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RENAL IMPAIRMENT AFTER SPONTANEOUS BACTERIAL PERITONITIS (SBP) IN CIRRHOTIC POPULATION.

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ABSTRACT... Objectives: To evaluate the frequency of renal impairment after spontaneous bacterial peritonitis (SBP) in cirrhotic population. **Study Design:** The study was conducted as Descriptive Cross-Sectional. **Setting:** Liaquat National Hospital Karachi. **Period:** For six months (October 01, 2015 to March 31, 2016). **Methodology:** The subjects with liver cirrhosis spontaneous bacterial peritonitis (SBP) were evaluated for serum creatinine and serum blood urea nitrogen (BUN) for evaluation of renal impairment while the patient's information was recorded on proforma and analyzed in SPSS-15.0. **Results:** The mean \pm SD of age, BUN and serum creatinine for whole population was 50.69 ± 10.69 years, 22.4197 ± 11.64742 and 1.2207 ± 0.92535 . Renal impairment was detected in 40 (27.2%) individuals while it is normal in 107 (72.8%) subjects. **Conclusion:** The renal impairment after SBP in cirrhotic population is higher in present study.

Key words: Cirrhosis, Renal Impairment, Spontaneous Bacterial Peritonitis.

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INTRODUCTION

SBP is complication of liver cirrhosis and is infected ascites in the absence of source of infection and is a life threatening complication of liver cirrhosis.¹⁻³ Its prevalence exists as 10% - 30%. Its mortality is 70% reported years ago but the in-hospital mortality has been decrease as 20% with proper diagnosis and treatment.⁴⁻⁶

Renal impairment in the course of SBP is a common complication associated with cirrhotic individuals with ascites and comprised the prognostic value for hospital survival in these patients.⁷⁻⁹ Renal impairment after SBP has been described in 25% to 38% of the reported cases.¹⁰ SBP is functional by nature and may follow a progressive course. Patients with severely impaired liver function before onset of SBP are predisposed to SBP.¹⁰ Recently renal impairment has been shown to be the best predictor of in hospital mortality in patients with SBP.^{11,12} The renal failure in cirrhotic population with ascites hash fatal outcome with reported mortality rate as 22-50% despite resolution of infection with permanent renal failure.¹³

SBP considered as a precipitating factor for renal failure in cirrhotic individuals, a better exploration of SBP allow detection of those individuals who are at risk for this complication and thus may get benefit from preventive elements aimed to maintain and preserve the renal function.

PATIENTS AND METHODS

The six months (October 01, 2015 to March 31, 2016) descriptive cross-sectional study was conducted at Liaquat National Hospital Karachi.

Inclusion Criteria

The patients had Age 18-70 years, both genders admitted with ascites due to cirrhosis of liver and diagnosed to have SBP on Ascitic fluid D/R results.

Exclusion Criteria

1. Patients with liver cirrhosis without ascites or not tested positive for SBP
2. Patients with previous history of renal impairment prior to SBP.
3. Patients with history of taking albumin infusion or any plasma expander within two weeks.

4. Patient with non-cirrhotic ascites (malignancy and tuberculosis).

Spontaneous Bacterial Peritonitis

Polymorph nuclear neutrophilic leukocyte counts >250 cells/mm³ on ascitic fluid detail report (Ascitic DR).

Renal Impairment: blood urea nitrogen (BUN) or serum creatinine >30 mg/dl or 1.5 mg/dl.

The data was collected from patients with cirrhosis of liver with ascites attended gastroenterology out and in patient department and diagnosed as had SBP on testing. Informed consent was taken from all patients prior to inclusion in the study. All patients were included as per inclusion and exclusion criteria. Routine clinical chemistry tests including serum creatinine and blood urea nitrogen (BUN) were performed while all the data was saved on proforma. The SPSS was used to calculate the frequencies and percentages for qualitative variables. BUN and serum creatinine were performed on the same auto analyzer, Synchron Cx-7 in the same clinical laboratory and single person was observe the results to control the confounders. Additionally; age, severity (Child Pugh class A, B or C) of liver cirrhosis, etiology of liver cirrhosis and presence or absence of other co-morbidities like Diabetes, Hypertension etc were stratified to control the confounders. The p-value ≤ 0.05 was labeled as state of significance.

RESULTS

Out of 147 patients, the mean \pm SD of age, BUN and serum creatinine for whole population was 50.69 ± 10.69 years, 22.4197 ± 11.64742 and 1.2207 ± 0.92535 . Renal impairment was detected in 40 (27.2%) individuals while it is normal in 107 (72.8%) subjects. The results are presented in Figure-1 to 3 and Table-I-III.

Among 29 patients of child's Pugh A, 5 (17.2%) had renal impairment. Frequency of renal impairment was higher in child's Pugh B (23.5%) and found highest in child's Pugh C (38%).

Anti HCV antibody was observed in 99(67.3%) cases, HBsAg was in 27(18.4%) patients, both

Anti-HCV antibody and HBsAg were observed in 12(8.2%) cases. Similarly both HBsAg and Anti-HDV antibody was seen in 2(1.4%) cases and the cause of cirrhosis in 7 (4.8%) cases was indeterminate.

Out of 99 patients with Anti-HCV antibody 29(29.3%) had renal impairment. Out of 27 patients with HBsAg 6(22.2%) had renal impairment. 1(50%) with HBV/HDV co-infection and 3(25%) with HBV/HCV co-infection had renal impairment while 1(14.3%) cases with indeterminate etiology had renal impairment.

Anti HCV antibody was observed in 52(60.5%) males and 47(77.0%) female cases. HBsAg were observed in 22(25.6%) males and 5(8.2%) female cases. HBV/HCV co-infection was found in 5(5.8%) males and 7(11.5%) females while HBV/HDV co-infection was found in 2(2.3%) males but none of female cases. Etiology of cirrhosis was indeterminate in 5(5.8%) males and 2(3.3%) female cases. Out of 14 patients of age 26-35 years 3(21.4%) had Anti HCV antibody, 8(57.1%) had HBsAg, 2(14.3%) had HBV/HDV co-infection while no cause was found in 1(7.1%). Out of 36 patients of age 36-45 years, 19(52.8%) had Anti HCV antibody, 9(25%) had HBsAg, 5(13.9%) had HBV/HCV co-infection while 3(8.3%) had indeterminate etiology.

Out of 48 patients of age 46-55 years 35(72.9%) had Anti HCV antibody, 8(16.7%) had HBsAg, 3(6.2%) had HBV/HCV co-infection while no cause was found in 2(4.2%). Majority of the patients in age group 56-65 (87.5%), and age group 66-75 (77.8%) had Anti HCV antibody. 2(5%) patients had HBsAg, 2(5%) had HBV/HCV co-infection and no cause was found in 1(2.5%) patient in age group 56-65 while the remaining 2(22.2%) patients in age group 66-75 had HBV/HCV co-infection.

Out of 86 males, 26 (30.2%) had renal impairment and among 61 females, 14 (22.9%) had renal impairment. Out of 14 patients of age 26-35 years 2 (14.3%) had renal impairment. Out of 36 patients of age 36-45 years, 7 (19.4%) had renal impairment. Out of 48 patients of age 46-

55 years, 14(29.2%) had renal impairment. Out of 40 patients of age 56-65 years, 13(32.5%) had renal impairment while majority (44.4%) of the patients in age group between 66-75 had renal impairment.

Out of 147 patients, 120(81.6%) had no associated diseases while 27(18.4%) had associated diseases. Among 86 males, 72(83.7%) had no associated diseases while 14 (16.3%) had associated diseases. Among 61 females, 48 (78.7%) had no associated diseases while 13(21.3%) had associated diseases.

Out of 14 males, 9(64.3%) had Diabetes Mellitus, 2(14.3%) had hypertension, 2(14.3%) had ischemic heart disease while 1(7.1%) had congestive cardiac failure. Out of 13 females, 11(84.6%) had Diabetes Mellitus, 2(15.4%) had hypertension, while non had ischemic heart disease or congestive cardiac failure. Out of 120 patients with no associated diseases, renal impairment was found in 29(24.2%) patients while renal impairment was found in 11(40.7%) patients out of 27 with associated diseases. Out of 20 patients with diabetes mellitus, 9(45%) had renal impairment. Out of 4 patients with hypertension, 1 (25%) had renal impairment while 1 out of 2 patients with ischemic heart disease had renal impairment and none of the patient with CCF had renal impairment.

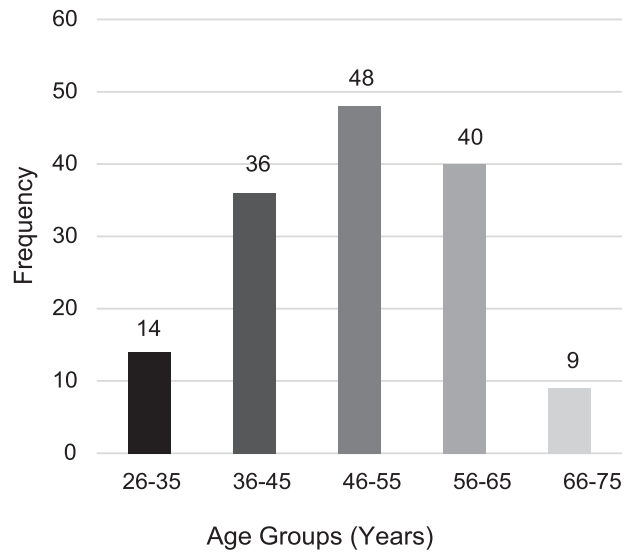


Figure-2. Age distribution of the patients n=147

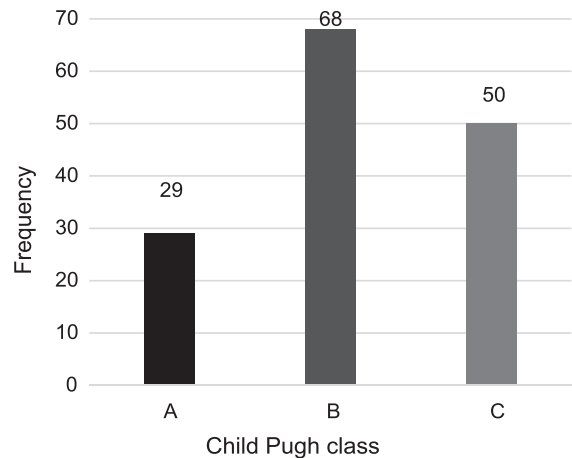


Figure-3. Distribution of child's Pugh classification: n = 147

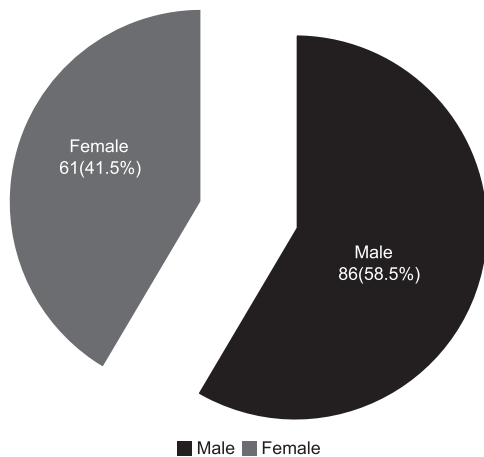


Figure-1. Gender distribution: n = 147

Renal Impairment	Child's Pugh Classification		
	A	B	C
Yes	5 (17.2%)	16 (23.5%)	19 (38%)
No	24 (82.8%)	52 (76.5%)	31 (62%)

Table-I. Frequency of renal impairment according to child's Pugh classification: n = 147

DISCUSSION

The prevalence for renal impairment is directly proportion to the liver disease severity and is independent of its etiology.

Renal Impairment	Etiology				
	Anti-HCV Antibody	HBsAg	Both Anti-HCV Antibody and HBsAg	Both HBsAg and Anti-HDV Antibody	Indeterminate
Yes	29 (29.3%)	6 (22.2%)	3 (25%)	1 (50%)	1 (14.3%)
No	70 (70.7%)	21 (77.8%)	9 (75%)	1 (50%)	6 (85.7%)

Table-II. Frequency of renal impairment according to etiology of cirrhosis: n = 147

Associated Diseases	Renal Impairment	
	Yes	No
DM	9 (45%)	11 (55%)
HTN	1 (25%)	3 (75%)
IHD	1 (50%)	1 (50%)
CCF	0	1 (100%)

Table-III. Frequency of renal impairment according to specific diseases: n = 27

Improvement in renal functions has been documented with improvement in liver functions and/or liver transplantation. Male predominance in the present study with 1.4: 1 male to female ratio, a nearer pattern to our study regarding age and gender distribution in cohort of liver cirrhosis was observed in former study.¹⁴ Renal impairment is independent of the etiology of cirrhosis. This finding confirms a previous study (Follo A, et al);¹⁴ and recalls that the alterations in renal function, as assessed by blood urea nitrogen level, occurred regardless of the etiology of cirrhosis.

The associated factors in the present study could not be evaluated, which may be a limitation of the present study. However, serum creatinine and blood urea nitrogen (BUN) were evaluated as a predictor of renal function. Different theories have been suggested for renal insufficiency in cirrhotic population with ascites & SBP. Therefore, in order to reduce the cost of hospitalization and treatment, we suggest that this particular group of patients be selected for treatment with albumin. In the present study, renal impairment was detected in 40 (27.2%) patients while 107 (72.8%) were spared from renal dysfunction. SBP induced renal impairment associated with in-hospital mortality. In a Spanish study by Ruiz-del-Arbol L et al¹³, eight of the 23 patients included developed renal failure, and six died. In contrast, all patients without renal failure were discharged alive, these figures were almost similar to other studies^{15,16}, and concluded that renal impairment has been shown to be the best predictor of in-hospital mortality in

patients with SBP. In the present study, the mean blood urea nitrogen (BUN) and serum creatinine were 22.15 ± 11.65 and 1.22 ± 0.93 . The mean creatinine in our study was lower compared to former study of cirrhotic population with ascites and SBP in which the mean creatinine was 1.95 ± 1.00 .⁹ Coral PG, et al also reported a mean blood urea nitrogen (BUN) and creatinine of 75.2 ± 67.9 and 1.6 ± 1.3 respectively in cirrhotic patients with SBP. These figures are also high compared to our study. The difference in these figures may be due to better patient selection and exclusion of patients who have previous history of renal impairment prior to SBP. Another reason may be due to a low incidence of other co-morbid illnesses in our cohort known to cause renal insufficiency.

In the present study, among 29 patients of Child's Pugh A, 5 (17.2%) had renal impairment. Frequency of kidney impairment observed was higher in Child's Pugh B (23.5%) and highest in Child's Pugh C (38%). Although, in this study, the frequency of renal impairment was also studied according to the Child's Class and it was found that the frequency of renal impairment increases with liver disease severity. This was not shown in previous studies. Instead, they related Model for end-stage liver disease (MELD) score as a predictive factor for the development of renal impairment as discussed previously. However, as the sample size was not estimated for the subgroup analysis; reliable inference could not be made in this regard. Former studies detected

high levels of BUN and creatinine in a significantly higher proportion of cirrhotic patients with SBP respectively.^{17,18} This abnormality was irrespective of the etiology of cirrhosis. However, the frequency was dependent on the prothrombin time (PT), albumin and sodium, BUN and creatinine levels at the time of diagnosis of SBP, but not according to the Child-Pugh classification although PT and albumin are two of the five parameters of Child-Pugh classification. Patients with renal impairment exhibit high mortality, more likely due to the advanced hepatic disease itself than death due to renal failure in this special group of patients. We have also taken in account the associated disease known to cause renal impairment in our study, as these could be potential confounders. Since only a small percentage of patients had associated diseases in our study, it is difficult to have a subset analysis as to whether the presence of any co-morbid illness increase the likelihood of developing renal impairment in cirrhotic patients with SBP. Given the limited number of patients, it is difficult to make further inferences. The cause of renal impairment in liver disease remains uncertain but it has been speculated that it may be multifactorial. However, the pathophysiologic mechanisms are combined based on arterial vasodilatation and decrease in renal perfusion.

CONCLUSION

The study findings demonstrate the male predominance (1.4: 1 male to female ratio), majority (46.3%) individuals were of child Pugh class-B, proportion of renal impairment was 27.2% and renal impairment was observed as highest in child's Pugh C as compared to A & B respectively.





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AUTHORSHIP AND CONTRIBUTION DECLARATION

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1	Asif Javaid Wakani	Contributions to conception and design, acquisition of data, analysis and interpretation of data.	
2	Riaz Hussain Awan	Drafting the article and shares ites expert research opinion and experience in finalizing the manuscript.	
3	Seema Nayab	Contributed in conception and interpretation of data and give his expert view for manuscript designing.	
4	Khadim Hussain Awan	Collection and acquisition of data, analysis and itnerpretation of data and make it suitable for final revision and a corresponding author.	
5	Faqir Muhammad Awan	Data collection and analysis.	