

Original Research Article

COMPARATIVE ANALYSIS OF SHORT-COURSE VS LONG COURSE ANTIBIOTIC THERAPY AMONG PATIENTS WITH COMPLICATED INTRA-ABDOMINAL INFECTIONS

ABSTRACT

Background

Complicated intra-abdominal infections have become a major health challenge that merits safe and efficacious therapy. Antibiotic therapy is the treatment of choice, however the duration of antibiotic use is debatable.

Objective

To compare the safety and efficacy of the short course and long course antibiotic therapy towards the treatment and the progressive outcome of patients presented with complicated intra-abdominal infections.

Methodology

This comparative study was carried out on 94 subjects (chosen via non-probability, consecutive sampling), who presented with complicated intra-abdominal infections, had signs and symptoms of infection along with ultrasound abdomen examination consistent with infective foci and routine blood test showing raised total leukocyte count, at the Department of Surgery - Liaquat University Hospital, Hyderabad. Subjects were divided into two groups (47 in each) through a random assignments. Group-A was kept on a short course (5-7-days) while Group-B was kept on a long course (7-10 days) antibiotic therapy. Data were documented using a structured questionnaire, including inquiries related to sociodemographic details, disease specifics, and observed for the outcome variables (mainly postoperative early resolution of infection and long hospital stay).

Results

In Group A, resolution of infection was achieved in 59.57%, 29.79% and 10.64% patients on day 5, 6 and 7, respectively. In Group B, resolution of infection was only reported as 42.55%, 36.17%

and 21.28% on day 5, 6 and 7, respectively. The median duration of taking antibiotic was almost half in short course group than the long. Surgical site infections were commonly observed in Group B patients. There was no mortality observed in both groups. There is no significance difference observed in primary outcome of clinical cure among the groups.

Conclusion

It can be concluded that the short course antibiotic therapy has good efficacy to treat CIAI when the primary foci of infection are surgically extracted with adequate source control.

Keywords: *Complicated intra-abdominal infections, Short course Antibiotic therapy, Long course Antibiotic therapy..*

INTRODUCTION

Complicated intra-abdominal infections (CIAI) are a mutual problem faced by surgeons worldwide. Nowadays CIAI is widely considered a common disease in clinical practice and leads to poor outcomes due to chances of secondary bacteremia with an incidence of 11-15% and increased mortality of about 10.5% [1, 2]. CIAIs are intra-abdominal infections that have extended beyond the organ of origin causing either an abscess formation or peritonitis [2].

The cause of CIAI is thought to be either pre-existing organ failure of the patient or infection by the surgeon or working team during surgery and incomplete source control that extends the infection beyond the specific organ to the peritoneal cavity [3]. Multiple organisms are the cause of CIAI as Enterobacteriaceae, in combination with anaerobes, are found in community-acquired CIAI (CA-CIAI), *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Enterococcus* spp, and *Candida* spp are found in healthcare-acquired CIAI (HA-CIAI) [4]. Hence CIAI has become a health challenge, though the management includes resuscitating the patient, controlling the source of infection as early as possible, and starting antimicrobial therapy accordingly [3, 5]. There is still a long debate on the duration of antibiotic prescription.

Surgical Infection Society (SIS) and the Infectious Diseases Society of America (IDSA) recommended the short course of 4 to 7 days but the discontinuation should be decided depending on a thorough understanding of controlling infectious source and patient's status individually [6-8]. Long time exposure to antibiotics harms patients' health, make them susceptible to *Clostridioides difficile* infection and drug resistance [9, 10] There is no benefit observed in the long duration of antibiotic administration as it will also cause treatment failure and also increase the chance of antibiotic resistance [11-13]. As long-duration antibiotic administration was conventionally about 7-14 days [13, 14]. There must be a checkpoint for

identifying the host response towards the specific antibiotic therapy with the capability of cessation of the antibiotic treatment after achieving the required response [15].

Multiple international studies are in favor of short-course antibiotic therapy for 5 days along with the source control would benefit the patient with the similar efficacy as compared to the long course therapy [16]. Treatment failure occurred less frequently with a short duration (four-day) of therapy. Resolution was found to be occurring two days sooner after source control in patients receiving the shorter courses of antimicrobial therapy [12]. However, data in critically ill patients with complicated intra-abdominal infections are limited in our population.

OBJECTIVE

To compare the efficacy of short-course antibiotic therapy versus long-course antibiotic therapy among patients with complicated intra-abdominal infections in terms of early resolution of infection and the long hospital stay.

METHODOLOGY

This prospective comparative study was carried out from May 2019 to October 2021 involving a sample of 94 patients of age 20-60 years, chosen via non-probability, consecutive sampling, presented at the Dept. of Surgery at Liaquat University Hospital, Hyderabad, with complicated intra-abdominal infections defined as the infection extending beyond the hollow organ of origin into the peritoneal space and led to peritonitis with the presentation of fever ($\text{temp} > 38\text{C}$), leukocytosis ($\text{TLC} > 11,000$), disturbed gastrointestinal function and abscess formation on ultrasound. The study was approved by the ethical review committee and informed consent was taken from each patient prior to enrollment in the study. Patients with age more than 60 years and were having uncontrolled diabetes were not taken into the study. Moreover patients who are using corticosteroids were excluded from the study. Patients were divided into two groups (47 in each) through a lottery method. In Group-A short-course antibiotic therapy (5-7 days) and in Group-B long course (7-10 days) antibiotic therapy was given. Later on, the outcome variables like the resolution of infection and long hospital stay (> 7 days), up to one month, of post-administration of antibiotic therapy were observed. Patients were discharged when the resolution of infection occurred both clinically (afebrile) for 24 hours with the return of gastrointestinal functions, on the ultrasound, no thick fluid was observed and called for subsequent follow-ups weekly for one month. All the maneuvers (history taking, physical examination, sampling and data collection) were done by the principal researcher while the data were collected on a pre-designed proforma. The data was analyzed using SPSS version 22.0 Chi-square test was applied to find the associations between categorical variables and a p-value less than 0.05 was considered significant

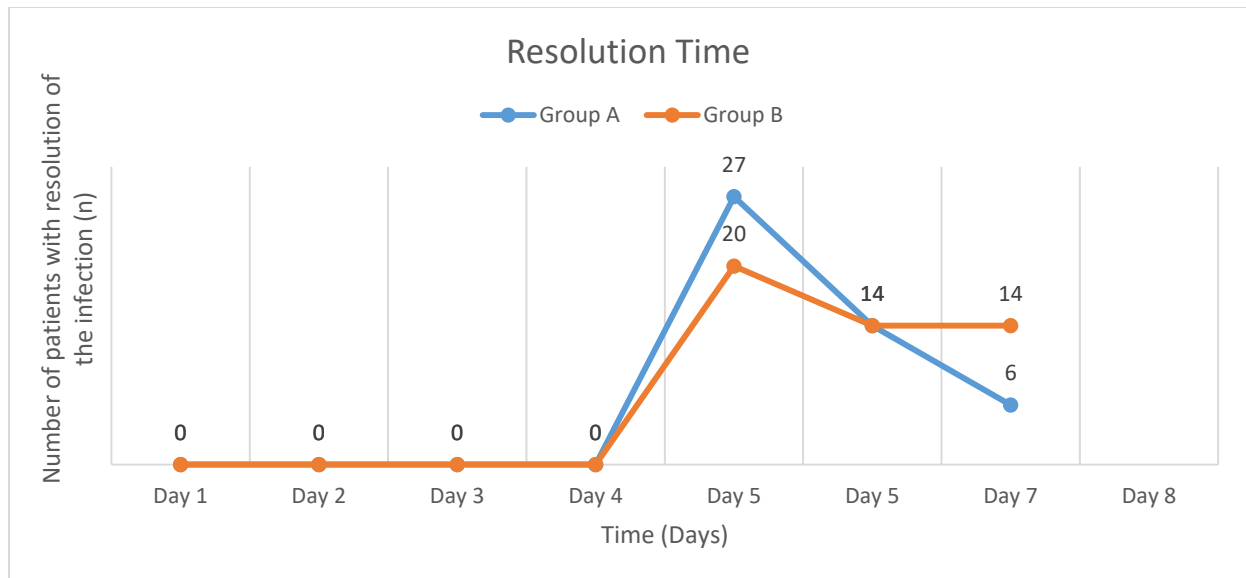
RESULTS

Table 1 : Sample Description

Variable		Group A	Group B
Gender	Male	31	28
	Female	16	19
Mean Age (Years)		35 (\pm 3.7)	33 (\pm 2.3)
Median Duration of Use (Days)		06	08

In Group A, resolution of infection was achieved in 59.57%, 29.79% and 10.64% patients on day 5, 6 and 7, respectively. In Group B resolution of infection was only reported as 42.55%, 36.17% and 21.28% on day 5, 6 and 7, respectively. The trend is graphically represented below:

Fig 1 : Resolution Time



The median duration of taking antibiotic was almost half in short course group than the long. Surgical site infection were commonly observed in Group B patients. There was no mortality observed in both groups. There is no significance difference observed in primary outcome of clinical cure among the groups.

DISCUSSION

Traditionally, physicians have administered antimicrobial therapy in patients who have intra-abdominal infections until clinical and laboratory evidence suggests that the infection has resolved. They reasoned that ongoing sepsis was indicative of ongoing replication of pathogens. More recent experimental data, however, suggest that a prolonged Systemic inflammatory response syndrome (SIRS) may be more a reflection of host immune activity than an indication of the presence of viable microorganisms. [16] As such, efforts have begun to shorten the duration of antimicrobial therapy in the presence of traditional markers of sepsis. These efforts have already been successful in other severe infections such as ventilator-associated pneumonia. [17]

Currently, the average duration of antibiotic therapy for intraabdominal infection is 10 to 14 days. [18, 19] The results of smaller studies on the effect of an abbreviated course of antimicrobial therapy have been published. A study reported on an uncontrolled study in which 23 consecutive patients with diffuse peritonitis were assigned to receive 3 to 5 days of antibiotics. [20] Infections developed in 22% of these patients; these rates were similar to those seen in a historical cohort.

A study randomly assigned 90 patients with mild-to-moderate intraabdominal infection to either 3 days or 5 or more days of ertapenem therapy, found no between-group difference in infectious outcomes. [21] Those findings, however, are not generalizable to the majority of patients with

intraabdominal infection, since half the patients had appendiceal disease and the overall rate of infectious complications was less than 10%. As compared with these studies, the STOP-IT trial had several advantages, including a larger sample size, randomized design, and enrollment of patients with a broader range of severity of illness.

The rate of infectious complications was low in both groups of our study and none was severe. Given the large difference in the number of days of treatment in the two study groups, neither shortening nor lengthening the duration of antimicrobial therapy appears likely to affect infectious outcomes. Truly clinically significant improvement in the management of this disease, therefore, probably awaits more effective technical or immune response-modifying interventions.

CONCLUSION

It can be concluded that the short course antibiotic therapy has good efficacy to treat CIAI when the primary foci of infection are surgically extracted with adequate source control.

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