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RESEARCH ARTICLE

EFFICACY OF ANTIBIOTICS IN ROUTINE CLEAN SURGERIES: A PROSPECTIVE STUDY IN A TERTIARY CARE HOSPITAL IN EASTERN INDIA.

Dr. Sagar Kumar¹ and Dr. Abhishek Kumar Singh^{2,*}

¹Tutor, Department of Pharmacology, MGM Medical College, Jamshedpur

²Assistant Professor, Department of Pediatric Surgery, RIMS, Ranchi

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*Corresponding author:
Dr. Abhishek Kumar Singh

ABSTRACT

Objective: The objective of this study to find out incidence of surgical site infection in clean surgeries operated with peri-operative and post-operative dose of antibiotics. **Setting and Design:** A Prospective study in a tertiary care hospital in eastern India. Durations:one year. Materials and methods: 25 General surgical cases were operated with perioperative 3 doses versus postoperative 5 days course of antibiotic in each group from July 2018 to August 2019. Data collected and analysed and two Sided 'P' Value was compared. **Results:** Out of two groups 8% and 12% was the incidence of surgical site infection and 'p' value was 1.000 which is statistically insignificant. **Conclusion:** Use of 3 dose perioperative antibiotic is sufficient to prevent surgical site infection and no need of 5 days course of antibiotics.

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INTRODUCTION

Antimicrobial agents were once hailed as magic bullets that promised to eradicate infection. Unfortunately this promise has not been fulfilled. The use of antimicrobial agents to prevent surgical infection has become a subject of controversy and disappointment in clinical practice. Despite advances in surgical science, infection still remains responsible for most of the post-operative morbidity and mortality. The basic surgical skills of postoperative precaution, pre-operative preparation, excellent surgical technique, fastidious wound care and postoperative management are corner-stones of infection prophylaxis. Antibiotics for prolonged period may be harmful to both individual and hospital colony whether they are given as prophylaxis or for therapy. Routine use of antibiotics for a prolonged period after clean surgery is not justifiable. With the fear of developing wound infection after surgery we use to administer antibiotics for a period of 7-10days even in clean and clean-contaminated cases.

This is not only expensive but also lead to hospital acquired infection and resistance to not only that particular antibiotic but also other antibiotics of the same group. By clean surgery we mean that an uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital or infected urinary tract is not entered. Wounds are closed primarily and, if necessary, drained with closed drainage. Antibiotics which provide coverage throughout the perioperative period will reduce the infection rate of wound and also other infectious complications of body.

MATERIAL AND METHODS

The study is a randomized prospective and comparative evaluation of prophylactic administration of three doses of broad spectrum cephalosporin group of antibiotic Ceftriaxone with 5 days conventional course of postoperative antibiotics in clean surgeries. Two groups were established on the basis of numerical status. Patients with odd numbers were taken for

three dose trials whereas those with even numbers were taken for five days course of antibiotics. The study was not blind. The study admitted 50 patients 25 in each group, men and women 18 years and more undergoing clean operation from July 2018 to August 2019. Initial dose of antibiotic, 1gm Ceftriaxone was administered one hour before surgery by intravenous route. Two more doses of Ceftriaxone were given second at immediately after shifting the patient to ward and third 12 hours after the second dose. In patients with 5days course the first dose was given immediately after operation and continued for five days two days intravenously and three days oral (Cefixime). Exclusion Criteria: Concurrent or previous treatment with antibiotic was not allowed. Following group of patients were not eligible for enrolment in the study (a). Patients with hypersensitivity or history of adverse drug reaction to cephalosporin group, (b) patients less than 18 years, patients with significant degree of renal impairment, severe hepatic disease, on steroid therapy, obese, suffering from diabetes mellitus, or tuberculosis.

RESULTS

Total 50 patients were included in this study and 25 were given 3 doses of antibiotics preoperatively (Group A) and 25 were given 5 days conventional antibiotics (Group B).

Table 1. Age and sex distribution

Sex		Gr A	Gr B
	Male	15	15
	Female	10	10
	Total	25	25
Age Range (Yrs)			
	18-30 Yrs	8	5
	30-50 Yrs	9	12
	>50 Yrs	8	8

Table 1 shows the age and sex distribution in the study which was not significant.

Table 2. Grading of Infections

Grade of Infection	Group A		Group B	
	7 th Post Operative day	10 th Post Operative day	7 th Post Operative day	10 th Post Operative day
Superficial	1	0	2	0
Superficial – deep	0	1	0	1
Deep SSI	0	0	0	0
Organ/Space	00	00	00	00

- One patient in Group A developed grade I infection on 7th post-operative day.
- Two patient in Group B developed grade I infection on 7th post-operative day.
- One patient in Group B developed grade II infection on 10th post-operative day.
- One patient in Group A developed grade II infection on 10th post-operative day.
- No patient in either group developed grade III or IV infection.
- The infection rate in Group A is 8% and in Group B is 12%.

Table 3. Statistical analysis of the data

Infections Yes/No	Group A	Group B	Total
Yes	2(4%)	3(6%)	5(10%)
No	23(46%)	22(44%)	45(90%)
Total	25(50%)	25(50%)	50(100%)

The two sided P value is 1.000 which is statistically insignificant.

Table 4. Type of Surgeries performed

Serial No.	Cases	Group A	Group B	Total
1.	Inguinal Hernia	07	08	15
2	Umbilical Hernia	04	07	11
3	Fibroadenoma	03	02	05
4	lipoma	04	02	06
5	Varicose veins	02	00	02
6	Hydrocoel	02	03	05
7	Orchidectomy	01	00	01
8	Thyroidectomy	02	00	02
9	Incisional hernia repair	00	01	01
10	Gynaeomastia	00	01	01
11	Fibroma	00	01	01
	Total	25	25	50

DISCUSSION

An effective prophylactic regimen should be directed against the most likely organisms. Infections can be prevented when effective concentrations of the drug are present in the blood and the tissue during and shortly after the procedure. Therefore, antibiotic prophylaxis should begin just before the operation. Beginning earlier was found to be unnecessary and potentially dangerous, while beginning later was found to be less effective¹. A single dose prophylaxis before surgery was found to be sufficient. If surgery is delayed or prolonged, often a second dose is advisable if antimicrobial agent with short life is used. Post-operative administration is unnecessary and harmful. Pre-operative use of antibiotics to prevent wound infection was demonstrated by Bernard and Cole (1964)². A study conducted by Classen *et al*¹ has shown that patients who received pre-operative antibiotics early developed 3.8% wound infections. Patients who received antibiotics perioperatively developed 1.45% infections compared to those who received antibiotic postoperatively and developed 3.3% wound infections¹. To find out the economical savings achieved with the right prophylaxis to prevent surgical wound infections, a study was done by Fernandes³. Our study also showed an economical advantage in using only 3 doses of perioperative antibiotic prophylaxis. The American guidelines⁴ for surgical prophylaxis, worked out recently by the CDC, have not modified their general structure and have strongly influenced the protocols and the prescriptive behavior of other countries. Incidence of wound infection following clean surgery is 1.8% as claimed by Curse and Foord⁵. As most of the wound infections are detected within three days after surgery, this indicates that these infections are acquired during operative procedure. The contaminating bacteria could have been present either in the skin or were inoculated during surgery^{6,7}. In our study standard skin preparation was done for all patients, which decreased the exogenous bacterial load; however, the organisms situated deep within the skin pores cannot be eliminated completely. Various authors have studied the efficacy of single dose antibiotics in preventing wound sepsis/infections.

Some previous studies of surgical site infection I at other anatomic sites reported a higher risk in female patients,^{8,9} whereas others showed a higher risk in male patients.¹⁰ Shkedy *et al.*¹¹ found that women had a higher incidence of surgical site infection I after parotidectomies than men. In our study, the dissimilar male: female ratios in the two groups did not seem to impact the results. All of the above studies support the results of the present study that a 1-day peri-operative antibiotic prophylaxis is almost as effective as multiple-dose antibiotics. Hence, a single-day prophylaxis is recommended to reduce the financial burdens, the emergence of resistant strains and to avoid the side effects of the drugs. The main shortcoming of our study is the small sample size.. However, we do feel that our results can serve as a pilot study that will assist surgeons in decision-making regarding antibiotic use and also help in guiding further research in this field.

CONCLUSION

Three dose antibiotics are sufficient in preventing wound infection. Prolonged administration of antibiotics is unnecessary and costlier. Wound infection is equal in both sex and not associated with sex predominance. Prolonged use of antibiotics is associated with emergence of resistant strains and super-infections, which can be prevented by cost-effective short term antibiotic prophylaxis. Whether prophylactic antibiotics have a greater effect in other settings or in different patient groups warrants further study.

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