

## **“Prophylactic antibiotics and Post operative surgical wound Infection”**

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### **Introduction**

Post operative wound infection has been the greatest obstacle to advancement of surgery down the centuries. Lister introduced antiseptic methods for safe surgery. The advent of antibiotics did raise the hope of a permanent solution to this problem but later it has become the nightmare of the surgeon. Many considered and still now consider antibiotic as “wonder drug” which could cover their lapses in surgical technique and asepsis. Over reliance on antibiotics led to their extensive and often indiscriminate use resulting into development of resistance by various organisms and the problem of “Hospital Infection” has boomeranged on us<sup>1</sup>.

Antibacterial agents administered as early as three hours after experimental contamination of wound, have no influence on the infection rate of the operative wounds. If the body already has adequate antibiotic concentration at the time of contamination, infection can be adequately prevented<sup>2</sup>.

### **Materials And Methods**

All of the patients in our study were treated in the General surgical units. This work involved the study of hundred patients who underwent various surgeries. All the surgeries in the study were elective cases and all the patients subjected to this study were healthy individuals with a general work up. All the patients were studied from the time of their admission, till their discharge from the wards, and up to second and fourth week of follow up. Details of individual cases were maintained in the proforma. Routine investigation were done pre-operatively in all the patients. In patients below 40 years complete haemogram, urine routine, blood urea, Serum creatinine and blood sugars were done. In older patients chest x-ray, and ECG were done, other investigation were done in some patients where needed. The details of the surgical procedure, the duration of surgery and any contamination on table were noted. A second dose of antibiotic was repeated at the end of two hours of operation where the surgery exceeds 2 hours.

### **Following Principle Were Observed In All Cases Namely :**

1. Cases which were posed as emergency surgical procedure and dirty cases were not taken in this study as they require the therapeutic long term antibiotic. Only clean, clean contaminated, and contaminated cases were accepted.
2. Patients preparation like control of diabetes, chest physiotherapy in geriatric age group and personal hygiene was ensured prior to elective surgery.
3. Preventive measure were taken to reduce exogenous and endogenous contamination.
4. A single dose of first generation cephalosporin cefazolin 1 gm was given intravenously as bolus at the time induction of anesthesia. Metronidazole 500mg was added where anaerobic contamination was suspected like colorectal surgery.
5. A second dose was repeated at the end of 2 hours of operation. Where surgery exceeds 2 hours.
6. Pre-operative pathological findings and degree of contamination if any were noted for future reference.
7. Post operatively any signs of infection like persistent fever, wound discharge where noted.
8. All the wounds were inspected at 48 hours and were kept open for daily inspection.
9. Post operative administration of antibiotics was not allowed unless and until definite evidence of wound sepsis was found and antibiotics were given as per culture and sensitivity results.
10. Final review of wound was done at the end of 2 weeks and 4 weeks subsequently.
11. The total cost and post operative stay in the hospital was also noted for all patients.

### **Observation And Analysis**

The following data was analysed in the study of hundred patients who underwent various elective surgical procedures. Out of 100 patients studied 66 were males and 34 were females. Age incidence varied between the second decade to seventh decade of life. The maximum number of patients were found in to be in

the age group of 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> decade. The youngest patient in the series was 14 years who underwent herniotomy and the oldest was 70 years who underwent Hernioplasty.

Associated pathology like Allergic Bronchitis in 1 patients, diabetes in 20 cases and Hypertension in 5 cases.

Table – 1

Associated pathology	No of cases
Bronchitis	1
Diabetics	20
Hypertension	5

**Surgical Wound Classification:**

As per surgical wound classification clean cases were 75, clean contaminated were 23, contaminated 2 cases.

Table – 2

Wound class	No of cases	Infected cases
Clean	75	9
Clean contaminated	23	2
Contaminated	2	1

The operative diagnosis were subgrouped and summarized as follows the

Table - 3

Operative Diagnosis	No of cases	Infected cases
Laprosopic Surgery	9	--
Hernia and hydrocele	34	7
Thyroid Surgery	10	--
Haemorrhoidectomy, fistulotomy Sphincterotomy	7	1
Varicose vein Surgery	7	2
Excision under LA	14	--
Excision under general Anesthesia	9	--
Biliary Surgery	1	--
Colorectal surgery	2	1
Others	7	1

Parameters looked for post operative morbidity are

- ❖ Temperature of 100<sup>0</sup> f or more 24 hours after Surgery.
- ❖ Signs of wound infection like redness, collection or discharge.
- ❖ Side effects of the drugs.

**Wounds Sepsis And Bacteriology**

Table - 4

	Fever	Serious discharge	Purulent discharge	Organism grown
Clean (9)	1	8	1	6 No growth 2 S. aureus 1 Pseudonomas
Clean Contaminated 2	2	1	1	1 No growth 1 E.coli
Contaminated 1	1	1	-	1 S.aureus

In our study of 100 patients, 4 patients had post operative fever. Fever subsided within 2 – 4 days and no antibiotics were administered.

In 75 clean cases, 2 patients (2.6%) patients developed post operative fever. Fever subsided within 2 – 4 days and no antibiotics were administered. One patient developed fever and Sero-sangenous discharge. 8 (10.6%) patients developed serous discharge alone, out of which 6 (8%) patients showed no growth in culture and no antibiotics were put. 2 (2.6%) cases showed staphylococcus aureus, one (1.3%) patient showed pseudomonas growth. Total 3 (4%) patients showed wound sepsis in clean cases. These patients received further antibiotic for period of 5 days as per culture and sensitivity report.

In clean contaminated case out of 23 patients. 2 (8.6%) patients developed post operative pyrexia which settled and no antibiotics given. One patient (4.3%) patients showed serous discharge from surgical

wound site, no antibiotic given as culture revealed no growth. One patient (4.3%) showed purulent discharge culture revealed *E. Coli* growth, so antibiotics were given as per culture sensitivity for 5 days.

In 2 patients categorised under contaminated wound one developed fever and one patient (50%) developed sero sanguinous discharge revealing staphylococcus aureus, so antibiotic started as per culture sensitivity and continued for 5 days.

**Organisms Isolated from culture:**

1.	Staphylococcus aureus	-	3
2.	E. Coli	-	1
3.	Pseudomonas	-	1

A total of 12 cases were examined for presence of micro organisms, of that 3 (25%) showed Staphylococcus aureus, 1 (8.3%) showed pseudomonas and 1 (8.3%) showed E. Coli. Staphylococcus aureus was the most common organisms grown in cultures of our study.

**Side Effects:**

These were no major side effects of the drug used in cefazolin except one patient developed superficial thrombophlebitis which subsided by local applications of Heparine and one patient developed skin rasher which subsided with inj chlorphenamine maleate.

**Discussion**

National nosocomial infection surveillance study (NNISS) data the accepted infection rate should be for clean cases 2.1%, clean contaminated cases 3.3% contaminated cases 6.4% and dirty cases 7.1%<sup>3</sup>. What has been observed in this study a single shot antibiotic prophylaxis can achieve a accepted post operative infection rate of 5%. Use of prophylactic antibiotic in clean contaminated and contaminated cases are well advocated, but it is still controversial in clean cases<sup>4</sup>. In this study even clean cases (12%) have shown infection. Hence at this stage single dose prophylactic antibiotic is recommended in all clean cases until a definite proof is available against its usefulness.

Cefazolin has most of characteristics of the ideal prophylactic antimicrobial drug<sup>5</sup>. Such as.

- Has the necessary spectrum of activity and is active against the pathogens causing post operative surgical site infection in patients.
- Reaches adequate concentration in the tissues of the operative site.
- Has a half life which permits single dose injection.
- Can be given by bolus injection at induction of anesthesia.
- Has no adverse effects associated with short term administration.
- Is not allergic.
- Does not interact with drugs given preoperatively.
- Does not select for resistant microorganisms in the patients.
- Is not an essential drug of the therapeutic arsenal.
- Is not expensive.

Second generation cephalosporins (cefamandole, cefuroxime) have no advantage over cefazolin in surgical prophylaxis, they have a slightly broad spectrum against Enterobacteriaceae. Which is not needed in elective surgery and they are more expensive<sup>5</sup>. For all procedures for which anaerobic activity are needed, Metronidazole can be combined with the cephalosporins. The route of administration of an antibiotic should be intravenously as a bolus dose as practiced in this study and so advised by other workers in order to achieve a rapid therapeutic levels<sup>6</sup>. The timing of a single dose prophylaxis is very important.

In absence of infection post operative pyrexia does not warrant any antibiotics. As found in this study post operative pyrexia did not require any treatment. However when there is frank wound infection like serous or Purulent discharge showing positive culture growth, required appropriate antibiotic according to culture sensitivity. As in this study 5% showed frank wound infection with positive culture growth required antibiotic according to culture sensitivity. In our study even clean cases have shown infection hence at this stage single dose prophylactic antibiotic is recommended in all clean cases until a definite proof is available against its usefulness.

## **Conclusion**

We conclude that single dose of cefazolin with addition of metranidazole when there should be anaerobic coverage can be widely applied in the routine practice in clean, clean contaminated and contaminated surgeries.

In our study single dose prophylactic antibiotic

- Reduced the incidence of post operative morbidity..
- Had no major side effects.

Cefazolin was given at the time of anesthesia. So we are sure of giving the antibiotic and risk of mistakes and maladministration of antibiotics was reduced. Prolonged antibiotic therapy should be avoided as it has got no advantage over single dose prophylaxis, though one should not forget a good and aseptic surgical technique to avoid post operative wound sepsis.

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