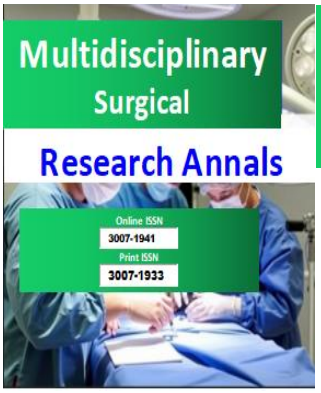

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Frequency of Asymptomatic Spontaneous Bacterial Peritonitis in Patients With Chronic Liver Disease and Ascites.

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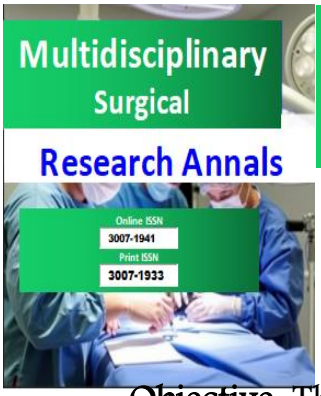
Abstract

Background: Chronic liver disease (CLD) contributes significantly to morbidity and mortality around the world. In Pakistan, it is due mainly to infections of Hepatitis B and C. One of the complications of CLD, which is often important for such patients, involves an infection of spontaneous bacterial peritonitis. Asymptomatic spontaneous bacterial peritonitis commonly develops in asymptomatic patients with ascites and is therefore preventable when it develops early.



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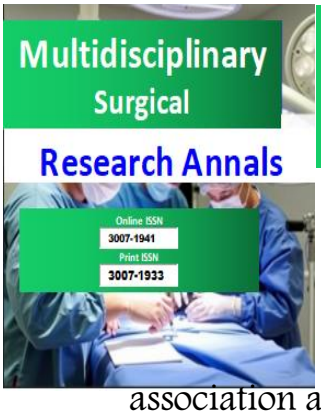
Objective: This study will determine the incidence of asymptomatic SBP in patients with CLD and ascites, providing potentially valuable data to support screening protocols for early intervention and improved outcomes.

Methods: It was a cross-sectional study carried out for six months in the Gastroenterology Department of Sheikh Zayed Hospital, Lahore. A total of 121 CLD patients with ascites, meeting particular inclusion criteria, were assessed. The cases were categorized as asymptomatic SBP if the cultures were positive with more than 10^5 colonies or more than 250/mm^3 polymorphonuclear cells, without fever, pain, or tenderness. The patients were stratified according to age, gender, and Child-Pugh classification. The data were analyzed using SPSS version 24, along with the Chi-square test for correlation between the Child-Pugh class and SBP.

Results: The proportion of asymptomatic SBP was at 14.8 % among 121 patients. The patients were older: 66.1%, were mostly more than 50 years old, with a fair sex distribution ratio of 52.1 females against 47.9 males. Patients classified into Child-Pugh Class C constituted the highest proportions of patients with SBP cases of 14.8 % and significant



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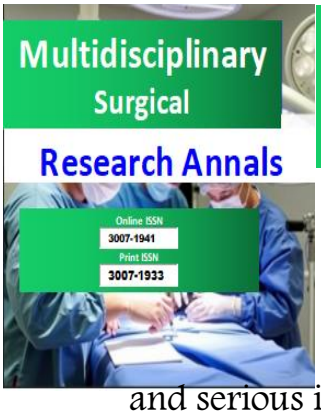
association at p=0.000.

Conclusion: Asymptomatic SBP in 14.8% of the patients with CLD and ascites forms the justification for routine screening on hospital admission. Critical importance is placed on detecting asymptomatic SBP because this leads to earlier intervention and a potential reduction in the risk of major complications, particularly in patients classified as Child Class C.

Introduction

Chronic liver disease is the major cause of diseases and death in this world. It accounted for roughly 2% of total deaths in 2010. However, it remains to be one of the significant concerns to health systems and populations as a whole. Cirrhosis forms one of the complications in chronic liver diseases as this disease causes liver scarring and permanent liver damage to result in organ malfunction. Chronic hepatitis B and C infections are among the significant causes of liver disease in Pakistan because of high viral transmissions and limited access to more comprehensive antiviral treatments. Infections are also highly prevalent in the patients with CLD results of immune dysfunction accompanying this liver impairment. SBP is one of the most common



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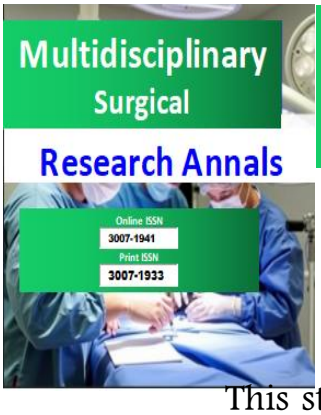
and serious infections found in these patients. The pathogenesis of SBP is primarily attributed to bacterial translocation wherein enteric-located bacteria cross from the gut wall into the ascitic fluid. Such processes occur through changes in gut permeability, low gut motility, and conditions of immune deficiency that arise with liver cirrhosis. The most frequently identified organisms involved with SBP include enteric-related pathogens such as Escherichia coli, Klebsiella pneumoniae, and species of Streptococcus.

The clinical presentation of SBP varies from having classic symptoms such as abdominal pain, fever, and change in mental status in most patients to being entirely asymptomatic. Most patients with the asymptomatic form of SBP usually present incidentally on carrying out the analysis of ascitic fluid for other reasons; these include hospitalizations of complications of cirrhosis that include gastrointestinal bleeding or hepatic encephalopathy. Already, data published in different studies in Pakistan have demonstrated an overall prevalence of asymptomatic SBP at about 13% among patients with CLD. Thus, all the patients with chronic liver disease and ascites should be screened routinely while presenting to the hospital.



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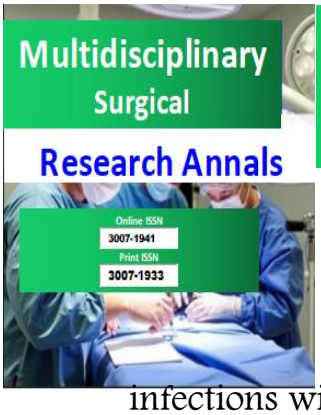
This study aimed to quantify the frequency of asymptomatic SBP in patients with CLD. Increased knowledge of its prevalence can help inform clinical guidelines related to screening and management that will improve patient outcomes as a result of timely intervention and prophylaxis.

Chronic liver disease refers to a continuum of hepatic conditions that involve progressive liver damage and regeneration, ultimately resulting in fibrosis and cirrhosis. The final stage of CLD is cirrhosis, where the normal tissue of the liver is replaced by scar tissue and severely impairs the functioning of the liver. In most cases, this form of liver damage is irreversible, and the only definitive treatment for this condition is liver transplantation. However, some cases of cirrhosis can be stabilized or improved if the underlying cause is treated early. Patients with cirrhosis suffer from many potentially life-threatening complications, such as portal hypertension, ascites, and increased susceptibility to infections such as SBP; all these add up to a dramatically reduced life expectancy.

The causes of CLD and cirrhosis differ between various populations. The most prevalent causes in the United States are chronic



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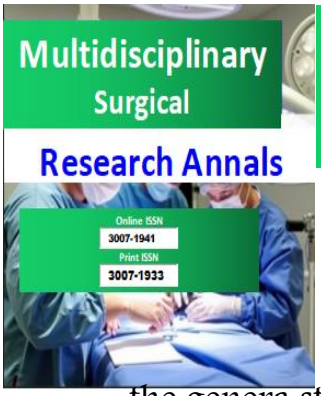
infections with the hepatitis B and C viruses, alcoholic liver disease, and NAFLD. Hepatitis B and C are the leading causes of acute and chronic liver diseases in Pakistan and the rest of South Asia, primarily due to high prevalence rates and suboptimal management. Other etiologies include autoimmune hepatitis, primary biliary cirrhosis, metabolic, and hereditary conditions such as Wilson's disease and alpha-1 antitrypsin deficiency. Environmental, genetic, and lifestyle factors also determine the incidence and progression of these liver diseases.

Patients with CLD and compensated cirrhosis may have nonspecific complaints, such as fatigue, weight loss, or weakness. As the cirrhosis progresses to decompensated cirrhosis, the symptoms may be more pronounced and severe. Typical presentations are jaundice, ascites, hepatic encephalopathy, and upper GI bleeding. Other complications associated with decompensated cirrhosis include portal hypertension, HCC, HRS, and an increased susceptibility to infection, such as SBP. SBP, or spontaneous bacterial peritonitis, is an acute bacterial infection of the ascitic fluid usually not accompanied by an obvious source of the infection in the abdominal region. The bacteria typically encountered – Escherichia coli, Klebsiella pneumonia, and a multitude of species within



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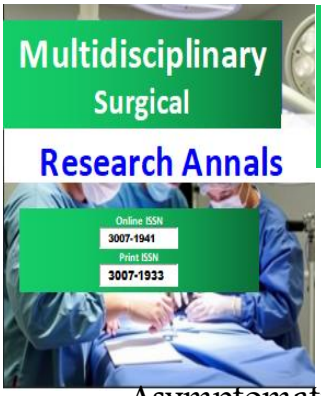
the genera streptococci – typically are gut-acquired organisms.

The infected patients have been almost solely those with cirrhosis and advanced liver disease. They translocate through the intestinal wall, enter the lymphatic system, and eventually colonize the ascitic fluid. Risk factors for SBP include low ascitic fluid protein levels, advanced liver disease (Child-Pugh class B or C), and concurrent complications such as variceal hemorrhage and renal dysfunction. Early diagnosis and management of SBP are crucial, as untreated SBP can rapidly progress to sepsis, septic shock, and multi-organ failure. Empiric antibiotic therapy is usually initiated upon suspicion of SBP, even before culture results are available, as delays in treatment are associated with significantly increased mortality. Research indicates that each hour of delay in antibiotic administration can increase mortality by approximately 8%. Timely diagnosis and intervention, therefore, are vital for improving survival outcomes in patients with SBP.

Objective

To determine the frequency of asymptomatic spontaneous bacterial peritonitis in patients with chronic liver disease and ascites.

Operational Definitions



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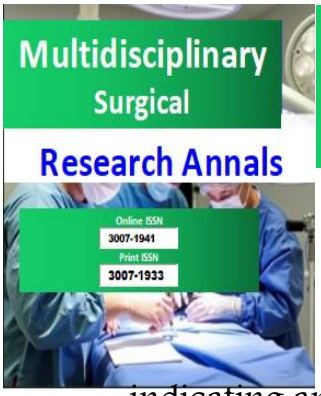
Asymptomatic Spontaneous Bacterial Peritonitis: Asymptomatic SBP is defined by an Ascitic fluid analysis that presents with a total white cell count of more than 500 cells/mm^3 or neutrophils of more than 250 cells/mm^3 with a positive culture indicating more than 10^5 bacterial colonies. The diagnosis is done without the presence of symptoms like fever, abdominal pain, and tenderness. Chronic Liver Disease: For this study, CLD is diagnosed based on ultrasonographic findings that are consistent with cirrhosis, such as a reduction in the size of the liver, coarse echo texture, and other structural changes that are consistent with chronic damage. Ascites: Ascites is the accumulation of fluid within the peritoneal cavity, often identified by shifting dullness or a fluid thrill on physical examination and confirmed via ultrasonography, which reveals free fluid in the abdomen. Secondary Bacterial Peritonitis: Secondary bacterial peritonitis is differentiated from SBP by several diagnostic criteria, including the following:

Persistent, localized abdominal pain and tenderness.

Ascitic fluid glucose level below 50 mg/dL.

A serum-ascites albumin gradient of less than 1.1.

Isolation of more than one microorganism in the ascitic fluid culture,



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indicating an intra-abdominal source of infection.

With these operational definitions, it is possible to accurately identify and classify SBP, asymptomatic SBP, and secondary bacterial peritonitis. It is against this background that the current study aims to reveal the prevalence of asymptomatic SBP to undertake a more structured approach toward screening, prophylaxis, and management in patients with chronic liver disease.

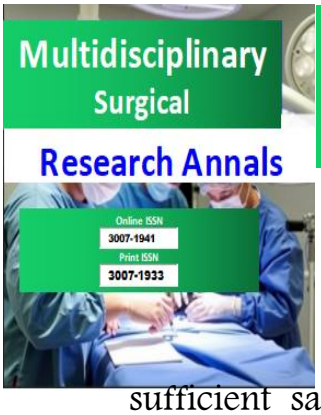
Materials & Methods

Research Area:

The study was conducted at the Department of Gastroenterology at Sheikh Zayed Hospital/PGMI, Lahore. It proved to be a specialty service for patients with chronic liver disease. This department had been selected because of its access to the volume of relevant cases and facility offered for advanced diagnostic and therapeutic interventions needed for the evaluation of spontaneous bacterial peritonitis in chronic liver disease.

Duration:

This cross-sectional study was done over six months: from January 26, 2021, up to July 25, 2021. A particular time was taken to ensure that



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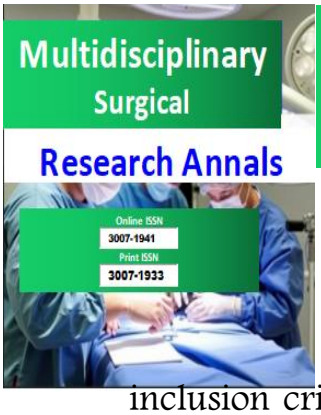
sufficient samples were collected and examined; otherwise, seasonal variation, if any, regarding disease presentation would be witnessed in the given time frame. Permission was taken before data collection for the synopsis of this study so that ethical aspects are strictly followed. In this regard, a cross-sectional design is chosen to capture the prevalence of asymptomatic SBP among patients with chronic liver disease within the concerned period. The design is found useful to determine the incidence of diseases without the demand for long-term follow-up of the patients, which may aptly fit the objective of assessing the prevalence of SBP among patients of chronic liver diseases with ascites.

- Sample Size: A total of 121 patients were studied. The sample size was calculated using WHO software for health research. The confidence level used was 95%, an anticipated population proportion of 13%, and a margin of error of 6%. This sample size was deemed sufficient to yield results that are representative of the chronic liver disease population within the hospital setting.

Sampling Technique:

A non-probability consecutive sampling method was used. This method allowed the selection of every eligible patient who comes within the



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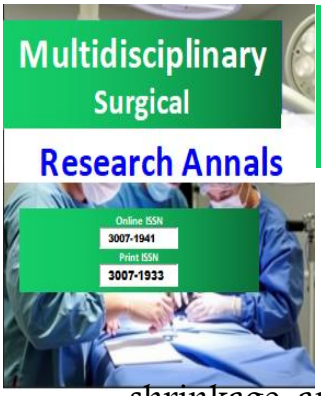
inclusion criteria during the study period, making this a practical and efficient data collection method. Although there is a limitation in generalizing from consecutive sampling, given the objective of the study and timeframe, it was appropriate for this study.

Selection Criteria:

Inclusion criteria included patients diagnosed with chronic liver disease at least six months prior, with an age of 18 to 60 years old, and evidence of recorded chronic liver disease. There were exclusions of cases of secondary bacterial peritonitis to study only specific cases of spontaneous bacterial peritonitis in chronic liver diseases with ascites.

Procedure for Data Collection

After the synopsis of the research was approved, patients were recruited from the Gastroenterology Department of Sheikh Zayed Hospital. Each patient was administered a structured questionnaire by a trainee for data collection, and auto-analyzers were used in the Pathology Department to test ascitic fluid. Diagnosis of SBP followed the operational definitions and treatment was administered as per the hospital protocol. The ultrasonographic findings revealed liver



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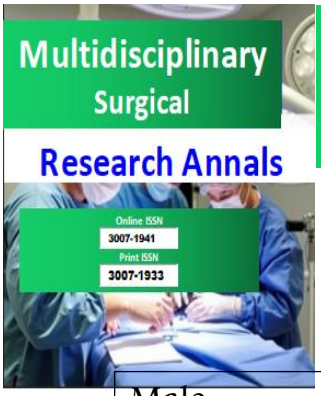
shrinkage and coarse echo texture, thus confirming the diagnosis of liver cirrhosis.

Data Analysis

The data was analyzed using SPSS version 24. Categorical variables like gender and Child-Pugh classification were described by frequencies and percentages. All the quantitative variables, such as age, used the mean and standard deviation to report their values. Outcomes according to age, gender, and Child-Pugh class were stratified to investigate any association. P-value < 0.05 was considered statistically significant, thus giving adequate interpretation of the results in this study.

Table: Demographic and Clinical Characteristics of Chronic Liver Disease Patients with Asymptomatic Spontaneous Bacterial Peritonitis (SBP)

Category	Frequency	Percent
Age Group		
31-39	3	2.4%
41-50	38	31.4%
>50	80	66.1%
Gender		



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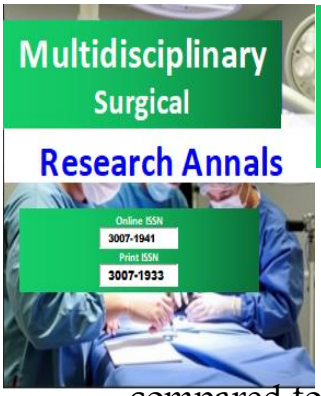
Male	58	47.9%
Female	63	52.1%
Spontaneous Bacterial Peritonitis (SBP)		
Yes	18	14.8%
No	103	85.2%
Child Class and SBP		
Child Class B with SBP	0	0%
Child Class B without SBP	42	34.7%
Child Class C with SBP	18	14.8%
Child Class C without SBP	61	50.4%
Total Patients	121	100%
Chi-square test for Child Class and SBP	**P-value = 0.000 (significant)**	

The data presents key insights into the demographic and clinical characteristics of patients with chronic liver disease. Most patients in this study fall into the age group above 50 years (66.1%), highlighting the prevalence of chronic liver disease complications in older adults. There is a slightly higher proportion of female patients (52.1%)



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compared to males (47.9%), which may reflect gender-specific patterns in disease prevalence or healthcare access in the population studied.

In terms of Spontaneous Bacterial Peritonitis (SBP), 14.8% of patients tested positive, indicating that while SBP is not universal among those with chronic liver disease and ascites, it remains a notable complication. When analyzed by the Child-Pugh class, all cases of SBP are confined to Child Class C patients, who represent a more severe stage of liver disease. None of the Child Class B patients had SBP, while 34.7% of them did not have SBP, suggesting that advancing liver disease severity (Child Class C) is strongly associated with SBP development. This is further supported by the significant chi-square test result (P-value = 0.000), underscoring a statistical relationship between the severity of liver disease and the presence of SBP. This information underlines the importance of SBP screening in patients with advanced liver disease, especially those in Child Class C, to enable timely intervention and management.

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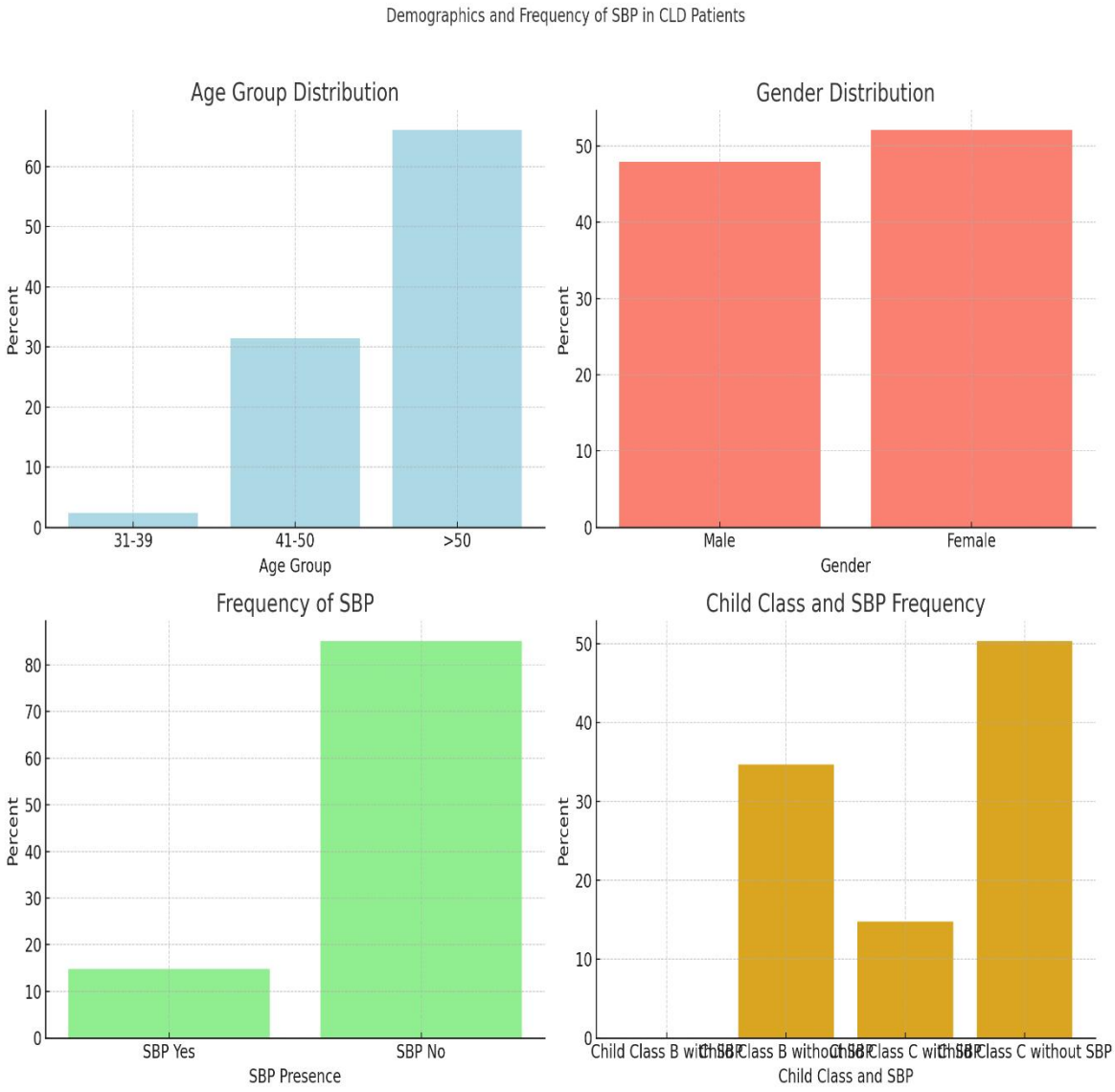
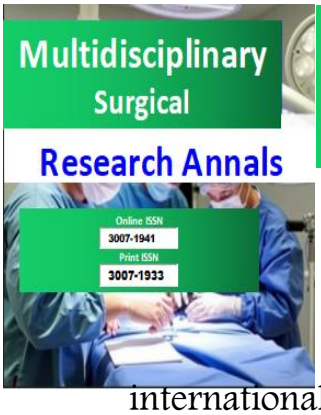


Discussion

While spontaneous bacterial peritonitis happens relatively often as a very asymptomatic complication of chronic liver disease and ascites, limited literature has documented frequency regarding both locally and



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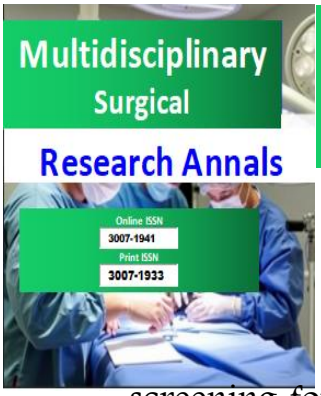
internationally in patients with spontaneous bacterial peritonitis as asymptomatic. This would indeed come in handy for any complications, possibly preceding something dangerous, like the development of hepatorenal syndrome, giving these patients an excellent chance to get a good prognosis or proper management.

According to the results of our study, 14.8% of the patients with CLD and ascites have asymptomatic SBP, and this is with considerable frequency. Another study, which is not dissimilar, reported almost the same: Abbasi Shaheed Hospital Karachi reported 13% and Services Hospital Lahore observed 11.4% among cirrhotic patients. More slight frequencies are reported in a few studies, such as 5% and 9.3%, which was recorded in Military Hospital Rawalpindi while in Tamil Nadu, India recorded, 16%. The current study has limitations in that it is a single-center and has a small sample size. A more accurate prevalence of asymptomatic SBP among chronic liver disease patients with ascites will be determined by the multicenter studies.

Conclusion

The study concludes that the prevalence of asymptomatic SBP among chronic liver disease patients with ascites is high (14.8%). Routine



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screening for SBP in these patients upon hospital admission, regardless of their presenting symptoms, is essential to improve outcomes and reduce complications.

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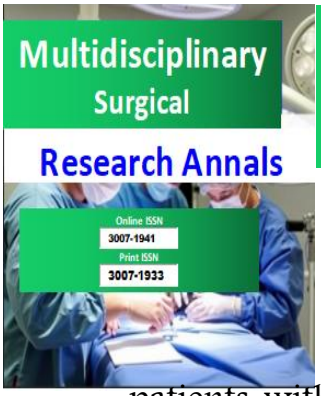

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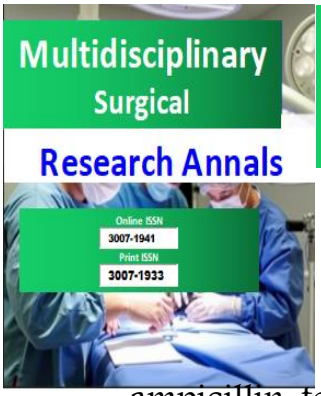

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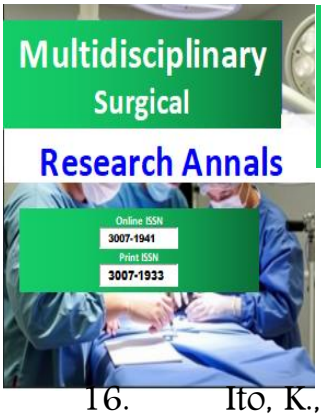

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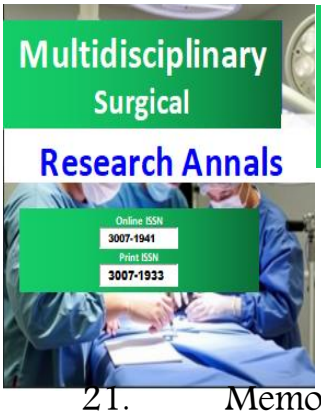

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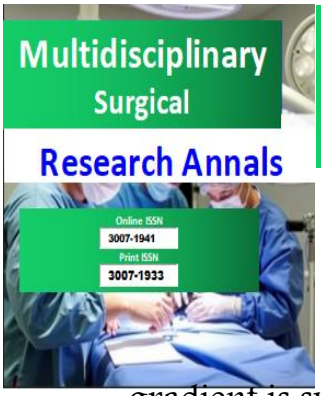

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