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Original Article

Prophylactic use of Ciprofloxacin-Metronidazole and Ceftriaxone-Metronidazole in appendectomy & cholecystectomy in Dhaka National Medical College Hospital

Shusmita Saha[1], Achinta N. Chowdhury[2], Syed Ashrafuzzaman[3]

[1]Associate Professor, Department of Pharmacology, Dhaka National Medical College, [2]Professor (c.c.), Department of Biochemistry, Dhaka National Medical College, [3]Professor, Department of Pharmacology, Ad-din Women's Medical College

Abstract

Appendectomy & Cholecystectomy are common abdominal operation worldwide. Before surgery, antibiotics are usually used in hospitals to avoid post-operative complications. 150 patients (age range 20-45 years) were taken from Dhaka National Medical College Hospital for interventional study. When patients were selected for appendectomy or cholecystectomy, either ciprofloxacin plus metronidazole or ceftriaxone plus metronidazole were given intravenously. The patients were divided into 2 groups. Group I received drugs ciprofloxacin plus metronidazole and group II received drugs ceftriaxone plus metronidazole. There were 48 & 27 cases of appendicitis in group I & group II respectively and 27 & 48 cases of cholecystitis in group I & group II respectively out of total 150 study subjects. It was observed that the rate of infection was 8% in group I and 10.6% in group II.

Keywords: Ciprofloxacin, Ceftriaxone, Metronidazole, Surgery.

Introduction

Appendicitis and cholecystitis are more common diseases in our country. Appendectomy is the most common abdominal operation worldwide.[1] For treatment of appendicitis & cholecystitis, surgical intervention is required. Before surgery, antibiotics are usually used in hospitals to avoid post-operative complications. Post-operative surgical site infections remain a major source of illness and a less frequent cause of death in the surgical patient. The incidence of infection varies from surgeon to surgeon, from hospital to hospital, from one surgical procedure to another and most importantly from one patient to another.[2]

The use of prophylactic antibiotic reduces wound infections in elective open cholecystectomies.[3]

The antibiotic therapy for the treatment of intra-abdominal infections greatly varies according to the severity of infection.[4]

Cephalosporins (Ceftriaxone) have been well documented as effective prophylactic agents in gastrointestinal and vascular surgery[5].

The quinolone antibiotic have been a major advance for the treatment of various types of infections. These agents have a generally good safety profiles, broad–spectrum activity & favourable pharmacokinetics. Although older quinolones such as ciprofloxacin were effective as prophylactic agents for biliary procedures & colorectal surgery and for the treatment of intra-abdominal infections, the use of these older quinolones was limited by the development of resistant organisms. In addition, because these agents had poor activity against anaerobes such as Bacteroid fragilis, the agents had to be combined with an antianaerobic agent, such as metronidazole, when anaerobic coverage was required.[6]

Sequential ciprofloxacin plus metronidazole IV to oral therapy is statistically equivatent to ceftriaxone plus metronidazole. The switch to oral therapy with ciprofloxacin plus metronidazole is as effective and safe as continued IV therapy in patients able to tolerate enteral feeding.[7]

Materials and methods

150 patients of Dhaka National Medical College Hospital were taken for interventional study. This study was undertaken between August 2007 to July 2008. Once patients were selected for surgery the drug regime-either ciprofloxacin plus metronidazole or ceftriaxone plus metronidazole during and after surgery were decided independently by the surgeon in the hospital. The patients were classified into following groups:

Group I: Ciprofloxacin plus metronidazole.
Group II: Ceftriaxone plus metronidazole.

The information regarding antimicrobials prescribed, name of the antibiotics, duration of antimicrobial therapy, indications for which patients underwent

surgery and incidence of post-operative infection were recorded in data collection form. Patient underwent elective surgery were included in this study. All analysis was done using the statistical package for social science (SPSS) software for window. To compare the differences between groups chi-square tests were performed. P <0.05 was considered as the level of significance in all cases.

Results

A total number of 150 patients entered in the study who were divided in 2 groups containing 75 patients in each group.

Table-1: Gender, age and clinical condition of the study subject.

Group	Gender		Age	Clinical condition	
	Male n (%)	Female n (%)	Mean ± SD	Appendicitis n (%)	Cholecystitis n (%)
Group I	28 (37.3)	47 (62.6)	29.6±14.6	48 (64)	27 (36)
Group II	26 (34.6)	49 (65.3)	36.7±14.5	27 (36)	48 (64)

Table-2: Distribution of the study subjects on the basis of monthly income.

Group	Monthly Income		
	Status I n (%)	Status II n (%)	Status III n (%)
Group I	32 (42.6)	37 (49.3)	6 (8)
Group II	20 (26.6)	48 (64)	7 (9.3)

Status I: Monthly income <5000Tk
Status II: Monthly income 5000 - 10000Tk
Status III: Monthly income >10000Tk

Table-3: Rate of infection.

Group	Outcome	
	No Infection n (%)	Infection n (%)
Group I	69 (92)	6 (8)
Group II	67 (89.3)	8 (10.6)
Total	**136 (90.6)**	**14 (9.3)**

Discussion

Once patients were selected for surgery the drug regime - either ciprofloxacin plus metronidazole or ceftriaxone plus metronidazole during and after surgery were decided independently by the surgeon in the hospital.

Male-female distribution of the study subjects were 28 & 47 in group I and 26 & 49 in the group II respectively. In one study, the mean age was 36 years for men and 33 years for women. There were no gender-related differences in ciprofloxacin pharmacokinetic in men and women of middle age.[8]

There were 143 patients who underwent appendectomy in another study period. The mean age and SD at operation was 28.1±15.8 years. There were 57% female patients.[1]

In the present study, the mean age of the study subjects were 29.6 (±14.6), 36 (±14.5) in group I and group II respectively. There was 64% & 36% appendicitis in group I and group II respectively and 36% & 64% cholecystitis occurred in group I and group II respectively.

In group I, 42.6%, 49.3% and 8% patients were under status I, status II and status III respectively.

In group II, 26.6%, 64% and 9.3% patients were under status I, status II and status III respectively.

Cost of treatment is always a consideration in the surgical procedure particularly for the patients belonging to low income section of the population. It has been found that more than 90% of the study subjects in this hospital had monthly income less than ten thousand taka only.

There were 14 cases of infection out of total 150 study subjects. It was observed that in group-I, the rate of infection was 8% and in group-II, it was 10.6%. In one particular study the rate of infection was 3.8%, 1.4% and 3.3% in case of preoperative, perioperative and post-operative cases respectively.[2]

Now a days ciprofloxacin-metronidazole and ceftriaxone-metronidazole combination are chosen by surgeon to prevent wound infection following major abdominal surgical procedures. Ceftriaxone is understandly costly compared to ciprofloxacin.

The findings of another study demonstrated that post operative infection is more common in those patients who needed prolonged time for operation. The prophylactic use of antimicrobial agent to reduce postoperative infection has been frequently advocated. The objective of antibiotic prophylaxis is to prevent postoperative infection which is the primary cause of morbidity and mortality in patients undergoing surgery today. The infection rate could be reduced if sterilization procedure of the operation theatre and general condition of the patients were improved.[9]

If the risk factors could be minimized, single dose prophylactic antibiotic can be effectively practiced in our country.

Conclusion

In appendectomy & cholecystectomy, the prophylactic use of ciprofloxacin plus metronidazole is more effective to prevent post-operative infections than ceftriaxone plus metronidazole. Antibiotic prophylaxis in major abdominal surgical procedures reduces the post-operative complications as well as morbidity and mortality.

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