ANTIBIOTIC PROPHYLAXIS IN CLEAN SURGERY

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This study was performed to compare the use of perioperative prophylactic antibioctics in reducing wound infection in clean elective general surgery operations with no use of antibiotics in these operations. It was an experimental prospective study. The study was conducted at Combined Military Hospital (CMH) Multan from June 2002 to December 2002. Hundred patients were included in the study. Convenience sampling technique was used for the selection of patients. Only those patients undergoing clean elective general surgery operations were included. Patients were divided into two equal Groups (Group A and Group B). Those in Group A were given injection cephradine 1g IV 8 hourly and injection gentamicin 80 mg IV 8 hourly 30 minutes before operation and continued for 24 hours postoperatively. Patients of group B did not receive any antibiotics. Surgical technique employed was similar. Patients from both groups were observed for the presence of wound infection. It was observed that in Group-A (with chemoprophylaxis) one patient (2%) developed postoperative wound infection and in Group-B (without chemo-prophylaxis) three patients (6%) developed postoperative wound infection. The low frequency of postoperative wound infection seen in Group-A as compared to Group-B (1/50 Vs 3/50) was not statistically significant by Chi-Square test. This study concludes that routine perioperative antibiotic prophylaxis doesn't significantly reduce the incidence of postoperative wound infections in clean elective general surgery operations.

Keywords: *Surgical-wound-infection; Antibiotics-Prophylaxis; Clean-Surgery.*

INTRODUCTION

The risk of postoperative wound infection is lowest after clean surgical procedures[1-5]. Prophylactic systemic antibiotics are not indicated for most patients undergoing clean surgical operations[2-9]. Majority of our surgeons still use prophylactic antibiotics in these clean procedures because of undue fear of infection in their mind. The correct use of antibiotics in patients undergoing surgery is vitally important because misuse of potent antimicrobial agents leads to drug toxicity, super infection, increase in healthcare cost and colonization of wards by highly resistant strains of bacteria[3,5,10-12]. This study was performed to evaluate whether the use of perioperative prophylactic antibiotics have an effect on postoperative wound infection in clean general surgery operations in our setup.

The objective of the study was to compare the frequencies of patients developing postoperative wound infection in two groups of patients (group A and group B) undergoing clean elective general surgery operations. Patients in group A were given perioperative prophylactic antibiotics while patients in group B were not given perioperative prophylactic antibiotics.

PATIENTS AND METHODS

This was an experimental prospective study conducted at surgical department of CMH, Multan from Jun 2002 to Dec 2002. The sample was a convenient sample. One hundred patients undergoing clean elective general surgery operations at CMH, Multan were blindly divided into two equal groups (group A and group B) alternating at the time of operation.

Following patients were excluded from the study:

1. Age less than one month and above 65 years.
2. Patients with co-morbid conditions like diabetes mellitus, jaundice, uraemia, hypertension, neoplasia, cardiac or renal disease and anaemia.
3. Malnourished & immunosuppressed pati-ents.
4. Operations lasting for more than two hours.
5. Any break in aseptic technique.
6. History of recent antibiotic therapy.
7. Allergy to Cephalosporins.
8. Patients who received blood transfusion in the perioperative period.
9. Patients with infective focus in the body.

Patients in group A were administered injection cephradine 1g IV 8 hourly and injection gentamicin 80 mg IV 8 hourly (doses of these antibiotics adjusted according to the body weight for children). Both the antibiotics were started half an hour before operation and were continued for first twenty-four hours after operation (i.e., a total of three doses of these antibiotics were given). Patients in Group B were not given any perioperative prophylactic antibiotics. The surgical technique used was identical in both groups with similar operation theatre discipline. Criteria adopted for diagnosing wound infection in this study was redness and swelling around the wound or pus or serious discharge from the wound.

Postoperatively the first dressing was changed on third postoperative day. All wounds were examined on 3rd, 6th, 8th, 15th and 30th day after surgery for the presence or absence of wound infection. On 8th postoperative day stitches were removed and patients with non-infected wound were discharged. Thereafter, patients' follow-up was on outpatient basis. In infected cases pus was sent for culture and sensitivity. Regular antiseptic dressings and where necessary incision and drainage was performed. Data was analyzed on SPSS statistical package version 8. Chi-square test was used to compare the difference between group A and group B for wound infection.

RESULTS

A total of 100 cases were divided into group A and B having 50 cases each. Both the groups were comparable regarding age and sex. In group-A, the age range was 1-60 years with mean age 34.60 ± 16.16 years. In group-B (control group), the age range was 2-62 years with means age 35.94 ± 15.71 years. Majority of the patient in both groups belonged to third, fourth and fifth decade of their lives (Table 1). Majority of the patients were male in both the groups. The male to female ratio was 1.6:1 in Group-A and 1.9:1 in Group-B.

Table 1: *Age distribution of 100 cases.*

Age in Years	Group A n=50	Group B n=50
1 – 10	4 (8%)	3 (6%)
11 – 20	6 (12%)	6 (12%)
21 – 30	10 (20%)	9 (18%)
31 – 40	13 (26%)	12 (24%)
41 – 50	8 (16%)	9 (18%)
51 – 60	6 (12%)	8 (16%)
60 – 65	3 (6%)	3 (6%)

Operations included herniotomies and herniorrhaphies, varicose veins, excision of lipomata, ganglia, skin biopsy, breast biopsy and excision biopsy of lymph nodes, operations on the thyroid gland, operations for hydrocele, varicocele, testicular tumours and cysts. The breakdown of operations in the two groups is depicted in Table 2.

In Group-A (with chemoprophylaxis) one patient (2%) developed postoperative wound infection, it was noticed on sixth postoperative day. In Group-B (without chemoprophylaxis) three patients (6%) developed postoperative wound infection (Table 3) that infection was noticed on third postoperative day in one patient and on sixth postoperative day in the remaining two patients. The decrease frequency of postoperative wound infection seen in Group-A as compared to Group-B (1/50 Vs 3/50) was not statistically significantly by Chi-Square Test.

Culture and sensitivity of pus from infected wound revealed that Staphylococcus aureus was the causative organism in 50% cases while Escherichia coli and Pseudomonas aeruginosa in 25% cases each (Table 4).

Table 2: *Disease distribution of operated cases.*

S. No.	Case	Group A n=50	Group B n=50	Total n=100
1.	Hernia	15	13	28
2.	Scrotal	5	7	12
3.	Limb	8	10	18
4.	Face/Neck	15	12	27
5.	Breast	7	8	15

Table 3: *Frequency of Postoperative wound infection.*

Wound Infection	Group A n=50	Group B n=50	Total n=100
Yes	1 (2%)	3 (6%)	4 (4%)
No	49 (98%)	47 (94%)	96 (96%)

Table 4: *Isolates from surgical site infection.*

Organism	No.	Percentage
Staphylococcus Aureus	2	50%
Pseudomonas Aeruginosa	1	25%
Escherichia Coli	1	25%

DISCUSSION

Clean surgery includes procedure where there is no break in the sterile technique and there is no entry into GIT, respiratory and genitor-urinary tracts[3,13]. There are several factors, which affect the frequency of postoperative wound infection[3,4,13-17]. Four main sources of infection are personnel, equipment used, the environment and patient's risk factors[18]. A surgeon can either prevent or decrease the risk of postoperative wound infection by correcting the factors involved in the development of postoperative wound infection[3,13]. Prophylactic antibiotics are no substitute for good surgical practice including strict aseptic technique[3,8]. Infection in a clean operation is always due to exogenous bacteria e.g., exogenous contact from breaks in technique by the operating team[3]. In this study we have excluded all those patients who had any of the risk factor involved in the development of wound infection so that these factors should not affect the results of our study.

Wound infection rate reported in literature for clean wound is between 1.5 and 4%[2-5,7,13,17]. Our study shows a wound infection rate of 6% without prophylactic antibiotics and 2% with prophylactic antibiotics. Most of the patients included in our study were young males with no predisposing factors. So the factors most probably operative in causing slightly higher infection rate in our patients were related to the surgical team or surgical environment.

This study also shows that there is no statistically significant difference in developing postoperative wound infection between those who were given perioperative prophylactic antibiotics (group A) and those who were not given perioperative prophylactic antibiotics (Group B).

Most of the studies conducted in Pakistan[2,5,6,9] and abroad[7] have ruled out the role of prophylactic antibiotics in decreasing wound infection in clean surgical procedures. Our study results are therefore in agreement with those of others.

Under most circumstances antimicrobial prophylaxis is not required in a clean surgical procedure. However, prophylaxis should be employed under those conditions where there is a potential intrinsic risk of infections such as in:

1. Insertion of a synthetic biomaterial device or prosthesis.
2. Clean operations performed in patients with impaired host defences.
3. Procedures in which infection would be disastrous-e.g., prosthesis placements, central nervous system operations, or cardiac procedures that use cardiopulmonary bypass[3,4].

It is concluded the decision to use prophylactic antibiotic therapy, therefore, must be based on balancing possible benefits against adverse effects. Indiscriminate use of antibiotics should be discouraged because it may lead to emergence of antibiotic resistant strains of organisms or serious hypersensitivity reactions. Prolonged use of prophylactic antibiotics may also mask the signs of established infections, making the diagnosis more difficult. We don't recommend anti-biotic prophylaxis routinely in clean elective general surgery operations.

In **conclusion**, this study suggests that routine perioperative antibiotic prophylaxis doesn't significantly reduce the incidence of postoperative wound infection in clean elective general surgical operations.

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