Original Research Article

A study of prevalence and clinico-laboratory profile of spontaneous bacterial peritonitis in cirrhosis liver with ascites

Mohammad Abdul Waheed[1], Upparakadiyala Rakesh[2*]

[1,2]Assistant Professor, Department of General Medicine, ESIC medical college Gulbarga, Sedam Road Gulbarga, Karnataka, INDIA.
Email: drwaheedngp@gmail.com , ukrakeshkmc04@gmail.com

Abstract

Background: Spontaneous Bacterial Peritonitis (SBP) is a common complication occurring in cirrhotic patients. The prevalence varies from 8% to 27%. Over 60% of the SBP episodes are produced by Gram- negative enteric bacilli. **Aim:** To study the prevalence and clinico-laboratory profile of patients with spontaneous bacterial peritonitis in cirrhosis liver with ascites. **Material and Methods:** A total of 75 patients with cirrhosis of liver with ascites diagnosed on the basis of clinical evaluation, biochemical investigations and ultrasonography. Ascitic fluid analysis was done for microbiological profile. **Results:** Prevalence of spontaneous bacterial peritonitis in this study was25.33%. The most common presenting feature of SBP was abdominal pain followed by abdominal tenderness and fever. The commonest organism isolated was E. coli followed by K. pneumoniae. **Conclusion:** Early recognition and treatment of SBP could reduce the morbidity and mortality of patients with cirrhosis liver and ascites and improve their quality of life.
Key Word: Cirrhosis liver, ascites, spontaneous bacterial peritonitis, prevalence

***Address for Correspondence:**
Dr. Upparakadiyala Rakesh, Assistant Professor. Department of General Medicine, ESIC Medical college Gulbarga. Sedam Road Gulbarga, Karnataka, INDIA.
Email: ukrakeshkmc04@gmail.com
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INTRODUCTION

Spontaneous Bacterial Peritonitis (SBP) is an infectious process that usually occurs in the cirrhotic patients with ascites, in which a contiguous local source of infection is absent. It is a common complication occurring in cirrhotic patients, mostly fatal in nature, if left untreated. The mortality ranges from48% to 57%.[1,2] The prevalence varies from 8% to 27%.[3,4] Spontaneous Bacterial Peritonitis develops in patients with advanced liver disease.[3] It is acon sequence of multiple defects in the immunedefense of patients with cirrhos is. While the etiology and incidence of hepatic failure differ between children and adults, in those individuals with ascites, the incidence of SBP is roughly equal. Regarding the etiology, over 60% of the SBP episodes are produced by Gram- negative enteric bacilli – E. coli and Klebsiella pneumoniae being the most frequently isolated microorganisms.[5,6] The present study was conducted to study the prevalence and clinico-laboratory profile of patients with spontaneous bacterial peritonitis in cirrhosis liver with ascites.

MATERIAL AND METHODS

This prospective study included 75 patients with cirrhosis of liver with ascites diagnosed on the basis of clinical evaluation, biochemical investigations and ultrasonography admitted to the Medical wards of Tertiary care hospital over a period of two years.

Inclusion criteria

- Patients with clinical features of cirrhosis with ascites.
- Ultrasonographic evidence of cirrhosis.

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- Those who had not been started on antibiotics, before admission.

Exclusion criteria

Patients with

- Non-cirrhotic portal fibrosis
- Cholelithiasis
- Hydatid cysts in the liver
- Secondaries in the liver
- Amoebic liver abscess
- Ascites due to renal, tubercular or malignant pathology.

Liver cirrhosis was diagnosed on the basis of -

A. Biochemical abnormalities like serum Bilirubin, serum albumin, SGOT, SGPT.
B. Ultrasonography showing shrunken or enlarged liver, nodular surface, increased echotexture, portal vein dilatation.
C. Ascitic fluid study.

Ascitic fluid analysis: The samples were collected prior to the administration of antibiotics to the patients. As most patients had tense ascites, the technique of a 'Z' tract, which minimizes leakage, was used. About 10ml of the ascitic fluid was inoculated into the blood culture bottles at the bedside. The bottles were incubated for 72 hours and those of which showed growth were plated for identification. Another 5ml was sent to the microbiological laboratory for culture by the conventional technique using agar plates as done routinely. About 1ml of the fluid was sent for cell count and in all cases cell count was done as soon as possible. The remainder of the fluid was sent for bio-chemical analysis. SBP was suspected clinically in patients presenting with fever, abdominal pain, tenderness and further confirmation was done by ascitic fluid cell count and culture. Statistical evaluation was performed and analysis done.

RESULTS

In this study, out of 75 cirrhotic patients with ascites, the number of males were 56 (74.67%) while the number of females were 19 (25.33%). The age groups ranged from 27 to 65 years. The mean age was 45.12 years. 19 out of 75 patients had spontaneous bacterial peritonitis, which means that 25.33%of cirrhotic patients with ascites had spontaneous bacterial peritonitis, on admission. Hence, the prevalence in this hospital was 25.33%. In this study, 68.42% (13outof19) of patients with spontaneous bacterial peritonitis were in the age group of 41to50 years. 15.79%(3outof19) of patients with spontaneous bacterial periton it is were in the age group of 51 to 60 years. There were 2 patients in the age group of 31to40 years, constituting 10.53% and one patient in the age group of 61to70 years, constituting 5.26%.25% (14 out of 56) of males and 26.32% (5 out of 19) of female patients had SBP.

Table 1: Clinical features in cirrhotic patients with SBP

Clinical Feature	No. Of patients	Percentage
Abdominalpain	16	84.21%
Tenderness	11	57.89%
Fever	10	52.63%
Glbleed	06	31.59%
Hepatic encephalopathy	02	10.53%
Renalfailure	02	10.53%

Abdominal pain constituted the major symptomin 84.21% of patients while abdominal tendernes s was the next commonest feature occurring in 57.89% of cases. Fever occurred in 52.63% of cases. GIbleed occurred in 31.58% of cases, followed by hepaticencephalopathyandrenal failure in10.52% of case search. 16 out of 19 patients (84.21%) with spontaneous bacterial peritonitis had ascitic fluid protein level less than 1 gm/dl. The mean value of ascitic fluid protein in patients with spontaneous bacterial peritonitis was 0.88 gm/dl. The mean value of ascitic fluid protein in Non SBP patients was 1.1 gm/dL. The serum bilirubin level was elevated in all patients with spontaneous bacterial peritonitis, with a mean value of 2.66% mg/dl. The PT was prolonged by at least 2 times than that of control, in 14 out of 19 patients, that is 73.68% of patients with spontaneous bacterial peritonitis. The serum albumin was reduced in all SBP patients with a mean value of 3.03 gm/dl. Out of 19 patients with SBP, 14 patients (73.68%) were in child's class C, 4 patients (21.05%) were in child's class B and 1 patient (5.26%) was in child's class A. Ascitic fluid cultures using blood culture bottles detected growth in all cases of spontaneous bacterial peritonitis whereas conventional methods could do so only in 47.37% of cases. Moreover, out of the 75 cirrhotic patients with ascites10 (10.33%) patients had positive culture for one organism, but the neutrophil cell count was less than 250 cells/mm3. This group of patients had mono-microbial non-neutrocytic ascites.

Table 2: Microbiological profile

Bacterial growth	No. of patients	Percentage
E.coli	8	42.11%
Klebsiella pneumoniae	7	36.84%
Proteus spp.	2	10.53%
Pseudomonas aeruginosa	1	5.27%
Staphylococcus aureus	1	5.27%

E. coli was the most common pathogenisolatedin 42.11% (8 out of 19) of the patients with spontaneous bacterial periton it is, while *Klebsiellapneumoniae* was isolated in 36.84% (7out of 19) of the patients followed by *Proteus* spp. in two patients, i.e., 10.53%, *Pseudomonasaeruginosa* in one patient, i.e., 5.27% and *Staphylococcus aureus* inonepatient, i.e. 5.27%.

DISCUSSION

In this study, the prevalence of spontaneous bacterial peritonitis in cirrhotics with ascites was 25.33% (19 out of 75 patients). In various studies world-wide, the cumulative probability of spontaneous bacterial peritonitis occurring during hospitalization in a patient with cirrhosis has been reported to vary from 8% to 27%.[3,4] In the present study, it was seen in 25.33% of the patients. Bacterial colonization of ascitic fluid is related to its markedly deficient bacterial and opsonic activity in cirrhosis. In this context, alcoholic and non-alcoholic cirrhosis behaves in a similar fashion. Among 75 patients with cirrhosis and ascites admitted to this hospital 74.67% were males whereas females constituted only 25.33%. This could be explained by the fact that, a large group of cirrhotic patients in our part is due to alcoholism and female alcoholics are fewer in numbers. The prevalence of spontaneous bacterial peritonitis was maximum in the age group of 41 to 50 years, which is 73.69%. Out of which, 84.62% (11out of 13 patients) were males and 15.38% (2 out of 13 patients) were females. Studies have shown that incidence of spontaneous bacterial peritonitis is equal in all age groups. However, in this study prevalence was maximum in the age group of41 to 50 years. This could be explained by the fact that mean age in this study was 45.12 years. In this study, 25% (14 out of 56) of males and 26.32% (5 out of 19) of female patients had SBP. Studies have shown that both sexes are affected equally with spontaneous bacterial peritonitis in patients with ascites. The main presenting feature was abdominal pain seen in 84.21% (16 out of19 patients) of patients with spontaneous bacterial peritonitis, while abdominal tenderness was present in 57.89% (11out of 19 patients) of patients. Fever was a presenting feature in 52.63% (10 out of 19 patients) of patients with spontaneous bacterial peritonitis, while only 23.21% (13 out of 56 patients) of patients without spontaneous bacterial peritonitis had fever. Bleichner G *et al*., showed that more than 20% of cirrhotics with GI bleed are infected at the time of admission.[7]Rimola *et al*., and Soriano *et al*., also showed that the bacterial infection develops in an additional 30% of those with upper GI bleed during hospitalization usually during the first 3 to 4 days.[8,9]Hepatic encephalopathy and renal failure was seen in 10.53% (2 out of 19patients) of patients with spontaneous bacterial peritonitis at presentation. The severity of liver disease is a major risk factor for the development of spontaneous bacterial peritonitis.[3,10,11] Severity is assessed by increased prothrombin time and increased serum bilirubin levels. In this study, serum bilirubin was elevated in all patients with spontaneous bacterial peritonitis, with a mean level of 2.66% mg/dl. In the study by Cirera I *et al*, serum bilirubin level>2.5 mg/dl is an independent predictive factor of SBP.[12]In this study, mean level of serum bilirubin in SBP patients was 2.66 mg/dl. The PT was prolonged by at least 2 times than that of control, in 73.68% (14 out of 19) of patients with spontaneous bacterial peritonitis. In the study by Guarner C, Runyon BA,56 (95%) of patients with spontaneous bacterial peritonitis can have increased serum bilirubin levels and 98% of patients can have abnormal PT.[13] In this study, serum bilirubin was elevated in all patients and PT was abnormal in 73.68% of patients. Out of 19 patients with SBP, 14 patients (73.68%) were in child's class C, 4 patients (21.05%) were in child's class B and 1 patient (5.26%) was in child's class A. Studies have shown that 70% of patients who develop SBP were in child C class. In this study 73.68% of patients were in child C class. In this study, 16 out of 19 patients (84.21%) with spontaneous bacterial peritonitis had ascitic fluid protein level less than 1 gm/dl. The mean value of ascitic fluid protein in patients with spontaneous bacterial peritonitis was 0.88 gm/dl. The mean value of ascitic fluid protein in non SBP patients was 1.1 gm/dL. Runyon BA study has shown that cirrhotic patients with ascitic fluid protein levels of 1 gm/dl or less had ten-fold increased risk for the development of spontaneous bacterial peritonitis, when compared tocirrhotic patients with ascitic fluid levels greater than 1 gm/dl.[14]This clearly shows that a low ascitic fluid proteins level is a predisposing factor for spontaneous bacterial peritonitis. The blood culture bottles detected growth in all cases of spontaneous bacterial peritonitis, while the conventional methods

could do so only in 47.37% of cases (9 out of 19), implying the superiority of the inoculation method. Similar experience has been of Pawar *et al.*, too.[15] A study by Runyon BA, Hoefs JC has shown that 35% to 58% of patients with spontaneous bacterial peritonitis are culture negative by conventional methods.[16] In this study 47.37% of patients with spontaneous bacterial peritonitis are culture negative by conventional method. Multiple studies have demonstrated superior sensitivity in using blood culture bottles for culture of ascitic fluid compared with the conventional techniques.[17,18] Further Runyon BA, Antillon MR and other have shown that bedside inoculation of ascitic fluid is superior to the delayed laboratory inoculation of blood culture bottles with ascitic fluid.[19] *E.coli* was the most common pathogen isolated in 42.11% (8 out of 19) of the patients with spontaneous bacterial peritonitis, while *Klebsiella pneumoniae* was isolated in 36.84% (7 out of 19) of the patients followed by *Proteus* spp. in two patients, that is 10.53%, *Pseudomonas aeruginosa*in one patients, that is 5.27% and *Staphylococcus aureus* in one patient, that is 5.27%.Studies by Runyon BA and Wiest R Garcia-TsaoG have shown more than 60% of SBP episodes are produced by Gram-negative enteric bacilli – *E.coli* and *Klebsiella pneumoniae* being the most frequently isolated organisms.[5,6]In this study, *E.coli* and *Klebsiella pneumoniae* were isolated in 78.95% of SBP patients. The commonest organism was *E.coli* followed by *Klebsiella pneumoniae*, like Monserrat *et al* who also isolated enteric organisms, in his study.[20]To conclude, early recognition and treatment of SBP could reduce the morbidity and mortality of patients with cirrhosis liver and ascites and improve their quality of life.

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