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Frequency of spontaneous bacterial peritonitis in liver cirrhosis patients with ascites: A single centre cross sectional study

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Abstract---Background: When cirrhosis and ascites are present, a very common bacterial infection known as spontaneous bacterial peritonitis (SBP) often develops. This condition must be early diagnosed and treated to reduce morbidity and mortality. Objective: To assess the frequency of Spontaneous Bacterial Peritonitis in Liver Cirrhosis patients with Ascites. Methodology: This cross sectional study was carried out at the department of gastroenterology, Lady Reading Hospital Peshawar. The duration of study was two years from January 2018 to December 2019. Spontaneous bacterial peritonitis was diagnosed as positive when the ascitic fluid bacterial culture was positive. Ascitic fluid was taken in

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aseptic condition and send to the hospital diagnostic laboratory for the culture test. All the information's were recorded in a proforma designed for this research. Data was analyzed by using SPSS version 24. Results: In the current research, totally 150 liver cirrhosis patients with ascites were enrolled. The male patients in our study were 87 (58%) while female patients were 63 (42%). The mean age of the participants (SD) was 48 (4.95) years. The frequency of Spontaneous Bacterial Peritonitis was 60 (40%). Based on identification of the positive culture, the predominant bacteria was E.coli in 24 (60%) patients, Klebsiela in 10 (25%), streptococcus in 3 (7.5%) patients while Staphylococcus was also observed in 3 (7.5%) patients. Conclusion: Our study concludes that spontaneous bacterial peritonitis is the prevalent condition in liver cirrhosis patients with ascites. To lower the mortality and morbidity rates in this group of patients, a strong awareness campaign must be implemented about early presentation.

Keywords---frequency, spontaneous bacterial peritonitis, liver cirrhosis, ascites.

Introduction

When cirrhosis and ascites are present, a very common bacterial infection known as spontaneous bacterial peritonitis (SBP) often develops. This condition must be early diagnosed and treated [1-3]. SBP was initially reported in 1971 by Conn and Fessel as a syndrome of infected ascitic fluid in individuals with cirrhosis of the liver [4]. SBP is defined as an infection of previously sterile ascitic fluid, with no obvious source of infection inside the abdomen [5]. Typically, the infectious organisms are those that are part of the normal gut flora. When initially reported, its mortality approached 90% however it has been lowered to around 20% with early identification and management [6, 7].

All liver cirrhosis patients with ascites are at risk for SBP, with the incidence of SBP in outpatients ranging from 1.5% to 3.5% and in hospital admitted patients it is ranging from 10% to 30% [8, 9]. The majority of SBP episodes develop while in the hospital, with half already present at the time of admission [8]. Depending on a number of risk variables, the in-hospital mortality rate for the first episode of SBP might vary from 10% to 50% [10, 11]. According to reports, between 31% and 93% of people die one year following their first episode of SBP [12].There are still gaps in understanding of the patho-physiology of SBP. As a result of cirrhotic patients' weakened defense systems, it is thought that one of the main processes underlying the development of SB bacterial and endotoxins translocation from the gastrointestinal system to peritoneal fluid [2, 13-16]. Patients with cirrhosis have lower amounts of complement cascade proteins, and their neutrophils' capacity for opsonization and phagocytosis is reduced. Bacteremia from the respiratory tract or urine may potentially cause the ascitic fluid to become infected. SBP may also be caused by medical intervention [17], like following endoscopic therapy of gastric or esophageal varices.

Some causes of SBP in patients include [1, 8]: (1) local symptoms and/or signs of peritonitis, such as abdominal discomfort, tenderness, vomiting, diarrhoea, and ileus; (2) indications of systemic inflammation, such as tachycardia and/or hyper or hypothermia; (4) severely affecting of liver function; (5) shock; (6) kidney failure; and (7) gastrointestinal bleeding. It is crucial to note that SBP can be asymptomatic in around 10–32% of instances, especially in outpatients [18-20]. Regarding the occurrence of SBP amongst patients with liver cirrhosis and ascites, Pakistani data are quite limited. The purpose of this research was to evaluate the findings with other studies in order to ascertain the incidence of SBP amongst liver cirrhosis patients with ascites.

Materials and Methods

This cross sectional study was carried out at the department of gastroenterology, Lady Reading Hospital Peshawar. The duration of study was two years from January 2018 to December 2019. The ethical and research committee of the hospital approved our study. The total sample size in the current study was 150 patients based on the WHO sample size calculator. The inclusion criteria of the current study were all the liver cirrhosis patients with ascites, patients of both the gender and all ages, patients with no treatment history of antibiotic in last seven days and willing to participate in our study. The exclusion criteria in the current study were all the patients with secondary peritonitis like ruptured appendix and perforated colon, patients on antibiotic treatment in the past seven days and patients not interested to participate in the current study. An informed consent was taken from all the enrolled patients in written form. All the patients enrolled in the current study were examined clinically in detail and history was taken. The cirrhosis was diagnosed based on the patient's history, examination, laboratory tests and ultrasound. Spontaneous bacterial peritonitis was diagnosed as positive when the ascitic fluid absolute Polymorphnuclear Leukocyte (PMN) count was <250 cells/mm3. Spontaneous bacterial peritonitis was also diagnosed as positive when the ascitic fluid bacterial culture was positive [21]. Ascitic fluid was taken in aseptic condition and send to the hospital diagnostic laboratory for the culture test. All the information's were recorded in a proforma designed for this research. Data was analyzed by using SPSS version 24. For data like age, means and standard deviation was computed whereas for data like gender and frequency of Spontaneous bacterial peritonitis, frequencies and percentages were computed.

Results

In the current research, totally 150 liver cirrhosis patients with ascites were enrolled. The male patients in our study were 87 (58%) while female patients were 63 (42%). (Figure 1) The mean age of the participants (SD) was 48 (4.95) years. Age distribution shows that 45 (30%) patients were 30-45 years old whereas 105 (70%) participants were 46-60 years. (Figure 2) According to Childs Pughs Classification, 75 (50%) patients were in class A, 30 (20%) patients were in class B while 45 (30%) patients were in class C. (Figure 3) The frequency of Spontaneous Bacterial Peritonitis was 60 (40%). (Figure 4) Based on identification of the positive culture, the predominant bacteria was E.coli in 24 (60%) patients, Klebsiela in 10 (25%), streptococcus in 3 (7.5%) patients while Staphylococcus was also observed in 3 (7.5%) patients. (Figure 5)

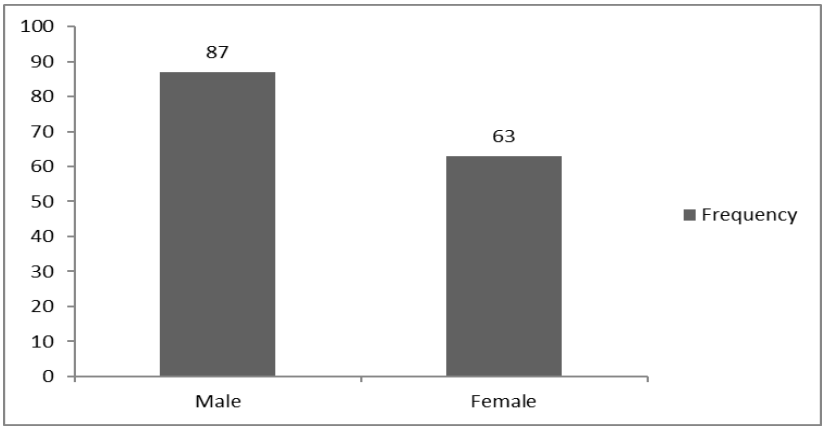

Figure 1. Frequency of patients based on gender

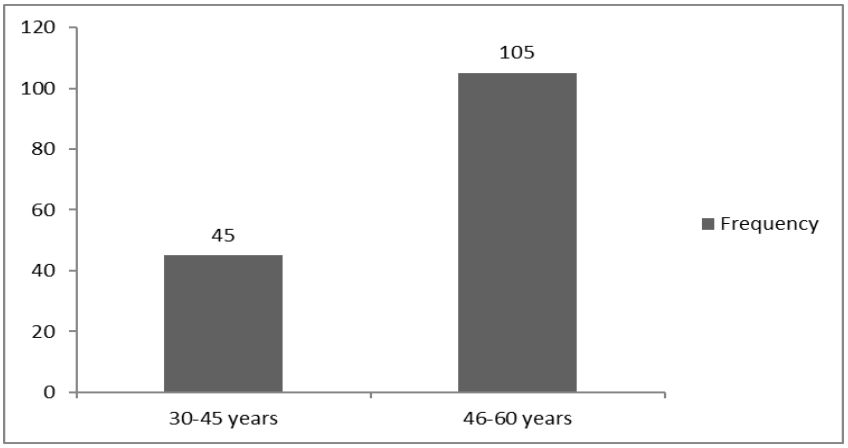

Figure 2. Frequency of patients based on age

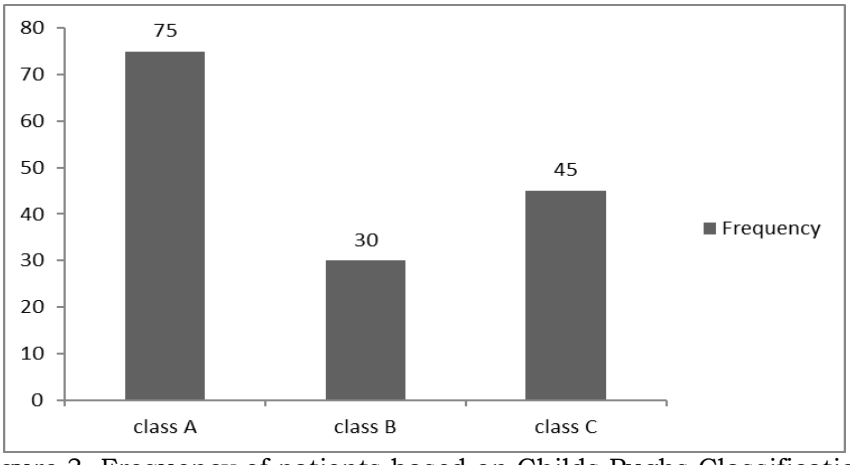

Figure 3. Frequency of patients based on Childs Pughs Classification

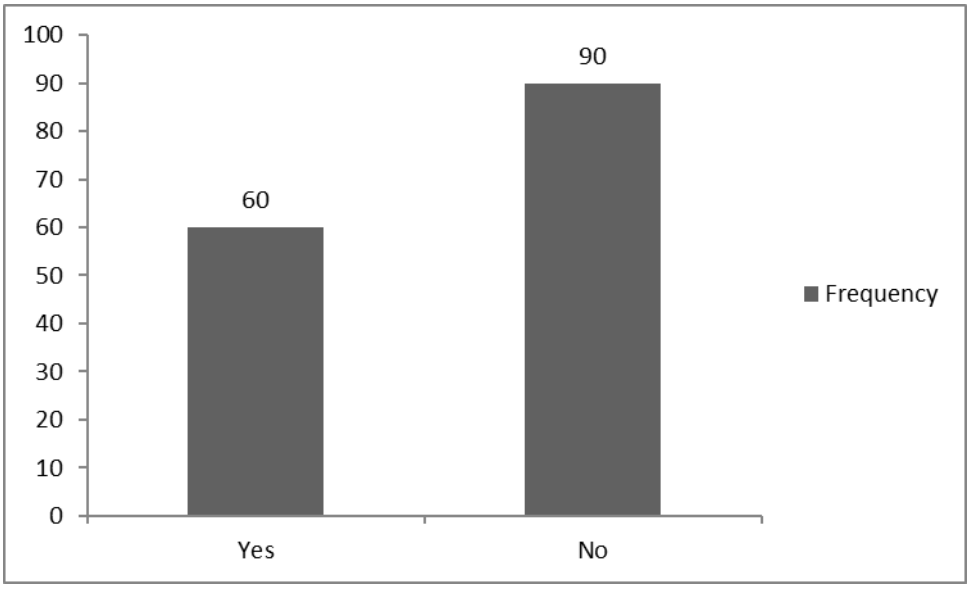

Figure 4. Frequency of Spontaneous Bacterial Peritonitis in Liver Cirrhosis patients

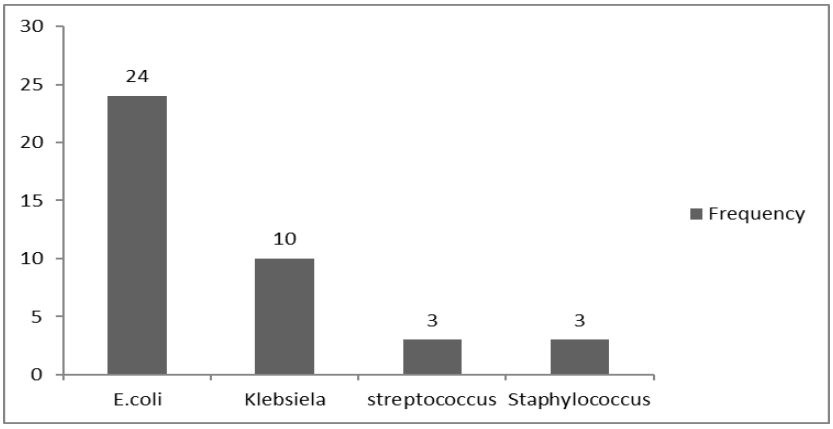

Figure 5. Frequency of different bacteria in positive culture samples

Discussion

SBP is one of the worst health consequences of cirrhosis. Early identification of SBP is necessary to decrease mortality by timely administration of antibiotic medication [22]. In the current research, totally 150 liver cirrhosis patients with ascites were enrolled. The male patients in our study were 87 (58%) while female patients were 63 (42%). The mean age of the participants (SD) was 48 (4.95) years. Age distribution shows that 45 (30%) patients were 30-45 years old whereas 105 (70%) participants were 46-60 years. According to Childs Pughs Classification, 75 (50%) patients were in class A, 30 (20%) patients were in class B while 45 (30%) patients were in class C. The frequency of Spontaneous Bacterial Peritonitis was 60 (40%). Based on identification of the positive culture, the predominant bacteria was E.coli in 24 (60%) patients, Klebsiela in 10 (25%),

streptococcus in 3 (7.5%) patients while Staphylococcus was also observed in 3 (7.5%) patients. In accordance with our findings, a previous study carried out by Ajayi Akande O et al. reported SBP in 66% patients. In their study E.coli was the predominant bacteria followed by Klebsiela [23]. Another study done by Jeando Khan Daidano et al. reported 13% prevalence of SBP in liver cirrhosis patients which is not in accordance with our findings. They reported E.coli in majority of the samples which is consistent with our results [24].

According to several research conducted in Pakistan, the frequency of SBP varies from 32 to 64% [20]. According to a research, SBP has a mortality rate of 10% to 15% [25]. SBP During normal follow-up, patients may exhibit encephalopathy, acute variceal haemorrhage, stomach discomfort, diarrhoea, and ileus [26]. Our results are consistent with published data [27] and show that individuals with enhanced PT, a marker of the severity of liver disease, higher blood bilirubin levels, and reduced ascitic fluid protein have a higher risk of SBP in cirrhosis of the liver. Cirrhotic patients receiving diuretic medication see an increase in ascitic fluid total protein levels, opsonic activity, and ascetic fluid complement. Because of fluid loss in the urine, it may prevent SBP from occurring [28]. Healthy individuals carry 1000 trillion or more bacteria from the stomach to the colon per gram of faeces in the colon [28]. SBP in advanced liver disease is caused by negative impacts from normal intestinal flora processes [29]. Increased intestinal permeability and bacterial pathological translocation are symptoms of immune dys-regulation in cirrhotic individuals [30]. E. coli and K. pneumonia are the most typical SBP-causing organisms [31]. Gram positive cocci have become a prominent pathogen in recent years when compared to gram negative cocci in various researches [32]. According to research from China [33], gram negative bacteria were more prevalent in individuals with community-acquired illnesses and predominated in nosocomial infections. Streptococcus 30%, E. coli 46%, and Klebsella 9% were found in studies published between 1971 and 1991 among 263 ascitic fluid culture organisms [34]. According to a literature study by Conn et al. [34], E. coli was the main pathogen of SBP. Nosocomial SBP had a higher disease severity than community-acquired SBP [1].

Conclusion

Our study concludes that spontaneous bacterial peritonitis is the prevalent condition in liver cirrhosis patients with ascites. To lower the mortality and morbidity rates in this group of patients, a strong awareness campaign must be implemented about early presentation.

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