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Frequency of Spontaneous Bacterial Peritonitis in Liver Cirrhosis patients with Ascites

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Abstract: Background: SBP is a prevalent complication in individuals with liver cirrhosis. Despite better therapy; it still has substantial morbidity and mortality rates.**Aim:** the aim of this study was to find out the frequency of spontaneous bacterial peritonitis in liver cirrhosis patients with ascites.**Materials and method:** The present retrospective study was carried out at the department of medicine and gastroenterology Bolan Medical Complex Hospital, Quetta from January 2025 to June 2025 after taking approval from the ethical committee of the hospital. Forty individuals of both genders and different age groups (ranged 41-80 years) with liver cirrhosis and ascites who were admitted in the medical ward of the hospital were included in this study. Liver cirrhosis was diagnosed by clinical examination, biochemical tests, abdominal ultrasounds, and viral markers. The ascitic fluid was analyzed for absolute neutrophil count, culture sensitivity, albumin, and cytology. SBP has been identified using established criteria. For data analysis SPSS version 16 was used. All qualitative variables were presented as frequencies and percentages. Age and gender-specific data were organized.**Results:** A total of 40 individuals were enrolled in this study out of which 25(62.5%) were males and 15(37.5%) were female. The mean age of the study participants was 59±99 (ranged 41-80) years. Spontaneous bacterial peritonitis was observed in 27(67.5% cases. Among the 27 patients who developed SPB, 17 (62.9%) had culture-positive SBP and 10 (37.0%) had CNNA. In this study, the overall incidence of MNB was 10 (25%). Among those with SBP, 27 (67.5%) exhibited monomicrobial infection with aerobic Gram-negative bacilli were responsible in 18 (66.6%) of the cases. Among the gram negative bacteria E.coli was the most prevalent 13(72.2%) followed by the species Klebsiella 5(27.7%). 9(33.3%) of the bacteria were Gram-positive in which the most predominant were the species of streptococcus 5 (55.5%) and Staphylococcus aureus 4 (44.4%) respectively.**Conclusion:** The present study concluded that Frequency of Spontaneous Bacterial Peritonitis in Liver Cirrhosis patients with Ascites was most prevalent (65%). To minimize morbidity and death in this category of patients, it is crucial to actively promote early presentation through awareness campaigns.

Keywords: Frequency; Spontaneous Bacterial Peritonitis; Liver Cirrhosis; Ascites

INTRODUCTION

Ascites refers to the accumulation of excess fluid in the peritoneal cavity. A clinical diagnosis of ascites requires above 500ml of fluid.1 Spontaneous Bacterial Peritonitis (SBP) is a prevalent complication in individuals with cirrhosis of liver and is defined as an infection of ascetic fluid without an obvious intra-abdominal focus.2 SBP symptoms are insignificant compared to those of surgical peritonitis without ascites. Ascites separate the visceral and parietal

pleuras, preventing rigid abdominal muscles. Patients with cirrhosis of the liver with SBP may not have signs of peritonitis, such as abdominal pain, discomfort, or fever. Despite better therapy, SBP still has substantial morbidity and mortality rates. The mortality rate for SBP is 70% per year due to complications such as septic shock, hepatorenal syndrome, and hepatic encephalopathy. International studies indicate that 10% to 30% of people with cirrhosis of the liver develop SBP.4 It can lead to hepatic encephalopathy and worsen the status of cirrhosis patients.5 The pathogenesis of SBP has not been well understood. Impairment of defensive systems in cirrhotic patients leads to the translocation of bacteria & endotoxins from the gastrointestinal tract to peritoneal fluid, which is thought to be a significant cause of SBP.6 Cirrhosis patients exhibit lower amounts of complement cascade proteins and reduced neutrophil opsonic and phagocytic capabilities. Bacteremia from the urinary or respiratory tract can cause infection in the ascitic fluid. SBP can be iatrogenic, such as following endoscopic approaches to esophageal or stomach varices.7 Infections are often caused by organisms found throughout the gastrointestinal system. To optimize sensitivity, at least 10 ml of ascitic fluid should be collected at the bedside into blood culture bottles.8 Positive ascitic fluid culture is not usually essential for diagnosing spontaneous bacterial peritonitis (SBP), although it can help guide antibiotic therapy. SBP is diagnosed based on established criteria. In the absence of intra-abdominal contaminating things, a WBC count compared to 500 cells/µl or an absolute neutrophil count greater than 250 cells/µl can be evaluated by microscopy in ascitic fluid or a computerized counter.8 It's worth noting that 10-32% of patients with outdoor SBP may not be symptomatic. Cirrhotic individuals with ascites are at risk for SBP, which may develop in 10% to 25% of them.9Approximately 50% of episodes of SBP occur at the time of hospital admission, with the rest developing during hospitalization. In-clinic death rates for initial episodes of SBP range from 10-50% and are influenced by several factors. The 1-year mortality rate after recovering from the first bout of SBP has been reported to be 60-7010. The present study was carried out to determine the frequency of spontaneous bacterial peritonitis in liver cirrhosis patients with Ascites.

Materials and method

The present retrospective study was carried out at the department of medicine and gastroenterology Bolan Medical Complex Hospital, Quetta from January 2025 to June 2025 after taking approval from the ethical committee of the hospital. Forty individuals of both genders and different age groups (ranged 41-80 years) with liver cirrhosis and ascites who were admitted in the medical ward of the hospital were included in this study. Liver cirrhosis was diagnosed by clinical examination, biochemical tests, abdominal ultrasounds, and viral markers. Each individual had abdominal paracentesis within forty eight hours of arrival under aseptic conditions. The ascitic fluid was analyzed for absolute neutrophil count, culture sensitivity, albumin, and cytology. SBP has been identified using established criteria, including an absolute the number of neutrophil of more than 250 cells/mm3 and neutrocytic ascites in the absence of intra-abdominal infection.[11] Patients with positive ascitic fluid cultures and a neutrophil count greater than 250 cells/mm3 were diagnosed as culture-positive neutrocytic ascites / SBP. Patients with negative ascitic fluid cultures and neutrocytic ascites were diagnosed with culture negative neutrocytic ascites (CNNA). Individuals with positive cultures in ascitic fluid but no neutrocytic ascites were diagnosed as monobacterial bacterascites (MNB). For data analysis SPSS version 16 was used. All qualitative variables were presented as frequencies and percentages. Age and gender-specific data were organized.

Results

A total of 40 individuals were enrolled in this study out of which 25(62.5%) were males and 15(37.5%) were female. The mean age of the study participants was 59±99 (ranged 41-80) years as shown in table 1. Age wise distribution of the study showed that majority of the individuals were in the age group 61 to 80 years 22(55%) followed by age group 41 to 60 years (45%) as presented in table 2. Spontaneous bacterial peritonitis was observed in 27(67.5% cases. Among the 27 patients who developed SPB, 17 (62.9%) had culture-positive SBP and 10 (37.0%) had CNNA. In this study, the overall incidence of MNB was 10 (25%) as presented in table 3. Among those with SBP, 27 (67.5%) exhibited monomicrobial infection with aerobic Gram-negative bacilli were responsible in 18 (66.6%) of the cases. Among the gram negative bacteria E.coli was the most prevalent 13(72.2%) followed by the species Klebsiella 5(27.7%). 9(33.3%) of the bacteria were Gram-positive in which the most predominant were the species of streptococcus 5 (55.5%) and Staphylococcus aureus 4 (44.4%) respectively as presented in the table 4.

Table 1.Demograpic features of the study population n=40	
Feature	**N (%)**
Gender	
Male	25(62.5%)
Female	15(37.5%)
Mean age in years	59±99 (ranged 41-80)

Table 2.Gender and age wise distribution of the study group.

Age group	Female	Male	Total
41 to 60	**5**	**13**	**18**
61 to 80	**10**	**12**	**22**
Total	**15**	**25**	**40**

Table 3. Shows neutrophil counts & ascitic culture.

Culture	Ascitic Neutrophils Above 250mm3	Ascitic Neutrophils below 250mm3	N(%)
Positive	17	10	27(67.5%)
Negative	10	3	13(32.5%)
Total	27	13	40(100%)

Table 4. Bacteria isolated from the culture of ascitic fluid

Bacteria	Culture Positive	Culture negative	Total
E.coli	13	Zero	13
Klebsiella spp	5	Zero	5
Staph aureus	4	Zero	4
Strept spp	5	Zero	5
No growth	Zero	11	11
Mixed growth	Zero	2	2
Total	27	13	40

DISCUSSION

The prevalence of chronic liver failure has increased globally in recent decades. Every year, 14-26 new infections per individual are added to the pool. Recent research found that chronic viral hepatitis constitutes one of the four main causes of chronic liver disease and cirrhosis. Cirrhosis often causes ascites, which may contribute to Spontaneous Bacterial Peritonitis , a life-threatening complication in hospitalized patients.12 It is a major illness in individuals who have severe liver condition with ascites. Research indicates that SBP affects 12-34% of indoor and outdoor patients who have chronic liver disease & ascites, with fatality rates ranging from 20-40%.13 SBP may be the primary risk factor for life-threatening consequences, resulting in poor survival. Chronic liver disease can decrease immunity and increase intestinal permeability, leading to bacterial translocation and SBP.14 Over 92% of cases are monomicrobial, with aerobic gram-negative bacilli accounting for more than two-thirds of them. Escherichia coli , Klebsiella species , Enterococcus facecalis , Pseudomonas species , and others were the most frequently isolated organisms from ascitic fluid with SBP.14 Identifying predisposing risk factors for SBP is crucial considering the high risk of negative outcomes. The purpose of this study was to assess the frequency of SBP in liver cirrhosis with ascites. A total of 40 individuals were enrolled in this study out of which 62.5% were males and 37.5% were female. The mean age of the study participants was 59±99 (ranged 41-80) years. Age wise distribution of the study showed that majority of the individuals were in the age group 61 to 80 years 22(55%) followed by age group 41 to 60 years (45%). The demographic features of our study are similar to the research conducted by Oladimeji et al,15In our study Spontaneous bacterial peritonitis was observed in 27(67.5% cases. These findings are comparable to the study done by Oladimeji et al, where the frequency was 67%.15 However, this was higher than the prevalence seen in the Mehmood Gilani study, which was 37%.16 Previous research suggest that the overall incidence of SBP among cirrhotic individuals ranges between 10-30%.17 Our study found a somewhat higher frequency of SBP compared to studies from the West 17-18, but still within the range of 30-64% reported in local literature.19 The variation in SBP prevalence between local and western research might

be attributed to different levels of liver disease among the populations studied. Our study showed that among the individuals who had SPB, 62.9% of them had culture-positive SBP and 37.0% had CNNA. In this study, the overall incidence of monobacterial bacterascites was 25%. This was comparable to the findings of Oladimeji et al15 and Runyon et al.20 Our study evaluated that Spontaneous bacterial peritonitis was caused by 66.6% of the Gram-negative bacilli in which E.coli was the most prevalent followed by the species Klebsiella. 33.3% of the bacteria responsible for SBP were Gram-positive in which the most predominant were the species of streptococcus and Staphylococcus aureus respectively. Our study results are similar to the previous study .15

CONCLUSION

The present study concluded that Frequency of Spontaneous Bacterial Peritonitis in Liver Cirrhosis patients with Ascites was most prevalent (65%). To minimize morbidity and death in this category of patients, it is crucial to actively promote early presentation through awareness campaigns.

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