

Original Article

A Single Centre Experience of Spontaneous Bacterial Peritonitis in Ascites with Cirrhosis : A Record Based Observational Study

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Spontaneous Bacterial Peritonitis (SBP) is one of the complicated infections in patients with cirrhosis and ascites which can be fatal if not diagnosed and treated. This is a record based observational study using the data of all patients admitted with established cirrhosis of liver with ascites. Aim of the study was to find out the incidence of SBP in cirrhosis patients and also to study the clinical profile of SBP. Thirty nine patients' data were included in the study. Three patients had classic SBP, one patient had Culture Negative Neutrocytic Ascites (CNNA) and two had bacterascites. Patients were treated with injection cefotaxime (2 gm) 8hourly for 5 days and clinical and laboratory parameters were evaluated.

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Key words : Ascites, Cirrhosis, Spontaneous Bacterial Peritonitis (SBP), Culture Negative Neutrocytic Ascites (CNNA), Bacterascites.

Ascites or hydroperitoneum is the collection of fluid of more than 25 ml in the abdominal cavity. The word ascites was derived from a Greek word "Askos" meaning a bag or sack. The term was coined by an Irish Physician Triwsa. Cirrhosis of liver is the commonest cause of ascites but many other conditions like cardiac (congestive cardiac failure), infections (tuberculosis, chlamydia), hypoproteinemia, pancreatitis, renal (nephrotic syndrome), hypothyroidism and familial Mediterranean fever can cause Ascites¹. Laennec coined the term "Cirrhosis" in 1826 and derived from a Greek word meaning 'Orange' or 'Twany'. Worldwide cirrhosis contributes to 1.1% of all deaths². Causes of cirrhosis can be alcoholic or post necrotic or NAFLD. Spontaneous Bacterial Peritonitis (SBP) is the bacterial infection of peritoneum in the presence of ascites. SBP rarely occurs without ascites. It is potentially a reversible condition if treated early and can be fatal without diagnosis and treatment. With availability of newer antibiotics the mortality rates has been reduced from 100% to less than 20% with early diagnosis and treatment³. Clinical presentation of SBP may be varying. It could be starting from asymptomatic to minor symptoms to severe symptoms. Clinically SBP

Editor's Comment :

- Spontaneous bacterial peritonitis (SBP) needs early recognition in patients of cirrhosis with ascites to prevent mortality.
- We had conducted a record based observational study including 39 patients.
- Of the 39 patients, 3 patients had classic SBP, one case was CNNA and two patients had bacterascites and rest had sterile ascites.
- Injection cefotaxime 2 gm 8 hourly for 5 days were used which was associated with zero mortality in our study.
- Small sample size of the study is an important limitation.

is classified into three variants —

- (1) Classic SBP- More than 250/mm³ polymorpho-nuclear leucocytes in ascitic fluid and culture is positive
- (2) Polymorpho-nuclear leucocytes >250/mm³ but culture is negative
- (3) Bacterascites- Culture is positive but polymorpho-nuclear leucocytes are less than 250/mm³

Common clinical manifestations are fever, pain abdomen, altered GI motility, features of hepatic encephalopathy in severe cases⁴. Early diagnosis and proper treatment reduces the mortality rates. In this back ground this study was conducted to find out the incidence of SBP in ascitic patients and to study the clinical profile of patients with SBP.

MATERIALS AND METHODS

This is a record based observational study done with patients admitted with history of ascites over a period of one year from May 2021 to April 2022. Ethics committee permission was obtained. Patients with history of abdominal paracentesis in the last three weeks, patients who had received antibiotics four weeks prior and patients with secondary causes of

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peritonitis were excluded from the study. Detailed history was taken and clinical examination was done. Patients underwent relevant investigations, were evaluated. Diagnosis of cirrhosis was confirmed by the report of ultrasound abdomen. After admission all patients 30 ml of ascitic fluid was obtained immediately which was sent for cytological examination and biochemistry and 10 ml of fluid for culture. Ascitic fluid cell count was done under microscope. Ascitic fluid cultures were done as per standard culture methods. According to record based evaluation of all these documented data focusing on the ascitic fluid Polymorpho-Nuclear count (PMN), patients were grouped into-

- (1) Sterile ascites
- (2) Classic SBP- Culture positive and PMN count more than 250/mm³
- (3) Culture Negative Neutrocytic Ascites (CNNA)
- (4) Bacterascites- PMN less than 250/mm³ but culture positive

RESULTS

We had included the data of 39 patients who were matching predefined inclusion and exclusion criterion. Among the study population, 29 were male and 10 were female patients. The mean age was 49.1±9.6 and 47.3±12.05 in male and female patients respectively. Age range was 20-65 years. 25 patients had alcoholic cirrhosis, 4 had post necrotic (hepatitis B) and rest 10 had non-alcoholic fatty liver disease (NAFLD). Patients with SBP had Child-Turcotte-Pugh class C.

Of the 39 patients, 3 patients had classic SBP, one case was CNNA and two patients had bacterascites and rest had sterile ascites. Average age of the patients with classic SBP and bacterascites was less than 40 years and only case with CNNA age was more than 40 years. Majority patients with SBP had alcoholic cirrhosis and one patient had post necrotic cirrhosis. Jaundice was a common finding in all cases with SBP, two patients had fever as presenting symptom and two had abdominal pain and one patient had GI bleed and no one had encephalopathy. Of the 6 cases of SBP only one was female and had classic SBP.

Table 1 is showing the characteristics of patients SBP in the study.

DISCUSSION

Spontaneous Bacterial Peritonitis (SBP) is almost all in cases with cirrhosis of Liver cases with few exceptions some case reports have shown SBP in cardiac ascites⁵. Incidence rates of SBP vary from

Parameter	Value
No of patients positive in all categories of SBP	6 (in number)
Total No of patients in study	39(in number)
Incidence of SBP	15.38%
Incidence of Classic SBP	7.69%
Age	47.12 ±10.6 (SD)
Sex Male/Female	5/1 (in number)
Jaundice	6 (in number)
Fever	2 (in number)
Pain abdomen	2 (in number)
GI bleed	1 (in number)
Total counts	12670 ± 6732 /uL
Hemoglobin	9.5 ± 2.1 gm/dl
Platelet count	124670 ± 51670 /uL
T Bilirubin in Classic SBP	6.23 ± 5.4 mg/dl
T Bilirubin in CNNA	2.8 mg/dl
Total protein	5.6 ± 1.1 gm/dl
Albumin	2.1 ± 0.31 gm/dl
Ascitic Fluid PMN counts	1500 ± 2897 /uL
Ascitic Fluid Protein	1.38 ± 0.89 gm/dl
Ascitic Fluid Sugars	88.65 ± 32 mg/dl
Ascitic Fluid Culture	5 positive
Ascitic Fluid Organism grown	<i>E coli</i>
Ascitic Fluid Response to treatment	All Recovered

study to study because of sample size in general hospitalized patients it is around 10-30%⁶. In the present study overall incidence of SBP is 15.38% and classic SBP 7.69%, CNNA 2.56% and bacterascites is 5.12%. A study published by Amarapurkar, *et al* in 1992 showed the incidence of Classic SBP is 12.9% and CNNA 9.6%⁷. However a study by Runyon and Hoef JC showed higher incidence of SBP is 64.7% classic SBP and 35.3% CNNA⁸. Two patients had fever in the present study (3.33%). Incidence of fever in study done by Weinstein, *et al* in 1978 was 68%⁹. However some studies had shown that they had fever but had vague abdominal pain. Abdominal pain was seen two patients the present study which almost similar to the other published studies. Hepatic encephalopathy was observed in many studies like Weinstein, *et al* and Amarapurkar, *et al* but none of our patients had encephalopathy. GI bleed was seen in one patient the present study. Asymptomatic cases are also common as seen in the study by Conn and Fessel, *et al*¹⁰. Abdominal paracentesis was a contraindication earlier because of coagulopathy, now the studies have shown that abdominal paracentesis is safe and doesnot increase the risk of bleeding. There are several independent risk predictors of SBP like CRP >13 mg/dl, Platelet count <82000/uL and advanced age¹¹. The other factors that determine the severity of SBP are severity of liver dysfunction; risk is more with advanced liver disease. Fever, high serum bilirubin, ascitic fluid total protein level of <1 g/dl and deranged renal functions are important predictors for

development of SBP². MELD score is another important predictors for development of SBP¹². MELD scoring was not done in this study as it is record based study. All patients with positive cultures grew *E coli*. Several other studies also shows similar results. Other common organisms that cause SBP are klebsiella pneumoniae, salmonella, staphylococcus aureus, klebsiella oxytoca, citrobacter spp, corynebacterium spp, pseudomonas aeruginosa, enterobacter cloacae, serratia marcescens, acinetobacter spp, proteus mirabilis¹³. Possible mechanisms that involve in the development of SBP are increased colonization of gram negative bacteria in the upper gastrointestinal tract and bacterial overgrowth and failure of the gut to control the bacteria and immune system³. SBP is one of the common causes of infection in the setting of ascites. Early diagnosis and treatment are very important in reducing the mortality. Despite of advances in medication, the one month mortality is around 26-48%¹⁴. Cefotaxime is the most extensively studied antibiotic and, should be given at a dose of 2 gm 8 hourly for 5 days, it rapidly penetrates the ascitic fluid and exceeds the MIC of 90% of the isolated organisms by 20-fold³. In the present study all patients were treated with cefotaxime 2 gm 8 hourly for 5 days and patient showed significant improvement in terms of clinical features and along with the Lab parameters. Other commonly used other two antibiotics are amoxicillin-clavulanic acid are ofloxacin. Use of intravenous albumin in the dose of 1.5gm /kg on day one and 1 gm on day three also reduces short and intermediate term mortality.

Limitations : Small sample size is an important limitation of our study. Predictive parameters could not be used as it is a record based analysis. Prospective observational study with adequate sample size needs to be done for generalization of the study result which emphasizes the need of preparing registry in this regard.

Conclusion : Spontaneous bacterial peritonitis in one of the common infections in setting of ascites secondary to cirrhosis of liver. Without treatment the mortality rates are very high and hence early diagnosis and treatment are very important. Gram negative bacteria like *E coli* is the commonest microorganism responsible for SBP. Injection cefotaxime 2 gm 8 hourly for 5 days would reduce the mortality rates.

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