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ORIGINAL RESEARCH

To study the effectiveness of antibiotics administered in a single dosage with those administered over the course of five days in clean surgery

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ABSTRACT

Aim: A research comparing the effectiveness of antibiotics administered in a single dosage with those administered over the course of five days in clean surgery.

Material and methods: The Department of General Surgery was responsible for carrying out this research. A total of 200 patients were chosen. At the time of induction or thirty minutes before the skin incision, a single dosage of one gramme (g) of injectable cefotaxime was administered to each and every patient in the research group. They were not given any further antibiotic treatment, either intravenously or orally. In the second group, every single patient was given 1 gramme of cefotaxime intravenously BD for a period of five days. Patients who were either underweight or obese had their dosage modified such that it was proportional to their body weight. Tab. cefixime 200mg BD was administered to patients in the control group who had had laparoscopic cholecystectomy and were expected to be released in two to three days.

Results: It was determined that the majority of patients were admitted for hernioplasty, which accounted for 45% of patients in the study group and 47% of patients in the control group. Laparoscopic cholecystectomy, which accounted for 39% of patients in both groups, was the next most common type of surgery, followed by appendicectomy and other surgeries. The laboratory confirmed that the main growth in the surgical site was E. coli, Staphylococcal aureus, and Streptococcal. This was the case in the control group, in which participants or patients received postoperative 3-4days of conventional antibiotic cover. However, 7 patients displayed organisms from their pus or contaminated wound, albeit in a lesser amount. While a considerable number of patients tested positive for the presence of infections, this connection was not determined to be significant. 93 percent of patients in the study group and 91 percent of patients in the control group did not have wound discharge, according to the distribution of participants among the study and control groups in terms of wound discharge. Seven patients in the study group had wound discharge, while nine patients in the control group did. Although there were more patients in the control group who had wound discharge, this difference did not show any significant association.

Conclusion: Because there was no difference found in SSI whether using single dose preoperative antibiotic prophylaxis or using five days of conventional postoperative antibiotic therapy, we came to the conclusion that a single dose of antibiotic prophylaxis

was sufficient for clean and clean contaminated surgeries. This was due to the fact that there was no difference found in SSI when either method was used.
Keywords: Antibiotics, clean surgery, SSI

INTRODUCTION

In a number of different randomised clinical studies, antimicrobial prophylaxis has been given to participants in an effort to lower the rate of wound infections. [1–3] Surgical site infections, often known as SSIs, are associated with a rise in overall mortality and morbidity, as well as an extension of the patient's time of stay in the hospital and an increase in total expenses. [4] Even in situations that were completely clean and uncontaminated, the author used to prescribe antibiotics for a period of seven to ten days following surgical procedures out of concern that a wound infection would emerge. This not only results in increased costs but also increases the risk of infections acquired in hospitals as well as resistance not only to the antibiotic in question but also to other antibiotics belonging to the same class. [5] There is no evidence that the administration of postoperative doses of an antimicrobial agent offers extra benefit. Since this practise is expensive and is linked with increasing rates of microbiological drug resistance, it should be avoided because of these factors. It cannot be emphasised enough that antibiotic prophylaxis given during surgery is only a supplement to, and in no way a replacement for, proper surgical technique. Several clinical investigations have conclusively shown that "single shot" prophylaxis administered at the proper time is just as effective as multiple-dose prophylaxis. This research was carried out with the goal of determining whether or not prophylactic antibiotics have a place in hospitals so as to minimise the great economic loss, in terms of both cost and staff-working hours, that would otherwise be incurred by both the person as an individual and the nation as a whole. Keeping in mind the significance of prophylactic antibiotics in the context of world literature. [6]

This study aimed to fill that lacunae and thereby assist the gradual shift away from over reliance on antibiotics in the prevention of SSI, particularly clean and clean contaminated wound, so that the author can prevent the rapidly developing resistance against antibiotics, prolonged hospital stays, and drug-induced complications. The purpose of this research was to evaluate the efficacy and advantages of administering a single dose of antibiotics preoperatively as opposed to the five days of conventional postoperative antibiotic therapy, as well as to study the bacteriology of wound infection and the cost efficacy of both treatment regimens.

MATERIAL AND METHODS

The Department of General Surgery was responsible for carrying out this research. A total of 200 patients were chosen. Patients having elective procedures who were between the age range of 18 to 66 years old and who did not suffer from any co-morbid conditions were considered for inclusion. Patients who did not give consent, who underwent emergency surgery with outpatient surgical procedures or those with a length of stay (LOS) 24hours or with minor surgical procedures including endoscopic procedures, who absconded or left the study or died during the period of the study, who already had contaminated cavities such as pyocele, empyema, drainage of pus, and patients who had co-morbid conditions such as diabetes mellitus and malignancy were excluded from the study. The research group consisted of 100 people, while the control group had the same number.

METHODOLOGY

At the time of induction or thirty minutes before the skin incision, a single dosage of one gramme (g) of injectable cefotaxime was administered to each and every patient in the research group. They were not given any further antibiotic treatment, either intravenously or

orally. In the second group, every single patient was given 1 gramme of cefotaxime intravenously BD for a period of five days. Patients who were either underweight or obese had their dosage modified such that it was proportional to their body weight. Tab. cefixime 200mg BD was administered to patients in the control group who had had laparoscopic cholecystectomy and were expected to be released in two to three days. This treatment lasted for two to three days. The following are the criteria that were used to define surgical site

INFECTIONS

- A surgical wound was regarded to have an infection if it fulfilled one or more of the following criteria.
- The wound spontaneously opened and drained purulent fluid
- The wound drained fluid that was culture positive or gramme stain positive for bacteria
- The surgeon saw erythema or drainage of pus and opened the incision after determining that it was infected with an infection.

Patients who had just had surgery were checked on every day. The patients' temperatures were recorded on a chart, and they were monitored for any signs of systemic illness. On the third postoperative day, the dressing of the wound was opened, and a check was performed to look for evidence of wound infection. These indicators include local erythema, induration, and local rises in temperature or discharge. A second and third look at the wound were taken on the fifth and seventh postoperative days, respectively.

The examination of the statistical significance of the data was performed using the Chi-square test, and the charting of the data was done on a page of Microsoft Excel. In both the observation and the debate, the pertinent data will be included.

RESULTS

After fulfilling the recommended protocol for particular surgeries, an experienced surgeon performed the complete surgical procedure on each of the 100 patients in the study group and each of the 100 patients in the control group in serial order. The patients were then given post-operative care and were followed up on by the investigator for a period of six months. Antibiotics were administered before surgery to patients in the trial group, while patients in the control group received the standard antibiotic coverage of 4-5 days after surgery. After analysing and contrasting the results, a conclusion was reached.

After the arbitrary assignment of 200 patients to the trial group and the control group (everyone gets equal selection in either single dose antibiotic group or either in multiple dose groups). Pre-operative distribution of patients in both groups according to age, sex, and type of surgery were matched by frequencies and chi-square test in order to check that there was no significant discrepancy in the distribution of cases between the groups based on the basis of age, sex, and type of surgeries.

Table 1: Age and gender distribution of the participants

Age (years)	Study group A	Control group B	p-value
below 30	15	13	
30-40	29	31	
40-50	27	23	0.71
50-60	15	21	
Above 60	14	12	
Gender			
Male	61	63	
Female	39	37	

According to Table 1, there were a total of 200 participants across both groups, with 100 people participating in each group. The participants' ages ranged from under 30 to over 60 years old, and the range of ages represented in this research was rather broad. The age range of 40 to 50 years old was the most prevalent. According to the tables and the p value, which was 0.71, there was not a significant difference in age between the control group and the study group. This was supported by the fact that the p value was not significant. the majority of participants in both groups were males; in the study group, 61 (61%) of the participants were males, while in the control group, 63 (63%) of the participants were males. The remaining participants were females, but there was no significant association in either group with the patients' gender.

Table 2: Type of surgery

Surgery	Study group	Control group	p-value
Appendicectomy	13	11	
Lap cholecystectomy	39	39	0.71
Hernioplasty	45	47	
Other surgeries	3	3	

Table 3: Post op of fever

Post- op fever	Study group	Control group	p-value
No	89	87	p-0.21
Yes	11	13	

The distribution of participants among the study group and the comparator group was shown in Table 2. Based on this table, it was determined that the majority of patients were admitted for hernioplasty, which accounted for 45% of patients in the study group and 47% of patients in the control group. Laparoscopic cholecystectomy, which accounted for 39% of patients in both groups, was the next most common type of surgery, followed by appendicectomy and other surgeries. However, there was no significant association between the (p-0.71). Hence, there was no appreciable disparity between the groups in terms of the distribution of patients depending on the kind of procedures performed. Although only 11% of patients in the trial group and 13% of patients in the control group reported experiencing fever after surgery, the majority of patients in both groups (89% and 87%) did not have severe fever after surgery. Despite the fact that there were a greater number of patients suffering from fever in the control group, this connection was not shown to be statistically significant (p-0.21).

The majority of patients in both the study group and the control group did not report experiencing severe pain. This was the case for 90% of patients in the study group and 86% of patients in the control group, respectively. Only 10% of patients in the study group and 14% of patients in the control group reported experiencing severe pain. This table demonstrated that the number of participants who reported experiencing pain was higher in the control group, but the association between the two groups was not found to be statistically significant (p- 0.22).

Table 4: Swelling at site of surgery

Swelling	Study group	Control group	p- value
No	93	91	0.27
Yes	7	9	

Table 4 revealed that the majority of patients in both the study group and the control group did not have any apparent edoema. This indicated that the majority of participants in both groups did not have visible swelling. 7 patients in the trial group and 9 patients in the control group had noticeable edoema during the post-operative period 3-6 days; these patients

required additional medication. The percentage of people in the study group that were in the control group was 91. As can be seen in this Table, the number of patients in the control group who had edoema at the site of incision was higher, although there was no statistically significant correlation between the two groups regarding this difference (p- 0.27).
93 percent of patients in the study group and 91 percent of patients in the control group did not have wound discharge, according to the distribution of participants among the study and control groups in terms of wound discharge. Seven patients in the study group had wound discharge, while nine patients in the control group did. Although there were more patients in the control group who had wound discharge, this difference did not show any significant association (p-0.27).

Table 5: Type of organisms at surgical site

Organisms	Study group	Control group	p-value
No growth	93	91	0.11
Streptococcal	0	1	
Staphylococcal	5	5	
E coli	2	3	

Table 5 demonstrated that the laboratory confirmed that the main growth in the surgical site was E. coli, Staphylococcal aureus, and Streptococcal. This was the case in the control group, in which participants or patients received postoperative 3-4days of conventional antibiotic cover. However, 7 patients displayed organisms from their pus or contaminated wound, albeit in a lesser amount. While a considerable number of patients tested positive for the presence of infections, this connection was not determined to be significant (p-0.11).

Table 6: Confirmed surgical site infection

Surgical site infection (SSI)	Study Group	Control Group	p-value
No	93	91	
Yes	7	9	0.23

According to Table 6, a confirmed surgical site infection was found in 7 patients among the group of patients who were given a pre-operative single dose of antibiotics for the study group, while the number of SSI patients was 9 in the control group. This information was gathered from patients who were given the antibiotics.
As a result, researchers discovered that the incidence rate of infection was 7% among patients who had been given a preoperative single dosage of antibiotic. The incidence rate was high among patients, coming in at 9%; yet, it seemed that the pre-operative antibiotic was more helpful in preventing post-operative infection; nonetheless, this hypothesis was not statistically shown to be significant (p- 0.23).

Table 7: Medical management needed for infection

Management	Study group	Control group	p-value
No	93	91	0.44
Yes	7	9	

Table 7 demonstrated that the majority of patients or participants in both groups did not require any additional medical treatment. This number was 93 in the study group and 91 in the control group. Despite the fact that the medical management required was less in the study group (7 participants) than in the control group (9 participants), this difference was not found to be statistically significant at the 95% confidence interval (p-0.44).

Table 8: Post-operative stays in hospital

Hospital stay	Study group	Control group	p-value
2 -3days	90	28	
4-5days	3	57	0.01
7 or more days	7	15	

Table 8 shows that the majority of patients in the control group stayed in the hospital for four to five days, while the majority of patients in the study group stayed for three to four days on average. Additionally, seven patients in the study group stayed in the hospital for seven days, while the control group had a total of 15 patients. This table demonstrates that patients who were given traditional post-operative antibiotics had a much longer average length of stay in the hospital, which was statistically shown to be significant (p-0.01).

DISCUSSION

The majority of people who took part in this study or were patients were between the ages of 30 and 40 or 40 and 50 years old; specifically, 29 (29%) and 27 (27%) of those in the study group who were given a single dose of the pre-operative antibiotic, and 31 (31%) and 23 (23%) of those in the control group, which was the group in which patients were given conventional post-operative antibiotics for 5 days.

In the current study, the majority of participants were male. 61% of participants in the study group and 63% of participants in the control group were male. The remaining 39% and 37% of participants in the study group and control group were female. This study was similar to one by Ranjan A et al., in which 84% of participants in the study group were male and 80% of participants in the second group were male. In this particular research, the SSI rate for the study group was 7%, whereas the rate for the control group was 9%. [6] In this study, participants in the study group were administered I.V. cefotaxime 1 gm (150 mg/kg) in the preoperative period 30 minutes before skin incision, while participants in the control group were given injections of cefotaxime 1 gm BD for a period of five days. Both groups received other medications, such as painkillers, in the same manner. That was analogous to the findings of Jayalal JA et al, in which patients in the study group who were due to have procedures were given 1 gramme of cefotaxime following a test dosage sixty minutes before the operation. Patients in the control group received an intravenous injection of ciprofloxacin 200 mg intravenous (IV) twice a day, as well as an intravenous injection of metronidazole 500 mg thrice a day. This treatment lasted for three days. The incidence of infection was comparable between the two groups. There were two instances of grade 2 infections out of thirty in each group, and there were no significant differences between the groups. [7]

The distribution of participants among the study and control groups with regard to wound discharge was as follows: the majority of patients in both groups, 93% and 91% respectively, did not have wound discharge; however, 7 patients in the study group and 9 patients in the control group did have wound discharge; the control group had a greater number of patients with wound discharge, but this difference did not show any significant association (p-0.27).

In contrast to the findings of Ranjan A et al, the incidence of post-operative wound infection was significantly higher in female participants across both groups, with 25% and 20% of females affected in the study group and control group respectively, compared to 7.1% and 6.25% of male participants across both groups.

In the current study, the distribution of participants among the study group and the comparator group in relation to the types of surgeries revealed that the majority of patients were admitted for hernioplasty, which accounted for 45% of patients in the study group and 47% of patients in the control group. This was followed by laparoscopic cholecystectomy, which accounted for 39% of patients in both groups, followed by appendicectomy and other

surgeries; however, there was no statistically significant association between the two groups and (p-0.71). Hence, there was no appreciable disparity between the groups in terms of the distribution of patients depending on the kind of procedures performed. Although only 11% of patients in the trial group and 13% of patients in the control group reported experiencing fever after surgery, the majority of patients in both groups (89% and 87%) did not have severe fever after surgery. Despite the fact that there were a greater number of patients suffering from fever in the control group, this connection was not shown to be statistically significant (p-0.21). It was quite similar to the findings of Thejeswi PC et al, who discovered that patients who had had hernioplasty and thyroidectomy made up the largest group in their study, even though the latter researchers looked at a variety of surgical procedures. Among the patients in the study group, the incidence of wound infection was 2.66%, whereas in the patients in the control group, it was 4.66%. This difference was not statistically significant. [8]
In the current study, the total cost of hospital stay in group most of patients stated that the total cost was almost free (70%), while in group received postoperative convention 5days antibiotics out of them mostly 44% stated that the total cost of surgery within range while patients stated that the cost were high 20 in study group and 12% in control group, this difference was found to be statistically highly significant (p-0.003), in study group all three patients who develop SS were in the study group, and in control group none of the patients.
In the current study, the majority of patients in the study group (90) stayed in the hospital for two to three days, whereas the majority of patients in the control group (28) stayed in the hospital for four to five days. Seven patients in the study group stayed in the hospital for seven days, while the control group had 15 patients. This difference in hospital stay duration was also found to be statistically significant (p-0), and it was comparable to the findings of Patel SM et al. and Anvikar AR et al., who stated that because of hospital prolonged stay the risk of mortality was higher. In conclusion, this table demonstrates that the duration of hospital stays was longer for patients who were given conventional post-operative antibiotics. In the study group, only patients who developed SSI stayed longer in the hospital. In the control group. [9,10]

CONCLUSION

Because there was no difference found in SSI whether using single dose preoperative antibiotic prophylaxis or using five days of conventional postoperative antibiotic therapy, we came to the conclusion that a single dose of antibiotic prophylaxis was sufficient for clean and clean contaminated surgeries. This was due to the fact that there was no difference found in SSI when either method was used. Second, the patients spent less time in the hospital as a result of the use of antibiotic prophylaxis with a single dosage. Finally, the use of the antibiotic prophylaxis administered in a single dosage may help keep the overall cost of treatment to a minimum.

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