

Prevalence of Spontaneous Bacterial Peritonitis in Cirrhotic Patients with Ascites

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ABSTRACT

Objective: To find out the prevalence of spontaneous bacterial peritonitis in cirrhotic patients.

Subjects and methods: This prospective study was conducted at Department of Medicine Liaquat University Hospital, Hyderabad between 1st January 2005 to 30th June 2005. This study included 50 known patients of cirrhosis of liver with ascites and with a clinical suspicion of spontaneous bacterial peritonitis admitted to medical wards of Liaquat University Teaching Hospital, Hyderabad. Diagnosis of spontaneous bacterial peritonitis was based on an ascitic fluid neutrophil count of >250/mm³ and/or a positive culture without evidence of secondary peritonitis and chronic liver disease were included in the study. Patients with non-cirrhotic ascites, evidence of secondary peritonitis, haemorrhagic ascites and evidence of intra-abdominal malignancy were excluded from the study. A detailed history and physical examination of all the patients were taken with special reference to the signs and symptoms of hepatocellular insufficiency and portal hypertension. 10 ml of ascitic fluid was withdraw and sent for examination. Abdominal ultrasonography was done in every patient to find out liver size, surface and texture, splenic enlargement and portal vein diameter.

Results: Out of 50 cirrhotic patients the viral markers study revealed that HBsAg positive 20, anti-HCV positive 28 and both HBsAg and anti-HCV positives in 2. Final outcome of patients of spontaneous bacterial peritonitis with encephalopathy, 11 patients were died and 6 were discharged and without encephalopathy 4 died and 8 were discharged.

Conclusion: We conclude that SBP is a frequent complication, depends of the severity of liver failure and is a marker for poor prognosis in patients with liver cirrhosis,

Keywords: Prevalence, Spontaneous bacterial peritonitis, Cirrhotic patients

INTRODUCTION

Spontaneous bacterial peritonitis (SBP) is a potentially fatal yet reversible cause of deterioration in patients with advanced cirrhosis. It is defined as a bacterial infection of the ascitic fluid in the absence of a focal contiguous source; this infection almost universally occurs in the background of severe liver disease¹. Since its first description by Conn² and Kerr et al³ in 1963, there has been a significant increase in the understanding of the pathophysiology, diagnosis, treatment, and prophylaxis of the disease. Spontaneous bacterial peritonitis (SBP) is a complication of cirrhosis with ascites. It likely occurs due to the translocation of gastrointestinal (GI) flora through the gut mucosa into the mesenteric lymphatic system and the ascitic fluid contained within^{4,5}.

Patients with cirrhosis and ascites show a higher susceptibility to bacterial infections⁶. Spontaneous

bacterial peritonitis is the infection of the ascetic fluid that occurs in the absence of a visceral perforation and in the absence of and intra-abdominal inflammatory focus such as abscess, acute pancreatitis or cholecystitis⁷. A diagnosis of SBP is made in the presence of an absolute polymorphic neutrophil count greater than or equal to 250 cells/mm³ in the ascitic fluid, with or without the presence of a positive ascitic fluid culture and without another infection source.^{8,9} Patients with cirrhosis and ascites along with low (<1g/dL) protein ascitic fluid are considered to be at high risk for the development of SBP^{10,11}. Serum bilirubin greater than 3.2mg/dL and platelet counts less than 98,000 cells/m further increase the probability of a first episode of SBP at 1 year from 24% in patients with low protein ascites concentration alone to 55% in patients with an additional factor (e.g., low platelets and/or high bilirubin)¹². The most commonly implicated bacteria in SBP are gram-negative rods (GNRs) including *Escherichia coli* and *Klebsiella pneumoniae*, as well as the gram-positive cocci *Streptococcus pneumoniae*¹³. It has been ascertained that certain *E. Coli* strains can translocate the intestinal mucosa more often - probably because of a higher capacity to

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adhere to it and because of a higher virulence that determines a higher resistance to the defence mechanisms of the host. In about 25% of the cases, gram-positive cocci are involved: streptococci (frequently pneumococcus) and enterococci^{14,15}.

PATIENTS AND METHODS

This prospective study was conducted at Department of Medicine Liaquat University Hospital, Hyderabad between 1st January 2005 to 30th June 2005. This study included 50 known patients of cirrhosis of liver with ascites and with a clinical suspicion of spontaneous bacterial peritonitis admitted to medical wards of Liaquat University Teaching Hospital, Hyderabad. Patients having chronic liver disease, ascites, ascitic fluid leukocyte count >500 cells/mm³ and neutrophil count >250 cells/mm³ were included in the study. Patients with non-cirrhotic ascites, evidence of secondary peritonitis, haemorrhagic ascites and evidence of intra-abdominal malignancy were excluded from the study. A detailed history and physical examination of all the patients were taken with special reference to the signs and symptoms of hepatocellular insufficiency and portal hypertension. 10-20 ml of ascitic fluid was withdrawn and sent for examination. 1 ml of fluid should be injected into an EDTA tube and 10-20 ml fluid of fluid should be inoculated into 10 ml of blood culture bottles. Abdominal ultrasonography was done in every patient to find out liver size, surface and texture, splenic enlargement and portal vein diameter. All these patients were followed during their stay in the ward and final outcome was recorded. The data were analyzed by using the statistical package SPSS-10.

RESULTS

This study was conducted in Liaquat University Hospital Hyderabad. A total of 50 patients with ascites due to cirrhosis liver fulfilled the criteria for inclusion in this study. These included 54% males and 46% females. The majority of patients were in the age group 40-59 years. Among the 50 cirrhotic patients included in this study, spontaneous bacterial peritonitis was positive in 29 patients (58%) while 21 patients (42%) were from non-SBP group. Out of 29 patients of SBP 15(51.72%) were males and 14(48.28%) were females (Table 1). Among 29 positive patients of SBP Ascitic fluid culture was positive in 13(44.82%) cases , Blood cultures were positive in 11(37.93%) cases, urine cultures were positive in 5 cases (17.24%) and throat swab cultures were positive in 3 cases (10.34%) [Table 2]. Out of 13 ascitic fluid culture positive cases Eschericia Coli was the predominant organism isolated accounting

for 61.53 % of the cases. Streptococcus was isolated in 2(15.38%) Staphylococcus in 1(7.69%) case, Klebsiella in 1(7.69%) case and Acinetobacter species in 1(7.69%) case. 16(55.17%) out of 29 cases were those of Culture Negative Neutrocytic Ascites (Table 3). Blood cultures were positive in 11 out of 29 patients (37.93%). E. Coli was isolated in 08 cases, Streptococcus in 2 cases and staphylococcus in 1 case. Urine cultures were positive in 5 patients (17.24%) and throat swab cultures were positive in 3 (10.34%) patients of cirrhosis of liver.

Table 1: Age and sex distribution of 50 patients of liver cirrhosis with cirrhosis

Age group (years)	Male		Female	
	No.	%	No.	%
20 - 39	5	10.0	3	6.0
40 – 59	16	32.0	14	28.0
60 - 79	5	10.0	6	12.0
>80	1	2.0	-	-

Table 2: Culture positivity in 29 cases of spontaneous bacterial peritonitis

Type of culture	No.	%
Ascitic fluid cultures	13	44.8
Blood cultures	11	37.8
Urine cultures	5	17.2
Throat swab cultures	3	10.2

Table 3: Bacterial yield of ascitic fluid cultures in 29 cases of spontaneous bacterial peritonitis

Bacteria	No.	%age
E. coli	8	27.8
Streptococcus pneumonia	2	6.8
Klebsiella	1	2.9
Staphylococcus aureus	1	2.9
Acinetobacter species	1	2.9
Culture-negative neutrocytic ascites	16	55.8

DISCUSSION

Spontaneous bacterial peritonitis is a frequent complication of cirrhotic patients¹⁶. Spontaneous bacterial peritonitis occurs in both children and adults and is a well-known and ominous complication in patients with cirrhosis¹⁷. A sample of ascitic fluid should be obtained routinely in all patients with cirrhosis and ascites admitted to hospital and in those hospitalized patients who develop signs or symptoms suggestive of SBP. The diagnosis of SBP is made when the polymorphonuclear leukocyte count in ascitic fluid is greater than 250 per cubic millimeter¹⁸. The concentration of bacteria in ascitic fluid of patients with SBP is usually very low (1 microorganism/ml or less) and this probably accounts for by the low frequency of positive ascitic fluid cultures when using conventional culture methods. The rate of positive cultures may be

increased by the inoculation of 10 ml of ascitic fluid into blood culture bottles immediately after paracentesis. Nevertheless, despite the use of this method, almost 50% of SBP episodes are culture-negative, in the absence of secondary causes of peritonitis, the ascitic fluid. On the basis of the ascitic cell count and culture results, two variants of SBP have been described culture-negative neutrocytic ascites (CNNA)¹⁹⁻²¹ and bacterascites (BA)²².

Most patients with cirrhosis and a polymorphonuclear cell count in ascitic fluid greater than 250 cells/mm³ have SBP. However, in a small proportion of patients the increased polymorphonuclear count is not the consequence of a SBP but of peritoneal inflammation secondary to the infection of intraabdominal organs (cholecistitis, diverticulitis) or gut perforation. This condition, usually referred to as "secondary peritonitis", may be difficult to differentiate from SBP on clinical grounds, although the former patients may have clinical signs or symptoms suggestive of this condition (localized abdominal pain or localized rebound or guarding). Some abnormalities in the ascitic fluid biochemistry, such as very low glucose levels and high concentrations of total protein, lactate dehydrogenase (LDH), alkaline phosphatase, and carcinoembryonic antigen (CEA) suggest secondary peritonitis instead of SBP^{18,19}. The identification of more than one bacteria in the Gram stain of ascitic fluid or in the ascitic fluid culture strongly supports the existence of secondary peritonitis because SBP is usually a monobacterial infection. Nevertheless, the diagnosis of secondary peritonitis should be confirmed by ultrasonographical or radiological examinations (abdomen X-ray, CT scan). The differential diagnosis between SBP and secondary peritonitis has important implications in clinical practice because the former is treated by antibiotics while the latter requires surgical intervention²⁰.

In our study all cases of liver cirrhosis were post-hepatic. Due to low prevalence of alcoholic cirrhosis in our region none of the cases in our study was from alcoholic cirrhosis group. Among 50 patients of cirrhosis of liver with ascites selected for inclusion in our study, 29(58%) patients were found to have SBP, which is similar to the study conducted by Runyon²¹. In our study out of 29 patients with SBP, 13(44.82%) patients had positive ascetic fluid culture, whereas 16(65.17%) were those of culture negative neutrocytic ascites (CNNA) on the other hand a study conducted at PMCH Nawabshah reported 25% bacterascites and 18.75% CNNA respectively²².

Andreu et al¹⁰ has reported a blood culture positivity of 15% with *E. coli* in 90% cases. In our study the mean PMN cells count in SBP group was 2052.41±2060.83/mm³ and in the non-SBP group

was 25.83±36.27/mm³ with a statistically significant difference in two groups which is in accordance to other studies conducted all over the world which have reported high PMN cells count in ascitic fluid in patients of SBP²³⁻²⁵.

CONCLUSION

Cirrhosis of liver is very common problem in our setup and mostly post-hepatitis following viral hepatitis. Spontaneous bacterial peritonitis is a common complication of liver cirrhosis and occurs in 58% of cases. It is suggested that routine diagnostic tap of ascitic fluid should be done in every patient and culture sensitivity should be done in each tap.

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