



## Original Article

# A Prospective Study on Use of Prophylactic Antibiotics before and after Surgery

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### ARTICLE INFO

### ABSTRACT

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**Background:** Surgical wound infections are the second most common healthcare-associated infection. The prophylactic administration of antibiotics decreases the risk of infection after surgical procedures. **Objective:** To observe and document the antibiotic use before and after surgery. **Methodology:** A prospective observational study was conducted over a period of 6 months period in a tertiary care teaching hospital. The main outcome measure of the study was the use of prophylactic antibiotics for surgery. **Results and Discussion:** Cephalosporins are the most preferred class of antibiotics used for prophylactic therapy and accounts for 61.3 % (n=97) of the total medications used in the study, followed by Aminoglycosides antibiotic which accounts for 18.9 % (n=30), 8.2% (n=13) and 6.9% (n=11) of patients were prescribed by Nitroimidazoles and Fluoroquinolones respectively. In Preoperative therapy, cefixime (22.7%) are most commonly used preoperative medication as any type of surgery, followed by Ceftriaxone and Cefuroxime (10.9%). A total number of study population (n=110), Cefixime (n=36) was mostly drug of choice in postoperative treatment because it used to treat number of bacterial infections, followed by Cefuroxime (n=17) and Ampicillin + Sulbactam (n=16) respectively. **Conclusion:** The most common medication prescribed were cephalosporins, Ceftriaxone is the choice for prophylaxis in the procedures carried out and it is followed by Aminoglycosides.

**Keywords:** Surgical prophylaxis, Antibiotics, Pre-operative, Post-operative

## 1. INTRODUCTION

Surgical wound infections are the second most common healthcare-associated infection<sup>1, 4, 5</sup>. The prophylactic administration of antibiotics decreases the risk of infection after many surgical procedures and represents an important component of care. Antibiotics administered prior to the contamination of previously sterile tissues or fluid are deemed prophylactic antibiotics<sup>7, 8</sup>. The goal of therapy is to prevent an infection from developing. Choosing AMA is

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based on some factors, antimicrobial regimen are the dose, route, and timing of administration. Antimicrobial therapy should be administered within 60 minutes prior to the surgery to ensure adequate drug tissue levels at the time of initial incision. For procedures lasting less than four hours, a single repeat dose of intravenous AMA is appropriate <sup>2</sup>. For procedures lasting more than four hours or in the setting of major blood loss, repeat dosing is indicated every one to two half-lives of the drug in patients with normal renal function <sup>1</sup>.

So our aim is to study the use of antibiotics in surgical prophylaxis in an attempt to promote their appropriate use and to observe and document the antibiotic use before and after surgery.

**2. METHODOLOGY**

This study was the kind of a prospective observational study that was conducted in the Department of Surgery at the Karuna Medical College Teaching Hospital, located at Chittur, Palakkad, and Kerala which is a 300 bedded hospital located in rural South India. The study period was 6 months starting from September 2016 to March 2017. The protocol was approved by Institutional human ethical committee of the Karuna medical college (GCP/IEC/1174/2016).The inclusion and exclusion criteria are, based on that patient age group between 18 to 75 years, admitted to surgical wards and who are receiving antimicrobial prophylaxis prior the surgery. Exclusion criteria include lack of desire and continue the cooperation in this study, contaminated surgical procedures, pregnant women and patients with insufficient data.

Patient demographic details, social history, socio economic status, past medical and medication history, patients known allergic to food and drugs were collected using suitable data.

**3. RESULTS AND DISCUSSION**

A total of 110 consecutive patients were enrolled and documented. The patient’s medical record and prescription was reviewed, and among study population (n=110) female patients were more in number (n=63) when compared with male patients (n=47). In total, 57.2% of the patients were females and 42.7% of the patients were males. The majority of patients (n=32 patients, 29%) belongs to the age group of 51- 60 years, followed by 23 patients (20.9%) in the age group of 18-30 years and 20 patients (18.18%) belongs to the age group of 61-75 years. In this study population (n=47 male patients) 21.27% (n=10) of patient were non-alcoholic and non-smoker, 40.42% (n=19) of the patient are smoker and drinking any form of alcohol, followed by 17 % (n=8) of patients are drinking any form of alcohol and 21.27% (n=10) of patients were smoker.

Among the study population, 24.54% (n=27) of patients were having Hypertension, 23.63% (n=26) of patients were having Diabetes either Type I or Type II followed by 6.36% (n=11) of patients were affected by lung diseases like

asthma, COPD, emphysema, cystic fibrosis etc. This was further followed by 1.81% (n=02) of patients were having dyslipidaemia and 29.9% (n=44) of patients were not having any co-morbid conditions. Majority of the patients (n=42) were collected in the department of general surgery, followed by 32% (n=35) of patients were in ENT department, 21% (n=23) patients were collected from Urology and 9% (n=10) patients were in Orthopaedics.

Among the study population, 19.09% (n=21) of patients were diagnosed with CSOM and UTI followed by 17.2% (n=19) with hernia (Incisional, Inguinal, Hiatal).9.09% (n=10) of patients were diagnosed with appendicitis and 6.36% (n=7) of patient having haemorrhoids. Preoperative therapy are designed to improve the outcome of the surgery, decrease the risk for complications, and make the surgery as safe and effective as possible. As the result shows cefixime (22.7%) are most commonly used preoperative medication as any type of surgery, followed by Ceftriaxone and Cefuroxime (10.9%) as prescribed respectively(Figure:1) Similar results were observed by the study conducted by Shah SK et al (2016) <sup>2</sup> concluded that most preferred SAP in 254 prescriptions were Cephalosporin followed by Beta Lactamase Inhibitors, Nitro imidazole and Fluoroquinolones and accounted for 44.34 %,18.9 %,17.5 %, 15.4 % respectively. This further also coincides with our result which also infers Cephalosporins to be the chief agent of choice for prophylactic therapy.

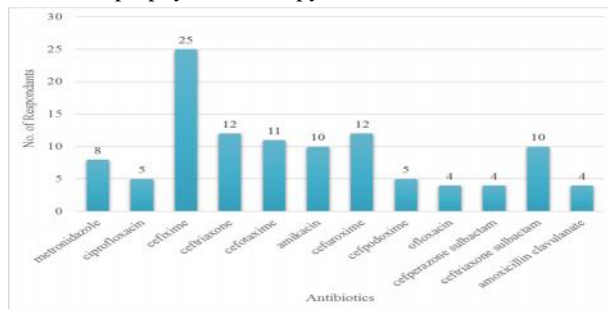


Fig 1: Prescription of Antibiotic among Pre -Operative Patients

A total number of study population (n=110), Cefixime (n=36) was mostly drug of choice in post-operative treatment because it used to treat number of bacterial infections. Followed by Cefuroxime (n=17) and Ampicillin + Sulbactam (n=16) respectively. (Figure: 2)

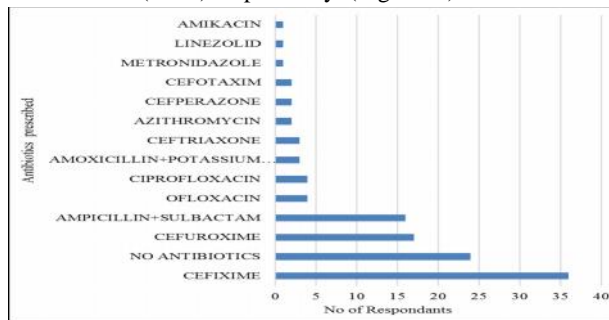


Fig 2: Prescription of Antibiotics among Post-Operative Patients

Study conducted by Selcuk Kaya et al.,<sup>3</sup> stated that the ideal agent to be used in surgical prophylaxis must be as broad spectrum as possible which have minimal side effects and be highly concentrated in surgical wound tissue and be inexpensive. Further the study concluded that Cefazolin is the most commonly recommended agent. However, in our study Cefixime was the mostly preferred antibiotic for prophylaxis.

The frequencies and percentage among the study population, most preferred class of antibiotic for prophylaxis given as monotherapy was concluded to be cephalosporin 3<sup>rd</sup> generation which accounted for 72.6 % of the total study population followed by cephalosporin 2<sup>nd</sup> generation drugs. The table 3 further shows that Cephalosporin mono therapy to be most preferred by accounting for approximately 97 %. Previously conducted by *Kasatpibal N et al.*,<sup>4</sup> showed one day antibiotic prophylaxis is just as effective in reducing SSI as multiple day antibiotic prophylaxis. This is in concordance with our study results.

**Table 3: Category wise distribution of drugs administered as Monotherapy**

S.NO.	ANTIBIOTIC	No. of RESPONDANTS	PERCENTAGE (%)
1	CEPHALOSPORINS(3RD)	53	72.6
2	CEPHALOSPORINS(2ND)	18	24.65
3	FLUOROQUINOLONE	1	1.03
4	PENICILLIN	1	1.03

#### 4. CONCLUSION

In our study concluded that the most common medication prescribed were Cephalosporins. In cephalosporin derivative, Cefixime are most commonly used preoperative medication as any type of surgery, followed by Ceftriaxone and Cefuroxime. Preoperative therapy are designed to improve the outcome of the surgery, decrease the risk for complications, and make the surgery as safe and effective as possible. Postoperative care begins immediately after surgery. It lasts for the duration of hospital stay and may continue after discharged. As part of postoperative care, healthcare provider should teach patient about the potential side effects and complications of the procedure. Cefixime was mostly drug of choice in post-operative treatment followed by Cefuroxime and Ampicillin + Sulbactam respectively.

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