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# A Single Dose Antibiotic Prophylaxis in Clean Surgery:-Our Experience

KEYWORDS: Antibiotic prophylaxis, Clean procedure.

**Dr.Chakane Milind**
Dept. of Surgery, Smt. Kashibai Navale Medical College & Hospital, Narhe, Dist. Pune, Maharashtra

**Dr.Snehal Purandare**
Dept. of Surgery, Smt. Kashibai Navale Medical College & Hospital, Narhe, Dist. Pune, Maharashtra.

**ABSTRACT** *Appropriate antibiotic prophylaxis can reduce the risk of postoperative wound infections, but misuse and overuse of antimicrobials increases both the cost and the selection pressure favouring the emergence of resistant bacteria. The objective of this study was to determine the effectiveness of a single dose preoperative antibiotic prophylaxis in reduction of postoperative wound infection in clean procedures.This was a prospective study.Total of 100 patients with clean operations admitted in a rural medical college hospital were taken for study.All patients received preoperative single dose of a combination of injection ampicillin 500 mg + cloxacillin 500 mg.Out of 100 patients only 5 patients (5%) developed post operative wound infection in the form of stitch abscess. A single dose antibiotic prophylaxis is an effective therapy in clean surgery to prevent wound infection.*

**Introduction**

Infection remains a great problem in surgical practice.Infection is encountered by all surgeons by the nature of their craft; they invariably impair the first line of host defence. Bacteria may enter the wound during or after the operation and may be of endogenous or exogenous origin. Surgical infection is the most common post operative complication and represents a significant burden in terms of patient morbidity and mortality,and cost to health services around the world. Wounds have been classified in to 4 categories according to the theoretical risk of number of bacteria contaminating the wound, i.e., clean, clean contaminated, contaminated,and dirty. 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 [1].

Appropriately administered antibiotic prophylaxis reduces the incidence of surgical wound infection[2]. However, in majority of cases antibiotics were prescribed for durations longer than recommended in guidelines and even if bacteria are sensitive to simple antibiotics, higher generation antibiotics are used.[3] Inappropriate use of antibiotics is associated with unnecessary increase in the cost of therapy and in the emergence of drug resistant bacteria.[4] The role of prophylactic antibiotics is well established It's administration can reduce the incidence of postoperative wound infection.If antibiotic is used as a prophylaxis,it should be used when local wound defences are not established(the decisive period). Ideally maximal blood and tissue levels shoud be present at the time at which the first incision is made and before contamination occurs.Intravenous administration of an antibiotic at induction of anaesthesia is optimal[5]

The aim of this study was to determine effectiveness of a single dose preoperative antibiotic(injection ampicillin+cloxacillin) prophylaxis in clean surgery cases and incidence of postoperative infection in these cases.

**MATERIAL AND METHODS**

This was a prospective study done on patients in Surgical Department in a rural medical college hospital from January 2012 to June 2012.

Total 100 consecutive patients under going clean elective general surgical operations were included in this study. Operations included herniotomies, herniorrhaphies,hernioplasty, operations for varicose veins, thyroidectomies, excision of lipoma, neurofibromata, ganglia,breast surgery, head and neck surgery,operation for hydrocele, varicocele.

Inclusion criteria: Patients of all age group admitted for clean procedures, and surgeries of < 3 hours duration were included in study.

Exclusion criteria: surgeries lasting for > 3 hours duration, patients suffering from systemic illnesses,malnourished patients,uncontrolled diabetics, patients with congestive cardiac failure, renal failure, severe liver dysfunction, pregnancy were excluded. Patients on steroid or chemotherapy or patients with concurrent antimicrobial therapy, pre-existing infection with resistant organisms, immunocompromised patients and patients who underwent emergency surgery were also excluded from the study. All this criteria were determined on clinical examination and relevant investigations.

Detailed history and examination of each patient was taken. Preoperative laboratory investigations like complete blood count, blood urea, serum creatinine, serum electrolytes, and blood sugar were done for all patients. ECG was also recorded for patients above 35 years of age.A standard protocol was maintained for preparation of parts. Injection ampicillin 500 mg+ cloxacillin 500mg was given 30 minutes before incision.Dose of antibiotic was adjusted as per weight of patients in children below 12 years of age.Skin incision was closed with monofilament interrupted sutures,except for thyroid surgery,in which subcuticular sutures were taken.Total operative time was documented.No antibiotic was given in postoperative period.Wounds were checked on 2nd and 4th postoperative day.Patients were discharged on 4th postoperative day if wound is healthy.Further wound inspection was done on 10th and 30th postoperative days.Sutures were removed on 10th postoperative day.If patient develop wound infection or pus discharge, then sutures were removed for drainage of pus. Pus was sent for culture and sensitivity using standard methods .Then daily dressing was done and antibiotics were started.Wound was left to heal by secondary intention.All data was analyzed.

**Results**

Total 100 patients were selected in this prospective study.The mean age of patients was 37 years Majority of patients were in in 3rd, 4th and 5th decades of their lives (Table no.1). Average preoperative hospital stay was 2days.Average duration of surgery was 66 minutes.Mesh was used as a part of hernioplasty in 45 patients(45%) and close drain was used in 20 patients(20%).No foreign material was used in 35 patients(35%). Maximum surgeries performed were of hernia(with or without mesh, open or laparoscopic),66 patients(66%).(Table no.2). Average post operative stay was 5 days.It was increased upto 10 days in patients who developed post operative wound

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infection.Total of 5 patients developed post operative wound infection.out of these in 2 patients mesh ,in 2 patients drain and in 1 patient no foreign material was used.(Table no.3). It was in the form of stitch abscess. In all cases ,it was superficial wound infection and did not required to remove mesh.No pathogenic organism was cultured from wound pus fluid.Although empirically oral ampicillin +cloxacillin was started in all 5 patients and continued for next 5 days.After daily dressing wound healed without any further wound complication.

**Discussion**

Introduction of antibiotic therapy in middle of the 20th century fostered hope that surgical infection would be eliminated[6]. Basic benefit of antibiotic is reduction of bacterial contamination in wound. The present generation of surgeons is facing increasing numbers of serious infections related to complex combination of factors including complicated and longer operations, and an increase in the numbers of geriatric patients. Postoperative infection rates in developing countries can reach astonishing levels.

Antibiotic prophylaxis in surgery has been proven to be effective in many clinical trials. Chandrashekhar et al [7], and De Alba Romero et al [8] reported infection in 10.2% cases with and 31.4% without antibiotic prophylaxis. In another study done by Surahio A R[9] shows the rate of wound infection is less in patients with single dose antibiotic prophylaxis as compared to 5-day conventional antibiotic prophylaxis. In our study the rate of wound infection was 5%,which is comparable with these studies. Different studies emphasise implementation of antibiotic prophylaxis protocol which will result in more appropriate choice of antibiotic timing and duration. [10] In a study done in Deep South Centre for Effectiveness Research, Birmingham, USA it was concluded that to avoid the wound infection best results are achieved when prophylactic antibiotic given inside the operation room (on induction of anaesthesia as compared to the given out of the operation room).[11] A study from Japan by Kobayashi M [12] showed combination of oral and intravenous antimicrobial prophylaxis as superior to intravenous alone. In another study done in Department of Surgery, School of Medicine, Hospital Colombia, it was reported that prophylactic antibiotics use in patients submitted to mesh inguinal hernioplasty decreased the rate of surgical site infection by almost 50%.[13]

**Conclusion**

Majority of our surgeons still use postoperative antibiotics in clean procedures because of undue fear of infection in their mind. This study conclude that a single dose of preoperative antibiotic prophylaxis is effective in decreasing postoperative wound infection in clean surgeries.It will help in decreasing healthcare cost.It will help in reducing antibiotic related morbidity, such as drug toxicity,antibiotics related diarrhea, superinfection.It will also help in decreasing resistant strains of bacteria due to overuse of antibiotics.

**Table 1**
**Distribution of cases according to age :**

| Age ( yrs ) | Number of patients |
|---|---|
| 1 -1 0 | 13 |
| 11 – 20 | 16 |
| 21 – 30 | 8 |
| 31 – 40 | 15 |
| 41 – 50 | 19 |
| 51 – 60 | 17 |
| 61 – 70 | 12 |
| Total | 100 |

**Table 2**
**Distribution of cases according to type of procedure :**

| Procedure | Number of patients |
|---|---|
| Hernia | 66 |
| Scrotum | 6 |
| Breast | 10 |
| Limb | 6 |
| Head / neck | 12 |
| Total | 100 |

**Table 3**
**Incidence of postoperative wound infection :**

| | Absence of Infection | Presence of Infection | Total |
|---|---|---|---|
| Mesh | 43 | 2 | 45 |
| Drain | 18 | 2 | 20 |
| No drain / mesh | 34 | 1 | 35 |
| Total | 95 | 5 | 100 |

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