DOI: https://doi.org/10.53350/pjmhs2023171853

ORIGINAL ARTICLE

Comparative Analysis of Intravenous Ceftriaxone and Ciprofloxacin for the Treatment of Bacterial Peritonitis in Liver Cirrhosis

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ABSTRACT

Objective: This research aimed to evaluate the relative benefits of intravenous ciprofloxacin and ceftriaxone for the treatment of bacterial peritonitis in cirrhotic liver patients.

Study Design: Randomized control trial

Place and Duration: Department of Gastroenterology, Shaikh Zayed Hospital Lahore in the period from March, 2022 to August, 2022.

Methods: Total 130 patients of bacterial peritonitis in liver cirrhosis were included. Patients were undergone for abdomen ultrasound to diagnose liver cirrhosis. Following the acquisition of written informed consent, participants' personal information (such as age, sex, and residence) was meticulously documented. Patients were equally divided in two groups. Group I received intravenous ceftriaxone 1g 12 hourly among 65 patients and 65 cases of group II received ciprofloxacin 200mg 12 hourly for 6 days. Effectiveness among both groups were assessed.

Results: There were 44 (67.7%) males and 21 (32.3%) females in group I and in group II 52 (80%) males and 13 (20%) females. Patients mean age in group I was 39.10±6.29 years and in group II mean age was 41.7±3.50 years. We found that majority of the cases were from urban areas 37 (56.9%) in group I and 39 (60%) cases in group II. Frequency of effectiveness in group I was 49 (75.4%) and in group II efficacy found in 47 (72.3%) cases. Post-treatment complications in group I was 7 (10.8%) and in group II found in 6 (9.2%) cases. Satisfaction rate among patients was almost equal 46 (70.8%) and 45 (62.9%) in group I and II.

Conclusion: The findings of this research indicate that the administration of ciprofloxacin intravenously is just as effective as the administration of ceftriaxone intravenously for the treatment of spontaneous bacterial peritonitis in cirrhotic cases.

INTRODUCTION

It is "necrosis of the liver parenchyma followed by fibrosis and regeneration" that characterises cirrhosis. In Pakistan, [1]liver cirrhosis is a leading cause of both death and disability. One of the major recognised causes of Chronic Liver Disease, especially in Pakistan, is the Hepatitis C virus. Over half of adult liver transplants in Western countries are due to HCV, which was identified in 1989 [2]. With a global prevalence of roughly 3%, this equates to about 210 million infected people. Pakistan has a [3]average prevalence of HCV infection of 5%. Sixty percent to seventy percent of those with chronic liver disease also have hepatitis C. Twenty years after infection, around 20% of individuals with Hepatitis C will develop fibrosis and Cirrhosis [4, 5]. The earliest manifestation of ascites in individuals with chronic liver disease is sometimes a clinical case of spontaneous bacterial peritonitis [5].

In the past, cirrhotic patients who developed spontaneous bacterial peritonitis were often treated with cefotaxime or ceftazidime as an initial line of therapy. Patients with cirrhosis who develop spontaneous bacterial peritonitis may benefit from ciprofloxacin instead of ceftazidime or ceftriaxone. The success rate for treating spontaneous bacterial peritonitis was 82% in the ciprofloxacin group and 91% in the ceftriaxone group when given intravenously. The same bacterial infection is responsible for all SBP cases [7]. [8] Gram-negative enteric bacteria (including Klebsiella pneumonia and E. coli) and gram-positive bacteria are the most frequent types of bacteria (Streptococcus pneumoniae, Enterococcus species, viridans streptococci). No strains of anaerobic bacteria have been linked to SBP. [9] Patients with cirrhosis can treat spontaneous bacterial peritonitis with ciprofloxacin just as effectively as they would with ceftriaxone and cefotaxime, but for much less money and with the added benefit of oral dosing. [10]

Our research aimed to compare the efficacy of intravenous ciprofloxacin and intravenous ceftriaxone as a kind of empirical therapy for the treatment of spontaneous bacterial peritonitis.

MATERIAL AND METHODS

This randomized control trial was conducted at Department of Gastroenterology, Shaikh Zayed Hospital Lahore in the period from March, 2022 to August, 2022.

and comprised of 130 cases. Following the acquisition of written informed consent, participants' personal information (such as age, sex, and residence) was meticulously documented. Pa Patients having hepatocellular carcinoma, diabetes mellitus, or a history of bleeding in the gastrointestinal tract were also excluded from the trial.

Both male and female patients between the ages of 15 and 65 were included in this study if they had ultrasonography abdominal evidence of cirrhosis of the liver. Abdominal sonography confirmed the presence of liver cirrhosis. As mentioned above, the ascitic fluid routine testing validated the diagnosis of spontaneous bacterial peritonitis that had been hypothesized based on the patient's history and pertinent clinical examination. Patients were randomly split in half using a table (Group I and II). Group I included 65 patients received intravenous ceftriaxone 1 g every 12 hours, while Group II had 65 patients received intravenous ciprofloxacin 200 mg every 12 hours. After 6 days of treatment, the effectiveness was evaluated by measuring the reduction of clinical symptoms, such as a rise in temperature to normal 98.6°F, the absence of stomach pain, and the determination of the ascitic fluid neutrophil count.

All of the data was imported into SPSS 20 and evaluated there. The results for qualitative factors like sex were shown as a percentage and frequency distribution. The average and standard deviation were used to describe the distribution of quantitative variables like age. Chi-square analysis was used to compare the two groups based on the outcome (resolution of spontaneous bacterial peritonitis, Yes/No). Assuming a significance level of $P<0.05$.

RESULTS

There were 44 (67.7%) males and 21 (32.3%) females in group I and in group II 52 (80%) males and 13 (20%) females. Patients

mean age in group I was 39.10±6.29 years and in group II mean age was 41.7±3.50 years. We found that majority of the cases were from urban areas 37 (56.9%) in group I and 39 (60%) cases in group II. (table 1)

Table-1: Demographics information of the both groups

Variables	Group I	Group II
Mean age (years)	39.10±6.29	41.7±3.50
Gender		
Male	44 (67.7%)	52 (80%)
Female	21 (32.3%)	13 (20%)
Residency		
Urban	37 (56.9%)	39 (60%)
Rural	28 (43.1%)	26 (40%)

Frequency of effectiveness in group I was 49 (75.4%) and in group II efficacy found in 47 (72.3%) cases. (figure 1)

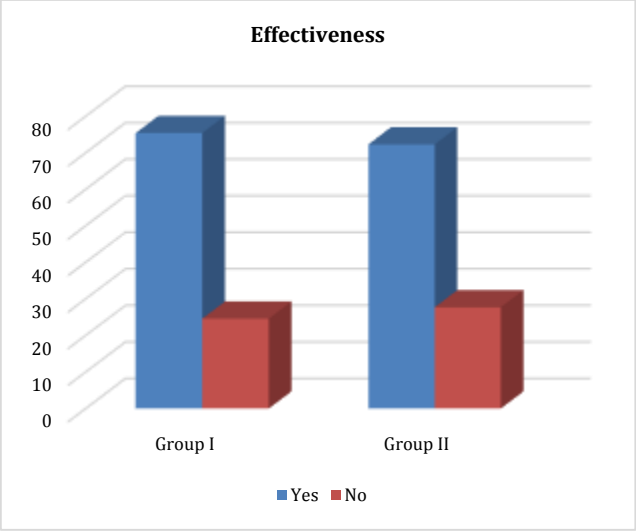

Figure-1: Frequency of effectiveness among both groups

Post-treatment complications in group I was 7 (10.8%) and in group II found in 6 (9.2%) cases. Satisfaction rate among patients was almost equal 46 (70.8%) and 45 (62.9%) in group I and II.(table 2)

Table-2: Post-treatment complications and patients satisfaction among both groups

Variables	Group I	Group II
Complications		
Yes	7 (10.8%)	6 (9.2%)
No	58 (89.2%)	59 (90.8%)
Satisfaction Rate		
Yes	46 (70.8%)	45 (62.9%)
No	19 (29.2%)	20(37.1%)

DISCUSSION

The scarring and fibrosis of the liver are permanent symptoms of the advanced liver disease known as cirrhosis. One of the most serious problems that can arise from cirrhosis is ascites, or the collection of fluid in the abdominal cavity. In the absence of an intra-abdominal infection, the most common and deadly complication of Cirrhotic ascites is a condition called spontaneous bacterial peritonitis. Only around one in every thirteen ascites patients develops bacterial peritonitis on their own. The ascitic fluid serves as a culture medium for a variety of bacterial agents, and a weakened humoral and cellular immune response contribute to this condition. [11]

Antibiotics for the treatment of Spontaneous Bacterial Peritonitis have been tested in a variety of clinical trials. Spontaneous bacterial peritonitis is treated with third-generation cephalosporins, which are also the antibiotics of choice and the ones most usually used. Common antibiotics include third-generation cephalosporins and quinolones. [12,13]

In current study 130 patients of bacterial peritonitis in liver cirrhosis were presented. Patients were distributed in two groups. There were 44 (67.7%) males and 21 (32.3%) females in group I and in group II 52 (80%) males and 13 (20%) females. Patients mean age in group I was 39.10±6.29 years and in group II mean age was 41.7±3.50 years. These results were comparable to the previous researches.[14,15] When a cirrhotic patient develops a case of spontaneous bacterial peritonitis, cefotaxime or ceftriaxone is typically the first antibiotics used. The use of ciprofloxacin has been proposed as an alternate treatment for cirrhotic individuals who develop spontaneous bacterial peritonitis instead of cefotaxime or ceftriaxone. Among those given intravenous ciprofloxacin and those given intravenous ceftriaxone, those with spontaneous bacterial peritonitis resolved at a rate of 80% and 83%, respectively. Based on these findings, it appears that ciprofloxacin administered intravenously (IV) is equally effective as cefotaxime and ceftriaxone in the empirical treatment of spontaneous bacterial peritonitis in cirrhotic patients, but at a lower cost. [14]

In our study, 75.4% of patients with spontaneous bacterial peritonitis were successfully treated in group I, whereas 72.3% of patients with the same diagnosis were treated successfully in group II. Resolution of spontaneous bacterial peritonitis was reported to be 80% in the intravenous ciprofloxacin group and 83% in the ceftriaxone group, in comparison to the research by Tuncer et al [14]. Angeli et al. found that a gradual reduction in the dosage of intravenously administered ciprofloxacin was feasible in 82% of patients; of these, 74% were able to return home to finish their antibiotic course. [16] Fransa et al. found that 73% of patients in their trial also saw therapeutic effectiveness by day 5 with ceftriaxone, which is quite similar to our results. [17]

Cefotaxime was compared to ampicillin and tobramycin in a study involving 73 patients conducted by Felisart and colleagues. No statistically significant difference in mortality or fatal outcomes was found in this study. However, when it came to curing Spontaneous Bacterial Peritonitis, Cefotaxime clearly outperformed the competition .[18] We found that ciprofloxacin given intravenously was just as effective as ceftriaxone for treating bacterial peritonitis in cirrhotic individuals, and it cost significantly less. Treatment for SBP can be effective with a short course (6 days) of intravenous ciprofloxacin and ceftriaxone. The antibiotic can be stopped if the polymorph nuclear differential count in ascitic fluid is less than 250 cells/mm3 on day 5 of therapy.

CONCLUSION

The findings of this research indicate that the administration of ciprofloxacin intravenously is just as effective as the administration of ceftriaxone intravenously for the treatment of spontaneous bacterial peritonitis in cirrhotic cases.

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