

Spontaneous Bacterial Peritonitis in Patients of Cirrhosis of Liver with Ascites: A Study from Central India

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ABSTRACT

A 50 patients of cirrhosis were enrolled for the study. Overall incidence of SBP in our study population was 54%. The mean age of presentation in our study was 44.11 years. 14 patients were diagnosed to have SBP or one of its variants with a prevalence of 34.14%. Only ascitic fluid routine microscopy and inoculation of ascitic fluid into blood culture bottle was found to be sufficient to diagnose SBP in most cases. Abdominal pain, tenderness and fever were strong indicators of ascitic fluid infection. Majority of patients with SBP were Culture negative neutrocytic ascites (CNNA) (63%) with isolated PMN count of >250 cells/mm³. Culture positivity was seen in 37% of patients of SBP out of which 30% were CNNA and 7% were Mono-microbial non-neutrocytic bacterascites (MNBA). Escherichia coli and Staphylococcus aureus were the most commonly isolated organisms. Peripheral leukocytosis was found to be a strong indicator for presence of ascitic fluid infection. Classical symptoms and signs were absent in these patients and hence, definitive diagnosis could only be made by ascitic fluid analysis and culture. Every patient of cirrhosis should be screened for SBP as delayed diagnosis can lead to fatal outcome. Routine antibiotic coverage should be avoided for fear of resistance.

KEY WORDS: ascites, cirrhosis, monomicrobial, neutrocytic, spontaneous bacterial peritonitis, culture negative neutrocytic ascites,

INTRODUCTION:

Cirrhosis of liver is a common disorder in clinical practice with increased advent of infectious and non-infectious causes resulting from portal hypertension and otherwise. Ascites is one of the most common consequences of portal hypertension resulting in decompensation and subsequent deterioration in the form of hepatic encephalopathy and spontaneous bacterial peritonitis. Cirrhosis of Liver leads to spontaneous bacterial peritonitis (SBP). SBP first reported in alcoholic cirrhosis has now also been reported in chronic active hepatitis, nephrotic syndrome, cardiac cirrhosis, primary biliary cirrhosis and malignant ascites. SBP leads to increased morbidity and mortality. Thus, the identification of SBP is all the more important as failure to recognize and treat the infection results in decompensation, progression to multi organ dysfunction and ultimately death.

Spontaneous bacterial peritonitis (SBP) is characterized by abrupt onset of fever with chills, abdominal pain and rebound tenderness over the abdomen. Absent bowel sounds and leukocytosis are seen in most cases. Paracentesis reveals cloudy ascitic fluid with many white blood cells, predominantly polymorphonuclear cells. It is mostly mono-pathogenic and the same organism is recovered from ascitic fluid as well as blood culture^[1]. Spontaneous bacterial peritonitis first reported in alcoholic cirrhosis has now also been reported in chronic active hepatitis, nephrotic syndrome, cardiac cirrhosis, primary biliary cirrhosis and malignant ascites. It may present as pyrexia of unknown origin, hypothermia or encephalopathy of any uncertain cause. Hence, screening becomes prudent in all patients of cirrhosis with ascites via diagnostic paracentesis. Spontaneous bacterial peritonitis is caused by enteric organisms in 75% of the cases and by non-enteric group of organisms including anaerobes in the remainder.

Early recognition of SBP has a favorable outcome in terms of reduced morbidity and mortality by effective intravenous antibiotics (beta lactamase resistant penicillin, cephalosporins). Secondary prophylaxis with oral therapy is needed to prevent subsequent attacks.

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The objective of this study was (a) to study the epidemiology and clinical spectrum of SBP in patients with cirrhosis of liver with ascites, (b) to determine the frequency of variants [Mono-microbial non-neutrocytic bacterascites (MNB) and Culture negative neutrocytic ascites (CNNA)] of ascitic fluid infections, and (c) to determine the spectrum of microbial flora isolated from SBP patients through ascitic fluid culture.

MATERIAL AND METHODS:

Patients admitted to People's College of Medical Sciences & Research Centre (PCMS), Bhanpur, Bhopal, with ascites and cirrhosis of liver (clinically, radiologically or histologically) were considered for the present study. The patients aged more than 12 years with no antibiotic treatment in 7 days prior to admission were included in the study. The patients aged less than 12 years of age, recently administered antibiotics during past 7 days or currently on antibiotics, patients with ascites with etiology other than cirrhosis of liver, undergone surgery within 3 months prior to admission. Spontaneous bacterial peritonitis was diagnosed by assessment of ascitic fluid neutrophil count being greater than 250 cells/mm³ or positive ascitic fluid culture and absence of intra-abdominal source of infection.

All patients underwent paracentesis within 24 hours of admission without administration of antibiotics. About 20ml of ascitic fluid was tapped in each patient with aseptic precautions 10ml of ascitic fluid was immediately inoculated into blood culture bottle at the bed-side for microbiological analysis. 10ml of ascitic fluid was used for biochemical and cytological analysis. All the samples were analyzed for types of cells and cell count, Gram's stain was done in all cases and ascitic fluid was subjected to microbiological culture. The broth bottle was incubated under aerobic conditions at 35°C for 7 days. Blind sub-cultures on 5% sheep blood agar and MacConkey's agar (incubated in aerobic conditions) and phenylethyl alcohol agar (incubated in anaerobic conditions) was done at 48 and 72 hours with final reporting after daily examination for visible growth at 72 hours. When turbidity was detected, additional sub-cultures were duly performed. Upon isolation, the organisms were characterized by standard tests and antibiotic sensitivity was evaluated.

Data was analyzed using Microsoft Excel and statistical analysis was done using the Chi Square test,

Student T test and the results were analyzed.

RESULTS:

Fifty patients were studied with regards to history and clinical examination, cytological, microbiological and biochemical tests. Out of the 50 patients screened, Twenty seven had SBP, while 23 had cirrhosis without SBP. The observations of the study were analyzed as follows (Table 1-6).

Cirrhosis predominantly affected the males with overall prevalence of 82%. Likewise, incidence of SBP was also more common in males (21/27). Only Leucocytosis was found to be significant between the patients with SBP and patients without SBP (p value 0.00625) (Table 7). Majority of patients were found to have SBP with Child Class C (72%) (Using multiple contingency Chi-square test- p value was found to be 0.0075 which was statistically significant) (Table 8).

Table 1: Gender distribution of patients.

Gender	All patients (n=27)	Patients with SBP (n=27)
Male	41	21
Female	9	6

Table 2: Age-wise distribution of patients.

Age group	All patients (n=50)	Patients with SBP (n=27)
18-29	6	4
30-49	26	14
50-69	16	8
70-89	2	1

Table 3: Etiological distribution of patients.

Etiology	All patients (n=50)	Patients with SBP (n=27)
Alcohol	27	12
Chronic hepatitis B	15	10
Others	11	5

Table 4: Variants of SBP.

Variant	N=27	Percentage
CNNA	17	63%
SBP with culture positivity	8	30%
MNBA	2	7%

Table 5: Spectrum of organisms in SBP.

Organism	N=10
<i>Escherichia coli</i>	4
<i>Staphylococcus aureus</i>	4
<i>Klebsiella pneumoniae</i>	1
<i>Acinetobacter spp.</i>	1

Table 6: Presenting complaints of the patients.

Symptoms	All patients with symptoms	Patients with SBP	Percentage of patients with SBP
Abdominal distension	48	26	96%
Abdominal pain	32	21	77.7%
Fever	29	20	74%
Oliguria	21	13	48%
Jaundice	23	14	51%
Altered sensorium	20	10	37%
Gastrointestinal bleed	9	5	18%

Table 7: Biochemical abnormalities in the patients.

Lab markers	Total (n=50)	SBP (n=27)	Percentage of patients with SBP
Leucocytosis	22	16	72.7%
Kidney injury	27	13	48%
Hyperbilirubinemia	25	21	84%
Raised liver enzymes	21	15	71.4%

Table 8: Child Pugh Class and SBP.

Class	Total (n=50)	SBP (n=27)	Percentage of patients with SBP
Child Pugh A	1	0	0%
Child Pugh B	20	6	30%
Child Pugh C	29	21	72.14%

DISCUSSION:

Cirrhosis of liver is no longer an under diagnosed entity and its incidence is rising more than ever. Even in its stable course, it leads to reduced quality of life and is most often derailed by development of SBP which is the most common infection in such patients leading to increased morbidity and mortality. Conn H.O. (1987) reported that SBP appeared at times in varying disguises over the preceding century, suddenly bursting forth in 1960^[2]. Initially, it was associated almost exclusively with alcoholic cirrhosis. But now, other causes of cirrhosis like post necrotic cirrhosis, cryptogenic cirrhosis, chronic active hepatitis, biliary cirrhosis and cardiac cirrhosis have also been proven significant^[3,4,5].

Thus, the identification of SBP is all the more important as failure to recognize and treat the infection results in decompensation, progression to multi organ dysfunction and ultimately death in such patients. Overall incidence of SBP in our study in the screened population was 54%, which was higher as compared to that reported by various studies (10-30%)^[6,7,8]. The mean age of presentation in our study was 44.11 years with Standard Deviation of +/- 13.6 years while the mean age at the time of diagnosis by Filik et al. was 49.9 years, 39 years in a study by N Rawat et al. and 44 years in Mihas AA's study^[9,10,11,12].

Earlier study from India by Agrawal et al. consisting of 41 patients showed ascitic fluid culture

positivity in 11 patients. Out of these 5 were positive by conventional culture while 6 were positive via detection through blood culture bottle. In this study, 14 patients were diagnosed to have SBP or one of its variants with a prevalence of 34.14% which was less than that in our study (54%). In a study by A P Jain et al. an isolation rate of 44% was seen for Coagulase positive Staphylococcus aureus while remainder of cultures grew Escherichia coli, Pseudomonas aeruginosa and Klebsiella pneumoniae^[14]. This was similar to that of our study where majority of infections were due to Escherichia coli and Staphylococcus aureus.

Our study was carried out to add to our knowledge of the data regarding clinical characteristics and epidemiology of SBP in patients with cirrhotic ascites in PCMS, Bhopal. To our knowledge, no such study has been carried out in Central India thus far. In our study, alcohol intake remained the leading cause of cirrhosis with 54% cases. Subsequently, incidence of SBP is highest in alcoholic cirrhosis (44%). Incidence of SBP was 54% in our study which is higher as compared to 10-30% as mentioned in Western literature. Possible reasons may be non-judicial use of proton pump inhibitors and irrational use of antibiotics which predispose the patients to small intestinal bacterial overload (SIBO) and resistant community acquired ascitic fluid infections respectively, and hence, these practices need to be

vehemently discouraged.

Majority of patients with SBP were CNNA (63%) with isolated PMN count of >250 cells/mm³. Culture positivity was seen in 37% of patients of SBP out of which 30% were CNNA and 7% were MNBA. *Escherichia coli* and *Staphylococcus aureus* were the most commonly isolated organisms. Only ascitic fluid routine microscopy and inoculation of ascitic fluid into blood culture bottle was found to be sufficient to diagnose SBP in most cases. Abdominal pain, tenderness and fever were strong indicators of ascitic fluid infection. But its absence cannot rule out SBP and routine ascitic fluid analysis needs to be performed in all patients of cirrhosis presenting with ascites. Peripheral leukocytosis was found to be a strong indicator for presence of ascitic fluid infection. Raised bilirubin levels was seen in most patients of SBP which may indicate towards the same. But these are nonspecific markers for the presence of ascitic fluid infection and have not been of any statistical significance according to this study. Ascitic fluid protein levels did not significantly differ between SBP and non-SBP group of patients and low ascitic protein was not associated with higher incidence of SBP. Advanced liver disease/ Child Pugh Class C had the highest incidence of spontaneous ascitic fluid infection among patients with cirrhosis.

CONCLUSION:

Spontaneous bacterial peritonitis is commonest infection complicating majority of patients with cirrhosis. Classical symptoms and signs were absent in these patients and hence, definitive diagnosis could only be made by ascitic fluid analysis and culture. CNNA was the most common variant of SBP. Every patient of cirrhosis should be screened for SBP as delayed diagnosis can lead to fatal outcome. Routine antibiotic coverage should be avoided for fear of resistance.

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