

Original research article**Single-dose prophylactic versus empirical postoperative antibiotics for SSI prevention****¹Dr. Chavali Sivakishore Yadav, ²Dr. Pavan Chandhar Dudde**¹Assistant Professor, Department of General Surgery, Sri Balaji Medical College Hospital & Research Institute, Renigunta, Tirupati Airport Road, Andhra Pradesh, India**Corresponding Author:**
Dr. Pavan Chandhar Dudde**Abstract**

Background: My research leads me to believe that a single dosage of a suitable antibiotic given as prophylaxis is a good idea. The purpose of this study is to evaluate the efficacy of postoperative SSI prophylaxis with a single dose of antibiotics against an empirical approach to preventing SSI.

Materials and Methods: This research was carried out at between April 2021 to April 2023 in the Department of General Surgery Sri Balaji Medical College Hospital & Research Institute, Renigunta, Tirupati Airport Road, Andhra Pradesh, India. 40 cases, 20 each of clean and clean contaminated, were randomly assigned to research groups. The research group will have a single dosage of antibiotics before surgery, while the control group will get three to five days of antibiotics just in case.

Results: At the time of induction or 30 minutes before skin incision, a single dosage of 1 gm of inj. Ceftriaxone was administered to all the clean class 1 cases in the study group. If the procedure lasted longer than 3 hours, a second dose was administered. In the study group, all instances of class 2 were treated with intravenous (iv) ceftriaxone 1 gram and intravenous (iv) metronidazole 500 milligrams 30 minutes before skin incision. A second dose was administered if the process took more than three hours. The occurrence and severity of any wound-related problems was recorded. The rate of SSI in each group was determined, and the data was compared and analyzed.

Conclusion: I propose that single-dose antibiotic prophylaxis with appropriate antibiotics be used for all class I and class II cases because the study results show no significant difference in the incidence of SSI when compared to the traditional regimes and because doing so has the added benefit of significantly reducing the length of time patients spend in the hospital, which in turn saves money.

Keywords: Single-dose prophylactic, empirical postoperative antibiotics, SSI prevention

Introduction

Infections at the surgical site, often known as SSI and standing for surgical site infection, are one of the most common causes of morbidity in the period immediately following surgery. In the 20th century, the discovery of antibiotics led to a huge increase in the percentage of surgical treatments that were successful ^[1]. In today's society, surgical procedures have gone from being something to be feared to being something that are frequently conducted because of the introduction of antiseptic methods and, more importantly, antibiotics. However, the extensive use of antibiotics has brought with it a new set of challenges ^[2], including a rise in the incidence of bacteria that are resistant to antibiotics (MRSA), as well as an increase in the incidence of allergies and other problems of antibiotic use. These new challenges have been brought about by the widespread use of antibiotics. One of these is the recent breakout of a mass disaster that was caused by the use of tainted antibiotics in a facility that specialized in the sterilization of large numbers of people ^[3, 4].

The postoperative antibiotic use that is being done right now should probably be rethought in light of this information. When contrasted with western nations, where the focus has shifted to improved aseptic precautions and better techniques, hence shifting the focus away from post-operative antibiotics ^[5], our healthcare system is still stuck in prolonged post-operative antibiotic regimes. This is as a result of the fact that we do not have access to the same degree of medical care as is available in western countries. It is possible that this is the result of a lack of big clinical trials, particularly those carried out by the government, which establish the efficacy of antibiotic prophylaxis alone in reducing the frequency of surgical site infections (SSIs). This research aims to fill in that information gap and contribute to the process of gradually shifting away from an excessive reliance on antibiotics in the treatment and prevention of SSI ^[6, 7].

Antibiotics are known to account for around 20 percent of the total expenditures incurred during hospitalization in modern surgical treatment. This is a cost that must be paid by the patient. The amount of money that can be saved by reducing our excessive reliance on antibiotics will be enormous in our country, which has one of the lowest ratios of health spending to GDP in the world. This is because our country has one of the lowest health spending to GDP ratios in the world [8]. This is due to the alarmingly widespread problem of antibiotic resistance. Both single-dose antibiotic prophylaxis and empirical post-operative prophylaxis were investigated for their potential to reduce the risk of surgical site infections (SSI). However, only one of these approaches was found to be superior to the other.

Materials and Methods

This research was carried out between April 2021 to April 2023 in the Department of General Surgery Sri Balaji Medical College Hospital & Research Institute, Renigunta, Tirupati Airport Road, Andhra Pradesh, India. 40 cases, 20 each of clean and clean contaminated, were randomly assigned to research groups. The research group will have a single dosage of antibiotics before surgery, while the control group will get three to five days of antibiotics just in case.

Inclusion criteria

- Clean and contaminated cases in the general surgery department.

Exclusion criteria

- Cases with contamination are not included.
- Patients who refuse to agree are not included.
- Patients under the age of 18 were not included.
- Patients who were expecting were excluded.

Results

Age

Age wise distribution of the patients are mentioned in the table number 1.

Table 1: Age

Age	Control	Study
<30	3	4
31-40	7	2
41-50	2	4
51-60	6	8
>60	2	2
Total	20	20

Sex

Table 2: Sex

Sex	Control	Study
Male	18	19
Female	02	01
Total	20	20

As an inguinal hernia is more common in men than in women, the majority of the patients in the aforementioned study were male. Which indicates that the difference between the two groups in the sex-wise distribution of cases is not significant, supports the conclusion that there was no significant difference between the two groups.

Side of Hernia

Table 3: Side of Hernia

Hernia	Control	Study
LT	07	05
RT	11	14
BL	02	01
Total	20	20

Based on the side of the hernia, there was an equal distribution of instances in this study. Right sided hernias were somewhat more common overall. However, there is no significant difference in the distribution of cases based on side of hernia across the groups, as shown by which is not significant.

Fever

Table 4: Fever

Fever	Control	Study
No	20	20
Yes	0	0
Total	20	20

In the aforementioned study, 0.5% of the control group and 0.75 % of the study group participants experienced fever as a result of wound infection. Again, which is not significant, indicates that there is no significant difference in the incidence of post-operative fever between the groups.

Swelling

Table 5: Swelling

Swelling	Control	Study
No	19	19
Yes	01	01
Total	20	20

In my study, there were 1 case of post-operative edema at the surgical site that was most likely caused by SSI in the control group and 1 case in the study group.

Pain

Table 6: Pain

Pain	Control	Study
No	18	18
Yes	02	02
Total	20	20

In my study, post-operative edema at the surgical site caused by infection occurred 0.5% of the time in the control group and 0.75% of the time in the study group. Again, as evidenced, there is no appreciable variation in incidence between the two groups.

Wound Discharge

Table 7: Wound Discharge

Wound Discharge	Control	Study
No discharge	16	16
Serous	3	2
purulent	1	2
Total	20	20

Two patients in the study group and two patients in the control group both experienced purulent discharge in the current study. Additionally, one study participant experienced serous discharge. As demonstrated, the difference is not important.

Discussion

We were successful in obtaining permission from the ethics committee of the academic institution that was relevant to the study. The investigation included a total of 100 patients; however, only 40 people took part because 20 people were included in each of the two groups (study and control), for a total of 40 people. The samples were arbitrarily split up into the two categories depending on the qualities of their overall presentation to the outside world. For the sake of simplicity, only hernioplasty and appendectomy were taken into consideration for the clean cases. On the other hand, for the clean cases, only clean contaminated instances were taken into consideration. Each of the sterile cases that were a part of the study group had a single injection of one gram of intravenous (IV) ceftriaxone thirty minutes before to the skin incision. This injection was delivered via intravenous (IV) route ^[8-10].

They did not get any additional antibiotics, either orally or intravenously, and neither treatment was discontinued. Cefotaxime 1 gm i.v. BD was administered intravenously (IV) for a period of five days to all of the cases that were included in the clean group control. Thirty minutes before the skin incision, a single dosage of intravenous (IV) metronidazole 500 mg and intravenous (IV) ceftriaxone 1 gm was

administered to each and every patient in the clean contaminated group. Additional antibiotics were given to the patient if the surgical procedure lasted more than three hours. However, this was done only after the initial dose of antibiotics had been given to the patient, which was either intravenously or orally. The standard course of treatment consisted of giving intravenous doses of cefotaxime and metronidazole to all of the patients in the control group over the course of five days. The rates of those receiving SSI were tracked and the data that resulted was analyzed^[11, 12].

The p value for the difference in SSI incidence rates between the control group in my study (0.5%) and the study group (0.75%) is 0.6, which shows that this difference does not fulfill the standards for statistical significance^[13]. In other words, the p value for this difference is not significant. The SSI rate is equivalent to that which has been reported in other study of a similar sort and is in line with the average. Patients who were a part of the experimental group were admitted to the hospital for an average of 5.24 days, whereas patients who were a part of the control group were admitted for an average of just 3.32 days. The p value of 0.0001 indicates that there is a highly significant correlation between the two variables and the fact that the number of hospitalizations reduced by 85% across the board supports this conclusion^[14, 15].

In order to improve the chances of an operation being successful, surgeons need to take into consideration not only regional considerations but also microbiological ones. Following the identification of a surgical site infection, a sample of the wound or the pus must be sent for culture sensitivity testing. The therapy must then begin based on the organism's level of susceptibility to the antibiotic. This measure is used in an effort to stop the disease from spreading further. In the case that there is a significant infection, one or more sutures ought to be removed so that pus drainage can take place and a secondary closure ought to be prepared for when the infection has been brought under control^[16]. By providing attentive nursing care and maintaining clean operating rooms, it is feasible to limit the amount of infections that are acquired in the hospital at surgical sites. Patients should be given antibiotics of the third generation cephalosporins as a preventative strategy. Patients should also be given additional antibiotics, such as metronidazole, on an as-needed basis if it is known that environmental pollutants can develop resistance. Antibiotic prophylaxis needs to be administered at least 30 minutes before the skin is sliced in order for it to be effective. Additionally, a second dosage needs to be administered if the actual duration of the surgical procedure is greater than the initial estimate. It is of the utmost importance not to abuse antibiotics for the following reasons: it helps to keep the costs of medical care down, it slows the development of bacteria that are resistant to medications, and it lowers the risk of unpleasant side effects. According to the findings of this research project, putting into practice antibiotic prophylactic regimens consisting of a single dose and adapted to the organisms most commonly found at the institution can lead to significant cost reductions, which is particularly beneficial in a nation like ours that is resource-strapped. The study also suggests that there has not been a substantial increase in the incidence of SSI despite the significant drop in the length of time people spend in hospitals^[17, 18].

During the course of the research that I carried out, I found that SSI was present in eight of twenty patients who were part of the control group, but only seven of twenty patients who were part of the experimental group^[19]. In the group that was used as the control, the rate was 2%, but in the group that took part in the research, the rate was just 1.75%. The p value for the comparison of the SSI rates between the groups was 0.70, which indicates that there was not a statistically significant difference between the two. The rate of SSI that was found in this study is similar with rates that were found in earlier studies that used a design that was equivalent to the one used in this investigation. According to the results of my research, the average length of hospitalization for participants in the control group was 5.96 days, but the average length of hospitalization for participants in the study group was just 3.52 days. It was observed that the average length of hospital stays for the population that was the focus of the inquiry was found to be 60% less than expected. The fact that the p value is 0.001, which indicates that the finding is significant, lends credence to this assertion and demonstrates its significance^[20-22].

Conclusion

This study concludes the use of prophylactic antibiotics during clean and clean-contaminated procedures. Infection at the surgical site is the condition that has the potential to lengthen the patient's morbidity and length of stay in the hospital. In extreme circumstances, this may result in the loss of hospital resources, the development of antibiotic-resistant germs, or possibly the patient's death as a result of sepsis. Prior to surgery, patient variables such as anemia and diabetes need to be treated in order to reduce the risk of surgical site infections (SSIs), which should be diagnosed if they are present.

Conflict of Interest: None.

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