

Original Article

Frequency of Asymptomatic Spontaneous Bacterial Peritonitis in Decompensated Cirrhotic Patients with Ascites

Shahroz Azhar¹, Sidra Safdar², Zainab Atiq³, Faisal Ishfaq¹, Sami Ullah Mumtaz¹, Sajid Abaidullah¹

¹King Edward Medical University, Mayo Hospital, Lahore,

²Institute of Nuclear Medicine and Oncology (INMOL), Lahore,

³Pakistan Kidney and Liver Institute & Research Center, Lahore

Abstract

Objective: To determine the frequency of asymptomatic spontaneous bacterial peritonitis in decompensated cirrhotic patients with ascites.

Methods: This was a Cross sectional study conducted at North Medical Ward, Mayo Hospital, Lahore for Six months i.e. August 2019 to January 2020. Total 156 patients fulfilling the selection criteria were enrolled in study from OPD. Patients were advised to present in next morning with overnight fast. Then ascitic fluid sample of 10ml was taken via paracentesis. All samples were sent to the laboratory of the hospital for assessment of spontaneous bacterial peritonitis. Reports were assessed and if absolute neutrophilic count $>250/\text{mm}^3$, SAAG >1.1 and positive fluid culture, then spontaneous bacterial peritonitis was labeled.

Results: Mean age of patients was 54.121 ± 10.27 years. Among patients 116(74.4%) were male and 40(25.6%) were female. Mean duration of cirrhosis and ascites was 56.13 ± 36.90 and 10.72 ± 12.10 months. Asymptomatic spontaneous bacterial peritonitis was diagnosed in 64(41%) patients. Age of patients (p-value=0.051), Child Pugh class (p-value=0.001) and duration of ascites (p-value=0.000) showed significant association for frequency of Asymptomatic spontaneous bacterial peritonitis.

Conclusion: There is higher frequency of asymptomatic spontaneous bacterial peritonitis in decompensated cirrhotic patients with ascites. So all cirrhotic patients with ascites even asymptomatic must undergo abdominal paracentesis for ascitic fluid analysis and/or cultures diagnostic for SBP.

Key Words: Asymptomatic, Spontaneous, Bacterial, Peritonitis, Decompensated, Cirrhotic, Ascites.

How to cite this:

Azhar S, Safdar S, Atiq Z, Ishfaq F, Mumtaz SU, Abaidullah S. Frequency of Asymptomatic Spontaneous Bacterial Peritonitis in Decompensated Cirrhotic Patients with Ascites. J Pak Soc Intern Med. 2022;3(3): 220-224

Corresponding Author: Dr. Shahroz Azhar

Email: shahrozazhar538@gmail.com

Introduction

Burden of chronic liver diseases are on the rise world-wide. In Europe an estimated 0.1% of the total population suffers from cirrhosis, the deadly complication of chronic liver disease.¹ Bacterial infections constitute a major complication of cirrhosis. They account for 25%–46% of hospitalizations due to acute decompensation events in patients with cirrhosis and are associated with high morbidity and mortality.² Bacterial infections increase fourfold the probability of death of patients with decompensated cirrhosis, reaching a 30% mortality rate after the first month and 63% after the first year of follow-up.³

Spontaneous bacterial peritonitis is the most frequent bacterial infection in patients with cirrhosis, followed by urinary tract infection, pneumonia, skin and soft tissue infections, and spontaneous bacteremia.^{4,5} During or after an episode of spontaneous bacterial peritonitis, patients frequently present signs of decompensation such as development or progression of ascites or hepatic encephalopathy, gastrointestinal bleeding, and extrahepatic organ compromise such as renal failure.^{5,6}

Spontaneous bacterial peritonitis is a serious and potentially life-threatening complication in patients with decompensated liver cirrhosis.⁷ The reported incidence varies between 7% and 30% in hospitalized patients with cirrhosis and ascites, representing one of their

main complications.⁸ In a local study, frequency of asymptomatic spontaneous bacterial peritonitis was seen in 11.4% patients.⁹ However, another local study reported 23.5% frequency of spontaneous bacterial peritonitis among cirrhotic patients with ascites.¹⁰

Literature showed that the frequency of asymptomatic spontaneous bacterial peritonitis is less in cirrhotic patients with ascites. But varied frequency has been observed. Moreover, this variation is present in local literature. This create a dispute whether to consider asymptomatic spontaneous bacterial peritonitis a significant problem. So we conducted this study to confirm the current incidence of asymptomatic spontaneous bacterial peritonitis in cirrhotic patients belonging to local population. Purpose of this study is to determine the frequency of asymptomatic spontaneous bacterial peritonitis in decompensated cirrhotic patients with ascites.

Methods

This was a Cross sectional study conducted at North Medical Ward, Mayo Hospital, Lahore for Six months i.e. August 2019 to January 2020. After institutional review board approval, 156 patients was included by Non-probability, consecutive sampling from outdoor department with 95% confidence level, 5% margin of error and taking expected percentage of asymptomatic spontaneous bacterial peritonitis i.e. 11.4% in decompensated cirrhotic patients with ascites. Patients aged 20-70years of either gender presenting with decompensated cirrhosis with ascites (as per operational definition) were included. Patients with infection (fever $\geq 100^{\circ}\text{F}$, abdominal pain and tenderness), hepatic encephalopathy, upper gastrointestinal bleed within the last four weeks (on medical record), deranged renal profile (creatinine $>1.5\text{mg/dl}$ or hemodialysis), antibiotic treatment within last two weeks, past history of spontaneous bacterial peritonitis (on medical record) were excluded from the study. Informed consent was obtained. Demographic information (name, age, sex, BMI, duration of cirrhosis, duration of ascites and Child-Pugh class) was also taken. Patients were advised to present in next morning with overnight fast. Then ascitic fluid sample of 10ml was taken via paracentesis. All samples were sent to the laboratory of the hospital for assessment of spontaneous bacterial peritonitis. Reports were assessed. Decompensated cirrhosis was defined as presence of ALT & AST $>40\text{IU}$ with coarse liver diagnosed on abdominal ultrasound for $>6\text{months}$ and patient is taking treatment for liver disease whether hepatitis B or C present or absent. Ascites was defined as $>25\text{ml}$ of fluid in peritoneal cavity in the abdomen detected on ultrasound. Asymptomatic spontaneous bacterial peritonitis was be labeled if there was absolute neutro-

phil count $>250/\text{mm}^3$, SAAG >1.1 and positive fluid culture 105 organism/ HPF. Patients with spontaneous bacterial peritonitis were managed as per hospital protocol. All this information was recorded on proforma. The collected data was analyzed statistically by using SPSS version 21. Quantitative variables like age, BMI, duration of cirrhosis and duration of ascites was presented in form of mean \pm SD. Qualitative variables like gender, Child-Pugh class, presence of Hepatitis B or C and asymptomatic spontaneous bacterial peritonitis was presented in form of frequency and percentage. Data was stratified for age, gender, BMI, Child-Pugh class, presence of Hepatitis B or C, duration of cirrhosis and duration of ascites. Post-stratification, chi-square test was applied to compare asymptomatic spontaneous bacterial peritonitis in stratified groups. p-value ≤ 0.05 was taken as significant.

Results

Mean age of patients was 54.121 ± 10.27 years. Minimum and maximum age of patients was 22 and 70 years. Among patients 116(74.4%) were male and 40(25.6%) were female. Mean duration of cirrhosis was 56.13 ± 36.90 months. Mean duration of ascites was 10.72 ± 12.10 months. Mean BMI of women was $25.87 \pm 2.83 \text{ Kg/m}^2$. According to child pugh class 12(7.7%) presented with Class-A, 96(61.5%) with class B and 48(30.8%) with Class-C. There were 132(84.6%) patients who were positive for Hepatitis B/C. Asymptomatic spontaneous bacterial peritonitis was diagnosed in 64(41%) patients. Significant association was seen between age of patients and Asymptomatic spontaneous bacterial peritonitis. Higher frequency was seen in elderly age group patients. i.e. (p-value=0.051) No significant association was seen between gender of patients and frequency of Asymptomatic spontaneous bacterial peritonitis. Although frequency was higher among female patients but it was not statistically significant. i.e. (p-value=0.1810). BMI of patients had no signifying impact on frequency of Asymptomatic spontaneous bacterial peritonitis. i.e. (p-value=0.727). Patients with Child Pugh class B and C had significantly higher frequency of Asymptomatic spontaneous bacterial peritonitis. i.e. (p-value= 0.001). Duration of cirrhosis did not show significant association

Table 1: Frequency of allergies in a sample of 300 medical students in Lahore, Pakistan, in 2014

Statistics	Age	Duration of Cirrhosis	Duration of Ascities	BMI
Mean	54.21	56.13	10.72	25.87
SD	10.27	36.90	12.10	2.83
Minimum	22	6	1	19
Maximum	70	144	72	35
n	156			

for frequency of Asymptomatic spontaneous bacterial peritonitis. i.e. (p-value=0.214). Duration of Ascites showed significant association for frequency of Asymptomatic spontaneous bacterial peritonitis. i.e. (p-value = 0.000).

Discussion

Table 2: *Asymptomatic Spontaneous Bacterial Peritonitis in relation to Child Pugh Class*

	Asymptomatic Spontaneous Bacterial Peritonitis		Total
	No	Yes	
A	7(7.6%)	5(7.8%)	12
B	67(72.8%)	29(45.3%)	96
C	18(19.6%)	30(46.9%)	48
Total	92	64	156
p-value	0.001		

Table 3: *Asymptomatic Spontaneous Bacterial Peritonitis in relation to Duration of Cirrhosis*

	Asymptomatic Spontaneous Bacterial Peritonitis		Total
	No	Yes	
6-24 Months	35(38%)	16(25%)	51
25-50 Months	15(16.3%)	11(17.2%)	26
>50 Months	42(45.7%)	37(57.8%)	79
Total	92	64	156
p-value	0.214		

Table 4: *Asymptomatic Spontaneous Bacterial Peritonitis in relation to Duration of Ascites*

	Asymptomatic Spontaneous Bacterial Peritonitis		Total
	No	Yes	
1-10	73(79.3%)	43(67.2%)	116
11-20	16(17.4%)	5(7.8%)	21
>20	3(3.3%)	16(25%)	19
Total	92	64	156
p-value	<0.001		

Spontaneous Bacterial Peritonitis (SBP) is a serious and potentially life-threatening complication in patients with decompensated liver cirrhosis. It appears to be a consequence of impaired defense mechanisms and an increased susceptibility to bacterial infections in cirrhotic patients with ascites in the absence of any intra-abdominal source of infection (e.g. intestinal perforations or abscesses).¹¹

Pakistan is also an endemic country to of hepatitis B and C virus infections therefore; prevalence of cirrhosis and its complications like SBP are increasing.

In the midst of such a grave situation, very limited research data and contradictory evidence is available on the magnitude of burden of SBP among local population of cirrhotic patients.

The incidence of spontaneous bacterial peritonitis or its variants in hospitalized patients with cirrhosis has been reported to be between 20-50% in different studies.¹²⁻¹⁴ So far few studies have evaluated incidence of asymptomatic SBP in outdoor patients.¹⁵⁻¹⁷

In this study asymptomatic spontaneous bacterial peritonitis was diagnosed in 64(41%) patients. Highest frequency was seen in patients in elderly age group (> 50 years: 76.6%, p-value=0.051), among female patients (68.8%, p-value=0.181), patients with normal BMI and among overweight patients (37.5% & 48.4%, p-value=0.727), patients with Child Pugh class B and C (45.3% & 46.9%, p-value=0.001), patients with prolong duration of cirrhosis (>50 Months: 57.8%, p-value=0.214) and with less duration of ascites (1-10 Month: 67.2%, p-value=0.000).

In a local study, frequency of asymptomatic spontaneous bacterial peritonitis was seen in 11.4% patients.⁹ However, another local study reported 23.5% frequency of spontaneous bacterial peritonitis among cirrhotic patients with ascites.¹⁰ A recently published local study from Rawalpindi reported the frequency of SBP in asymptomatic cirrhotic patients as 10%.⁹

Another local study from Multan reported the frequency of asymptomatic spontaneous bacterial peritonitis in patients with liver cirrhosis and 11.62%.¹⁸

Frequency of asymptomatic spontaneous bacterial peritonitis was higher as compared to above mentioned studies. This variation may be due to certain methodological difference like sample size and operational definition of outcome variables etc.

On the other hand, studies have reported higher frequencies as well for asymptomatic spontaneous bacterial peritonitis which are comparable to this study. According to Kasztelan-Szczerbinska et al., spontaneous bacterial peritonitis was diagnosed in 30% of all cirrhotic patients with ascites undergoing paracentesis.¹⁶

Shereen A. Abogalalain his study reported the frequency of spontaneous bacterial peritonitis in patients of liver cirrhosis with ascites at Tanta University Hospitals was found to be 41.7% from cases.¹⁹ Oladimeji et al., found that the frequency of spontaneous bacterial peritonitis was 67.7%.²⁰

Female predominance has been found in this study. Most studies present a male or no gender predominance.^{21,22}

The female predominance can be related to greater use of health facilities by women in Cameroon or a selection bias. Risk for SBP was increased among females as Dia et al., finding due to increased women's health frequentation.²¹

Similar trend was seen in this study as frequency of asymptomatic spontaneous bacterial peritonitis was higher among female patients. Asif Aziz in his study reported male predominance compared to female counterparts, as well as lower weight and shorter duration of ascites was associated with lower frequency of SBP in ascites patients.²³

However in this study female predominance was noted, and among normal and overweight patients frequency of asymptomatic SBP was higher and higher frequency of SBP in patients with shorter duration of ascites. Keeping in mind the above discussion it can be said that as occurrence of SBP can initiate downhill course in natural history of cirrhosis, all admitted patients should be screened for SBP.

Conclusion

There is higher frequency of asymptomatic spontaneous bacterial peritonitis in decompensated cirrhotic patients with ascites. So all cirrhotic patients with ascites even asymptomatic must undergo abdominal paracentesis for ascitic fluid analysis and/or culture as diagnostic for SBP.

Conflict of Interest: *None*

Funding Source: *None*

References

1. Khalid M, Samiullah R, Khalid SRJPAFMJ. Frequency of asymptomatic spontaneous bacterial peritonitis in outdoor patients with liver cirrhosis. *Pak Arm For Med J*. 2015;65(2):278-81.
2. Liver EAfTSoT. EASL Clinical Practice Guidelines for the management of patients with decompensated cirrhosis. *J Hepatol*. 2018;69(2):406-60.
3. Fiore M, Maraolo AE, Gentile I, Borgia G, Leone S, Sansone P, et al. Current concepts and future strategies in the antimicrobial therapy of emerging Gram-positive spontaneous bacterial peritonitis. *World J Hepatol*. 2017; 9(30):1166.
4. Piano S, Singh V, Caraceni P, Roblero Cum J. Epidemiology, predictors and outcomes of multi drug resistant (MDR) bacterial infections in patients with cirrhosis across the world. Final results of the " Global study". *Dig Liver Dis*. 2018;50(1):2-3.
5. Shizuma T. Spontaneous bacterial and fungal peritonitis in patients with liver cirrhosis: A literature review. *World J Hepatol*. 2018;10(2):254.
6. Oliveira AM, Branco JC, Barosa R, Rodrigues JA, Ramos L, Martins A, et al. Clinical and microbiological characteristics associated with mortality in spontaneous bacterial peritonitis: a multicenter cohort study. *Eu J Gastroenterol Hepatol*. 2016;28(10):1216-22.
7. El Motasem EM, Heikal AA, El Haddad HE, Hamdy A, Samie RMA, El Din HS. Value of different diagnostic markers in spontaneous bacterial peritonitis in HCV Egyptian cirrhotic patients. *Open J Gastroenterol*. 2015; 5(09):119.
8. Marciano S, Diaz JM, Dirchwolf M, Gadano A. Spontaneous bacterial peritonitis in patients with cirrhosis: incidence, outcomes, and treatment strategies. *Hep Med: Evid Res*. 2019;11(1):13.
9. Khalid M, Samiullah R, Khalid SR. Frequency of asymptomatic spontaneous bacterial peritonitis in outdoor patients with liver cirrhosis. *Pak Arm For Med J*. 2015;65(2):278-81.
10. Kamani L, Mumtaz K, Ahmed US, Ali AW, Jafri W. Outcomes in culture positive and culture negative ascitic fluid infection in patients with viral cirrhosis: cohort study. *BMC Gastroenterol*. 2008;8(1):1-6.
11. Tsochatzis EA, Bosch J, Burroughs AK. Liver cirrhosis. *Lancet*. 2014;383(9930):1749-61.
12. Gunjača I, Francetić I. Prevalence and clinical outcome of spontaneous bacterial peritonitis in hospitalized patients with liver cirrhosis: a prospective observational study in central part of Croatia. *Acta Clin Cro*. 2010; 49(1):11-8.
13. Alaniz C, Regal RE. Spontaneous bacterial peritonitis: a review of treatment options. *Pharm Therap*. 2009; 34(4):204.
14. 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 Col Abbot*. 2011;23(4):15-7.
15. Romney R, Mathurin P, Ganne-Carrié N, Halimi C, Medini A, Lemaitre P, et al. Usefulness of routine analysis of ascitic fluid at the time of therapeutic paracentesis in asymptomatic outpatients: Results of a multicenter prospective study. *Gastroentérol Clin Biol* 2005; 29(3): 275-9.
16. Kasztelan-Szczerbinska B, Słomka M, Celinski K, Serwacki M, Szczerbinski M, Cichoz-Lach H. Prevalence of spontaneous bacterial peritonitis in asymptomatic inpatients with decompensated liver cirrhosis—a pilot study. *Adv Med Sci*. 2011;56(1):13-7.
17. Castellote J, Girbau A, Maisterra S, Charhi N, Ballester R, Xiol X. Spontaneous bacterial peritonitis and bacterascites prevalence in asymptomatic cirrhotic outpatients undergoing large-volume paracentesis. *J Gastroenterol Hepatol*. 2008;23(2):256-9.
18. Ather MM, Arif MM, Qadir M, Khan HR, Khaliq SA, Rasheeq T. Frequency of Asymptomatic Spontaneous Bacterial Peritonitis in Outdoor Patients with Liver Cirrhosis. *Nat Ed Adv Board*. 2019;30(7):2-5.

19. Muhammad T, Shereen Aa, Mabrouk R, Abdallah A. Frequency of Spontaneous Bacterial Peritonitis in Patients of Liver Cirrhosis with Ascites at Tanta University Hospitals. *Med J Cairo Uni.* 2019;87(1):147-52.
20. Oladimeji AA, Temi AP, Adekunle AE, Taiwo RH, Ayokunle DS. Prevalence of spontaneous bacterial peritonitis in liver cirrhosis with ascites. *Pan Af Med J.* 2013;15(1).
21. Dia D, Serme Y, Bassène M, Halim A, Diallo S, Thioubou M, et al. Spontaneous bacterial peritonitis in Dakar, Senegal: study of 55 patients with cirrhosis. *Med Sante Trop.* 2014;24(1):55-7.
22. Noah DN, Bagnaka S, Andoulo FA, Bilounga JN, Namme HL. Complications and prognosis of cirrhotic patients at the Douala General Hospital in Cameroon. *J Appl Med Sci.* 2016;5(1):43-52.
23. 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 Arm For Med J.* 2020;70(5):1408-12.