Section: Surgery

Original Research Article

COMPARATIVE STUDY OF SINGLE DOSE PROPHYLACTIC ANTIBIOTIC VERSUS EMPIRICAL POSTOPERATIVE ANTIBIOTICS IN PREVENTION OF SSI

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Abstract

Background: To compare single dose prophylactic antibiotic versus empirical postoperative antibiotics in prevention of surgical site infections (SSI). **Materials and Methods:** One hundred twenty cases of clean and clean contaminated of both genders reported to department of general surgery were classified into two groups. Group 1 (study) comprised of 60 cases who received a single dose of antibiotics half hour preoperatively. Group 2 (control) comprised of 60 cases who received post-operative antibiotics after surgery for about 5-10 days. Parameters such as fever, swelling, hospital stay, pain, wound discharge, type of organism, SSI etc. was recorded. **Results:** Group 1 had 35 male and 25 females and group 2 had 27 males and 33 females. SSI was seen in 6 in group 1 and 10 in group 2. Fever was seen in 11 in group 1 and 15 in group 2, swelling was present in 10 in group 1 and 17 in group 2 and pain was present in 8 in group 1 and 16 in group 2. The difference was significant (P< 0.05). Wound discharge was serous in 4 in group 1 and 7 in group 2 and purulent in 2 in group 1 and 3 in group 2 patients. The difference was significant (P< 0.05). Streptococcus viridans was isolated in 3 cases in group 1 and 4 cases in group 2 and Staphylococcus aureus in 3 cases in group 1 and 6 cases in group 2. The difference was significant (P< 0.05). The hospital stay was 1-3 days was 10 days in group 1 and 5 days in group 2, 4-7 days in 36 in group 1 and 35 in group 2 and >7 days was 14 in group 1 and 20 in group 2. The difference was significant (P< 0.05). **Conclusion:** Single dose prophylactic antibiotics found to be better than empirical post-operative therapy in reducing the hospital stay and surgical site infection.

INTRODUCTION

One of the most frequent causes of postoperative morbidity is surgical site infections (SSI).[1] Surgical site infections are defined as infections of the tissues, organs and spaces exposed by surgeons during the performance of an invasive procedure. SSI can be classified into incisional and organ/ space infection.[2] Incisional SSI is further divided into deep and superficial categories. The results of surgeries significantly improved after antibiotics were introduced in the 20th century.[3] Due to the development of antiseptic procedures and, more crucially, the development of antibiotics, surgeries have gone from being a dreaded occurrence to an accepted part of modern life.[4]

However, widespread antibiotic use brought its own set of issues, including an increase in the prevalence of MRSA and other antibiotic-related disorders like allergies. The skin surface, the type of organism causing the infection, and host resistances all affect the clinical characteristics of the surgical site infection.[5] Heat, redness, swelling, pain, and loss of function at the location of the intrusive surgery are symptoms of infections. When the systemic phase of infection starts, the microorganisms finally penetrate the blood stream and reach distant organs.[6] This is because during the local phase of infection, the macrophages are unable to phagocytose all dead cells.[7] The microorganism's poisons infiltrate the host and harm the host tissue. A number of pathways, including the inflammatory phase, fibroblastic phase, and remodelling phase, are involved in the healing of wounds.[8] We performed this study to compare single dose prophylactic antibiotic versus empirical postoperative antibiotics in prevention of surgical site infections (SSI).

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MATERIALS AND METHODS

After considering the utility of the study and obtaining approval from ethical review committee, we selected one hundred twenty cases of clean and clean contaminated of both genders reported to department of general surgery. Patients' consent was obtained before starting the study.

Data such as name, age, gender etc. was recorded. Patients were classified into two groups. Group 1 (study) comprised of 60 cases who received a single dose of antibiotics half hour preoperatively. Group 2 (control) comprised of 60 cases who received post-operative antibiotics after surgery for about 5-10 days. Parameters such as fever, swelling, hospital stay, pain, wound discharge, type of organism, SSI etc. was recorded. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

RESULTS

Table 1: Patients distribution

Gender	Group 1	Group 2
Males	35	27
Females	25	33

Group 1 had 35 male and 25 females and group 2 had 27 males and 33 females (Table 1).

Table 2: Assessment of parameters

Parameters	Variables	Group 1	Group 2	P value
SSI	Yes	6	10	0.02
	No	54	50	
Fever	Yes	11	15	0.05
	No	49	45	
Swelling	Yes	10	17	0.04
	No	50	43	
Pain	Yes	8	16	0.01
	No	52	44	

SSI was seen in 6 in group 1 and 10 in group 2. Fever was seen in 11 in group 1 and 15 in group 2, swelling was present in 10 in group 1 and 17 in group 2 and pain was present in 8 in group 1 and 16 in group 2. The difference was significant (P< 0.05) (Table 2).

Table 3: Type of wound discharge

Wound discharge	Group 1	Group 2	P value
No	54	50	0.05
Serous	4	7	
Purulent	2	3	

Wound discharge was serous in 4 in group 1 and 7 in group 2 and purulent in 2 in group 1 and 3 in group 2 patients. The difference was significant (P< 0.05) (Table 3).

Table 4: Type of organisms isolated

Wound discharge	Group 1	Group 2	P value
Streptococcus viridans	3	4	0.67
Staphylococcus aureus	3	6	

Streptococcus viridans was isolated in 3 cases in group 1 and 4 cases in group 2 and Staphylococcus aureus in 3 cases in group 1 and 6 cases in group 2. The difference was significant (P< 0.05) (Table 4).

Table 5: Hospital stay

Hospital stay	Group 1	Group 2	P value
1-3 days	10	5	0.05
4-7 days	36	35	
>7 days	14	20	

The hospital stay was 1-3 days was 10 days in group 1 and 5 days in group 2, 4-7 days in 36 in group 1 and 35 in group 2 and >7 days was 14 in group 1 and 20 in group 2. The difference was significant (P< 0.05) (Table 5).

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DISCUSSION

A typical postoperative complication that manifests 30 days after the operation is the surgical site infection. The skin, subcutaneous tissue, deep soft tissue, and any component of the anatomy are all affected by the surgery site infection.[9,10] Many surgeons would still advise antimicrobials for 7–10 days after surgery in patients who were otherwise healthy out of worry for surgical site infections.[11] This could result in higher healthcare costs for patients as well as a greater chance that they will get sick in the hospital.[12] Prophylactic antibiotic use before surgery has been demonstrated to reduce the occurrence of wound infections and infection-related consequences, despite some evidence suggesting that antibiotics were improperly used to treat surgical site infections.[13]

Group 1 had 35 male and 25 females and group 2 had 27 males and 33 females. Rajarajan et al.[14] in their study a total of 100 surgical patients were chosen at random and divided into groups of 50. Preoperatively, the experimental group received a single dosage of antibiotics, whereas the control group received empirical antibiotic therapy for 3 to 5 days. Surgical site infection, infection severity, and other consequences did not significantly correlate. Patients spent a much longer amount of time in the hospital, paid significantly more money, and took more antibiotics overall. When it comes to decreasing the length of the patient's hospital stay and hospital expenses, one-dose preventive antibiotics are superior to empirical post-operative therapy.

In our study, SSI was seen in 6 in group 1 and 10 in group 2. Fever was seen in 11 in group 1 and 15 in group 2, swelling was present in 10 in group 1 and 17 in group 2 and pain was present in 8 in group 1 and 16 in group 2. Bengaru et al.[15] in their study a single dosage of preoperative prophylactic antibiotics was administered to 80 participants in Group A. No more antibiotics were administered. Antibiotics were administered preoperatively and postoperatively to 82 patients in Group B. The length of the postoperative hospital stay and postoperative surgical site infection were compared between the two groups. The incidence of surgical site infection was similar in both groups, with no discernible difference. The preoperative antibiotics only group (Group A) had a reduced median length of postoperative hospital stay. Infection at the surgical site was not significantly correlated with age or gender. In this investigation, there were no deep incisional or organ space infections.

Wound discharge was serous in 4 in group 1 and 7 in group 2 and purulent in 2 in group 1 and 3 in group 2 patients. Streptococcus viridans was isolated in 3 cases in group 1 and 4 cases in group 2 and Staphylococcus aureus in 3 cases in group 1 and 6 cases in group 2. The hospital stay was 1-3 days was 10 days in group 1 and 5 days in group 2, 4-7 days in 36 in group 1 and 35 in group 2 and >7 days was 14 in group 1 and 20 in group 2. Salih et al16 in their study a single dosage of metronidazole was administered intraoperatively to Group A. Metronidazole was administered surgically in repeated doses to sixty patients in Group B. Seroma, intrabdominal collections, postoperative fever, and wound infections were contrasted between the two groups. The baseline characteristics of the patients in both groups were comparable. The incidence of postoperative fever and wound infection was the same in both groups, with no discernible difference. Five patients in Group A (9%) experienced postoperative fever, four of them (7.8%) had wound infections. Six patients in Group B (10%) experienced postoperative fever, four of them (6.7%) had wound infections. Seroma or intraabdominal abscesses didn't form in any of the patients.

CONCLUSION

Single dose prophylactic antibiotics found to be better than empirical post-operative therapy in reducing the hospital stay and surgical site infection.

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