62%) patients survive .
Conclusion: Alcoholic cirrhosis is important contributing factor of SBP with liver cirrhosis than in non-alcoholic etiology. Therefore early recognition and prompt treatment of SBP can significantly reduce the mortality and morbidity of patients associated with decompensated cirrhosis of liver of alcoholic etiology and non alcoholic etiology.

Keywords: Ascitic fluid; Cirrhosis; Spontaneous bacterial peritonitis.

1. Introduction

Spontaneous bacterial peritonitis (SBP) is a common and severe complication of ascites in patients with chronic liver diseases. SBP was coined by Harold Conn in the early 1970s to describe the infection of ascitic fluid in the absence of any intra-abdominal, surgically treatable source of infection [1-3]. Spontaneous bacterial peritonitis can occur in up to 30% of patients with chronic liver disease with ascites [4]. It is reported that 30%–60% in patients with LC develop a bacterial infection [5-7], and the most common bacterial infections are Spontaneous Bacterial Peritonitis (SBP), urinary tract infection, pneumonia (respiratory infection), soft tissue infection, and bacteremia [8-12].

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Liver Cirrhosis (LC) are at high risk of developing bacterial infections because of the hypoactivity of phagocytic cells in the hepatic reticuloendothelial system as well as bacterial influx into the general circulation through portacaval shunts [13-15]. The diagnosis of SBP is established based on positive ascitic fluid bacterial cultures and the detection of an elevated absolute fluid polymorphonuclear neutrophil (PMN) count in the ascites (>250/mm3) without an evident intraabdominal surgically treatable source of infection [2, 16]. The causative organisms of SBP are mainly of intestinal origin with representative of normal aerobic flora – E.coli, streptococci (mostly pneumococci) and klebsiella.

The aims of the study are to evaluate the incidence and outcome of SBP in case of liver cirrhosis with ascites in East Indian population.

2. Materials and Methods

The present study was carried out in Narayam Medical College and Hospital, Jamuhar, Sasaram, Bihar. Sixty (60) cases of chronic liver disease (Cirrhosis) with ascites were considered for study.

2.1. Inclusion Criteria

All patients of Cirrhosis of liver with ascites were diagnosed on the basis of clinical evaluation, bio- chemical investigations and ultrasound of abdomen.

2.2. Exclusion Criteria

Patients, who had received antibiotics for 2 weeks prior to admission, patients classified as having secondary peritonitis, ascites due to malignancy or tuberculosis and ascites due to renal/cardiac causes.

The diagnosis of cirrhosis of liver was made on the basis of clinical presentation, ultrasound abdomen and liver function tests. Both old and newly diagnosed cases of cirrhosis liver were taken up for this study. Ascitic fluid analysis was done in all patients of cirrhosis of liver at the time of admission. Informed consent was taken from the patients or closed relatives where relevant. With all aseptic precautions, paracentesis was performed as early as possible,after hospitalization and before starting antibiotics by inserting a neddle of 18 or 22 gauge in left iliac fossa or midline just below the umbilicus. About 10 ml ascitic fluid was drawn and inoculated in a blood culture bottle at the bedside. Ascitic fluid was also collected in EDTA (Ethylene diamine tetracetic acid) tube for cell count.

3. Results

The mean age of incidence was 46.35 ±8.07 in our study group. The maximum incidence of Cirrhosis of liver was in the age group of 41-60 years and least was in the age group of 61-70 years. Relatively lesser incidence was observed among females of all age groups (Table 1).

Table-1. Age and sex incidence of Cirrhosis of liver with ascites in different age groups

Age (in years)	No. of Patients	Male	Female	Percentage of males	Percentage of females
31-40	13	11	02	84.61	15.38
41-50	27	19	08	70.37	29.62
51-60	17	15	02	88.23	11.77
61-70	03	03	0	100	--
Total	**60**	**48**	**12**	--	--

Out of 60 cases of Cirrhosis of liver, 43 (71.73%) patients were identified as cirrhotics of alcoholic etiology and 17 (28.26%) patients as cirrhotics of non- alcoholic etiology, indicating that alcohol is an important causative factor for cirrhosis of liver (Fig 1). The incidence of SBP in Cirrhosis of Liver was 13 (20.65%) out of 60 patients (Fig 2), in which 11(89.47 %) were male patients while 2 (10.25%) were female patients, showing that incidence of SBP is more in males compared to females (Table 2).

Figure-1. Aetiology of cirrhosis of liver

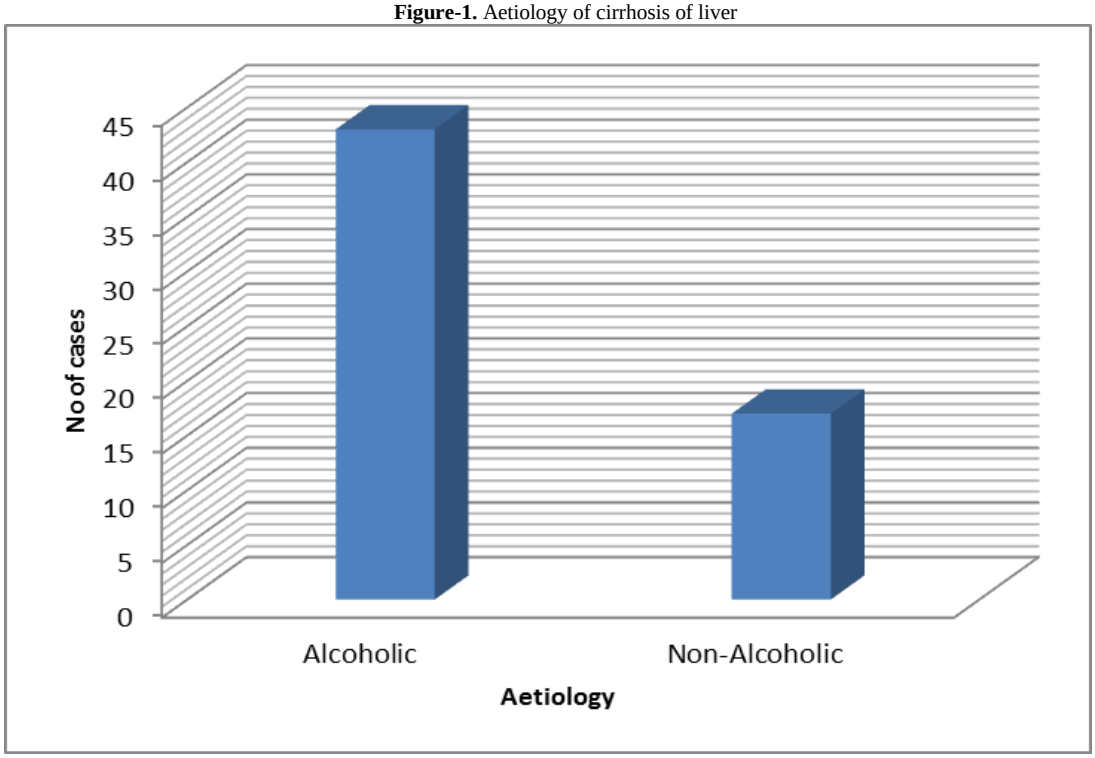


Figure-2. Incidence of SBP in Cirrhosis

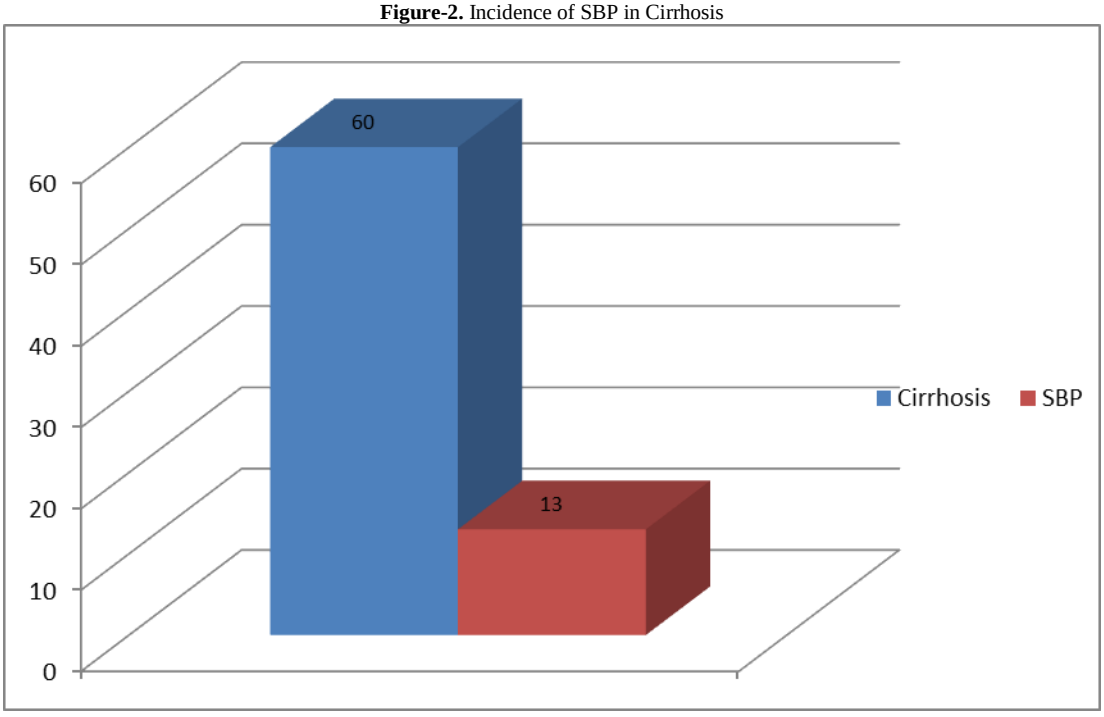


Table-2. Sex distribution in cases of SBP in Cirrhosis of Liver

Sex	No of Cases of SBP	Percentage
Male	11	89.47
Female	02	10.52
Total	13	100

Out of total 13 cases of SBP, 10 (78.94%) cases were culture Positive Neutrocytic Ascites and 3 (21.05%) cases were culture Negative Neutrocytic Ascites (Fig 3), and out of 10 cases of culture positive neutrocytic ascites, 1 organism was isolated in 7 (73.33%) cases. Two organisms in 2 (20.00%) cases and 3 organisms in 1 (6.66%) cases indicating that incidence of monomicrobial neutrocytic ascites was highest ,seen in 7 (73.33%) cases compared to polymicrobial neutrocytic ascites ,which was least seen in 1 (6.66%) case (Table 4). Out of 13 cases of SBP, death occurred in 5 (38%) cases and 8(62%) patients survive (Figure 4).

Figure-3. Incidence of culture positive and culture negative Neutrocytic ascites in SBP

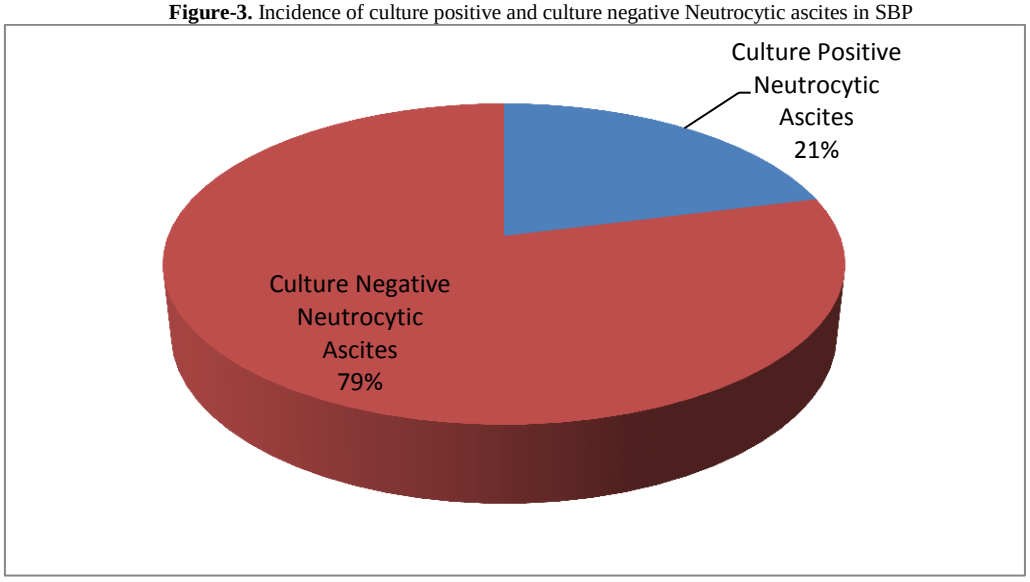
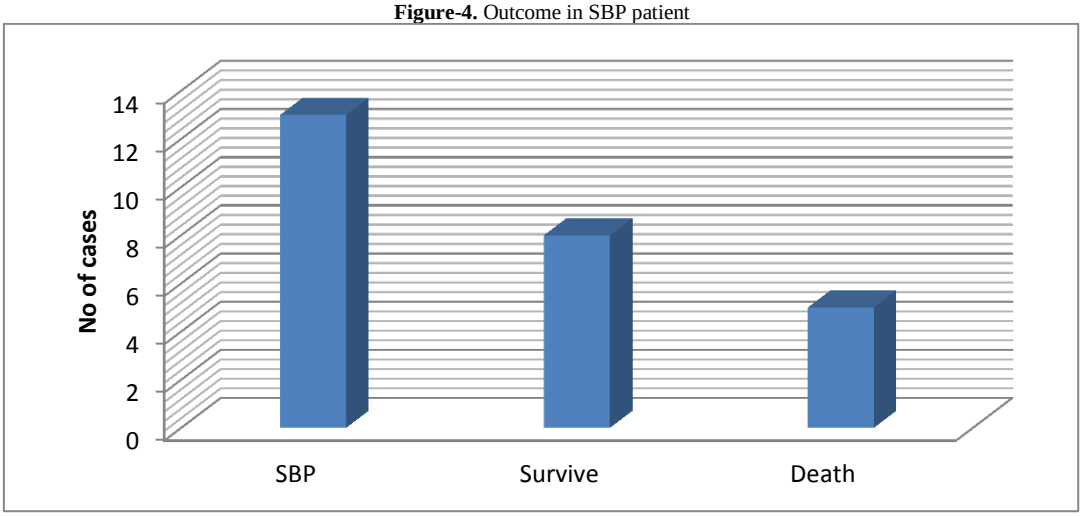


Table-4. Showing perentage of monomicrobial and polymicrobial ascites in SBP

Types of Organisms Isolated	No of cases of SBP	Percentage
Single type	07	73.33
two types	02	20.00
Three Types	01	6.66

Figure-4. Outcome in SBP patient



4. Discussion

Spontaneous Bacterial Peritonitis in cirrhotic patients with Ascites has become a well defined clinical syndrome in recent times. Spontaneous Bacterial Peritonitis is a bacterial infection of sterile ascitic fluid, in the absence of either, a contiguous or localized intraperitoneal source of infection, which complicates frequently and often severely, all forms of parenchymal liver diseases. In most cases complication develops after the patient is admitted to the Hospital. A direct correlation has been found between the impairment of local defensive mechanism of ascitic fluid and risk of SBP in cirrhotic patients hospitalized with ascites. It is generally accepted that SBP is a sequence of bacteremia, which is probably facilitated by low, depressed reticuloendothelial system phagocytic activity and serum complement deficiency. On the other hand, hepatic function would also be important, because C3, one of the most important elements in compliment activation, is synthesized in the liver. Hence, patients with both low protein content in ascitic fluid and hepatic insufficiency would be at high risk for developing SBP.

The unifying feature of the types of ascites susceptible to spontaneous infection is low protein concentrations. Ascites that is relatively resistant to SBP (ie, ascites due to peritoneal carcinomatosis or heart failure or physiologic peritoneal fluid) usually has a high protein concentration. The opsonic activity (endogenous antimicrobial activity) of ascites correlates closely with protein concentration.

In our study, the incidence of cirrhosis of liver was maximum in the age groups of 41-60 years (44 cases). 27 cases belonged to the age group of 41-50 years of age, out of which, 19 cases were males and 8 cases were females. 17 cases belonged to the age group of 51-60 years out of which 15 were males and 2 were females. In a study

conducted by Syed, *et al.* [17], highest number of cases was seen in the age group of 41-60 years which was similar to our study. The incidence of cirrhosis in our study was less in females in all groups compared to males.

In our study, the frequency of alcoholic cirrhotics was 71.73% compared to the non-alcoholic which is 28.26%, indicating that alcohol was an important cause for the development of Cirrhosis of liver.

In the present study, the incidence of spontaneous bacterial peritonitis in cirrhosis of liver with ascites was 20.65% where as out of 60 cases of cirrhosis of liver, SBP was diagnosed in 13 cases (P-value <0.001). In the study conducted Marelli, *et al.* [18] , in 1993, reported an incidence of 22.25% and Syed VA[73] et al in 2007, conducted a study where the incidence of SBP was found to be 24.69%, both of which were comparable to our study. Puri, *et al.* [19] in 1996 reported 30% patients with SBP and an incidence of 19% was reported in a study conducted by Almadal and Skinhoj [20] in 1987. So the incidence of SBP in our study was comparable to the above studies.

In this study Spontaneous Bacterial Peritonitis was a more common complication in patients with cirrhosis of liver of alcoholic etiology, than those of non alcoholic etiology. Out of 13 cases of SBP, 10 (23.25%) cases were due to alcoholic cirrhosis, whereas 3 (17.64%) cases due to non-alcoholic cirrhosis. In the study conducted by Rosa, *et al.* [21] in 2000 also reported that SBP was a more common complication in alcoholic cirrhosis than in the non alcoholic cirrhosis. In a study conducted by Jain, *et al.* [22], in 1999, the frequency of distribution of SBP in alcoholic cirrhosis was 37.03% as against 33.3% amongst non alcoholic cirrhosis.

In this study of 13 SBP patients, ascites fluid culture was positive in 10 cases and negative in 3 cases (P-value<0.001). Puri, *et al.* [23] in 1996, in their study reported this to be around 62%. Out of 10 cases of culture positive SBP in the present study, single organism (monomicrobial) was isolated in 7 cases (73.33%) while 2 and more than 2 organisms (polymicrobial) were isolated in remaining 3 cases, suggesting that the incidence of monomicrobial bacterioascites was high in culture positive neutrocytic ascites. Blood cultures of these patients yielded same organisms in 35.7% cases. In a study conducted by Jain, *et al.* [22], single organism (monomicrobial bacterioascites) was isolated in 77.77%.

In our study, out of 13 cases of Spontaneous Bacterial Peritonitis infection resolved in 8 (62%) cases and death occurred in 5(38%) cases in the hospital. In the pan sort et al 1999 conducted study and found mortality rates of 41% [24].

5. Conclusion

The incidence of SBP in cirrhosis of liver with ascites was more in male in comparison to females in all age groups. Spontaneous bacterial peritonitis was found to be more common in patients of alcoholic cirrhosis than in non-alcoholic etiology. Therefore early recognition and prompt treatment of SBP can significantly reduce the mortality and morbidity of patients associated with decompensated cirrhosis of liver of alcoholic etiology and non alcoholic etiology.

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