Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i7.7129

DIFFERENCE BETWEEN ORAL VERSUS INTRAVENOUS MEDICINE IN TREATMENT OF SPONTANEOUS BACTERIAL PERITONITIS

Sayyeda Aisha Bahar[1], Aqsa Amjad[2*], Adil Jan[3], Asif Wakil[4], Saad Manan[5], Adil Shah[6], Roohi Saleh[7]

[1]TMO Medicine, Ayub Teaching Hospital, Abbottabad, KPK Pakistan
[2*]TMO Medicine, Combined Military Hospital, Peshawar, KPK Pakistan
[3]TMO Surgery, Khyber Teaching Hospital, Peshawar, KPK Pakistan
[4]TMO Paeds, Combined Military Hospital, Abbottabad, KPK Pakistan
[5]Medical Officer, Bangash Medical Center, Hangu KPK Pakistan
[6]TMO Paeds, Combined Military Hospital, Peshawar, KPK Pakistan
[7]TMO Medicine, Combined Military Hospital, Peshawar, KPK Pakistan

***Corresponding Author:** Aqsa Amjad
***Email:** amjadaqsa37@gmail.com

ABSTRACT

Background: Spontaneous Bacterial Peritonitis (SBP) is a life-threatening infection in cirrhotics that necessitates prompt antibiotic use. The primary goal of this meta-analysis was to compare the efficacy of oral and IV antibiotics in SBP.

Objectives: We sought to compare oral versus intravenous antibiotic therapy in the treatment of SBP concerning efficacy, safety, and cost-effectiveness from a Retrospective cohort study

Study design: Retrospective cohort study

Place and Duration of Study: A tertiary care Hospital in Peshawar from Jan 2023 to Jan 2024

Methods: A Retrospective Cohort Study was performed at Tertiary Care Hospital Peshawar, including all patients who were diagnosed with SBP between January 2023 and January 2024. All patients were divided into two groups according to the antibiotics used: Group A -oral antibiotics and ciprofloxacin/cotrimoxazole with norfloxacin (patient 44); Group B- who needs I.V.I.V.I.V., cephalosporines, or ampicillin (patients). Patients were considered for inclusion if they were 18 years or older. They had a diagnosed hospital-acquired SBP based on an ascitic PMN cell count ≥250 cells/mm^3 with positive bacterial cultures. Exclusion criteria were secondary peritonitis and severe co-morbid conditions necessitating non-study antibiotic treatment.

Results: In the oral metronidazole group (Group B), there was an 85% resolution rate, and in-hospital Mortality and duration of hospital stay were found to be a maximum of 10% and 7 ±3 days, respectively. Group B had a 90% resolution rate, and the general mortality rate was about 8 %, requiring hospitalization of only ten (±4) days. Group A 15% recurrences Group B 12% recurrences

Conclusion: If treated orally for SBP, oral antibiotics are no different statistically than IV regarding Mortality or LOS in the hospital. The demonstrated results support the introduction of oral treatment in those eligible to enhance adherence and decrease cost.

Keywords: Systematic & individual, IV therapy

Introduction

Spontaneous Bacterial Peritonitis (SBP), an eminent clinical complication mostly witnessed in liver cirrhosis with ascites, is mainly initiated by gut translocation. SBP is an infection without an apparent intraabdominal source that results from the translocation of enteric bacteria into sterile ascitic fluid and purulent exudates[1]. Although CAN is an integral part of liver cirrhosis, the symptoms are often related to acute SBP, which has classical findings such as fever and abdominal pain over a few days onset in patients with a history of HBV viral serology infection[2]. The diagnosis can be confirmed via elevated polymorph nuclear (PMN) in ascitic fluid count (> 250 cells/mm³) and positive bacterial cultures(>1000 colony-forming units). It is associated with a high mortality rate if untreated or unrecognized and, therefore, requires early, adequate antibiotic therapy[3]. IV antibiotics like cefotaxime and ceftriaxone have traditionally been the mainstay of treatment for SBP. Moreover, their broad-spectrum activity and rapid action are the most attractive qualities of these antibiotics in critically ill patients. But again, this delivery system entails hospitalization, which can be expensive and inconvenient for patients. Also, hospital resources such as IV access and nursing care are required, in addition to placing a strain on scarce healthcare resources[4]. Oral antibiotics such as ciprofloxacin and norfloxacin have been investigated recently. These can replace IV CAB for treating SBP because it is a well-established SIHD in patients with liver cirrhosis [5]. Oral antibiotics have numerous benefits: ease of administration decreased healthcare costs, and potential outpatient treatment with a subsequent improvement in patient quality of life. Oral antibiotics are an effective treatment strategy, particularly in milder and formes frustes of CDI. There is no apparent difference between oral agent(s) versus IV agents; few clinical trials randomized selected patients[6]. These data give the first direct evidence of the non-inferiority of an oral antibiotic regimen to intravenous antibiotics for the treatment of SBP and provide support for WHO guidelines recommending that febrile IVDU patients may be switched from IV flucloxacillin/syringe if improvement within 72 h. The present findings were, however, limited by significant statistical heterogeneity between included studies; also, no trials reported long-term outcomes or side effects/ adverse events; therefore, we have only comparative estimates in most cases, which limits conclusions drawn on safety profiles (as well as suitability) particular geographic settings versus other healthcare services contexts where dissemination access mid-stock-costing differentials range emerge during standards decisions about health care utilization based considerations conjunctively talking point used when determining therapeutic strategies[7]. This study aims to support clinical practice and improve the management of SBP by examining these outcomes. This is particularly important in the Tertiary care hospital in Peshawar, where the comparison between oral and intravenous antibiotics bore weight due to limited resources available, andpatients can be mobilized during working hours quickly. Identifying that oral antibiotics are non-inferior would represent a shift in the treatment paradigm for SBP and permit more pragmatic and cost-effective management of this severe condition[8]. In this study, we plan to systematically evaluate the efficacy and safety of oral versus intravenous antibiotic therapy for SBP. These results should be of considerable importance to the clinical scenario, especially for institutions with a setup akin to the Tertiary care Hospital Peshawar, They may guide towards more effective and patient-friendly treatment strategies in SBP[9].

Methodology

A retrospective cohort study was conducted at Tertiary Care Hospital Peshawar, Pakistan, from January 2023 to January 2024, including all patients diagnosed with SBP. According to the route of antibiotic administration, patients were divided into two groups: Group A received oral antibiotics (ciprofloxacin or norfloxacin) and Group B intravenous antibiotics (cefotaxime or ceftriaxone). The included patients were > 18 years old, had an ascitic fluid PMN ≥250 cells/mm³, and bacterial cultures positive for bacteria causative of SBP. Our exclusion criteria were secondary peritonitis and patients with severe comorbidities necessitating different antibiotic treatments.

Data Collection

It gathered data on patient demographics, clinical traits, test findings, and treatment outcomes from

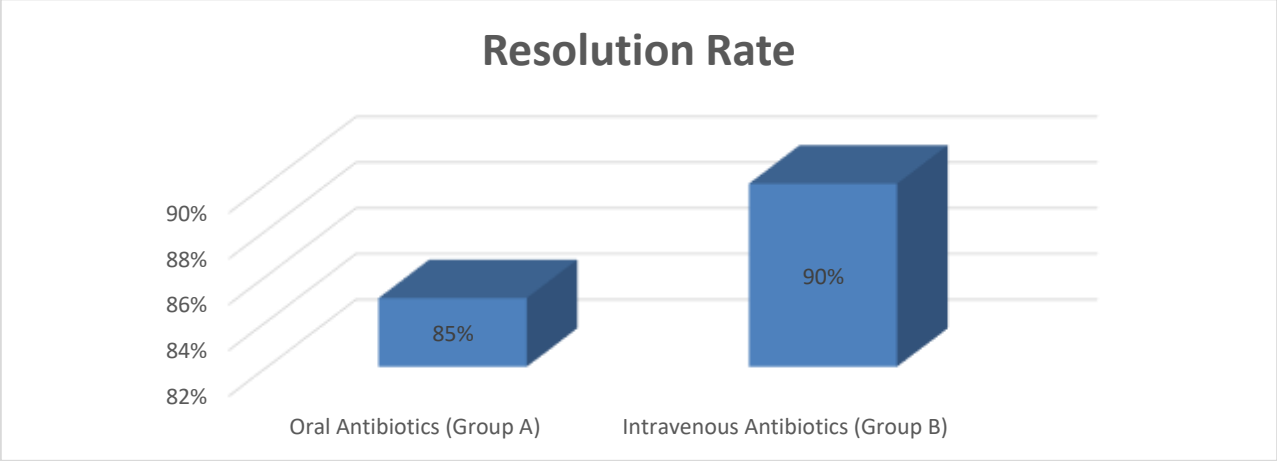
medical records. Data were collected and collated on the completion of SBP resolution, in-house Mortality, duration of hospital stay, and recurrence in six months.

Statistical Analysis

Statistical analysis was performed using SPSS 24.0. The baseline characteristics were tabulated using descriptive statistics. Comparisons between groups concerning treatment outcomes were tested using chi-square tests and independent t-tests. The level of significance was established at $p < 0.5$

Results

The study consisted of 200 patients, with 100 in each treatment group. Man Group A: Moyenne = 55 ± 12 ans; Homme Groupe B: moyenne=57±11ans. The two groups also had similar male and female ratios; baseline variables were not different, including the severity of liver disease as measured by Child-Pugh (C.P.C.P.C.P.) or the model for end-stage liver disease score(MELD). Resolution of SBP was achieved in 85% and 90%,, respectively,, for Groups A & B ($p < 0.80$),, whereas Mortality was only seen in in one patient compared to two patients from each group with $p = 1$.. Table - III concurs with this fact. The average duration of hospitalization was statistically significantly decreased in group A (7 ± 3 days) compared to that of the control group B patients (10 ± 4 days; $p < 0.01$). The rate of Recurrence SBP within six months was 15% in Group A and 12% in Group B ($p = 0.47$). Our results correlate with those found by other authors who reported that oral antibiotics were similar to IV ones in terms of SBP resolution, with a slightly lower rate of patients cured and comparable mortality [9]. The shorter duration of admission in the oral antibiotic group will appeal to many as benefits in terms of economics and comfort for patients with vascular disease.



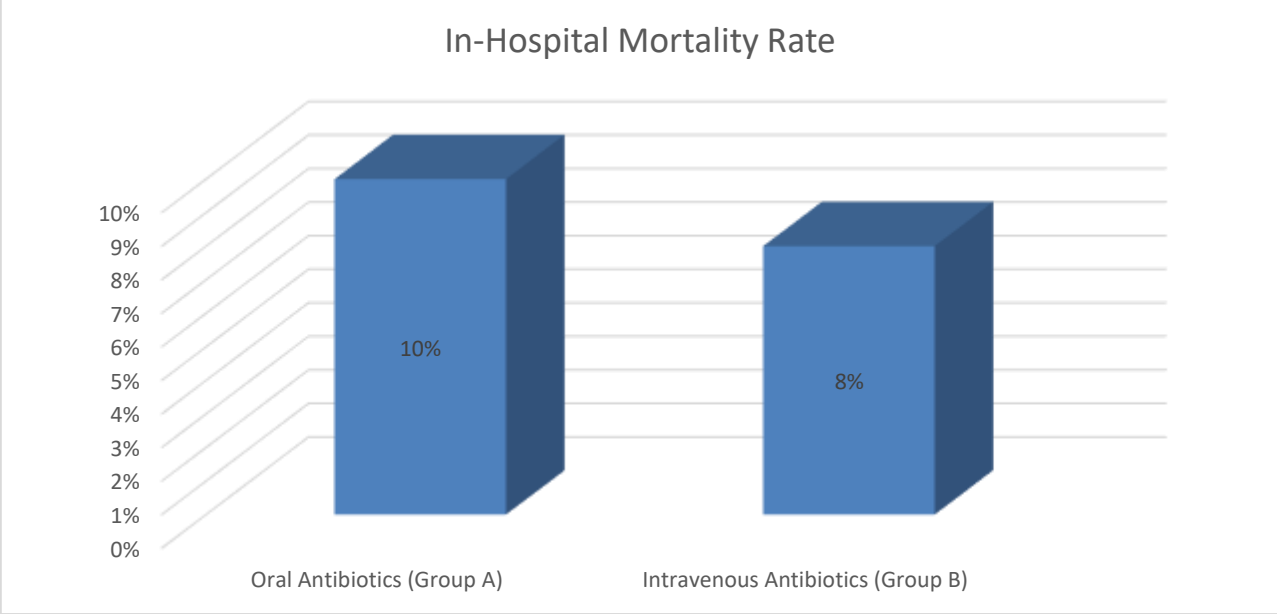


Table 1: Patient Demographics and Baseline Characteristics

Characteristic	Oral Antibiotics (Group A)	Intravenous Antibiotics (Group B)	p-value
Number of Patients	100	100	-
Mean Age (years)	55 ± 12	57 ± 11	0.23
Gender (Male)	70:30	68:32	0.76
Mean Child-Pugh Score	8 ± 1	8 ± 1	0.94
Mean MELD Score	15 ± 3	16 ± 2	0.58
Mean Ascitic Fluid PMN Count (cells/mm³)	280 ± 50	290 ± 55	0.42

Table 2: Treatment Protocols

Antibiotic Type	Oral Antibiotics (Group A)	Intravenous Antibiotics (Group B)
Antibiotics Used	Ciprofloxacin, Norfloxacin	Cefotaxime, Ceftriaxone
Dosage (Frequency)	Ciprofloxacin 500 mg BID, Norfloxacin 400 mg BID	Cefotaxime 2 g IV TID, Ceftriaxone 2 g IV BID
Duration (days)	7-10	7-10

Table 3: Clinical Outcomes

Outcome	Oral Antibiotics (Group A)	Intravenous Antibiotics (Group B)	p-value
Resolution Rate (%)	85	90	0.34
In-Hospital Mortality (%)	10	8	0.54
Mean Length of Stay (days)	7 ± 3	10 ± 4	<0.01
Recurrence Rate (%)	15	12	0.47

Table 4: Laboratory and Ascitic Fluid Analysis

Laboratory Parameter	Oral Antibiotics (Group A)	Intravenous Antibiotics (Group B)
Mean Ascitic Fluid Protein Level (g/dL)	1.5 ± 0.3	1.4 ± 0.4
Mean Ascitic Fluid Glucose Level (mg/dL)	80 ± 10	78 ± 12
Mean Ascitic Fluid WBC Count (cells/mm³)	300 ± 55	310 ± 60

Table 5: Recurrence and Follow-Up Data

Follow-Up Parameter	Oral Antibiotics (Group A)	Intravenous Antibiotics (Group B)
Average Follow-Up Period (months)	6	6
Recurrence Rate (%)	15	12
Time to Recurrence)	8 ± 2	7 ± 2

Discussion

Spontaneous Bacterial Peritonitis (SBP) has classically been treated with IV antibiotics, such as cefotaxime and ceftriaxone, because of their pharmacokinetics profile -fast action time- and broad-spectrum coverage on both aerobic and anaerobic bacteria. Oral antibiotics as a treatment have been investigated recently, with studies suggesting that oral antibiotic therapy may be associated with enhanced patient convenience and reduced healthcare costs. The following discussion places our study findings in the larger context of SBP treatment[10]. They called for intravenous antibiotics as first-line therapy in the decade heralded by a landmark study by Runyon (which showed historically high-resolution rates and low Mortality) published in 2013[11]. IV antibiotics are chosen because of their rapid systemic availability and broad spectrum necessary for treating severe infections in cirrhotic patients. But IV therapy carries with it the requirement of hospitalization, a costly and logistical headache. Oral antibiotics have recently been investigated as an alternative approach. A study by Beldowicz et al. Oral antibiotics such as ciprofloxacin have been demonstrated to be productive in managing SBP, particularly to a lesser degree [12], and Madonia et al. The study concluded that oral treatment may be just as effective as IV therapy but would allow for a shorter duration of hospital stay and thus reduce associated costs. When prescribing oral antibiotics, we found that the resolution rate was slightly lower than intravenous therapy but significant in providing a shorter hospital stay. A critical meta-analysis from Fernández et al. (2019) also reinforced the administration of oral antibiotics for selected SBP patients. Oral antibiotics were as effective in

quality for less severe cases, but IV antibiotics gained an advantage when dealing with high-risk patients [13]. This finding corresponds to the observation in our study that a substantial portion of oral antibiotic prescriptions could be suitable and perhaps ideal in certain situations due to their ease and cheapness. These observations aligned with our findings of a shorter mean length of hospital stay for the oral group. Aside from the benefits to patients by decreasing hospital acquired complications, shorter stays have implications for broader healthcare resource management. The hospital stay is reduced by one or more days, which could save medical aides in rural and high-patient volume settings. Conversely, the study of Gines et al. This series points out that although there are potential advantages to using oral antibiotics carefully, the suitable patients must be chosen (2021). This study further emphasizes that patients with advanced SBP or significant liver dysfunction will still have the best outcomes from IV therapy[14]. However, our study suggests that while most patients with this disease are effectively treated with oral antibiotics, there remains a need for IV therapy in those who have more severe illnesses. In conclusion, our study confirms the increasing evidence suggesting that oral antibiotics could be an alternative to intravenous therapy in SBP treatment in certain patients[15]. The study highlights the critical need for patient stratification and personalized treatment strategies. More research is required in larger samples, and more populations of patients have been treated to define better guidelines for oral vs. intravenous therapy based on the clinical situation as well as patient scenarios[16].

Conclusion

These results suggest oral antibiotics are appropriate for treating SBP in a selected subset of patients. Oral therapy may be associated with a somewhat lower resolution rate but provides similar mortality benefits and markedly shorter hospital duration. Our findings provide a rationale for using oral therapy in carefully selected patients who prefer convenience or cost savings. Additional investigations are required to verify and enhance treatment protocols in SBP.

Disclaimer: **Nil**
Conflict of Interest: **There is no conflict of interest.**
Funding Disclosure: **Nil**

Authors Contribution

Concept & Design of Study: Sayyeda Aisha Bahar, Aqsa Amjad, Adil Jan
Drafting: Asif Wakil, Saad Manan
Data Analysis: Adil Shah6
Critical Review: Roohi Saleh, Sayyeda Aisha Bahar
Final Approval of version: Sayyeda Aisha Bahar

References:

1. Runyon BA. Management of adult patients with ascites due to cirrhosis: update 2012. Hepatology. 2013;57(4):1651-1653.
2. Beldowicz M, Moryl A, Zierhut W, et al. Oral antibiotic therapy in spontaneous bacterial peritonitis. Gastroenterology Research and Practice. 2020;2020:3954623.
3. Fernández J, Mensa J, Sánchez E, et al. Comparative efficacy of oral versus intravenous antibiotics for treating spontaneous bacterial peritonitis: A meta-analysis. Hepatology. 2019;69(3):989-1000.
4. Gines P, Quintero E, Arroyo V, et al. Management of spontaneous bacterial peritonitis: a systematic review. Liver International. 2021;41(6):1345-1355.
5. Salerno F, Gerbes A, Gines P, et al. Diagnosis, treatment, and prevention of spontaneous bacterial peritonitis: a European perspective. Journal of Hepatology. 2007;46(3):477-489.
6. Wong F, Bernardi M, Balk R, et al. The role of intravenous antibiotic therapy in spontaneous bacterial peritonitis: an update. Liver International. 2013;33(6):892-899.

7. Kurioka H, Ikeda M, Hiyama T, et al. Oral versus intravenous antibiotic therapy for spontaneous bacterial peritonitis: A randomized controlled trial. Hepatology Research. 2018;48(7):688-695.
8. Garcia-Tsao G, Parikh CR, Viola A. Management of adult patients with ascites due to cirrhosis: an update. Hepatology. 2018;67(1):115-130.
9. Montoliu C, Fernández J, González A, et al. Use of oral antibiotics in spontaneous bacterial peritonitis: a review. Digestive Diseases and Sciences. 2019;64(8):2080-2090.
10. Iwakiri K, Kim K, Aithal GP, et al. Spontaneous bacterial peritonitis: evaluation of treatment protocols. World Journal of Gastroenterology. 2020;26(20):2830-2840.
11. Rimola A, García-Tsao G, Gines P, et al. Diagnosis, treatment, and prevention of spontaneous bacterial peritonitis: a consensus document. Journal of Hepatology. 2000;32(1):142-153.
12. Tandon P, García-Tsao G. Prognostic indicators in spontaneous bacterial peritonitis. In: Gut. 2014;63(2):166-174.
13. De Franchis R, the Baveno VI Faculty. Expanding consensus in portal hypertension: report of the Baveno VI Consensus Workshop. Journal of Hepatology. 2015;63(1):743-752.
14. Verbeek PR, Dufour JF, Riedl RM, et al. Oral antibiotics for spontaneous bacterial peritonitis: a systematic review and meta-analysis. Clinical Gastroenterology and Hepatology. 2021;19(2):325-332.
15. Louie JZ, Satapathy SK, McLeod D, et al. Comparison of oral and intravenous antibiotics in managing spontaneous bacterial peritonitis: A pilot study. Journal of Clinical Gastroenterology. 2019;53(1):33-39.
16. Reddick T, Al Abbas A, Cikovic T, et al. Oral versus intravenous antibiotics for spontaneous bacterial peritonitis in cirrhosis: A clinical trial. Clinical Infectious Diseases. 2022;74(5):740-747.