

Spontaneous Bacterial Peritonitis in Cirrhotic Patients: Frequency and Clinical Presentations

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Abstract

Objective: To determine the rate of spontaneous bacterial peritonitis (SBP) in patients of chronic liver disease with ascites and to determine their presenting clinical features.

Material and Methods: One hundred and three cirrhotic patients with ascites admitted in Medical Unit 3 of Sheikh Zayed Medical College/Hospital, Rahim Yar Khan from August 2020 to June, 2021 were included. Patients with non-cirrhotic ascites, recent antibiotic use or paracentesis and secondary bacterial peritonitis were excluded. Ascitic fluid sent for total and differential cell count, albumin and culture. SBP was diagnosed if neutrophil count was more than 250/cmm and/or there was positive ascitic fluid culture.

Results: Mean age of the patients was 51.55±12.64 years with range of 19 to 85 years. Fifty eight were male and 45 female. Fifty one (49.5 %) patients were found to have SBP. Among these, 33 (64.71 %) had culture negative neutrocytic ascites, 13 (25.49 %) had culture positive neutrocytic ascites and 5 (9.8 %) had culture positive non-neutrocytic ascites. Leukocyte count was significantly high in patients with SBP than those without SBP. Hepatic encephalopathy was presenting diagnosis in 31 patients of SBP, increasing abdominal distension in 8 patients, abdominal pain and fever in 7 and upper gastrointestinal bleeding in 5 patients. Twenty four of 31 hepatic encephalopathy patients also had history of abdominal pain and fever.

Conclusion: Spontaneous bacterial peritonitis was common in admitted cirrhotic patients, and hepatic encephalopathy, abdominal pain and fever were the commonest presenting features in these patients.

Key words: Spontaneous bacterial peritonitis, cirrhosis, ascites

How to cite: Ahmad I, Irfan H. Spontaneous Bacterial Peritonitis in Cirrhotic Patients: Frequency and Clinical Presentations. *Esculapio - JSIMS* 2023;19(04):500-503.

DOI: <https://doi.org/10.51273/esc23.251319424>

Introduction

Spontaneous bacterial peritonitis (SBP) is infection of ascitic fluid without any surgically treatable cause.¹ It usually occurs in patients with advanced cirrhosis² but can occur in other diseases like malignant ascites, nephrotic syndrome and congestive cardiac failure.³ Bacteria that cause SBP mostly originate from small intestine.⁴ Other sources may be urinary tract, skin or oropharynx. Risk factors for SBP include ascitic fluid protein less than 1 g/dL,⁵ variceal bleeding and

use of proton pump inhibitors.⁶ It is associated with high mortality if treatment is delayed,² due to sepsis, hepatorenal syndrome and liver failure.⁷

SBP occurs in 20–30 % of cirrhotic patients with ascites⁸ and 70 % patients who develops it, has recurrence within one year. Patients of SBP present with abdominal pain, tenderness and fever. Abdominal rigidity is typically absent as compared to secondary peritonitis. Abdominal features are absent in one third of cases. Other presentations include diarrhea, hepatic encephalopathy, dizziness, hypotension and renal failure.⁹ About 29 % of patients with SBP have no signs or symptoms of infection at the time of diagnosis.¹⁰

Cirrhosis is common in our area and many of admitted cirrhotic patients have ascites. As mentioned above, patients with SBP may be asymptomatic and admitted in hospital for other reasons, and also, they may have

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Submission Date:	21-09-2023
1st Revision Date:	09-10-2023
Acceptance Date:	01-12-2023

no localizing symptoms and fever. We performed this study to see percentage of our admitted cirrhotic patients who had been suffering from SBP and to note their presenting clinical features, so that this illness could be detected earlier and treatment be started to avoid high mortality in these patients.

The objective of this study was to determine the frequency of SBP in cirrhotic patients with ascites admitted in our hospital and to find out the modes of presentation in symptomatic patients.

The Study design was Descriptive, and the study site was Medical Unit 3, Sheikh Zayed Medical College/ Hospital, Rahim Yar Khan and duration was from August 18, 2020 to June 26, 2021. 103 consecutive patients. One hundred and three consecutive cirrhotic patients with ascites of any age or gender admitted in Medical Unit 3 were included in the study. Cirrhosis was diagnosed on the basis of clinical, laboratory (prolonged prothrombin time, hypoalbuminemia) and ultrasound (shrunken liver, splenomegaly and ascites) features. Inclusion was regardless of reason for their admission. Following patients were excluded:

1. Those having non-cirrhotic ascites.
2. Those already taking antibiotic or have taken it during last two weeks.
3. Those who underwent peritoneal paracentesis during last three months.
4. Those having intra-abdominal surgically treatable disease.
5. If ascitic fluid leucocyte count was > 10,000/cmm or growth was polymicrobial, both of which point to secondary peritonitis.

Materials and Methods

Included patients were asked about symptoms and comorbid conditions like diabetes mellitus, hypertension, renal failure and cardiopulmonary diseases. Patients' blood was sent for complete blood count (CBC), prothrombin time (PT), liver function tests, albumin and creatinine. Ascitic tap was done using aseptic technique. Ascitic fluid was sent for total leucocyte count and differential count (2 ml in bottle containing anticoagulant), and albumin (3 ml). Ten ml fluid was inoculated in blood culture bottle at bedside and sent to our hospital laboratory for culture. Spontaneous bacterial peritonitis was diagnosed on the basis of ascitic fluid neutrophil count > 250 cells/cmm and/or positive fluid culture.¹ The data was entered and analyzed using SPSS version 25. The

qualitative data was expressed as frequency and percentage, and analyzed by Chi-square test. The quantitative data was expressed as mean ± SD and range, and analyzed by Student's t-test. A p value of < 0.05 was considered significant. Study protocol was approved from Institutional Review Board and Ethical Committee.

Results

Mean age of our patients was 51.55±12.64 years. Youngest patient was 19 years old and oldest was 85 years old. Fifty eight patients (56.3 %) were male and 45 (43.7 %) were female. Ninety five patients (92.2 %) were known to have cirrhosis while remaining were diagnosed as cirrhotic during this admission. Cause of cirrhosis was hepatitis C in 96 patients (93.2 %), hepatitis B in 5 (4.9 %) and alcoholism in 2 (1.9 %).

Out of 103 patients having cirrhosis and ascites admitted for various reasons, 51 (49.5 %) were proved to have SBP. There was no significant difference between SBP and non-SBP groups regarding age (51.78 vs 51.33 years, p = 0.855) and gender (p = 0.495). Similarly, number of patients in both groups while considering cause of cirrhosis, presence of various comorbidities and use of drugs were not statistically different (Table 1). Apart from total leucocyte count (TLC) which was significantly different between SBP and non-SBP groups (p = 0.001), other laboratory tests did not show any statistical difference (Table 2). Among 51 patients having SBP, 5 (9.8 %) had culture positive non-neutrocytic ascites, 13 (25.5 %) had culture positive neutrocytic

Table 1: Past and treatment histories of 103 patients

Variables	Total patients	SBP present	SBP absent	p value
Known cirrhosis				
Yes	95	49	46	0.269
No	8	2	6	
Cause of cirrhosis				
Hepatitis C	96	47	49	0.890
Hepatitis B	5	3	2	
Others	2	1	1	
Comorbidities				
Diabetes mellitus	36	18	18	0.510
Hypertension	18	9	9	
IHD	2	2	0	
COPD	1	1	0	
Treatment history				
PPI	100	51	49	0.627
Beta blockers	98	49	49	
Prokinetics	86	44	42	

ascites and 33 (64.7 %) had culture negative neutrocytic ascites. Included 103 patients admitted in Medical indoor for various reasons; 58 had hepatic encephalopathy, 28 were admitted due to abdominal distension, 9 presented with upper gastrointestinal bleeding and 8 were suffering from abdominal pain and fever (Table 3). Among patients having hepatic encephalopathy, 24 had history of abdominal pain and fever.

Discussion

Patients with cirrhosis have low albumin ascites. This along with low immunity due to advanced disease and

Table 2: Lab data of 103 patients according to presence or absence of SBP

Laboratory tests	SBP present	SBP absent	P value
Hemoglobin (g/dl)	8.53 ± 1.35	8.97 ± 1.37	0.109
TLC (10 ⁹ /L)	10.58 ± 5.9	7.43 ± 3.50	0.001
Platelet count (10 ⁹ /L)	79.94 ± 24.36	83.77 ± 27.45	0.456
Total bilirubin (mg/dL)	2.50 ± 2.27	2.18 ± 1.65	0.422
Albumin (g/dL)	2.54 ± 0.53	2.41 ± 0.61	0.253
Prothrombin time (seconds)	18.31 ± 3.00	18.33 ± 2.78	0.982
Creatinine (mg/dL)	1.15 ± 0.36	1.12 ± 0.44	0.765
Sodium (mmol/L)	139.45 ± 4.03	138.77 ± 4.47	0.419
Ascitic albumin (g/dL)	1.06 ± 0.49	1.14 ± 0.54	0.458

Table 3: Clinical presentations of 103 patients

Presentation	Total patients	SBP patients	Non-SBP patients
Hepatic encephalopathy	58	31	27
Abdominal distension	28	8	20
Hematemesis/melena	9	5	4
Abdominal pain/fever	8	7	1

other factors like low intestinal motility and increased permeability,⁴ and use of proton pump inhibitors¹¹ leads to the development of infection of ascitic fluid (SBP) which is associated with increased morbidity and mortality.²

When tested, 7 to 30 % of cirrhotic patients with ascites found to have SBP.¹² In a teaching hospital in Ghana, 25 % (26/103) cirrhotic patients had SBP.¹³ A study conducted in Aswan University Hospital in Egypt showed that 62 % cirrhotic patients had primary ascitic fluid infection.¹⁴ Choubey et al in Central India studied 50 cirrhotic patients with ascites. Twenty-seven (54 %) of their patients had SBP on ascitic fluid analysis.¹⁵ In our study, SBP was detected in 49.5 % of patients. Simi-

lar findings were noted in other local studies with rates of SBP of 33 %, ^{16,17} 36 %, 18.40 %, ¹⁹ and 56 %.²⁰ This high rate of SBP in hospitalized cirrhotic patients reflects increased risk of infections in decompensated liver disease.

Regarding types of SBP, most common is culture negative neutrocytic ascites. In our study its frequency is 64.7 % and in others these are 63 %, ¹⁵ 60%, ¹⁴ 57 %, ²⁰ and 52 %.²¹ Classical (culture positive neutrocytic) ascites has frequency of 25.5 % in our study and in others 39%, ²⁰ 30 %, ^{14,15} and 24%.²¹ Least common was bacterascites having rates of 9.8 % (our study), 10%¹⁴ and 3%.²⁰ Lower frequency of culture positivity reflects lower sensitivity of ascitic fluid culture due to presence of lesser number of organisms. It may be due to prior intake of antibiotics by the patients themselves without prescription as it is a common practice in our setup. Although we excluded such patients but some patients might have concealed this information.

Abdominal pain/tenderness and fever are common presenting complaints of patients with SBP.²¹ Abdominal pain was present in 71 to 80 %^{15,22} of patients, and fever was seen in 74%¹⁵ and 55%²² of patients. In our study, hepatic encephalopathy was the most common presenting problem but most of these patients also had history of abdominal pain and fever. Some asymptomatic cirrhotic patients with ascites also had SBP when ascitic fluid analysis was performed in these patients.^{23,24}

Conclusion

Spontaneous bacterial peritonitis was present in half of cirrhotic patient with ascites admitted for various reasons. It indicates that every such patient should have ascitic fluid analysis done to detect and treat SBP. Hepatic encephalopathy, abdominal pain and fever are common presenting features in these patients.

Conflict of Interest: None

Funding Source: None

Reference

1. Raza M, Javed S, Ahmad M, Khanum A, Najeeb Ullah, Andrabi WI. Microbial spectrum and antibiotic sensitivity patterns in ascitic fluid of cirrhotic patients. Pak J Med Health Sci 2021; 15 (1): 157-9.
2. Babar AN, Rasool S, Azhar S, Komal J, Hanif S. The bacterial spectrum of spontaneous bacterial peritonitis in patients with cirrhosis of liver. Professional Med J 2020; 27 (10):2099-2103.

3. Canakis A, Canakis J, Lohani M, Ostrander T. Spontaneous bacterial peritonitis in cardiac ascites: a rare but deadly occurrence. *Am J Case Rep* 2019; 20: 1446-8.
4. Amjad M, Gul MA, Rasool S, Dilshad A, Hyder A, Hameed N. Bugs commonly causing spontaneous bacterial peritonitis in patients with decompensated liver disease. *PJMHS* 2019; 13 (4): 939-41.
5. Huang CH, Lee CH, Chang C. Spontaneous bacterial peritonitis in decompensated liver cirrhosis-a literature review. *Livers* 2022; 2 (3): 214-32.
6. Min YW, Lim KS, Min BH, Gwak GY, Paik YH, Choi MS, et al. Proton pump inhibitor use significantly increases the risk of spontaneous bacterial peritonitis in 1965 patients with cirrhosis and ascites: a propensity score matched cohort study. *Aliment Pharmacol Ther* 2014; 40 (6):695-704.
7. Alzouki AN, Hamad A, Almasri H, Ata M, Ashour A, Othman M, et al. Predictors of short-term mortality following first episode of spontaneous bacterial peritonitis in hospitalized cirrhotic patients. *Cureus* 2021; 13 (10): e18999.
8. Kiyani KA, Kiyani MH, Ishag M. Chronic liver disease and patterns of different associated infections. *Pak J Pathol* 2019; 30 (3): 86-87.
9. Gilani SFM, Hassan F, Siddiqi FA, Gardezi SAA. Frequency of symptomatic spontaneous bacterial peritonitis and associated and associated clinical parameters in patients with liver cirrhosis. *Pak Armed Forces Med J* 2021; 71 (5): 1598-1602.
10. Aziz A, Ashraf S, Talpur MTH, Aamer N, Solangi SA, Shabir KU, et al. Spontaneous bacterial peritonitis in asymptomatic cirrhotic patients with ascites in a tertiary care hospital – a cross-sectional study. *Pak Armed Forces Med J* 2020; 70 (5): 1408-12.
11. Shaikh BA, Shaikh ZA, Shah AH, Kumar A. Determining the risk of spontaneous bacterial peritonitis due to increase use of proton pump inhibitors among cirrhotic patients with ascites. *Pak J Med Sci* 2021; 37 (4):1075-9.
12. Marciano S, Diaz JM, Dirchwolf M, Gadano A. Spontaneous bacterial peritonitis in patients with cirrhosis: incidence, outcomes, and treatment strategies. *Hepat Med* 2019; 11: 13-22
13. Duah A, Nkrumah KN. Prevalence and predictors for spontaneous bacterial peritonitis in cirrhotic patients with ascites admitted at medical block in Korle-Bu teaching hospital, Ghana. *PAMJ* 2019; 33: 35.
14. Hafez MZE, Abdallah HAM, Abdellatif KKK. Prevalence of spontaneous bacterial peritonitis in cirrhotic patients with ascites and its pattern in Aswan University Hospital. *EJHM* 2020; 81 (2): 1444-8.
15. Choubey PP, Sood SS, Dhaneria S. Spontaneous bacterial peritonitis in patients of cirrhosis of liver with ascites: A study from Central India. *People's J of Sci Res* 2019; 12 (2): 34-7.
16. Asif SJ, Gondal GM, Parveen S, Mushtaq S, Awan S, Hussain T. The pattern of microbial flora in spontaneous bacterial peritonitis in cirrhotic patients. *J Rawal M Uni* 2020; 24 (1): 62-7.
17. Raja K, Kiyani RS, Rehman S, Rashid A, Kumar S, Bibi A. Evaluation of diagnostic accuracy of C-reactive protein as a biomarker of spontaneous bacterial peritonitis in patients having decompensated chronic liver disease. *Professional Med J* 2021; 28 (10): 1438-42.
18. Gul N, Rizvi TH, Alam M. Patients of liver cirrhosis with low ascitic protein contents. *The Professional* 2018; 25 (2): 302-6.
19. Kokab B, Nadeem S, Rehman SU. Spontaneous bacterial peritonitis in cases with liver cirrhosis. *APMC* 2018; 12 (1): 74-6.
20. Zaman A, Kareem R, Mahmood R, Hameed K, Khan EM. Frequency of microbial spectrum of spontaneous bacterial peritonitis in established cirrhosis liver. *J Ayub Med Coll* 2011; 23 (4): 15-7.
21. Bibi S, Ahmed WD, Arif A, Khan F, Alam SE. Clinical, laboratory and bacterial profile of spontaneous bacterial peritonitis in chronic liver disease patients. *JCPSP* 2015; 25 (2): 95-9.
22. Kim T, Hong SI, Park SY, Jung J, Chong YP, Kim SH, et al. Clinical features and outcomes of spontaneous bacterial peritonitis caused by streptococcus pneumoniae: A matched case-control study. *Medicine* 2016; 95 (22): e3796.
23. Ahmed O, Rodrigues DM, Brahmania M, Patel K. Low incidence of spontaneous bacterial peritonitis in asymptomatic outpatients with cirrhosis undergoing paracentesis: A systematic review and meta-analysis. *JCAG* 2018; 1 (issue suppl 2): 278.
24. Azhar S, Safdar S, Atique Z, Ishfaq F, Mumtaz SU, Abaidullah S. Frequency of asymptomatic spontaneous bacterial peritonitis in decompensated cirrhotic patients with ascites. *J Pak Society Int Med* 2022; 3 (3): 220-4.

Authors Contribution

IA: Conceptualization of Project

HI: Data Collection

IA, HI: Literature Search

IA: Statistical Analysis

IA, HI: Drafting, Revision

IA: Writing of Manuscript