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FREQUENCY OF SPONTANEOUS BACTERIAL PERITONITIS IN CIRRHOTIC PATIENTS WITH ASCITES

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Abstract

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

Methods: *This cross-sectional study was conducted in department of General Medicine, Bolan Medical Complex Hospital Quetta. We included 171 patients with diagnosis of liver cirrhosis having ascites, aged 25 to 65 years. In all patients, thorough investigations were conducted to determine the presence of absence of SBP.*

Results: *The mean age was 53.4±9.5 years. Regarding gender distribution, 81.3% were female (n=139) and 18.7% were male (n=32). The average duration of disease among the participants was 3.8±2.9 years. The mean body mass index (BMI) was 26.3±2.1 kg/m². Finally, 5.8% of the participants reported a family history (n=10), whereas 94.2% did not. Out of 171 patients, SBP was diagnosed in 77 (45.03%) patients.*

Conclusion: *Spontaneous bacterial peritonitis (SBP) is a common presentation in cirrhotic patients presenting with ascites. So according to present study results routine evaluation of ascitic fluid should be carried out to rule out SBP in these patients.*

INTRODUCTION

Liver cirrhosis is a common health issue affecting both low-, middle-, and high-income nations, contributing significantly to illness and death worldwide.[1] It results from prolonged inflammation of the liver, which leads to widespread scarring and replacement of normal liver tissue with regenerative nodules. Over time, this process can progress to liver failure.[2] In 2017, cirrhosis-related deaths accounted for approximately 24% of all global fatalities, an increase from 1.9% in previous years.[3] The primary causes include chronic alcohol misuse, infections such as viral hepatitis, nonalcoholic steatohepatitis, and autoimmune disorders. Symptoms can vary widely, with some patients exhibiting signs like jaundice, fluid accumulation in the abdomen (ascites), hepatic encephalopathy, and bleeding from varices in advanced stages. Others may remain entirely asymptomatic, showing no outward clinical signs.[4, 5]

Ascites refers to the accumulation of free fluid within the peritoneal cavity. It is the most common early sign of decompensation in patients with cirrhosis, marking the transition from compensated to decompensated disease. The underlying mechanism is mainly due to increased

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portal (sinusoidal) pressure and sodium retention, which result from vasodilation and the subsequent stimulation of pathways that promote sodium retention.[6, 7]

Patients with cirrhosis exhibit compromised defenses against bacterial infections due to decreased ability to clear bacteria effectively. This immune impairment promotes bacterial translocation, driven by increased intestinal permeability and overgrowth of gut bacteria. As a result, approximately 30% of individuals with cirrhosis experience bacterial infections either upon admission or during their hospital stay, with spontaneous bacterial peritonitis being the most prevalent type.[8, 9]

Spontaneous bacterial peritonitis (SBP) is a serious complication that can occur in patients with cirrhosis and ascites. Ascitic fluid is primarily transudative with limited opsonic activity, creating an ideal environment for bacterial growth. The occurrence of SBP varies, affecting approximately 1.5% to 3.5% of outpatient cases and up to 30% of hospitalized individuals. Initially, SBP carried a mortality rate greater than 90% during hospital stays, but advances in early detection and the use of prompt antibiotics have significantly improved outcomes, reducing mortality to around 20%.[7, 10]

The aim of the present study was to determine the frequency of spontaneous bacterial peritonitis in cirrhotic patients with ascites.

Materials and Methods:

This cross-sectional study was conducted in department of General Medicine, Bolan Medical Complex Hospital Quetta. We included 171 patients with diagnosis of liver cirrhosis having ascites, aged 25 to 65 years. While patients having secondary SBP (ascetic fluid glucose <50mg/dl, protein >3gm/dl, and albumin gradient <1.1), those with history of recent abdominal surgery or trauma that could affect ascites formation or increase the risk of secondary peritonitis, pregnant females and those with peritoneal carcinomatosis were excluded.

Verbal informed consent was taken from the patients by explaining the purpose and benefits of the study. In all patients, thorough investigations were conducted to determine the presence of absence of SBP. The following crieteria was used to determine SBP; presence of an ascitic fluid infection without an evident intra-abdominal surgically-treatable source and presence of all these was taken as positive, total leukocyte count >500/ml, neutrophil count > 250/ml, serum asitic albumin gradient >1.1, Ascitic fluid albumin <1 gm/dl.

Statistical analysis was performed using SPSS version 25.0. Mean and standard deviation was calculated for age, height, weight, BMI and duration of disease. Frequency and percentage was presented for gender, residence (rural/urban), Employment status, Family history of disease and spontaneous bacterial peritonitis (present/absent).

RESULTS:

The baseline characteristics of the study participants (N=171) are as follows: The mean age was 53.4±9.5 years. Regarding gender distribution, 81.3% were female (n=139) and 18.7% were male (n=32). In terms of residence, 40.3% of participants lived in urban areas (n=69), while 59.6% resided in rural areas (n=102). The average duration of disease among the participants was 3.8±2.9 years. The mean body mass index (BMI) was 26.3±2.1 kg/m^2. Concerning employment status, 78.4% were employed (n=134) and 21.6% were unemployed (n=37). Finally, 5.8% of the participants reported a family history (n=10), whereas 94.2% did not (Table 1).

Out of 171 patients, SBP was diagnosed in 77 (45.03%) patients (Figure 1).

Table 1. Baseline Characteristics (N=171).

Age (Years)	53.4±9.5
Gender (%)	
Female	139 (81.3%)
Male	32 (18.7%)

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Residence (%)	
Urban	69 (40.3%)
Rural	102 (59.6%)
Duration of Disease (Years)	3.8±2.9
BMI (Kg/m^2)	26.3±2.1
Employment status (%)	
Employed	134 (78.4%)
Unemployed	37 (21.6%)
Family History (%)	
Yes	10 (5.8%)
No	161 (94.2%)

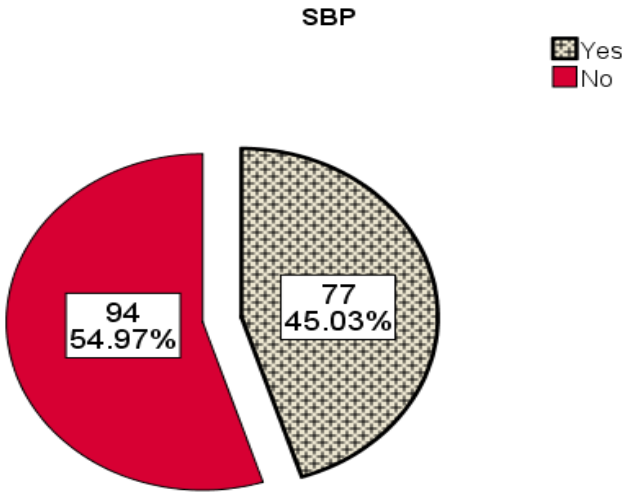

Figure 1. Frequency of SBP.

DISCUSSION:

Spontaneous bacterial peritonitis (SBP) frequently occurs in patients with chronic liver disease and ascites, and it is often asymptomatic.[11] Although it is commonly documented in medical literature, research on the actual prevalence of SBP remains limited. Investigating the frequency of spontaneous bacterial peritonitis (SBP) in cirrhotic patients with ascites is essential for optimizing clinical management, assessing patient risk, allocating resources effectively, stimulating further research, and informing public health strategies. Understanding the prevalence of SBP enhances patient care, reduces morbidity and mortality, and has broader implications for healthcare systems and public health initiatives.

The development of spontaneous bacterial peritonitis (SBP) occurs through a series of four interconnected stages. It begins with an overgrowth of bacteria within the small intestine. Next, there is an increase in the permeability of the intestinal lining, allowing bacteria and their toxins to cross the mucosal barrier more easily. The third stage involves bacterial translocation, where live microorganisms or their toxic components pass through the intestinal mucosa into underlying tissues. Ultimately, the immune defenses become compromised, leading to immunosuppression. Various factors contribute to bacterial overgrowth

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in patients with liver cirrhosis, including impaired intestinal motility, abnormal bile secretion, reduced stomach acid production (hypochlorhydria), and irregularities in IgA antibody synthesis.[12, 13] In severe cases of liver cirrhosis, intestinal motility is notably diminished, fostering bacterial overgrowth and facilitating the movement of microbes across a weakened mucosal barrier. Portal hypertension significantly contributes to increased intestinal permeability and the deterioration of mucosal defenses. Bacterial translocation is characterized either by active invasion or passive movement of live bacteria and their toxic products across the epithelial lining into the lamina propria. From this point, microorganisms can travel to mesenteric lymph nodes or distance to other parts of the body. Patients suffering from liver cirrhosis often experience immunosuppression due to multiple factors, including decreased activity of neutrophils and mononuclear phagocytes, weakened humoral immune responses, and reduced opsonin activity in ascitic fluid.[14, 15] These interconnected processes collectively play a critical role in the pathogenesis of SBP in individuals with cirrhotic liver disease and ascites.

Several local studies have examined the prevalence of spontaneous bacterial peritonitis (SBP) among patients with cirrhosis and ascites, revealing a wide range of occurrence rates. One study reported an incidence of 38.0%, indicating that over a third of such patients are affected.[16] Another investigation found a higher prevalence of 52.3%, suggesting that more than half of the cirrhotic patients with ascites could develop SBP.[17] Conversely, a different local research showed a significantly lower prevalence of just 10.0%, highlighting variability in findings across different populations or methodologies. Yet another study has documented this frequency, further contributing to the understanding of SBP occurrence in these patients.[18]

A 2016 study involving patients at PTCL Medical Center Lahore and the Medical Special Ward Services Hospital found that 9.3% of patients had asymptomatic spontaneous bacterial peritonitis.[19] This rate is significantly lower than our findings. Additionally, another research reported an incidence rate of 3.5%, which is also below our calculated value.[20] This discrepancy may be attributed to a lack of awareness about the disease among the general population, leading to a higher occurrence of related complications such as spontaneous bacterial peritonitis.[21]

This study has certain limitations, including being conducted at a single center and involving a relatively small number of participants. Nonetheless, the findings highlight the notable prevalence of asymptomatic spontaneous bacterial peritonitis. Patients suffering from chronic liver disease with ascites may be susceptible to developing this silent infection, although additional research is necessary to confirm and clarify this relationship.

CONCLUSION:

Spontaneous bacterial peritonitis (SBP) is a common presentation in cirrhotic patients presenting with ascites. So according to present study results routine evaluation of ascitic fluid should be carried out to rule out SBP in these patients.

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