

# Role of Oral Verses Intravenous Antibiotic in Patients with Spontaneous Bacterial Peritonitis

Muhammad Hassan Zafar<sup>1</sup>, Ammar Asghar<sup>1</sup> and Uzma Ather<sup>2</sup>

## ABSTRACT

**Objective:** To determine the role of oral versus IV antibiotics in patients with spontaneous bacterial peritonitis.

**Study Design:** Randomized trial study.

**Place and Duration of Study:** This study was conducted at the Department of Medicine, Services hospital, Lahore from June 2017 to December 2017.

**Materials and Methods:** Patients of age range 16-80years of either gender with SBP due to cirrhosis were included. Patients with other comorbidities like varices, previous failed medical management or recurrent SBP were excluded. Then patients were randomized in either group and treatment was given. Patients were followed-up and presence of SBP and mortality was noted.

**Results:** The mean age of patients was  $45.36 \pm 12.02$  years in oral group and  $46.67 \pm 11.94$  years in IV group. There were 37 males and 13 females in oral group while 28 males and 22 females in IV group. SBP was eradicated in 43 (86%) patients with oral antibiotics while in 46 (92%) patients with IV antibiotics. Mortality occurred in 1 (2%) patients with oral antibiotics while in 1 (2%) patients with IV antibiotics. The difference was insignificant ( $p > 0.05$ ).

**Conclusion:** The role of both oral and intravenous antibiotic are equal in eradication of spontaneous bacterial peritonitis. Thus we can replace IV antibiotics with oral antibiotics and can improve compliance.

**Key Words:** Administrative rout, Spontaneous bacterial peritonitis (SBP), Bacterial infection, Peritonitis, Cirrhosis.

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## INTRODUCTION

The most commonly occurring bacterial infection of ascites is spontaneous bacterial peritonitis (SBP). This is often fatal in patients with cirrhosis with miscellaneous symptomatology. The incidence of spontaneous bacterial peritonitis patients who are hospitalized ranged between 10 to 30% and its mortality ranged between 10%-46%.<sup>1-3</sup> In 1907 spontaneous bacterial peritonitis was described by Krencker and than by Caroli in 1958 and few others in 1964 including Kerr.<sup>4-6</sup> Spontaneous bacterial peritonitis term was invented by Conn in 1964 to describe a syndrome of peritonitis and bacteraemia. This syndrome was observed in Laennec's cirrhosis without a seeming source of infection.<sup>7</sup> In peritoneal cavity the fluid overflow, sodium and water retention is due to the portal hypertension and activation of the renin-angiotensin pour.<sup>8</sup>

<sup>1</sup>. Department of Medicine, Services Hospital Lahore.

<sup>2</sup>. Department of Physiology, Continental Medical College Lahore.

Correspondence: Dr. Muhammad Hassan Zafar, House Officer, Department of Medicine, Services Hospital, Lahore.  
Contact No: 03328676120  
Email: virgo.8@yahoo.com

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## MATERIALS AND METHODS

This was a randomised trial was done in Department of Medicine, Services hospital, Lahore over a period of 6 months from June 2017 to December 2017. Sample size of 100 patients was calculated with 95% confidence level, 9% margin of error and taking expected percentage of SBP i.e. 30% in patients of cirrhosis. Patients of age range 16-80years of either gender with SBP due to cirrhosis were included through non-probability, consecutive sampling. Patients with other comorbidities like varices, previous failed medical management or recurrent SBP were excluded. Then patients were randomly divided in two groups by using random number table. In group A, patients were given oral antibiotics. In group B, patients were given intravenous antibiotics. Then patients were followed-up for 3 months in OPD. After 3 months, ascetic fluid was obtained again and sent to the laboratory of the hospital for assessment of presence of SBP. Reports were assessed and presence of SBP was noted. If patient dies during treatment, then mortality was noted.. The analysis was performed using software named statistical package for social sciences (SPSS) version 20. Descriptive statistics were applied to calculate mean $\pm$ SD for age. Frequency distribution and percentages were calculated for qualitative variables like gender, SBP presence and mortality. Both groups

were compared by using chi-square test. Over all a P values  $\leq 0.05$  was considered statistically significant.

## RESULTS

The mean age of patients was  $45.36 \pm 12.02$  years in oral group and  $46.67 \pm 11.94$  years in IV group. There were 37 males and 13 females in oral group while 28 males and 22 females in IV group. The mean duration of cirrhosis was  $5.34 \pm 2.22$  years in oral group and  $6.74 \pm 2.69$  years in IV group. The mean BMI of patients was  $20.28 \pm 8.94 \text{ kg/m}^2$  in oral group and  $20.21 \pm 6.59 \text{ kg/m}^2$  in IV group (Table 1).

Spontaneous bacterial peritonitis was eradicated in 43 (86%) patients with oral antibiotics while in 46 (92%) patients with IV antibiotics. SBP was present in 7 (14%) patients with oral antibiotics while in 4 (8%) patients with IV antibiotics. The difference was insignificant ( $p > 0.05$ ). Mortality occurred in 1 (2%) patients with oral antibiotics while in 1 (2%) patients with IV antibiotics. The difference was insignificant ( $p > 0.05$ ) [Table 2].

**Table No.1: Characteristics of patients (n=100)**

Variable	Oral antibiotic	IV antibiotic
Age (years)	$45.36 \pm 12.02$	$46.67 \pm 11.94$
Gender (m/f)	37/13	28/22
Duration of cirrhosis	$5.34 \pm 2.22$	$6.74 \pm 2.69$
BMI	$20.28 \pm 8.94$	$20.21 \pm 6.59$

**Table No.2: Comparison of both groups for outcome**

Outcome	Oral antibiotic	IV antibiotic	p-value
SBP (after 3months)	7 (14%)	4 (8%)	0.3377
Mortality	1 (2%)	1 (2%)	$> 0.999$

## DISCUSSION

It is very rare that SBP appear without cirrhosis and hence it is always with cardiac, malignancy, renal, portal vein thrombosis and autoimmune related infections of ascites.<sup>9-15</sup> The adult cirrhotic patients with ascitic fluid polymorphonuclear neutrophil (PMN) counts of 250 cells/ $\mu\text{L}$  or greater in a community-acquired setting (in the absence of recent beta-lactam antibiotic exposure) should receive empiric antibiotic therapy (e.g. an intravenous (IV) third-generation cephalosporin, preferably cefotaxime 2 g every 8 hours) which should be established on confined receptiveness testing of bacteria.<sup>16-17</sup> As an alternative to IV cefotaxime, in patients with cirrhosis can be treated with oral ofloxacin (400 mg twice per day), if none of the contraindications like vomiting, shock and serum creatinine greater than 3 are present.<sup>16</sup>

This study was conducted to determine the role of oral versus intravenous antibiotics in patients with SBP. SBP was eradicated in 43 (86%) patients with oral antibiotics while in 46 (92%) patients with IV antibiotics. SBP was present in 7 (14%) patients with

oral antibiotics while in 4 (8%) patients with IV antibiotics. The difference was insignificant ( $p > 0.05$ ). Mortality occurred in 1 (2%) patients with oral antibiotics while in 1 (2%) patients with IV antibiotics. The difference was insignificant ( $p > 0.05$ ).

We had observed in our study the role of both oral and intravenous antibiotic is crucial and situation dependent but due to the low quality of research related to the outcomes, it is difficult to draw a clear administrative route picture for both treatment types. The debate survives with event situations like an intravenous antibiotic is much appropriate when any there is suspicion (fever tenderness, ascites, and cirrhosis etc.) arises for SBP, than this option should be opted immediately. This will reduce the complications. Broad-spectrum antibiotics cephalosporins that belong to third generation group are the perfect choice to control SBP due to its superiority in controlled trials and rare side effects. Also the nephrotoxicity risk became low in when compare to the other antibiotics.<sup>17-20</sup>

Other antibiotic like cefotaxime that is covering the most causative pathogens due to its ascetic fluid excellent penetration. It also gain 94% sterilization when applied to its cases.<sup>21</sup> The treatment efficacy and clinical decree with this drug ranges from 77% to 98% but bearing in mind the high dosage will not produce any therapeutic advantages.<sup>22</sup> American Association for study of liver disease has put forth a standard regimen of cefotaxime dose as 2g every 8-hour.<sup>16</sup> That's why a 5-day treatment will generate the desirable results than a 10-day use.<sup>17</sup>

Amoxicillin and clavulanic acid are the alternative IV antibiotics that yield comparable results to cefotaxime and gentamicin in patients with SBP.<sup>23,24</sup> It is well versed that the antibiotics which are not third generation with an exception of cephalosporins always owe high adverse events risk, that's why the evidence lacked in their role as primary treatment. Whereas among oral antibiotics fluoroquinolones were probably unfussy and suitable in SBP patients because of its bioavailability that range from 70% to 95% for ciprofloxacin and levofloxacin respectively.<sup>25</sup> Among few trials the SBP resolved at the almost same rate with both drugs oral ofloxacin and IV cefotaxime i.e. 84% and 85% respectively.<sup>26</sup> However a therapy can be switched elsewhere for example in one of published studies which is a controlled randomized trial by Terg et al<sup>25</sup>, showed that a patient who were receiving IV ciprofloxacin can be passably treated with oral ciprofloxacin. This switch is more cost effective and effective at infection tenacity.<sup>24</sup> In this way the best optimized tenacity to control SBP is the switch therapy technique whereas it is difficult to draw a clear administrative route picture for both treatment types.

## CONCLUSION

The role of both oral and intravenous antibiotic are equal in eradication of SBP. Thus we can replace IV antibiotics with oral antibiotics and can improve

compliance. This may help in reducing cost of IV antibiotics and use of syringe and aseptic measures and oral antibiotic can be given at home, instead of admitting the patients in hospital.

#### Author's Contribution:

Concept & Design of Study: Muhammad Hassan Zafar  
 Drafting: Ammar Asghar  
 Data Analysis: Uzma Ather  
 Revisiting Critically: Muhammad Hassan Zafar, Ammar Asghar  
 Final Approval of version: Muhammad Hassan Zafar

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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